Boot media

Install and maintain

NetApp
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Boot media

Overview of boot media replacement - AFF A150

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 A150

Before shutting down the impaired controller, check if your version of ONTAP supports NetApp Volume Encryption (NVE) and if your key management system is properly configured.

Step 1: Check if your version of ONTAP supports encryption

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

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

   `version -v`

   If the output includes `10no-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 Onboard Key Manager (OKM) or the External Key Manager (EKM) 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.

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

Key Manager type	Follow these steps…
External Key Manager (EKM)	Determine if EKM is enabled on your system by running the following command: `security key-manager show key store` If EKM is enabled, `external` is listed in the output.

Onboard Key Manager (OKM)	Determine if OKM is enabled on your system by running one of the following commands based on the version of ONTAP the node is running.
	
	• For ONTAP 9.14.1 or later, enter the following command:
	
	`security key-manager keystore show`
	
	If OKM is enabled, `OKM` is listed in the command output.
	
	• For ONTAP 9.13.1 or earlier, enter the following command:
	
	`security key-manager show-key-store`
	
	If OKM is enabled, `onboard` is listed in the command output.

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

   `security key-manager key query`

3. 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.

   - If the value in the Restored column is true, the keys are properly restored, and it is safe to proceed with the controller shutdown.
   - If the value is anything other than true, the keys have not been restored, and you'll need to take additional steps (restoring or syncing keys) depending on whether you're using EKM or OKM.

4. Depending on whether you're using EKM or OKM, select one of the following options and follow the appropriate steps depending on the output value displayed in the `Restored` column.

EKM

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

Output value in `Restored` column	**Follow these steps…**
`true`	You can safely shut down the impaired controller. Go to shutdown the impaired controller.
Anything other than `true`	a. Restore the external key management authentication keys to all nodes in the cluster using the following command: `security key-manager external restore` If the command fails, contact NetApp Support. b. Verify that the `Restored` column displays `true` for all authentication keys by entering the *`security key-manager key query`* command. If all the authentication keys are `true`, you can safely shut down the impaired controller. Go to shutdown the impaired controller.

OKM

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

Output value in `Restored` column	**Follow these steps…**
`true`	Manually back up the OKM information. a. Go to the advanced mode by entering `set -priv advanced` and then enter `Y` when prompted. b. Enter the following 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. 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`	a. Enter the onboard security key-manager sync command:
	
	`security key-manager onboard sync`
	
	b. Enter the 32 character, alphanumeric onboard key management passphrase when prompted.
	
	If the passphrase cannot be provided, contact NetApp Support.
	
	c. Verify the `Restored` column displays `true` for all authentication keys:
	
	`security key-manager key query`
	
	d. Verify that the `Key Manager` type displays `onboard`, and then manually back up the OKM information.
	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. You can safely shut down the impaired controller. Go to shutdown the impaired controller.

Shut down the impaired controller - AFF A150

Shut down or take over the impaired controller using the appropriate procedure for your configuration.

Option 1: Most configurations

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

Steps

a. 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 `y` when prompted.
System prompt or password prompt (enter system password)	Take over or halt the impaired controller from the healthy controller: `storage failover takeover -ofnode impaired_node_name` When the impaired controller shows Waiting for giveback…, press Ctrl-C, and then respond `y`.

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 `y` when prompted.
System prompt or password prompt (enter system password)	Take over or halt the impaired controller from the healthy controller: `storage failover takeover -ofnode` *`impaired_node_name`* When the impaired controller shows Waiting for giveback…, press Ctrl-C, and then respond `y`.

Replace the boot media - AFF A150

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.

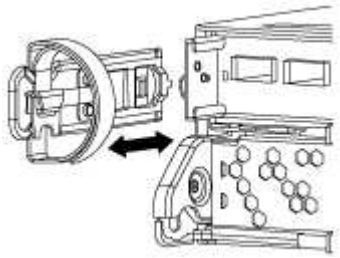
Step 1: Remove the controller module

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

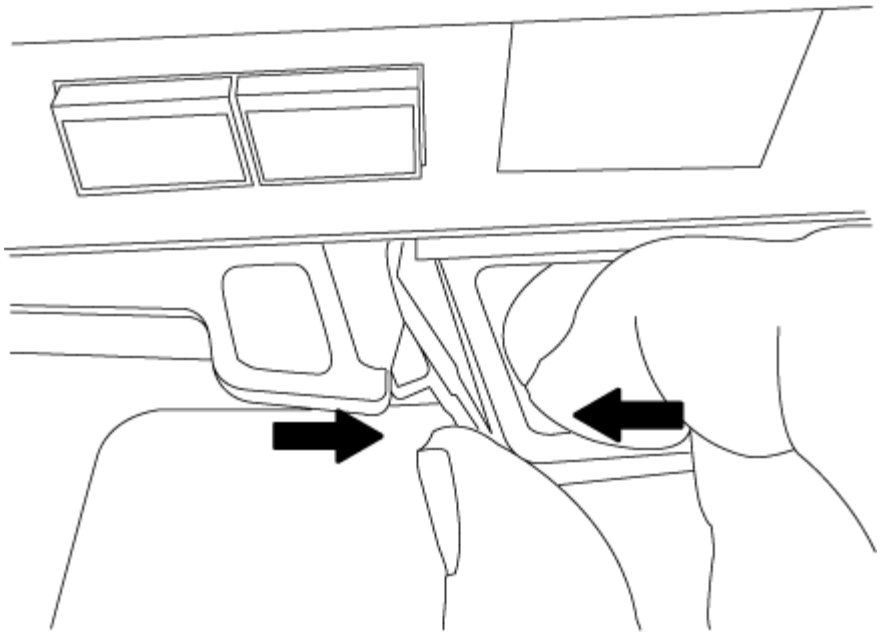
1. If you are not already grounded, properly ground yourself.
2. Loosen the hook and loop strap binding the cables to the cable management device, and then unplug the system cables and SFPs (if needed) from the controller module, keeping track of where the cables were connected.

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

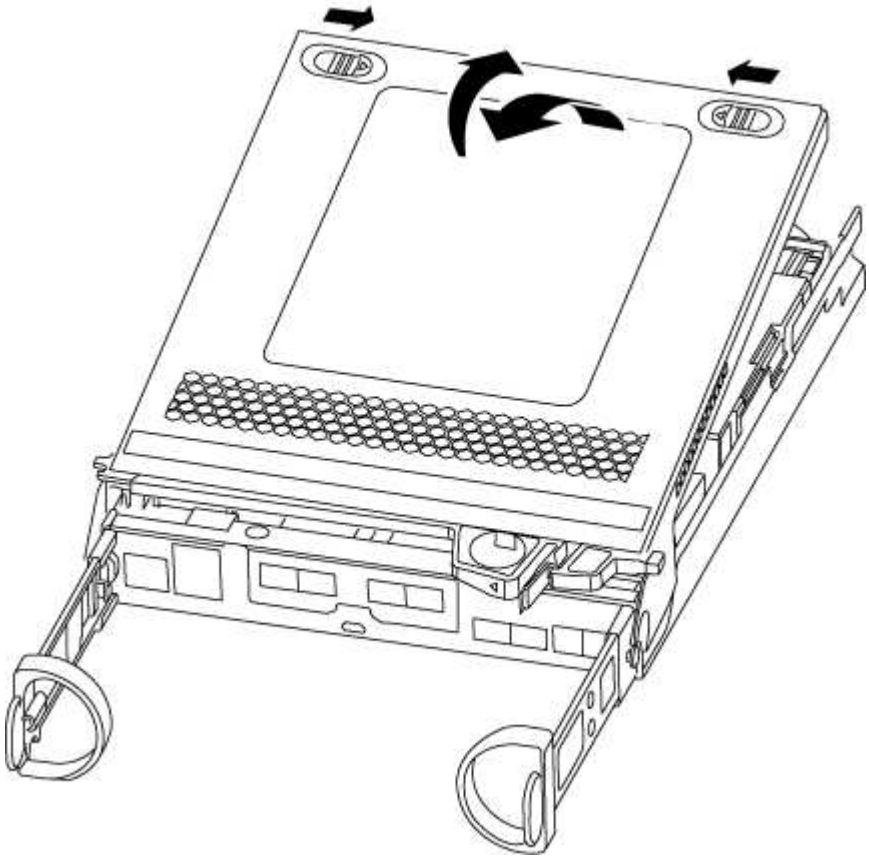
3. Remove and set aside the cable management devices from the left and right sides of the controller module.



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.

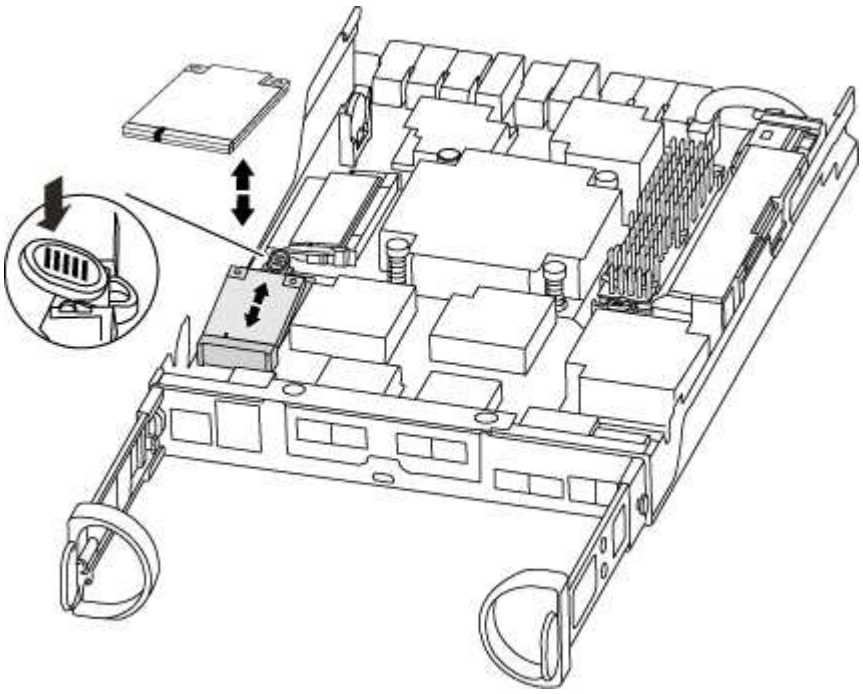


Step 2: Replace the boot media

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

Steps

1. If you are not already grounded, properly ground yourself.
2. Locate the boot media using the following illustration or the FRU map on the controller module:



3. 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.

4. Align the edges of the replacement boot media with the boot media socket, and then gently push it into the socket.
5. Check the boot media to make sure that it is seated squarely and completely in the socket.

   If necessary, remove the boot media and reseat it into the socket.

6. Push the boot media down to engage the locking button on the boot media housing.
7. 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 controller 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 controller to boot to LOADER.

6. For systems with one controller in the chassis, reconnect the power and turn on the power supplies.

   The system begins to boot and stops at the LOADER prompt.

7. Set your network connection type at the LOADER prompt:

   - If you are configuring DHCP: `ifconfig e0a -auto`

     The target port you configure is the target port you use to communicate with the impaired controller from the healthy controller during var file system restore with a network connection. You can also use the e0M port in this command.

   - If you are configuring manual connections: `ifconfig e0a -addr=filer_addr -mask=netmask -gw=gateway-dns=dns_addr-domain=dns_domain`
     - filer_addr is the IP address of the storage system.
     - netmask is the network mask of the management network that is connected to the HA partner.
     - gateway is the gateway for the network.
     - dns_addr is the IP address of a name server on your network.
     - dns_domain is the Domain Name System (DNS) domain name.

       If you use this optional parameter, you do not need a fully qualified domain name in the netboot server URL. You need only the server's host name.

Other parameters might be necessary for your interface. You can enter `help ifconfig` at the firmware prompt for details.

Boot the recovery image - AFF A150

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

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:

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

4. Ensure that the environmental variables are set as expected:
   a. Take the controller 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 `savenv` 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.
Waiting for giveback…	a. Log into the partner controller. b. Confirm the target controller is ready for giveback with the `storage failover show` command.

7. Connect the console cable to the partner controller.
8. Give back the controller using the `storage failover giveback -fromnode local` command.
9. 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.
10. Move the console cable to the repaired controller and run the `version -v` command to check the ONTAP versions.
11. 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 A150

Step 1: Restore key manager

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

If NSE or NVE are enabled along with Onboard or external Key Manager you must restore settings you captured at the beginning of this procedure.

Steps

1. Connect the console cable to the target controller.
2. Select one of the following options to restore the onboard key manager configuration from the ONATP boot menu.

Option 1: Systems with onboard key manager server configuration

Restore the onboard key manager configuration from the ONATP boot menu.

Before you begin

You need the 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. From the ONTAP boot menu select the appropriate option:
   - For ONTAP 9.8 and later, select option 10:

```
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.
(10) Set Onboard Key Manager recovery secrets.
(11) Configure node for external key management.
Selection (1-11)? 10
```

   - For ONTAP 9.7 and earlier, enter the hidden option `recover_onboard_keymanager` command.

```
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
```

2. Confirm the continuation of the process. `This option must be used only in disaster recovery procedures. Are you sure? (y or n): `y`
3. Enter the cluster-wide passphrase twice.

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

   ```
   Enter the passphrase for onboard key management:

   Enter the passphrase again to confirm:
   ```

4. Enter the backup information. Paste the entire content from the BEGIN BACKUP line through the END BACKUP line.

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

```
Enter the backup data:

--------------------------BEGIN BACKUP--------------------------
0123456789012345678901234567890123456789012345678901234567890123
1234567890123456789012345678901234567890123456789012345678901234
2345678901234567890123456789012345678901234567890123456789012345
3456789012345678901234567890123456789012345678901234567890123456
4567890123456789012345678901234567890123456789012345678901234567
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
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AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
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AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
0123456789012345678901234567890123456789012345678901234567890123
1234567890123456789012345678901234567890123456789012345678901234
2345678901234567890123456789012345678901234567890123456789012345
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

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

5. The recovery process will be completed.

```
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.

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

8. From the partner node, giveback the partner controller: `storage failover giveback -fromnode local -only-cfo-aggregates true`.
9. Once booted only with CFO aggregate run the *security key-manager onboard sync* command.
10. Enter the cluster-wide passphrase for the Onboard Key Manager.

```
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 the error is corrected and the sync runs successfully.

11. Ensure that all keys are synced: `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 of the node from the partner: `storage failover giveback -fromnode local`

Option 2: Systems with external key manager server configuration

Restore the external key manager configuration from the ONATP 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. Select Option 11 from the ONTAP 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
```

2. When prompted confirm you have gathered the required information:
   a. `Do you have a copy of the /cfcard/kmip/certs/client.crt file? {y/n}` *y*
   b. `Do you have a copy of the /cfcard/kmip/certs/client.key file? {y/n}` *y*
   c. `Do you have a copy of the /cfcard/kmip/certs/CA.pem file? {y/n}` *y*
   d. `Do you have a copy of the /cfcard/kmip/servers.cfg file? {y/n}` *y*

      You may also these prompts instead:

   e. `Do you have a copy of the /cfcard/kmip/servers.cfg file? {y/n}` *n*
      i. `Do you know the KMIP server address? {y/n}` *y*
      ii. `Do you know the KMIP Port? {y/n}` *y*
3. Supply the information for each of these prompts:
   a. *Enter the client certificate (client.crt) file contents:*
   b. *Enter the client key (client.key) file contents:*
   c. *Enter the KMIP server CA(s) (CA.pem) file contents:*
   d. *Enter the server configuration (servers.cfg) file contents:*

```
Example

Enter the client certificate (client.crt) file contents:
-----BEGIN CERTIFICATE-----
MIIDvjCCAqagAwIBAgICN3gwDQYJKoZIhvcNAQELBQAwgY8xCzAJBgNVBAYTAlVT
MRMwEQYDVQQIEwpDYWxpZm9ybmlhMQwwCgYDVQQHEwNTVkwxDzANBgNVBAoTBk5l
MSUbQusvzAFs8G3P54GG32iIRvaCFnj2gQpCxciLJ0qB2foiBGx5XVQ/Mtk+rlap
Pk4ECW/wqSOUXDYtJs1+RB+w0+SHx8mzxpbz3mXF/X/1PC3YOzVNCq5eieek62si
Fp8=
-----END CERTIFICATE-----

Enter the client key (client.key) file contents:
-----BEGIN RSA PRIVATE KEY-----
MIIEpQIBAAKCAQEAoU1eajEG6QC2h2Zih0jEaGVtQUexNeoCFwKPoMSePmjDNtrU
MSB1SlX3VgCuElHk57XPdq6xSbYlbkIb4bAgLztHEmUDOkGmXYAkblQ=
-----END RSA PRIVATE KEY-----

Enter the KMIP server CA(s) (CA.pem) file contents:
-----BEGIN CERTIFICATE-----
MIIEizCCA3OgAwIBAgIBADANBgkqhkiG9w0BAQsFADCBjzELMAkGA1UEBhMCVVMx
7yaumMQETNrpMfP+nQMd34y4AmseWYGM6qG0z37BRnYU0Wf2qDL61cQ3/jkm7Y94
EQBKG1NY8dVyjphmYZv+
-----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
```

4. The recovery process will complete:

```
System is ready to utilize external key manager(s).
Trying to recover keys from key servers....
[Aug 29 21:06:28]: 0x808806100: 0: DEBUG: kmip2::main:
[initOpenssl]:460: Performing initialization of OpenSSL
Successfully recovered keymanager secrets.
```

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

```
**********************************************************************
************
* 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
```

Step 2: Complete the boot media replacement

Complete the boot media replacement process after the normal boot by completing final checks and giving back storage.

1. Check the console output:

If the console displays…	Then…
The login prompt	Go to Step 6.
Waiting for giveback…	a. Log into the partner controller. b. Confirm the target controller is ready for giveback with the *storage failover show* command.

2. Move the console cable to the partner controller and give back the target controller storage using 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 the partner is "not ready", wait 5 minutes for the HA subsystem to synchronize between the partners.

- If the command fails because of an NDMP, SnapMirror, or SnapVault process, disable the process. See the appropriate Documentation Center for more information.

3. Wait 3 minutes and check the failover status with the *storage failover show* command.
4. At the clustershell prompt, enter the *network interface show -is-home false* command to list the logical interfaces that are not on their home controller and port.

   If any interfaces are listed as `false`, revert those interfaces back to their home port using the *net int revert -vserver Cluster -lif _nodename* command.

5. Move the console cable to the target controller and run the *version -v* command to check the ONTAP versions.
6. Use the `storage encryption disk show` to review the output.
7. 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 synchronize the missing onboard keys on the repaired node.

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

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

Return the failed part to NetApp - AFF A150

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.

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