



## **Boot media**

### **Install and maintain**

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# Boot media

## Replace the boot media - FAS9500

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`.

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 does not require connection to a network to restore the `var` file system. The HA pair in a single chassis has an internal e0S connection, which is used to transfer `var` config between them.
  - 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.

## Pre-shutdown checks for onboard encryption keys - FAS9500

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

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 the [Synchronize a node with the cluster](#).

### Steps

1. Check the status of the impaired controller:
  - If the impaired controller is at the login prompt, log in as `admin`.
  - If the impaired controller is at the LOADER prompt and is part of HA configuration, log in as `admin` on the healthy controller.
  - If the impaired controller 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 controller if up, or on the partner controller if the impaired controller 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.

## ONTAP 9.6 and later

Before shutting down the impaired controller, 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 controller.


## 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 controller.
  - 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.
2. 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 controller.
3. 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 controller.
4. 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 32 character, alphanumeric 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 controller.

## 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 controller.
  - 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.
2. 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 controller.
  3. 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. You can safely shut down the controller.
  4. 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 32 character, alphanumeric 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 controller.

## Shut down the impaired controller - FAS9500

Shut down or take over the impaired controller using one of the following options.

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

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 are using NetApp Storage Encryption, you must have reset the MSID using the instructions in the [Returning SEDs to unprotected mode](#).
- If you have a SAN system, you must have checked event messages (`cluster kernel-service show`) for impaired controller SCSI blade. The `cluster kernel-service show` command 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=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`



When you see *Do you want to disable auto-giveback?*, enter `y`.

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</pre> <p>When the impaired controller shows Waiting for giveback..., press Ctrl-C, and then respond <i>y</i>.</p>

## Remove the controller, replace the boot media, and transfer the boot image - FAS9500

You must remove and open the controller module, locate and replace the boot media in the controller, and then transfer the image to the replacement boot media.

### 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.

#### Steps

1. If you are not already grounded, properly ground yourself.
2. Unplug the cables from the impaired controller module, and keep track of where the cables were connected.
3. Slide the terra cotta button on the cam handle downward until it unlocks.

[Animation - Remove controller module](#)





1	Cam handle release button
2	Cam handle

4. Rotate the cam handle so that it completely disengages the controller module from the chassis, and then slide the controller module out of the chassis.

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

5. Place the controller module lid-side up on a stable, flat surface, press the blue button on the cover, slide the cover to the back of the controller module, and then swing the cover up and lift it off of the controller module.



1	Controller module cover locking button
---	--

## Step 2: Replace the boot media

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

### Steps

1. Lift the black air duct at the back of the controller module and then locate the boot media using the following illustration or the FRU map on the controller module:

[Animation - Replace boot media](#)



1	Press release tab
2	Boot media

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. Reinstall the controller module lid by aligning the pins on the lid with the slots on the motherboard carrier, and then slide the lid into place.

### 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.

#### Before you begin

- 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 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. Recable the controller module, as needed.
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, and then push the cam handle to the closed position.


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
    - `bootarg.init.san_optimized` for AFF

- `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. 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 node from the healthy node 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.
8. If the controller is in a stretch or fabric-attached MetroCluster, you must restore the FC adapter configuration:
- a. Boot to Maintenance mode: `boot_ontap maint`
  - b. Set the MetroCluster ports as initiators: `ucadmin modify -m fc -t initiator adapter_name`
  - c. Halt to return to Maintenance mode: `halt`

The changes will be implemented when the system is booted.

## Boot the recovery image - FAS9500

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

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	<ol style="list-style-type: none"><li>a. Press <code>y</code> when prompted to restore the backup configuration.</li><li>b. Press <code>y</code> when prompted to overwrite <code>/etc/ssh/ssh_host_ecdsa_key</code>.</li><li>c. Press <code>y</code> when prompted to confirm if the restore backup was successful.</li><li>d. Press <code>y</code> when prompted to the restored configuration copy.</li><li>e. Set the healthy node to advanced privilege level: <code>set -privilege advanced</code></li><li>f. Run the restore backup command: <code>system node restore-backup -node local -target-address impaired_node_IP_address</code></li><li>g. Return the node to admin level: <code>set -privilege admin</code></li><li>h. Press <code>y</code> when prompted to use the restored configuration.</li><li>i. Press <code>y</code> when prompted to reboot the node.</li></ol>
No network connection	<ol style="list-style-type: none"><li>a. Press <code>n</code> when prompted to restore the backup configuration.</li><li>b. Reboot the system when prompted by the system.</li><li>c. Select the <b>Update flash from backup config</b> (sync flash) option from the displayed menu.</li></ol> <p>If you are prompted to continue with the update, press <code>y</code>.</p>

If your system has...	Then...
No network connection and is in a MetroCluster IP configuration	<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. Wait for the iSCSI storage connections to connect.</p> <p>You can proceed after you see the following messages:</p> <pre data-bbox="673 394 1489 1255"> date-and-time [node- name:iscsi.session.stateChanged:notice]: iSCSI session state is changed to Connected for the target iSCSI-target (type: dr_auxiliary, address: ip-address). date-and-time [node- name:iscsi.session.stateChanged:notice]: iSCSI session state is changed to Connected for the target iSCSI-target (type: dr_partner, address: ip-address). date-and-time [node- name:iscsi.session.stateChanged:notice]: iSCSI session state is changed to Connected for the target iSCSI-target (type: dr_auxiliary, address: ip-address). date-and-time [node- name:iscsi.session.stateChanged:notice]: iSCSI session state is changed to Connected for the target iSCSI-target (type: dr_partner, address: ip-address).</pre> <p>d. 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 [Post boot media replacement steps for OKM, NSE, and NVE](#)

- 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 node. b. Confirm the target node is ready for giveback with the <code>storage failover show</code> command.

7. Connect the console cable to the partner node.

8. Give back the node 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 node 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.

## Post boot media replacement steps for OKM, NSE, and NVE - FAS9500

Once environment variables are checked, you must complete steps specific to restore Onboard Key Manager (OKM), NetApp Storage Encryption (NSE) and NetApp Volume Encryption (NVE).

- 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

- 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>
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 menu</code> 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 section, 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:

Enter the backup data:

```
-----BEGIN BACKUP-----
TmV0QXBwIEtleSBCbG9iAAEAAAAEAAAAcAEAAAAAADuD+byAAAAACEAAAAAAAAA
QAAAAAAAAABvOIH0AAAAAMh7qDLRyH1DBz12piVdy9ATSFMT0C0TIYFss4PDjTaV
dzRYkLd1PhQLxAWJwOlyqSr8qY1SEBgm1IWgE5DLRqkiAAAAAAAAACgAAAAAAAA
3WTh7gAAAAAAAAAAAAAAAAAIAAAAAAgAZJEIWvdeHr5RCAvHGclo+wAAAAAAAA
lgAAAAAAAAAoAAAAAAAAAEOTcR0AAAAAAAAAAAAAAAACAAAAAAJAGr3tJA/
LRzUQRHwv+1aWvAAAAAAAAAACQAAAAAAAAAgAAAAAAAAACdhTcvAAAAAJ1PXeBf
ml4NBsSyV1B4jc4A7cvWEFY6lLG6hc6tbKLAHZuvfQ4rlbYAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA...
H4nPQM0nrDRYRa9SCv8AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAA
-----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 log in as admin.
- Confirm the target node is ready for giveback with the `storage failover show` command.
- Give back 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 session, check with the 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 NVRAMs to synchronize.
- If the command fails because of an NDMP, SnapMirror, or SnapVault process, disable the process. See the appropriate content 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. If you are running ONTAP 9.6 or later, run the security key-manager onboard sync:
  - a. Run the `security key-manager onboard sync` command and then enter the passphrase when prompted.
  - b. 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.

- c. 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, three 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

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...	<ol 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> </ol>

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 is "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 content 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 encryption and 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 - FAS9500

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

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