NetApp

ASA A70 and ASA A90 systems

Install and maintain

NetApp
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ASA A70 and ASA A90 systems

Overview of the maintenance procedures - ASA A70 and ASA A90

Maintain the hardware of your ASA A70 and ASA A90 storage systems to ensure long-term reliability and optimal performance. Perform regular maintenance tasks such as replacing faulty components, as this helps prevent downtime and data loss.

The maintenance procedures assume that the ASA A70 and ASA A90 systems have already been deployed as a storage node in the ONTAP environment.

System components

For the ASA A70 and ASA A90 storage systems, you can perform maintenance procedures on the following components.

Boot media	You can replace a failed boot media from the partner node for the boot image. Boot media replace uses the boot image from the partner node and automatically runs the appropriate boot menu option to install the boot image on the replacement boot media.
Chassis	The chassis is the physical enclosure housing all the controller components such as the controller/CPU unit, power supply, and I/O.
Controller	A controller consists of a board, firmware, and software. It controls the storage, I/O cards, and runs the ONTAP operating system software.
DIMM	A dual in-line memory module (DIMM) is a type of computer memory. They are installed to add system memory to a controller motherboard.
Drive	A drive is a device that provides the physical storage needed for data.
Fan	A fan cools the controller.
NVRAM	The NVRAM (Non-Volatile Random Access Memory) is a module that allows the controller to protect and save in-flight data if the system loses power. The system ID resides in the NVRAM module. When replaced, the controller assumes the new system ID from the replacement NVRAM module.
NV battery	The NV battery is responsible for providing power to the NVRAM module while data in-flight is being destaged to flash memory after a power loss.
I/O module	The I/O module (Input/Output module) is a hardware component that acts as an intermediary between the controller and various devices or systems that need to exchange data with the controller.

Power supply	A power supply provides a redundant power source in a controller.
Real-time clock battery	A real-time clock battery preserves system date and time information if the power is off.
System Management module	The System Management module provides the interface between the controller and a console or laptop for controller or system maintenance purposes. The System management module contains the boot media and stores the system serial number (SSN).

Boot media

Overview of boot media recovery - ASA A70 and ASA A90

Boot media recovery for your ASA A70 or ASA A90 storage system uses the boot image from the partner node and automatically runs the appropriate boot menu option to install the boot image on your replacement boot media.

When you encounter boot error messages similar to the one shown below, you need to replace the boot media and restore the ONTAP image from the partner node.

```
Can't find primary boot device u0a.0
Can't find backup boot device u0a.1
ACPI RSDP Found at 0x777fe014

Starting AUTOBOOT press Ctrl-C to abort...
Could not load fat://boot0/X86_64/freebsd/image1/kernel: Device not found

ERROR: Error booting OS on: 'boot0' file:
fat://boot0/X86_64/Linux/image1/vmlinuz (boot0, fat)
ERROR: Error booting OS on: 'boot0' file:
fat://boot0/X86_64/freebsd/image1/kernel (boot0, fat)

Autoboot of PRIMARY image failed. Device not found (-6)
LOADER-A>
```

Boot media replacement workflow - ASA A70 and ASA A90

Get started with replacing the boot media in your ASA A70 and ASA A90 storage system by reviewing the replacement requirements, shutting down the controller, replacing the boot media, restoring the image on the boot media, and verifying the system functionality.

1   **Review the boot media requirements**

Review the requirements for boot media replacement.

2 **Shut down the controller**

Shut down the controller in your storage system when when you need to replace the boot media.

3 **Replace the boot media**

Remove the failed boot media from the System Management module and install the replacement boot media.

4 **Restore the image on the boot media**

Restore the ONTAP image from the partner controller.

5 **Return the failed part to NetApp**

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

Requirement to replace the boot media - ASA A70 and ASA A90

Before replacing the boot media in your ASA A70 or ASA A90 system, ensure you meet the necessary requirements for a successful replacement. This includes verifying that you have the correct replacement boot media, confirming that there are no defective cluster ports on the controller, and determining whether Onboard Key Manager (OKM) or External Key Manager (EKM) is enabled.

Review the following requirements.

- You must replace the failed boot media with a replacement boot media you received from NetApp.
- There must be no faulty cluster ports on the impaired controller.
- Determine if Onboard Key Manger (OKM) or Eternal Key Manager (EKM) is configured using one of the following methods:
    - You can ask the system administrator if OKM or EKM are enabled.
    - To check if OKM is enabled, you can use the `security key-manager onboard show`.
    - To check if EKM is enabled, you can use the `security key-manager external show`.
- For OKM, you need the OKM passphrase file contents.
- For EKM, you need copies of the following files from the partner node:
    - /cfcard/kmip/servers.cfg file.
    - /cfcard/kmip/certs/client.crt file.
    - /cfcard/kmip/certs/client.key file.
    - /cfcard/kmip/certs/CA.pem file.

What's next

After you've reviewed the boot media requirements, you shut down the controller.

Shut down the controller to replace the boot media - ASA A1K

Shut down the impaired controller in your ASA A70 or ASA A90 storage system to prevent data loss and ensure system stability when replacing the boot media.

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

About this task

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

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

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

Steps

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

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

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

2. Disable automatic giveback 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 `y` when prompted.
System prompt or password prompt	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`.

What's next

After you shut down the impaired controller, you replace the boot media.

Replace the boot media - ASA A70 and ASA A90

The boot media in your ASA A70 or ASA A90 system stores essential firmware and configuration data. The replacement process involves removing the System Management module, removing the impaired boot media, installing the replacement boot media in the System Management module, and then reinstalling the System Management module.

The boot media is located inside the System Management module and is accessed by removing the module from the system.

Steps

1. On the front of the chassis, use your thumbs to firmly push each drive in until you feel a positive stop. This ensures that the drives are firmly seated against the chassis midplane.

2. Go to the rear of the chassis. If you are not already grounded, properly ground yourself.

3. Disconnect power to the controller module by pulling the controller module out about three inches:

    a. Press down on both of the controller module locking latches, and then rotate both latches downward at the same time.

    b. Pull the controller module about 3 inches out of the chassis to disengage power.

    c. Remove any cables connected to the System Management module. Make sure to label where the cables were connected, so that you can connect them to the correct ports when you reinstall the module.

    d. Rotate the cable management tray down by pulling the buttons on both sides on the inside of the cable management tray and then rotate the tray down.

    e. Depress the system management cam button. The cam lever moves away from the chassis.

    f. Rotate the cam lever all the way down and remove the System Management module from the controller module.

    g. Place the System Management module on an anti-static mat, so that the boot media is accessible.

4. Remove the boot media from the management module:
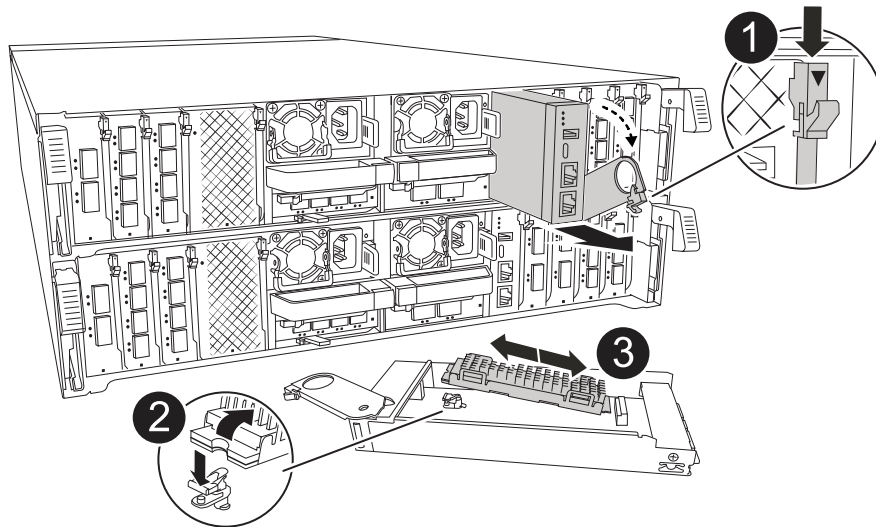
❶	System Management module cam latch
❷	Boot media locking button
❸	Boot media

   a. Press the blue locking button.

   b. Rotate the boot media up, slide it out of the socket, and set it aside.

5. Install the replacement boot media into the System Management module:

   a. Align the edges of the boot media with the socket housing, and then gently push it squarely into the socket.

   b. Rotate the boot media down toward the locking button.

   c. Push the locking button, rotate the boot media all the way down and then release the locking button.

6. Reinstall the System Management module:

   a. Rotate the cable management tray up to the closed position.

   b. Recable the System Management module.

7. Reinstall the controller and reconnect power to the controller module:

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

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

   b. Rotate the locking latches upward into the locked position.

     The controller begins to boot as soon as it is seated and power is restored.

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

What's next

After physically replacing the impaired boot media, restore the ONTAP image from the partner node.

Restore the image on the boot media - ASA A70 and ASA A90

After installing the new boot media device in your ASA A70 or ASA A90 system, you can start the automated boot media recovery process to restore the configuration from the partner node.

During the recovery process, the system checks whether encryption is enabled and determines the type of key encryption in use. If key encryption is enabled, the system guides you through the appropriate steps to restore it.

Before you begin

- Determine if Onboard Key Manger (OKM) or Eternal Key Manager (EKM) is configured using one of the following methods:

    ◦ You can ask the customer or system administrator if OKM or EKM are enabled.

    ◦ To check if OKM is enabled, use the following command:

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

    ◦ To check if EKM is enabled, use the following command:

    ```
    security key-manager external show
    ```

- For OKM, you need the OKM passphrase file contents.
- For EKM, you need copies of the following files from the partner node:

    ◦ /cfcard/kmip/servers.cfg file.

    ◦ /cfcard/kmip/certs/client.crt file.

    ◦ /cfcard/kmip/certs/client.key file.

    ◦ /cfcard/kmip/certs/CA.pem file.

Steps

1. From the LOADER prompt, enter the command:

    ```
    boot_recovery -partner
    ```

    The screen displays the following message:

    ```
    Starting boot media recovery (BMR) process. Press Ctrl-C to abort…
    ```

2. Monitor the boot media install recovery process.

    The process completes and displays the `Installation complete.` message.

3. The system checks for encryption and encryption type and displays one of two messages. Depending on what message is displayed, take one of the following actions:

(i) Occasionally, the process may not be able to identify if key manager is configured on the system. It will display an error message, ask if key manager is configured for the system, and then ask what type of key manager is configured. The process will resume after you resolve the issue.

Show example of configuration error finding prompts

```
Error when fetching key manager config from partner ${partner_ip}:
${status}

Has key manager been configured on this system

Is the key manager onboard
```

If you see this message…	Do this…
`key manager is not configured. Exiting.`	Encryption is not installed on the system. Complete the following steps: a. Log into the node when the login prompt is displayed and give back the storage: `storage failover giveback -ofnode impaired_node_name` b. Go to step 5 to enable automatic giveback if it was disabled.
`key manager is configured.`	Go to step 4 to restore the appropriate key manager. The node access the boot menu and runs: • Option 10 for systems with Onboard Key Manager (OKM). • Option 11 for systems with External Key Manager (EKM).

4. Select the appropriate key manager restoration process.

Onboard Key Manager (OKM)

If OKM is detected, the system displays the following message and begins running BootMenu Option 10.

```
key manager is configured.
Entering Bootmenu Option 10...

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

a. Enter `Y` at the prompt to confirm you want to start the OKM recovery process.

b. Enter the passphrase for onboard key manager when prompted, and enter the passphrase again when prompted, to confirm.

   Show example of passphrase prompts

   ```
   Enter the passphrase for onboard key management:
   Enter the passphrase again to confirm:
   Enter the backup data:
   -----BEGIN PASSPHRASE-----
   <passphrase_value>
   -----END PASSPHRASE-----
   ```

c. Continue to monitor the recovery process as it restores the appropriate files from the partner node.

   When the recovery process is complete, the node will reboot. The following messages indicate a successful recovery:

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

   Successfully recovered keymanager secrets.
   ```

d. When the node reboots, verify the boot media recovery was successful by confirming that the system is back online and operational.

e. Return the impaired controller to normal operation by giving back its storage:

   ```
   storage failover giveback -ofnode impaired_node_name
   ```

f. After the partner node is fully up and serving data, synchronize the OKM keys across the cluster.

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

External Key Manager (EKM)

If EKM is detected, the system displays the following message and begins running BootMenu Option 11.

```
key manager is configured.
Entering Bootmenu Option 11...
```

a. The next step depends on which version of ONTAP your system is running:

If your system is running…	Do this…
ONTAP 9.16.0	a. Press `Ctlr-C` to exit BootMenu Option 11. b. Press `Ctlr-C` to exit the EKM configuration process and return to the boot menu. c. Select BootMenu Option 8. d. Reboot the node. If `AUTOBOOT` is set, the node reboots and uses the configuration files from the partner node. If `AUTOBOOT` is not set, enter the appropriate boot command. The node reboots and uses the configuration files from the partner node. e. Reboot the node so that EKM protects the boot media partition. f. Proceed to step c.
ONTAP 9.16.1	Proceed to the next step.

b. Enter the following EKM configuration setting when prompted:

Action	Example
Enter the client certificate contents from the `/cfcard/kmip/certs/client.crt` file.	**Show example of client certificate contents** ``` -----BEGIN CERTIFICATE----- <certificate_value> -----END CERTIFICATE----- ```

Action	Example
Enter the client key file contents from the `/cfcard/kmip/certs/client.key` file.	**Show example of client key file contents** ``` -----BEGIN RSA PRIVATE KEY----- <key_value> -----END RSA PRIVATE KEY----- ```
Enter the KMIP server CA(s) file contents from the `/cfcard/kmip/certs/CA.pem` file.	**Show example of KMIP server file contents** ``` -----BEGIN CERTIFICATE----- <KMIP_certificate_CA_value > -----END CERTIFICATE----- ```

Action	Example
Enter the server configuration file contents from the `/cfcard/kmip/servers.cfg` file.	**Show example of server configuration file contents**

Show example of server configuration file contents

```
xxx.xxx.xxx.xxx:5696.host=
xxx.xxx.xxx.xxx
xxx.xxx.xxx.xxx:5696.port=
5696
xxx.xxx.xxx.xxx:5696.trust
ed_file=/cfcard/kmip/certs
/CA.pem
xxx.xxx.xxx.xxx:5696.proto
col=KMIP1_4
1xxx.xxx.xxx.xxx:5696.time
out=25
xxx.xxx.xxx.xxx:5696.nbio=
1
xxx.xxx.xxx.xxx:5696.cert_
file=/cfcard/kmip/certs/cl
ient.crt
xxx.xxx.xxx.xxx:5696.key_f
ile=/cfcard/kmip/certs/cli
ent.key
xxx.xxx.xxx.xxx:5696.ciphe
rs="TLSv1.2:kRSA:!CAMELLIA
:!IDEA:!RC2:!RC4:!SEED:!eN
ULL:!aNULL"
xxx.xxx.xxx.xxx:5696.verif
y=true
xxx.xxx.xxx.xxx:5696.netap
p_keystore_uuid=<id_value>
```

Action	Example
If prompted, enter the ONTAP Cluster UUID from the partner.	**Show example of ONTAP Cluster UUID** ``` Notice: bootarg.mgwd.cluster_uuid is not set or is empty. Do you know the ONTAP Cluster UUID? {y/n} y Enter the ONTAP Cluster UUID: <cluster_uuid_value> System is ready to utilize external key manager(s). ```
If prompted, enter the temporary network interface and settings for the node.	**Show example of a temporary network setting** ``` In order to recover key information, a temporary network interface needs to be configured. Select the network port you want to use (for example, 'e0a') e0M Enter the IP address for port : xxx.xxx.xxx.xxx Enter the netmask for port : xxx.xxx.xxx.xxx Enter IP address of default gateway: xxx.xxx.xxx.xxx Trying to recover keys from key servers.... [discover_versions] [status=SUCCESS reason= message=] ```

c. Depending on whether the key is successfully restored, take one of the following actions:

- If the EKM configuration has been successfully restored, the process attempts to restore the appropriate files from the partner node and reboots the node. Go to step d.

Show example of successful 9.16.0 restore messages

```
kmip2_client: Importing keys from external key server:
xxx.xxx.xxx.xxx:5696
[Feb  6 04:57:43]: 0x80cc09000: 0: DEBUG:
kmip2::kmipCmds::KmipLocateCmdUtils:
[locateMrootAkUuids]:420: Locating local cluster MROOT-AK
with keystore UUID: <uuid>
[Feb  6 04:57:43]: 0x80cc09000: 0: DEBUG:
kmip2::kmipCmds::KmipLocateCmdBase: [doCmdImp]:79: Calling
KMIP Locate for the following attributes: [<x-NETAPP-
ClusterId, <uuid>>, <x-NETAPP-KeyUsage, MROOT-AK>, <x-
NETAPP-KeystoreUuid, <uuid>>, <x-NETAPP-Product, Data
ONTAP>]
[Feb  6 04:57:44]: 0x80cc09000: 0: DEBUG:
kmip2::kmipCmds::KmipLocateCmdBase: [doCmdImp]:84: KMIP
Locate executed successfully!
[Feb  6 04:57:44]: 0x80cc09000: 0: DEBUG:
kmip2::kmipCmds::KmipLocateCmdBase: [setUuidList]:50: UUID
returned: <uuid>
...
kmip2_client: Successfully imported the keys from external
key server: xxx.xxx.xxx.xxx:5696

GEOM_ELI: Device nvd0s4.eli created.
GEOM_ELI: Encryption: AES-XTS 256
GEOM_ELI:     Crypto: software
Feb 06 05:02:37 [_server-name_]: crypto_get_mroot_ak:140
MROOT-AK is requested.
Feb 06 05:02:37 [_server-name_]: crypto_get_mroot_ak:162
Returning MROOT-AK.
```

Show example of successful 9.16.1 restore messages

```
System is ready to utilize external key manager(s).
Trying to recover keys from key servers....
[discover_versions]
[status=SUCCESS reason= message=]
...
kmip2_client: Successfully imported the keys from external
key server: xxx.xxx.xxx.xxx:xxxx
Successfully recovered keymanager secrets.
```

- If the key is not successfully restored, the system will halt and indicate that it could not restore the key. The error and warning messages are displayed. Rerun the recovery process by entering `boot_recovery -partner`.

Show example of key recovery error and warning messages

```
ERROR: kmip_init: halting this system with encrypted
mroot...
WARNING: kmip_init: authentication keys might not be
available.
**********************************************************
*                   A T T E N T I O N                    *
*                                                        *
*        System cannot connect to key managers.         *
*                                                        *
**********************************************************
ERROR: kmip_init: halting this system with encrypted
mroot...
.
Terminated

Uptime: 11m32s
System halting...

LOADER-B>
```

d. When the node reboots, verify that the boot media recovery was successful by confirming that the system is back online and operational.

e. Return the controller to normal operation by giving back its storage:

```
storage failover giveback -ofnode impaired_node_name.
```

5. If automatic giveback was disabled, reenable it:

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

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

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

What's next

After you've restored the ONTAP image and the node is up and serving data, you return the failed part to NetApp.

Return the failed part to NetApp - ASA A70 and ASA A90

If a component in your ASA A1K system fails, return the failed part to NetApp. See the Part Return and Replacements page for further information.

Chassis

Chassis replacement workflow - ASA A70 and ASA A90

Get started with replacing the chassis in your ASA A70 or ASA A90 storage system by shutting down the controllers, removing and replacing the chassis, and verifying system operations.

1 **Review the chassis replace requirements**

Review the chassis replacement requirements.

2 **Prepare for chassis replace**

Prepare to replace the chassis by locating the system, gathering system credentials and necessary tools, verifying the replacement chassis was received, and labeling the system cables.

3 **Shut down the controllers**

Shut down the controllers so you can perform maintenance on the chassis.

4 **Replace the chassis**

Replace the chassis by moving the components from the impaired chassis to the replacement chassis.

5 **Complete the chassis replacement**

Complete the chassis replacement by bringing the controllers up, giving back the controllers, and returning the failed chassis to NetApp.

Requirement to replace the chassis - ASA A70 and ASA A90

Before replacing the chassis in your ASA A70 or ASA A90 system, ensure you meet the necessary requirements for a successful replacement. This includes verifying all other components in the system are functioning properly, verifying that you have local administrator credentials for ONTAP, the correct replacement chassis, and the necessary tools.

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

Review the following requirements.

- Make sure all other components in the system are functioning properly; if not, contact NetApp support for assistance.
- Obtain local administrator credentials for ONTAP if you don't have them.
- Make sure that you have the necessary tools and equipment for the replacement.
- You can use the chassis replacement procedure with all versions of ONTAP supported by your system.
- The chassis replacement procedure is written with the assumption that you are moving the bezel, NVMe drives, and controller modules to the new chassis, and that the replacement chassis is a new component from NetApp.
- The chassis replacement procedure is disruptive. For a two-node cluster, you will have a complete service outage and a partial outage in a multi-node cluster.

What's next?
After reviewing the chassis replacement requirements, you need to prepare for chassis replace.

Prepare to replace chassis - ASA A70 and ASA A90

Prepare to replace the impaired chassis in your ASA A70 or ASA A90 system by identifying the impaired chassis, verifying the replacement components, and labeling the cables and controller modules.

Step 1: Locate and monitor your system

You should open a console session and save sessions logs for future reference, and also turn on the system location LED to find the impaired chassis.

1. Connect to the serial console port to interface with and monitor the system.
2. Locate and turn on the controller's Location LED:
   a. Use the `system controller location-led show` command to show the current state of the location LED.
   b. Change the state of the location LED to "on":

      `system controller location-led modify -node node1 -state on`.

      The Location LED remains lit for 30 minutes.

Step 2: Verify replacement components

You should verify that you received the necessary components, remove them from packaging, and save the packaging.

1. Before opening the packaging, you should look at the packaging label and verify:

   ◦ Component part number.

   ◦ Part description.

   ◦ Quantity in the box.

2. Remove the contents from the packaging and use the packaging to returning the failed component to NetApp.

Step 3: Label the cables and controller modules

You should label the cables and controller modules before removing them from the controller modules or chassis.

1. Label all the cables associated with the storage system. This aids recabling later in this procedure.

2. Label the controller modules.

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

What's next?

After you've prepared to replace your ASA A70 or ASA A90 chassis hardware, you need to shut down the controllers.

Shut down the controllers to replace the chassis - ASA A70 and ASA A90

Shut down the controllers in your ASA A70 or ASA A90 storage system to prevent data loss and ensure system stability when replacing the chassis.

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

Before you begin

• Make sure you have the necessary permissions and credentials:

   ◦ Local administrator credentials for ONTAP.

   ◦ BMC accessability for each controller.

• Make sure you have the necessary tools and equipment for the replacement.

• As a best practice before shutdown, you should:

   ◦ Perform additional system health checks.

   ◦ Upgrade ONTAP to a recommended release for the system.

   ◦ Resolve any Active IQ Wellness Alerts and Risks. Make note of any faults presently on the system, such as LEDs on the system components.

Steps

1. Log into the cluster through SSH or log in from any node in the cluster using a local console cable and a laptop/console.

2. Stop all clients/host from accessing data on the NetApp system.

3. Suspend external backup jobs.

4. If AutoSupport is enabled, suppress case creation and indicate how long you expect the system to be offline:

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

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

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

6. Exit the cluster shell:

   ```
   exit
   ```

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

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

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

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

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

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

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

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

What's next?

After the controllers are shut down, you need to replace the chassis.

Move and replace hardware - ASA A70 and ASA A90

Replace the chassis in your ASA A70 or ASA A90 system when a hardware failure requires it. This process involves powering down the system, removing the existing chassis, installing the new one, and reconfiguring components to ensure proper system operation.

Step 1: Remove the PSUs and cables

You need to remove all four power supply units (PSUs), two per controller, before removing the controller. Removing them lightens the overall weight of each controller.

1. Remove the four PSUs:

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

   b. Unplug power cords from the controller module PSU.

      If your system has DC power, disconnect the power block from the PSUs.

   c. Remove the PSU from the controller by rotating the PSU handle up so that you can pull the PSU out, press the PSU locking tab, and then pull PSU out of the controller module.

   ⚠ The PSU is short. Always use two hands to support it when removing it from the controller module so that it does not suddenly swing free from the controller module and injure you.
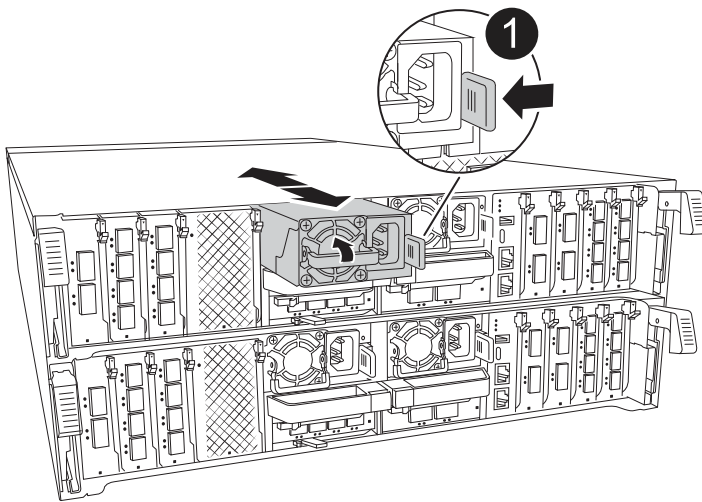
❶	Terracotta PSU locking tab

   d. Repeat these steps for the remaining PSUs.

2. Remove the cables:

   a. Unplug the system cables and any SFP and QSFP modules (if needed) from the controller module, but leave them in the cable management device to keep them organized.

   ℹ Cables should have been labeled at the beginning of this procedure.

   b. Remove the cable management device from the controller modules and set them aside.

Step 2: Remove the controller modules and drives

Remove the controllers from the chassis and then remove the drives from the chassis.

1. Check the that amber NVRAM status LED located in slot 4/5 on the back of each controller module is off. Look for the NV icon.
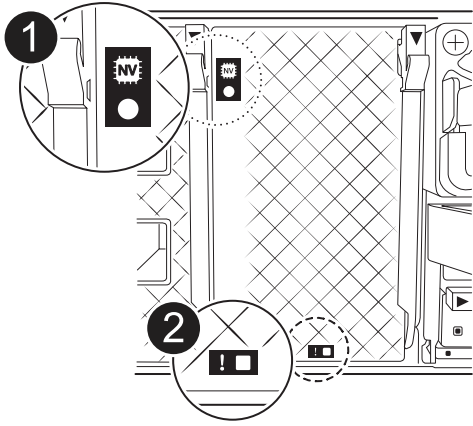
❶	NVRAM status LED
❷	NVRAM attention LED

- ◦ If the NVRAM LED is off, go to the next step.
- ◦ If the NVRAM LED is flashing, wait for the flashing to stop. If flashing continues for longer than 5 minutes, contact NetApp Support Site for assistance.

2. Remove the controller modules:

   a. Press down on both of the locking latches on the controller, and then rotate both latches downward at the same time.

   The controller module moves slightly out of the chassis.
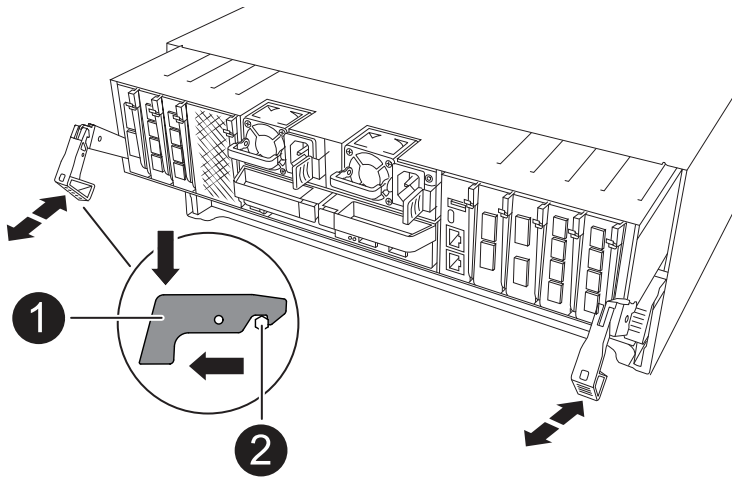
❶	Locking latch
❷	Locking pin

   b. Slide the controller module out of the chassis by the locking latches, and place it on a flat, stable surface.

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

    c. Repeat these steps for the second controller module.

3. Remove the drives:

    a. Gently remove the bezel from the front of the system.

    b. Press the release button at the top of the drive carrier face below the LEDs.

    c. Pull the cam handle to its fully open position to unseat the drive from the midplane, and then gently slide the drive out of the chassis.

    The drive should disengage from the chassis, allowing it to slide free of the chassis.

> (i) Drives are fragile. Always use two hands to support the drive weight when removing a drive to prevent damage to them.

    d. Keep track of which drive bay each drive was in and set the drive aside on a static-free cart or table.

    e. Repeat this step for the remaining drives in the chassis.

Step 3: Replace the impaired chassis

Remove the impaired chassis and install the replacement chassis.

1. Remove the impaired chassis:

    a. Remove the screws from the chassis mount points.

    b. Using two people or a lift, slide the impaired chassis off the rack rails in a system cabinet or equipment rack, and then set it aside.

2. Install the replacement chassis:

    a. Using two people or a lift, install the replacement chassis into the equipment rack or system cabinet by guiding the chassis onto the rack rails in a system cabinet or equipment rack.

    b. Slide the chassis all the way into the equipment rack or system cabinet.

    c. Secure the front of the chassis to the equipment rack or system cabinet, using the screws you removed from the impaired chassis.

Step 4: Install the chassis components

After the replacement chassis is installed, you need to install the controller modules, recable them, and then reinstall the drives and PSUs.

1. Beginning with the bottom controller module, install the controller modules in the replacement chassis:

    a. Align the end of the controller module with the opening in the chassis, and then gently push the controller all the way into the chassis.

    b. Rotate the locking latches upward into the locked position.

    c. If you have not already done so, reinstall the cable management device and recable the controller.

    If you removed the media converters (QSFPs or SFPs), remember to reinstall them.

    Make sure that the cables are connected referencing the cable labels.

2. Reinstall the drives into their corresponding drive bays in the front of the chassis.

3. Install all four of the PSUs:

   a. Using both hands, support and align the edges of the PSU with the opening in the controller module.

   b. Gently push the PSU into the controller module until the locking tab clicks into place.

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

      > ⓘ To avoid damaging the internal connector, do not use excessive force when sliding the
      >   PSU into the system.

4. Reconnect the PSU power cables to all four of the PSUs.

   a. Secure the power cable to the PSU using the power cable retainer.

      If you have DC power supplies, reconnect the power block to the power supplies after the controller module is fully seated in the chassis and secure the power cable to the PSU with the thumbscrews.

   The controller modules begin to boot as soon as PSUs are installed and power is restored.

What's next?

After you've replaced the impaired ASA A70 or ASA A90 chassis and reinstalled the components into it, you need to complete the chassis replacement.

Complete the chassis replacement - ASA A70 and ASA A90

Reboot the controllers, verify system health, and return the failed part to NetApp to complete the final step in the ASA A70 and ASA A90 chassis replacement procedure.

Step 1: Boot the controllers and give back the controllers

After the controllers reboot, boot ONTAP and give back the controllers.

1. Check the console output:

   a. If the controller boots to the LOADER prompt, reboot the controller with the `boot_ontap` command.

   b. If the console displays `waiting for giveback` after the reboot, log into the partner controller and check that the replaced controller is ready for giveback with the `storage failover show` command.

2. Perform the giveback:

   a. Connect the console cable to the partner controller.

   b. Give back the controller with the `storage failover giveback -fromnode local` command.

Step 2: Verify storage system health

After the controller has given back the storage, you should check the overall health with Active IQ Config Advisor.

1. After the giveback is complete, run Active IQ Config Advisor to verify the health of the storage system.

2. Correct any issues you encounter.

Step 3: Return the failed part to NetApp

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

Controller

Controller replacement workflow - ASA A70 and ASA A90

Get started with replacing the controller in your ASA A70 or ASA A90 storage system by shutting down the impaired controller, removing and replacing the controller, restoring the system configuration, and returning control of storage resources to the replacement controller.

1 **Review controller replacement requirements**

To replace the controller module, you must meet certain requirements.

2 **Shut down the impaired controller**

Shut down or take over the impaired controller so that the healthy controller continues to serve data from the impaired controller storage.

3 **Replace the controller**

Replacing the controller includes removing the impaired controller, moving the FRU components to the replacement controller module, and then installing the replacement controller module in the enclosure.

4 **Restore and verify the system configuration**

Verify the low-level system configuration of the replacement controller and reconfigure system settings as necessary.

5 **Recable and give back the controller**

Recable the controller and transfer the ownership of storage resources back to the replacement controller.

6 **Complete controller replacement**

Verify the LIfs, check cluster health, and return the failed part to NetApp.

Requirements to replace the controller - ASA A70 and ASA A90

Before replacing the controller in your ASA A70 or ASA A90 system, ensure you meet the necessary requirements for a successful replacement. This includes verifying all other components in the system are functioning properly, verifying that you have the correct

replacement controller, and saving the controller's console output to a text log file.

Review the requirements for replacing the controller module.

- All drive shelves must be working properly.

- The healthy controller must be able to take over the controller that is being replaced (referred to in this procedure as the "impaired controller").

- Do not use this procedure for controller upgrades; instead, refer to the Choose your controller hardware upgrade procedure for guidance.

- If your system is in a MetroCluster configuration, you must review Choosing the correct recovery procedure to determine whether you should use this procedure.

- You must replace the failed component with the field-replaceable unit (FRU) you received from NetApp.

- You must replace a controller module with a controller module of the same model type. You cannot upgrade your system by just replacing the controller module.

- You cannot change any drives or drive shelves as part of this procedure.

- Because the boot device is located on the System Management module that is installed in the back of the system, you do not need to move the boot device when replacing a controller module.

- It is important that you apply the commands in these steps on the correct systems:
  - The *impaired* controller is the controller that is being replaced.
  - The *replacement* controller is the new controller that is replacing the impaired controller.
  - The *healthy* controller is the surviving controller.

- You must always capture the controller's console output to a text log file.

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

Shut down the impaired controller - ASA A70 and ASA A90

Shut down the controller in your ASA A70 or ASA A90 storage system to prevent data loss and ensure system stability when replacing the controller.

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

About this task

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

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

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

Steps

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

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

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

2. Disable automatic giveback 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:

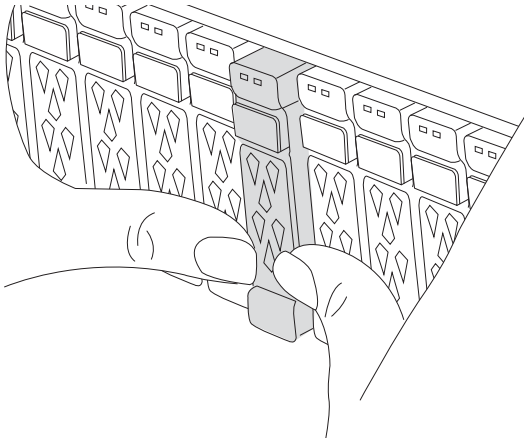| If the impaired controller is displaying…	Then…
The LOADER prompt	Go to the next step.
Waiting for giveback…	Press Ctrl-C, and then respond `y` when prompted.
System prompt or password prompt	Take over or halt the impaired controller from the healthy controller: `storage failover takeover -ofnode impaired_node_name` When the impaired controller shows Waiting for giveback…, press Ctrl-C, and then respond `y`.

Replace the controller - ASA A70 and ASA A90

Replace the controller in your ASA A70 or ASA A90 system when a hardware failure requires it. This process involves removing the impaired controller, moving the components to the replacement controller, installing the replacement controller, and rebooting the system.
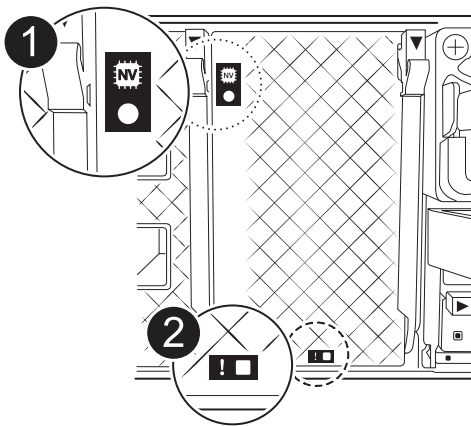
Step 1: Remove the controller module

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

1. On the front of the chassis, use your thumbs to firmly push each drive in until you feel a positive stop. This ensures that the drives are firmly seated against the chassis midplane.

2. Check the amber NVRAM that status LED located in slot 4/5 on the back of the impaired controller module is off. Look for the NV icon.

❶	NVRAM status LED
❷	NVRAM attention LED

   ◦ If the NV LED is off, go to the next step.

   ◦ If the NV LED is flashing, wait for the flashing to stop. If flashing continues for longer than 5 minutes, contact Technical Support for assistance.

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

4. Unplug the controller module power supply cables from the controller module power supplies (PSU).

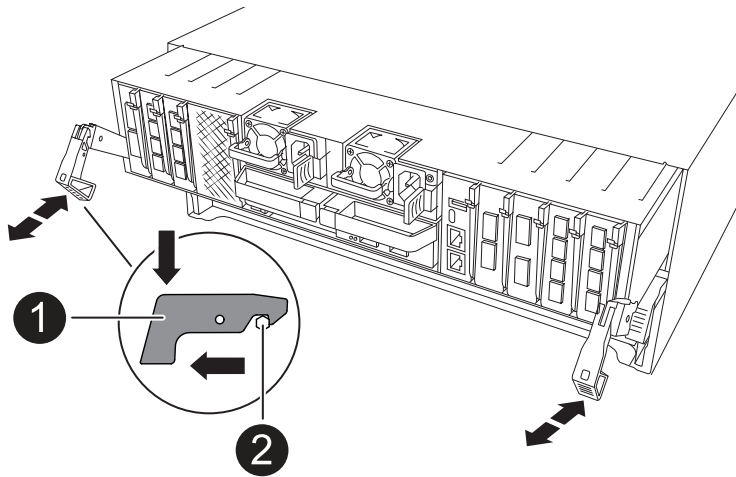   > ⓘ If your system has DC power, disconnect the power block from the PSUs.

5. Unplug the system cables and SFP and QSFP modules (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.

6. Remove the cable management device from the controller module.

7. Press down on both of the locking latches, and then rotate both latches downward at the same time.

   The controller module moves slightly out of the chassis.

1	Locking latch
2	Locking pin

8. Slide the controller module out of the chassis and place it on a flat, stable surface.

   Make sure that you support the bottom of the controller module as you slide it out of the chassis.
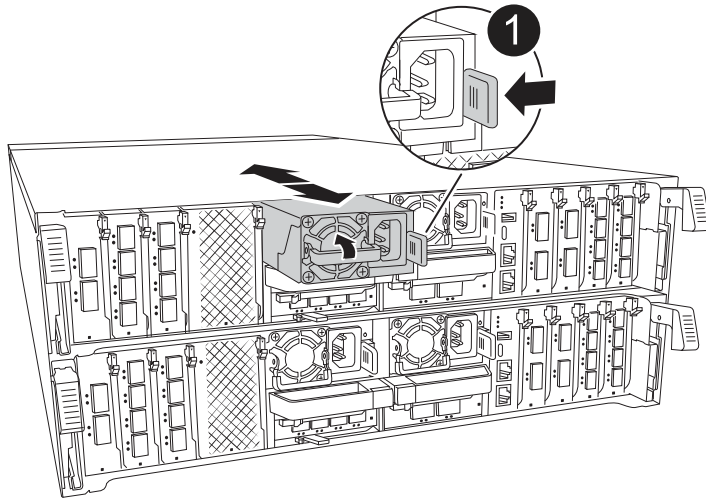
Step 2: Move the power supplies

Move the power supplies to the replacement controller.

1. Rotate the cam handle such that it can be used to pull power supply out of the controller module while pressing the locking tab.

   > ⚠️ The power supply is short. Always use two hands to support it when removing it from the controller module so that it does not suddenly swing free from the controller module and injure you.

1	Terracotta PSU locking tab
2	Power supply

2. Move the power supply to the new controller module, and then install it.

3. Using both hands, support and align the edges of the power supply with the opening in the controller module, and then gently push the power supply into the controller module until the locking tab clicks into place.

   The power supplies will only properly engage with the internal connector and lock in place one way.
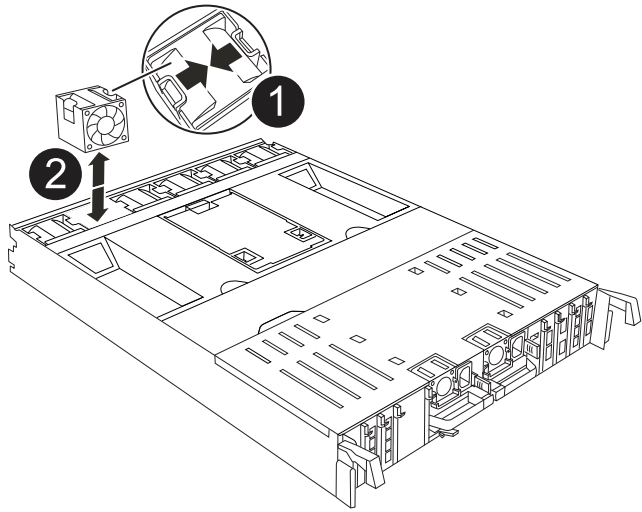
   ⓘ To avoid damaging the internal connector, do not use excessive force when sliding the power supply into the system.

Step 3: Move the fans

Move the fans modules to the replacement controller module.

1. Remove the fan module by pinching the locking tabs on the side of the fan module, and then lifting the fan module straight out of the controller module.

❶	Fan locking tabs
❷	Fan module

2. Move the fan module to the replacement controller module, and then install the fan module by aligning its edges with the opening in the controller module, and then sliding the fan module into the controller module until the locking latches click into place.

3. Repeat these steps for the remaining fan modules.

Step 4: Move the NV battery

Move the NV battery to the replacement controller module.

1. Open the air duct cover in the middle of the controller module and locate the NV battery.

|	
❶	NV battery air duct
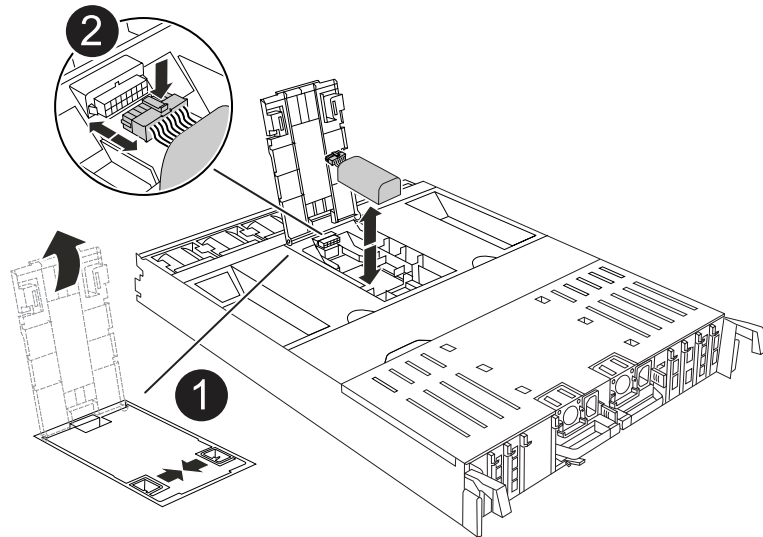
❷	NV battery pack plug

Attention: The NV module LED blinks while destaging contents to the flash memory when you halt the system. After the destage is complete, the LED turns off.

2. Lift the battery up to access the battery plug.

3. Squeeze the clip on the face of the battery plug to release the plug from the socket, and then unplug the battery cable from the socket.

4. Lift the battery out of the air duct and controller module.

5. Move the battery pack to the replacement controller module and then install it in the replacement controller module:

   a. Open the NV battery air duct in the replacement controller module.

   b. Plug the battery plug into the socket and make sure that the plug locks into place.

   c. Insert the battery pack into the slot and press firmly down on the battery pack to make sure that it is locked into place.

   d. Close the NV battery air duct.

Step 5: Move system DIMMs

Move the DIMMs to the replacement controller module.

1. Open the controller air duct on the top of the controller.

   a. Insert your fingers in the recesses at the far ends of the air duct.

   b. Lift the air duct and rotate it upward as far as it will go.

2. Locate the system DIMMs on the motherboard.
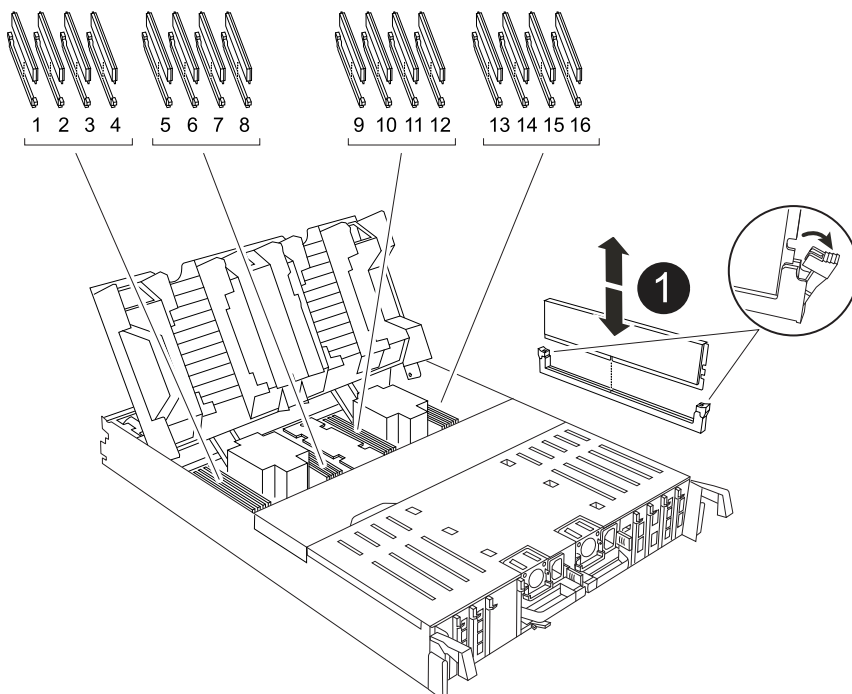
1	System DIMM

3. Note the orientation of the DIMM in the socket so that you can insert the DIMM in the replacement controller module in the proper orientation.

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

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

5. Locate the slot on the replacement controller module where you are installing the DIMM.

6. Insert the DIMM squarely into the slot.

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

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

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

8. Repeat these steps for the remaining DIMMs.

9. Close the controller air duct.

Step 6: Move the I/O modules

Move the I/O modules to the replacement controller module.
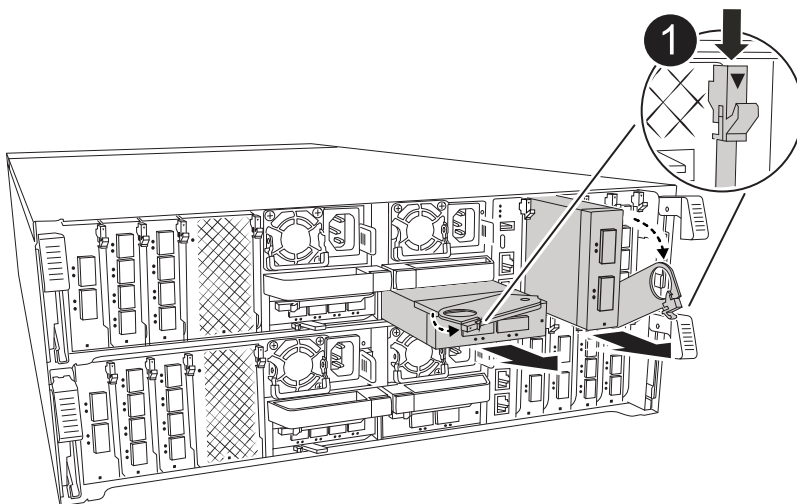
1	I/O module cam lever

1. Unplug any cabling on the target I/O module.

   Make sure that you label the cables so that you know where they came from.

2. Rotate the cable management arm down by pulling the buttons on the inside of the cable management arm

and rotating it down.

3. Remove the I/O modules from the controller module:

   a. Depress the target I/O module cam latch button.

   b. Rotate the cam latch down as far as it will go. For horizontal modules, rotate the cam away from the module as far as it will go.

   c. Remove the module from the controller module by hooking your finger into the cam lever opening and pulling the module out of the controller module.

      Make sure that you keep track of which slot the I/O module was in.

   d. Install the replacement I/O module into the replacement controller module by gently sliding the I/O module into the slot until the I/O cam latch begins to engage with the I/O cam pin, and then push the I/O cam latch all the way up to lock the module in place.

4. Repeat these steps to move the remaining I/O modules, except the modules in slots 6 and 7, to the replacement controller module.

   > ⓘ To move the I/O modules from slots 6 and 7, you must move the carrier containing these I/O modules from the impaired controller module to the replacement controller module.

5. Move the carrier containing the I/O modules in slots 6 and 7 to the replacement controller module:

   a. Press the button on the right-most handle on the carrier handle. ..Slide the carrier out of the impaired controller module insert it into the replacement controller module in the same position it was in the impaired controller module.

   b. Gently push the carrier all the way into the replacement controller module until it locks into place.

Step 7: Move the System Management module

Move the System Management module to the replacement controller module.
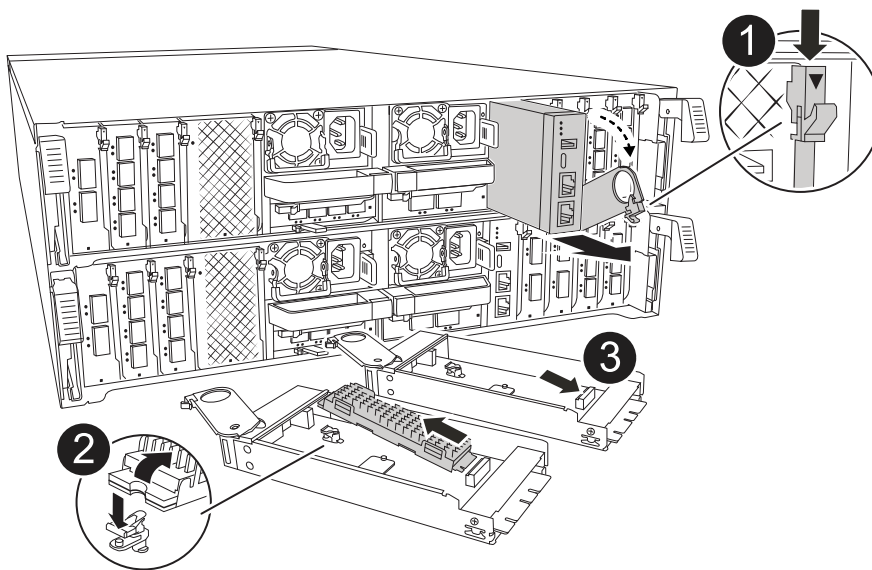
❶	System Management module cam latch

②	Boot media locking button
③	Replacement System Management module

1. Remove the System Management module from the impaired controller module:

   a. Depress the system management cam button.

   b. Rotate the cam lever all the way down.

   c. Loop your finger into the cam lever and pull the module straight out of the system.

2. Install the system management module into the replacement controller module in the same slot that it was in on the impaired controller module:

   a. Align the edges of the System Management module with the system opening and gently push it into the controller module.

   b. Gently slide the module into the slot until the cam latch begins to engage with the I/O cam pin, and then rotate the cam latch all the way up to lock the module in place.

Step 8: Move the NVRAM module

Move the NVRAM module to the replacement controller module.
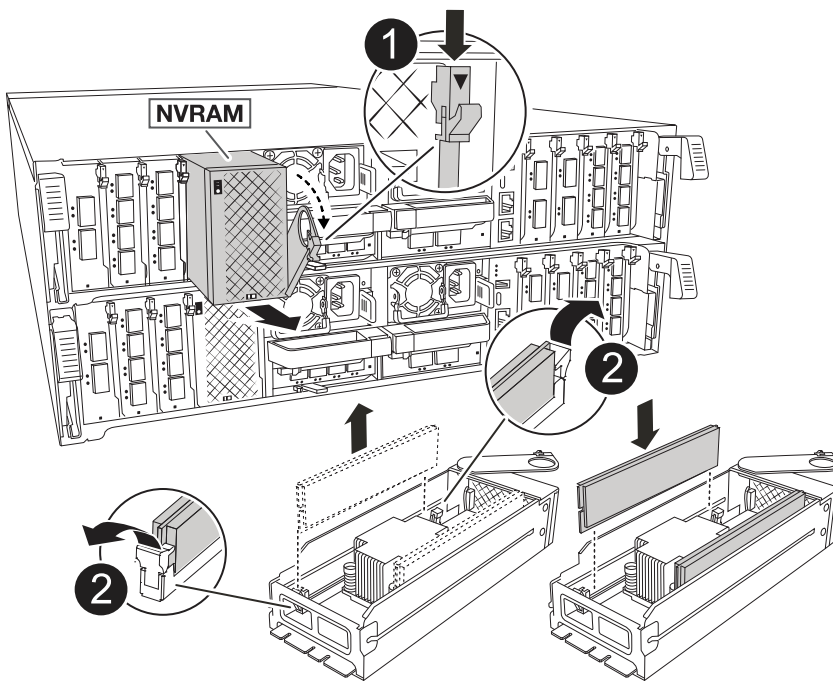
①	Cam locking button
②	DIMM locking tab

1. Remove the NVRAM module from the impaired controller module:

   a. Depress the cam latch button.

The cam button moves away from the chassis.

    b. Rotate the cam latch as far as it will go.

    c. Remove the NVRAM module from the enclosure by hooking your finger into the cam lever opening and pulling the module out of the enclosure.

2. Install the NVRAM module into slot 4/5 in the replacement controller module:

    a. Align the module with the edges of the chassis opening in slot 4/5.

    b. Gently slide the module into the slot all the way, and then push the cam latch all the way up to lock the module in place.

Step 9: Install the controller module

Reinstall the controller module and reboot it.

1. Ensure the air duct is completely closed by rotating it down as far as it will go.

   It must lie flush against the controller module sheet metal.

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

   > (i) Do not completely insert the controller module in the chassis until instructed to do so.

3. Reinstall the cable management arm, if removed, but do not reconnect any cables to the replacement controller.

4. Plug the console cable into the console port of the replacement controller module and reconnect it to the laptop so that so that it receives console messages when it reboots. The replacement controller receives power from the healthy controller and begins to reboot as soon as it is seated completely in the chassis.

5. Complete the reinstallation of the controller module:

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

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

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

    b. Rotate the locking latches upward into the locked position.

   > (i) The controller boots to the LOADER prompt as soon as it is fully seated.

6. From the LOADER prompt, enter `show date` to display the date and time on the replacement controller. Date and time are in GMT.

   > (i) Time displayed is local time not always GMT and is displayed in 24hr mode.

7. Set the current time in GMT with the `set time hh:mm:ss` command. You can get the current GMT from the partner node the `date -u`command.

8. Recable the storage system, as needed.

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

9. Plug the power cords into the power supplies.

> (i) If you have DC power supplies, reconnect the power block to the power supplies after the controller module is fully seated in the chassis.

Restore and verify the system configuration - ASA A70 and ASA A90

Verify that the controller's HA configuration is active and functioning correctly in your ASA A70 or ASA A90 storage system, and confirm that the system's adapters list all the paths to the disks.

Step 1: Verify HA config settings

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

1. Boot to maintenance mode: `boot_ontap maint`

   a. Enter `y` when you see *Continue with boot?*.

   If you see the *System ID mismatch* warning message, enter `y`.

2. Enter `sysconfig -v` and capture the display contents.

   > (i) if you see *PERSONALITY MISMATCH* contact customer support.

3. From the `sysconfig -v` output, compare the adapter card information with the cards and locations in the replacement controller.

4. Verify that all components display the same `HA` state: `ha-config show`

   The HA state should be the same for all components.

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

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

   ◦ `ha`

   ◦ `mcc` (not supported)

   ◦ `mccip` (not supported in ASA systems)

   ◦ `non-ha` (not supported)

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

Step 2: Verify disk list

1. Verify that the adapter lists the paths to all disks with the `storage show disk -p`.

   If you see any issues, check cabling and reseat cables.

2. Exit Maintenance mode: `halt.`

Give back the controller - ASA A70 and ASA A90

Return control of storage resources to the replacement controller so your ASA A70 or ASA A90 system can resume normal operation. The give back procedure varies based on the encryption type used by your system: no encryption, Onboard Key Manager (OKM) encryption, or External Key Manager (EKM) encryption.

No encryption

Return the impaired controller to normal operation by giving back its storage.

Steps

1. From the LOADER prompt, enter `boot_ontap`.

2. Press <enter> when console messages stop.

   ◦ If you see the *login* prompt, go to the next step at the end of this section.

   ◦ If you see *Waiting for giveback*, press the <enter> key, log into the partner node, and then go to the next step at the end of this section.

3. Return the impaired controller to normal operation by giving back its storage:

   `storage failover giveback -ofnode` *impaired_node_name*.

4. If automatic giveback was disabled, reenable it:

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

5. If AutoSupport is enabled, restore/unsuppress automatic case creation:

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

OKM encryption

Reset onboard encryption and return the controller to normal operation.

Steps

1. From the LOADER prompt, enter:

   `boot_ontap maint`

2. Boot to the ONTAP menu from the LOADER prompt `boot_ontap menu` and select option 10.

3. Enter the OKM passphrase. You can get this passphrase from the customer, or contact NetApp Support.

   > ⓘ You will be prompted twice for the passphrase.

4. Enter the backup key data when prompted.

5. At the boot menu, enter option `1` for normal boot.

6. Press <enter> when *Waiting for giveback* is displayed.

7. Move the console cable to the partner node and login as `admin`.

8. Give back only the CFO aggregates (the root aggregate):

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

   If you encounter errors, contact NetApp Support.

9. Wait 5 minutes after the giveback report completes, and check failover status and giveback status:

```
storage failover show and storage failover show-giveback.
```

10. Move the console cable to the replacement node and enter:

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

    > (i) You will be prompted for the cluster-wide passphrase of OKM for the cluster.

11. Check status of the keys with the following command:

    ```
    security key-manager key query -key-type svm-KEK.
    ```

    If the *Restored* column shows anything but *true*, contact NetApp Support.

12. Return the impaired controller to normal operation by giving back its storage:

    ```
    storage failover giveback -ofnode impaired_node_name.
    ```

13. If automatic giveback was disabled, reenable it:

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

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

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

EKM encryption

Reset encryption and return the controller to normal operation.

Steps

1. If the root volume is encrypted with External Key Manager and the console cable is connected to the replacement node, enter `boot_ontap menu` and select option `11`.

2. Answer `y` or `n` to the following questions:

   Do you have a copy of the /cfcard/kmip/certs/client.crt file? {y/n}

   Do you have a copy of the /cfcard/kmip/certs/client.key file? {y/n}

   Do you have a copy of the /cfcard/kmip/certs/CA.pem file? {y/n}

   OR

   Do you have a copy of the /cfcard/kmip/servers.cfg file? {y/n}

   Do you know the KMIP server address? {y/n}

   Do you know the KMIP port? {y/n}

   > (i) Contact NetApp Support if you have issues.

3. Supply the information for:

   ◦ The client certificate (client.crt) file contents.

- ◦ The client key (client.key) file contents.
- ◦ The KMIP server CA(s) (CA.pem) file contents.
- ◦ The IP address for the KMIP server.
- ◦ The port for the KMIP server.

4. Once the system processes, you will see the Boot Menu. Select '1' for normal boot.

5. Check the takeover status:

   `storage failover show.`

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

7. If automatic giveback was disabled, reenable it:

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

8. If AutoSupport is enabled, restore/unsuppress automatic case creation:

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

Complete controller replacement - ASA A70 and ASA A90

Verify that the logical interfaces (LIFs) are reporting to their home port, perform a cluster health check, and then return the failed part to NetApp to complete the final step in the ASA A70 and ASA A90 controller replacement procedure.

Step 1: Verify LIFs and check cluster health

Before returning the replacement node to service, verify that the logical interfaces are on their home ports, check the cluster health, and reset automatic giveback.

Steps

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

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

2. Check the health of your cluster. See the How to perform a cluster health check with a script in ONTAP KB article for more information.

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

Step 2: Return the failed part to NetApp

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

Replace a DIMM - ASA A70 and ASA A90

Replace a DIMM in your ASA A70 or ASA A90 system if excessive correctable or uncorrectable memory errors are detected. Such errors can prevent the storage system from booting ONTAP. The replacement process involves shutting down the impaired controller, removing it, replacing the DIMM, reinstalling the controller, and then returning the failed part to NetApp.

Before you begin

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

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

Step 1: Shut down the impaired controller

Shut down or take over the impaired controller.

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

About this task

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

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

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

Steps

1. If AutoSupport is enabled, suppress automatic case creation by invoking an AutoSupport message:
   `system node autosupport invoke -node * -type all -message MAINT=<# of hours>h`

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

2. Disable automatic giveback from the console of the healthy controller: `storage failover modify -node local -auto-giveback false`

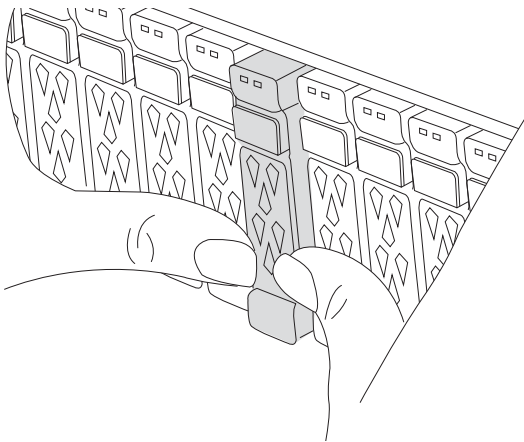   > ⓘ When you see *Do you want to disable auto-giveback?*, enter `y`.

3. Take the impaired controller to the LOADER prompt:

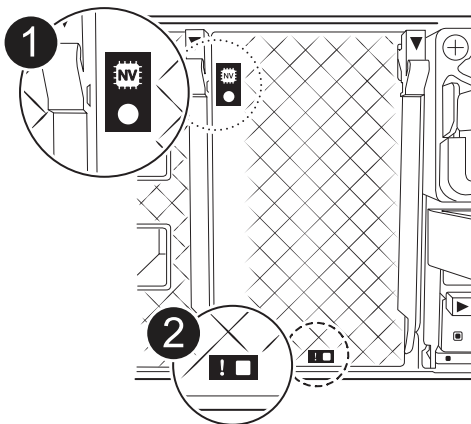| If the impaired controller is displaying…	Then…
The LOADER prompt	Go to the next step.
Waiting for giveback…	Press Ctrl-C, and then respond `y` when prompted.
System prompt or password prompt	Take over or halt the impaired controller from the healthy controller: `storage failover takeover -ofnode` *impaired_node_name* When the impaired controller shows Waiting for giveback…, press Ctrl-C, and then respond `y`.

Step 2: Remove the controller module

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

1. On the front of the chassis, use your thumbs to firmly push each drive in until you feel a positive stop. This ensures that the drives are firmly seated against the chassis midplane.

2. Check the amber NVRAM that status LED located in slot 4/5 on the back of the impaired controller module is off. Look for the NV icon.

①	NVRAM status LED
②	NVRAM attention LED

- ◦ If the NV LED is off, go to the next step.
- ◦ If the NV LED is flashing, wait for the flashing to stop. If flashing continues for longer than 5 minutes, contact Technical Support for assistance.

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

4. Unplug the controller module power supply cables from the controller module power supplies (PSU).

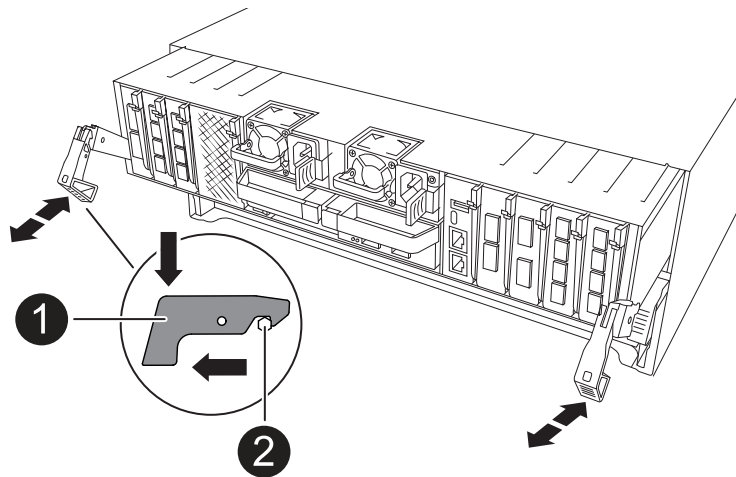> **ⓘ** If your system has DC power, disconnect the power block from the PSUs.

5. Unplug the system cables and SFP and QSFP modules (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.

6. Remove the cable management device from the controller module.

7. Press down on both of the locking latches, and then rotate both latches downward at the same time.

   The controller module moves slightly out of the chassis.

①	Locking latch
②	Locking pin

8. Slide the controller module out of the chassis and place it on a flat, stable surface.

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

Step 3: Replace a DIMM

To replace the DIMMs, locate them inside the controller and follow the specific sequence of steps.

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

2. Open the controller air duct on the top of the controller.

   a. Insert your fingers in the recesses at the far ends of the air duct.

   b. Lift the air duct and rotate it upward as far as it will go.

3. Locate the DIMMs on your controller module and identify the target DIMM.

   > ℹ️ Consult either the Netapp Hardware Universe or the FRU map on your controller module for exact DIMM locations for the AFF A70 or AFF A90.

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

   > ℹ️ Carefully hold the DIMM by the edges to avoid pressure on the components on the DIMM circuit board.
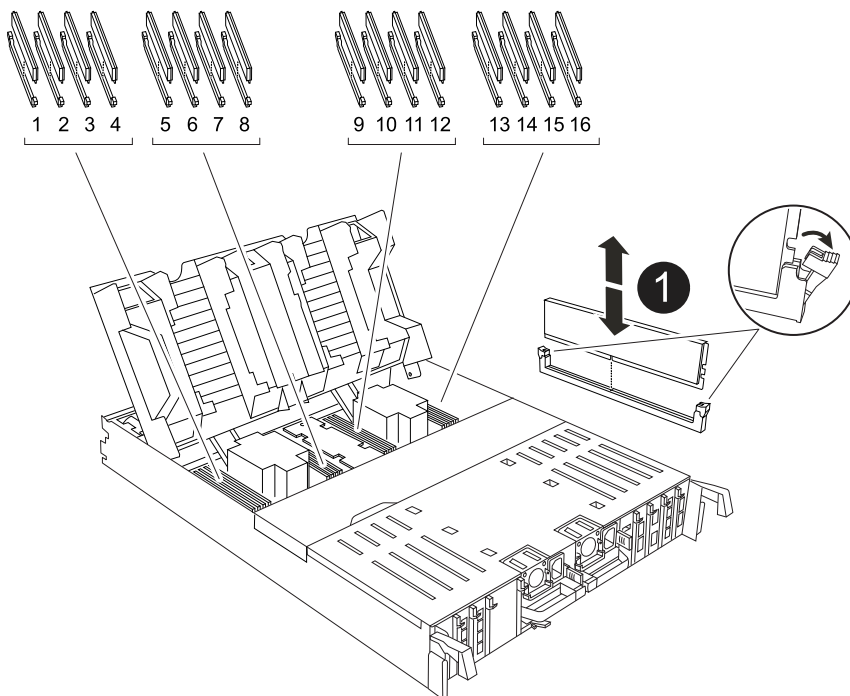
1	DIMM and DIMM ejector tabs

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

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

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

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

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

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

8. Close the controller air duct.

Step 4: Reinstall the controller module

Reinstall the controller module and reboot it.

1. Ensure the air duct is completely closed by rotating it down as far as it will go.

    It must lie flush against the controller module sheet metal.

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

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

3. Recable the storage system, as needed.

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

    ⓘ | Make sure that the console cable is connected to the repaired controller module so that it receives console messages when it reboots. The repaired controller receives power from the healthy controller and begins to reboot as soon as it is seated completely in the chassis.

4. Complete the reinstallation of the controller module:

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

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

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

    b. Rotate the locking latches upward into the locked position.

       ⓘ | If the controller boots to the LOADER prompt, reboot it with the `boot_ontap` command.

5. Plug the power cords into the power supplies.

    ⓘ | If you have DC power supplies, reconnect the power block to the power supplies after the controller module is fully seated in the chassis.

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

7. If automatic giveback was disabled, reenable it: `storage failover modify -node local -auto`

```
-giveback true.
```

8. If AutoSupport is enabled, restore/unsuppress automatic case creation: `system node autosupport invoke -node * -type all -message MAINT=END`.

Step 5: Return the failed part to NetApp

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

Replace SSD Drive -ASA A70 and ASA A90

Replace a drive in your ASA A70 or ASA A90 system when a drive fails or requires an upgrade. This process involves identifying the faulty drive, safely removing it, and installing a new drive to ensure continued data access and system performance.

You can replace a failed SSD drive nondisruptively while I/O is in progress.

When a drive fails, the platform logs a warning message to the system console indicating which drive has failed. In addition, both the fault LED on the operator display panel and the fault LED on the failed drive are illuminated.

Before you begin

- Follow best practice and install the current version of the Disk Qualification Package (DQP) before replacing a drive.

- Identify the failed disk drive by running the `storage disk show -broken` command from the system console.

  The failed drive appears in the list of failed drives. If it does not, you should wait, and then run the command again.

  > (i) It can take up to several hours for the drive to appear in the list of failed drives.

- Determine whether SED authentication is enabled.

  How you replace the disk depends on how the disk drive is being used. If SED authentication is enabled, you must use the SED replacement instructions in the ONTAP 9 NetApp Encryption Power Guide. These Instructions describe additional steps you must perform before and after replacing an SED.

- Make sure the replacement drive is supported by your platform. See the NetApp Hardware Universe.

- Make sure all other components in the system are functioning properly; if not, you must contact technical support.

About this task

Drive firmware is automatically updated (nondisruptively) on new drives that have non-current firmware versions.

When replacing several disk drives, you must wait 70 seconds between the removal of each failed disk drive and the insertion of the replacement disk drive to allow the storage system to recognize the existence of each new disk.

Steps

1. Properly ground yourself.

2. Physically identify the failed drive.

   When a drive fails, the system logs a warning message to the system console indicating which drive failed. Additionally, the attention (amber) LED on the drive shelf operator display panel and the failed drive illuminate.

   > ⓘ The activity (green) LED on a failed drive can be illuminated (solid), which indicates that the drive has power, but should not be blinking, which indicates I/O activity. A failed drive has no I/O activity.

3. Remove the failed drive:

   a. Press the release button on the drive face to open the cam handle.

   b. Slide the drive out of the shelf using the cam handle and supporting the drive with your other hand.

4. Wait a minimum of 70 seconds before inserting the replacement drive.

   This allows the system to recognize that a drive was removed.

5. Insert the replacement drive:

   a. With the cam handle in the open position, use both hands to insert the replacement drive.

   b. Push until the drive stops.

   c. Close the cam handle so that the drive is fully seated into the midplane and the handle clicks into place.

      Be sure to close the cam handle slowly so that it aligns correctly with the face of the drive.

6. Verify that the drive's activity (green) LED is illuminated.

   When the drive's activity LED is solid, it means that the drive has power. When the drive's activity LED is blinking, it means that the drive has power and I/O is in progress. If the drive firmware is automatically updating, the LED blinks.

7. If you are replacing another drive, repeat Steps 2 through 6.

8. 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.

Replace a fan module - ASA A70 and ASA A90

Replace a fan module in your ASA A70 or ASA A90 system when a fan fails or is not operating efficiently, as this can affect system cooling and overall performance. The replacement process involves shutting down the controller, removing the controller, replacing the fan, reinstalling the controller, and returning the failed part to NetApp.

To replace a fan, remove the failed fan module and replace it with a new fan module.

Step 1: Shut down the impaired controller

Shut down or take over the impaired controller.

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

About this task

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

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

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

Steps

1. If AutoSupport is enabled, suppress automatic case creation by invoking an AutoSupport message:
   `system node autosupport invoke -node * -type all -message MAINT=<# of hours>h`

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

2. Disable automatic giveback 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`.
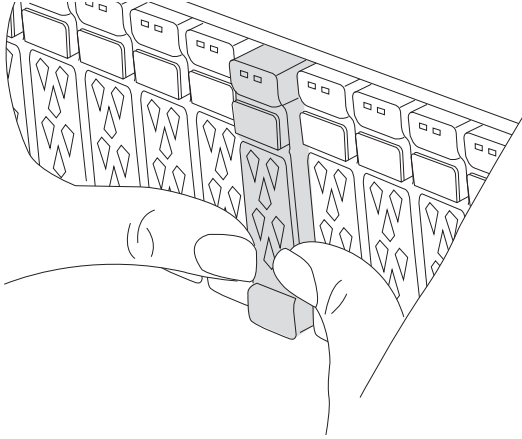
3. Take the impaired controller to the LOADER prompt:

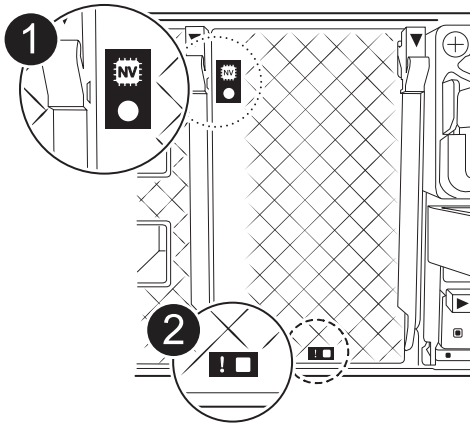 | If the impaired controller is displaying… | Then… |
   | --- | --- |
   | The LOADER prompt | Go to the next step. |
   | Waiting for giveback… | Press Ctrl-C, and then respond `y` when prompted. |
   | System prompt or password prompt | Take over or halt the impaired controller from the healthy controller: `storage failover takeover -ofnode impaired_node_name`

When the impaired controller shows Waiting for giveback…, press Ctrl-C, and then respond `y`. |

Step 2: Remove the controller module

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

1. On the front of the chassis, use your thumbs to firmly push each drive in until you feel a positive stop. This ensures that the drives are firmly seated against the chassis midplane.

2. Check the amber NVRAM that status LED located in slot 4/5 on the back of the impaired controller module is off. Look for the NV icon.

❶	NVRAM status LED
❷	NVRAM attention LED

   ◦ If the NV LED is off, go to the next step.
   ◦ If the NV LED is flashing, wait for the flashing to stop. If flashing continues for longer than 5 minutes, contact Technical Support for assistance.

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

4. Unplug the controller module power supply cables from the controller module power supplies (PSU).
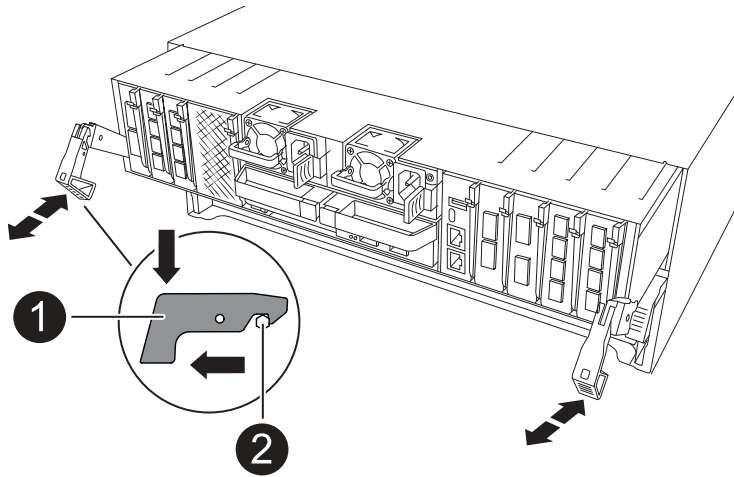
   ⓘ   If your system has DC power, disconnect the power block from the PSUs.

5. Unplug the system cables and SFP and QSFP modules (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.

6. Remove the cable management device from the controller module.

7. Press down on both of the locking latches, and then rotate both latches downward at the same time.

   The controller module moves slightly out of the chassis.

①	Locking latch
②	Locking pin

8. Slide the controller module out of the chassis and place it on a flat, stable surface.

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

Step 3: Replace fan

To replace a fan, remove the failed fan module and replace it with a new fan module.

1. Identify the fan module that you must replace by checking the console error messages.

2. Remove the fan module by pinching the locking tabs on the side of the fan module, and then lifting the fan module straight out of the controller module.
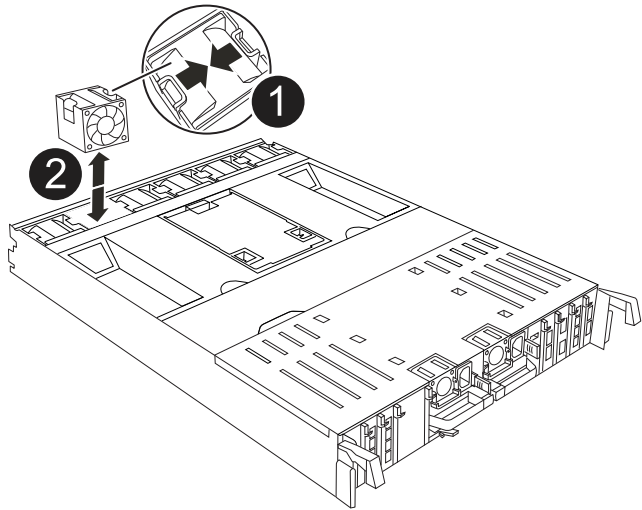
①	Fan locking tabs
②	Fan module

3. Align the edges of the replacement fan module with the opening in the controller module, and then slide the replacement fan module into the controller module until the locking latches click into place.

Step 4: Reinstall the controller module

Reinstall the controller module and reboot it.

1. Ensure the air duct is completely closed by rotating it down as far as it will go.

   It must lie flush against the controller module sheet metal.

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

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

3. Recable the storage system, as needed.

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

   > ⓘ Make sure that the console cable is connected to the repaired controller module so that it receives console messages when it reboots. The repaired controller receives power from the healthy controller and begins to reboot as soon as it is seated completely in the chassis.

4. Complete the reinstallation of the controller module:

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

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

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

    b. Rotate the locking latches upward into the locked position.

 If the controller boots to the LOADER prompt, reboot it with the `boot_ontap` command.

5. Plug the power cords into the power supplies.

 If you have DC power supplies, reconnect the power block to the power supplies after the controller module is fully seated in the chassis.

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

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

8. If AutoSupport is enabled, restore/unsuppress automatic case creation: `system node autosupport invoke -node * -type all -message MAINT=END`.

Step 5: Return the failed part to NetApp

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

Replace NVRAM - ASA A70 and ASA A90

Replace the NVRAM in your ASA A70 or ASA A90 system when the non-volatile memory becomes faulty or requires an upgrade. The replacement process involves shutting down the impaired controller, replacing the NVRAM module or the NVRAM DIMM, reassigning the disks, and returning the failed part to NetApp.

The NVRAM module consists of the NVRAM12 hardware and field-replaceable DIMMs. You can replace a failed NVRAM module or the DIMMs inside the NVRAM module.

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

Make sure you replace the failed component with a replacement component you received from NetApp.

Step 1: Shut down the impaired controller

Shut down or take over the impaired controller.

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

About this task

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

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

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

Steps

1. If AutoSupport is enabled, suppress automatic case creation by invoking an AutoSupport message:
   `system node autosupport invoke -node * -type all -message MAINT=<# of hours>h`

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

2. Disable automatic giveback from the console of the healthy controller: `storage failover modify -node local -auto-giveback false`

   > (i) 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 `y` when prompted.
System prompt or password prompt	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`.

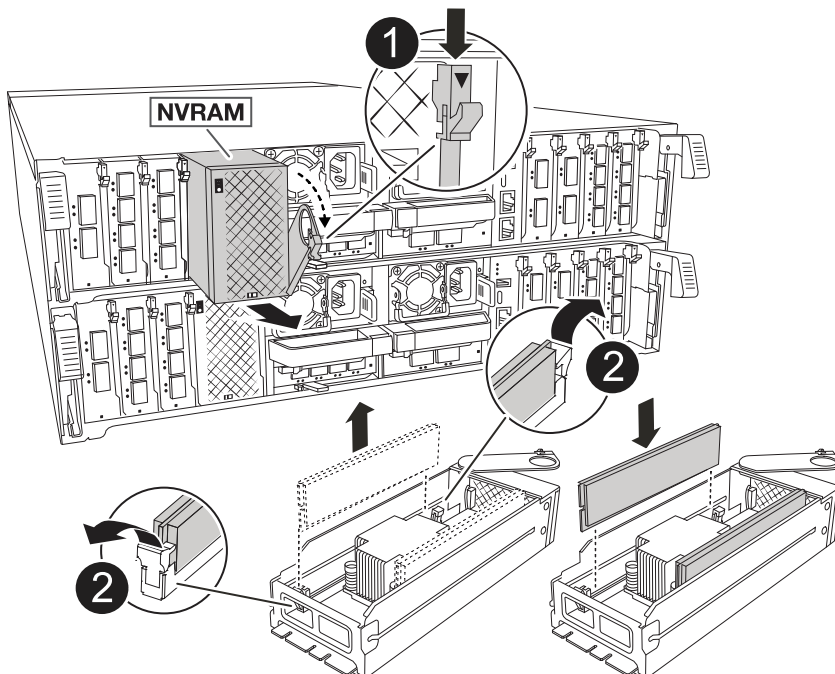## Step 2: Replace the NVRAM module

To replace the NVRAM module, locate it in slot 4/5 in the chassis and follow the specific sequence of steps.

1. On the front of the chassis, use your thumbs to firmly push each drive in until you feel a positive stop. This ensures that the drives are firmly seated against the chassis midplane.

2. Go to the rear of the chassis. If you are not already grounded, properly ground yourself.

3. Disconnect power to the controller module by pulling the controller module out about three inches:

   a. Press down on both of the controller module locking latches, and then rotate both latches downward at the same time.

   b. Pull the controller module about 3 inches out of the chassis to disengage power.

4. Rotate the cable management tray down by pulling the buttons on the inside of the cable management tray and rotating it down.

5. Remove the target NVRAM module from the chassis:

   a. Depress the cam latch button.

      The cam button moves away from the chassis.

   b. Rotate the cam latch as far as it will go.

   c. Remove the impaired NVRAM module from the chassis by hooking your finger into the cam lever opening and pulling the module out of the chassis.

❶	Cam locking button
❷	DIMM locking tabs

6. Set the NVRAM module on a stable surface.

7. Remove the DIMMs, one at a time, from the impaired NVRAM module and install them in the replacement NVRAM module.

8. Install the replacement NVRAM module into the chassis:

   a. Align the module with the edges of the chassis opening in slot 4/5.

   b. Gently slide the module into the slot all the way, and then push the cam latch all the way up to lock the module in place.

9. Reconnect power to the controller module:

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

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

   b. Rotate the locking latches upward into the locked position.

      ⓘ   The controller reboots as soon as it is fully seated in the chassis.

10. Rotate the cable management tray up to the closed position.

Step 3: Replace a NVRAM DIMM

To replace NVRAM DIMMs in the NVRAM module, you must remove the NVRAM module, and then replace the target DIMM.

1. On the front of the chassis, use your thumbs to firmly push each drive in until you feel a positive stop. This ensures that the drives are firmly seated against the chassis midplane.


2. Go to the rear of the chassis. If you are not already grounded, properly ground yourself.

3. Disconnect power to the controller module by pulling the controller module out about three inches:

   a. Press down on both of the controller module locking latches, and then rotate both latches downward at

the same time.

   b. Pull the controller module about 3 inches out of the chassis to disengage power.

4. Rotate the cable management tray down by gently pulling the pins on the ends of the tray and rotating the tray down.

5. Remove the target NVRAM module from the chassis:

   a. Depress the cam button.

      The cam button moves away from the chassis.

   b. Rotate the cam latch as far as it will go.

   c. Remove the NVRAM module from the chassis by hooking your finger into the cam lever opening and pulling the module out of the chassis.
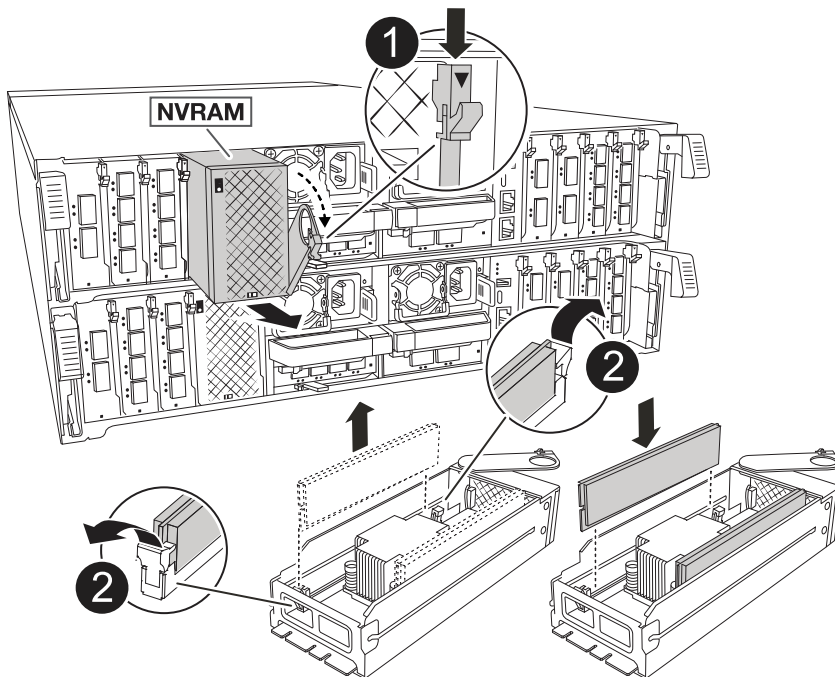
❶	Cam locking button
❷	DIMM locking tabs

6. Set the NVRAM module on a stable surface.

7. Locate the DIMM to be replaced inside the NVRAM module.

    (i)   Consult the FRU map label on the side of the NVRAM module to determine the locations of DIMM slots 1 and 2.

8. Remove the DIMM by pressing down on the DIMM locking tabs and lifting the DIMM out of the socket.

9. Install the replacement DIMM by aligning the DIMM with the socket and gently pushing the DIMM into the socket until the locking tabs lock in place.

10. Install the NVRAM module into the chassis:

a. Gently slide the module into the slot until the cam latch begins to engage with the I/O cam pin, and then rotate the cam latch all the way up to lock the module in place.

11. Reconnect power to the controller module:

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

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

    b. Rotate the locking latches upward into the locked position.

       (i) The controller reboots as soon as it is fully seated in the chassis.

12. Rotate the cable management tray up to the closed position.

Step 4: Verify controller state

You must confirm the controller state of the controllers connected to the disk pool when you boot the controller.

Steps

1. If the controller is in Maintenance mode (showing the `*>` prompt), exit Maintenance mode and go to the LOADER prompt: *halt*

2. From the LOADER prompt on the controller, boot the controller and enter *y* when prompted to override the system ID due to a system ID mismatch.

3. Wait until the Waiting for giveback… message is displayed on the console of the controller with the replacement module and then, from the healthy controller, verify the system state: *storage failover show*

   In the command output, you should see a message indicates the state of the controllers.

```
                            Takeover
Node            Partner         Possible State Description
-------------- -------------- --------
------------------------------------
<nodename>
               <nodename>-    true     Connected to <nodename>-P2-3-178.
               P2-3-178                 Waiting for cluster applications
to
                                       come online on the local node.
AFF-A90-NBC-P2-3-178
               <nodename>-    true     Connected to <nodename>-P2-3-177,
               P2-3-177                 Partial giveback
2 entries were displayed.
```

4. Give back the controller:

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

       The controller connects back its storage pool and completes booting.

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

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

For more information, see the Manual giveback commands topic to override the veto.

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

5. Verify all disks are displayed: `storage disk show`

```
::> storage disk show
                        Usable           Disk    Container   Container
Disk                      Size Shelf Bay Type    Type        Name
---------------- ---------- ----- --- ------- ----------- ---------
1.0.0                    3.49TB     0   0 SSD-NVM aggregate   pod_NVME_SSD_1
1.0.1                    3.49TB     0   1 SSD-NVM aggregate   pod_NVME_SSD_1
1.0.2                    3.49TB     0   2 SSD-NVM aggregate   pod_NVME_SSD_1
1.0.3                    3.49TB     0   3 SSD-NVM aggregate   pod_NVME_SSD_1
1.0.4                    3.49TB     0   4 SSD-NVM aggregate   pod_NVME_SSD_1

[...]
48 entries were displayed.
```

Step 5: Return the failed part to NetApp

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

Replace the NV battery - ASA A70 and ASA A90

Replace the NV battery in your ASA A70 or ASA A90 system when the battery begins to lose charge or fails, as it is responsible for preserving critical system data during power outages. The replacement process involves shutting down the impaired controller, removing the controller module, replacing the NV battery, reinstalling the controller module, and returning the failed part to NetApp.

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

Step 1: Shut down the impaired controller

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

About this task

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

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

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

Steps

1. If AutoSupport is enabled, suppress automatic case creation by invoking an AutoSupport message:
   `system node autosupport invoke -node * -type all -message MAINT=<# of hours>h`

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

2. Disable automatic giveback from the console of the healthy controller: `storage failover modify -node local -auto-giveback false`

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

3. Take the impaired controller to the LOADER prompt:

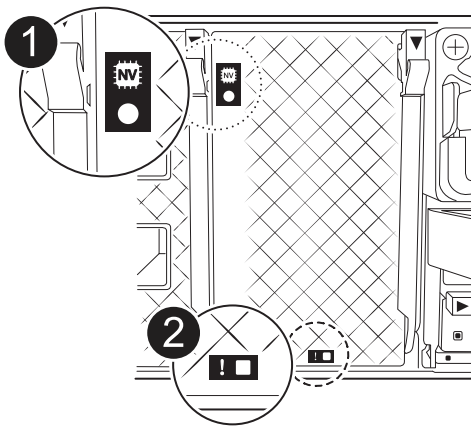| If the impaired controller is displaying…	Then…
The LOADER prompt	Go to the next step.
Waiting for giveback…	Press Ctrl-C, and then respond `y` when prompted.
System prompt or password prompt	Take over or halt the impaired controller from the healthy controller: `storage failover takeover -ofnode impaired_node_name` When the impaired controller shows Waiting for giveback…, press Ctrl-C, and then respond `y`.

Step 2: Remove the controller module

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

1. On the front of the chassis, use your thumbs to firmly push each drive in until you feel a positive stop. This ensures that the drives are firmly seated against the chassis midplane.

2. Check the amber NVRAM that status LED located in slot 4/5 on the back of the impaired controller module is off. Look for the NV icon.

❶	NVRAM status LED
❷	NVRAM attention LED

- If the NV LED is off, go to the next step.
- If the NV LED is flashing, wait for the flashing to stop. If flashing continues for longer than 5 minutes, contact Technical Support for assistance.

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

4. Unplug the controller module power supply cables from the controller module power supplies (PSU).

> ⓘ   If your system has DC power, disconnect the power block from the PSUs.

5. Unplug the system cables and SFP and QSFP modules (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.

6. Remove the cable management device from the controller module.

7. Press down on both of the locking latches, and then rotate both latches downward at the same time.

   The controller module moves slightly out of the chassis.

①	Locking latch
②	Locking pin

8. Slide the controller module out of the chassis and place it on a flat, stable surface.

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

Step 3: Replace the NV battery

Remove the failed NV battery from the controller module and install the replacement NV battery.

1. Open the air duct cover and locate the NV battery.
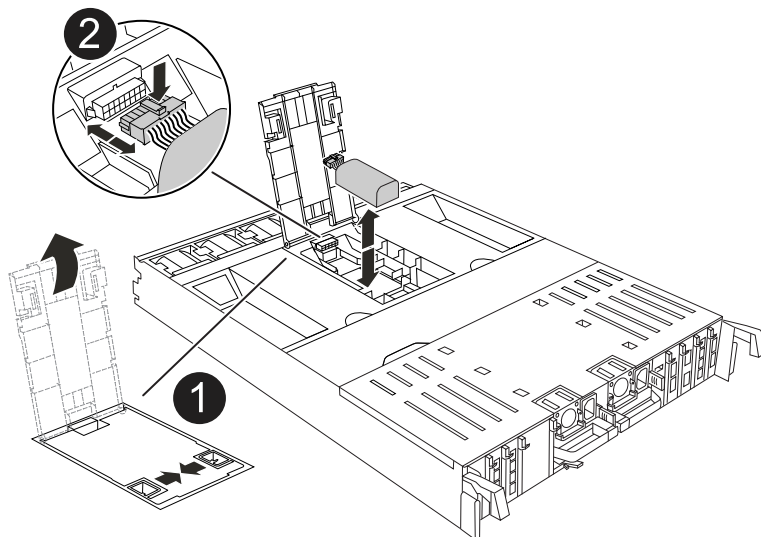
❶	NV battery air duct cover
❷	NV battery plug

2. Lift the battery up to access the battery plug.

3. Squeeze the clip on the face of the battery plug to release the plug from the socket, and then unplug the battery cable from the socket.

4. Lift the battery out of the air duct and controller module, and then set it aside.

5. Remove the replacement battery from its package.

6. Install the replacement battery pack into the controller:

   a. Plug the battery plug into the riser socket and make sure that the plug locks into place.

   b. Insert the battery pack into the slot and press firmly down on the battery pack to make sure that it is locked into place.

7. Close the NV air duct cover.

   Make sure that the plug locks into the socket.

Step 4: Reinstall the controller module

Reinstall the controller module and reboot it.

1. Ensure the air duct is completely closed by rotating it down as far as it will go.

   It must lie flush against the controller module sheet metal.

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

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

3. Recable the storage system, as needed.

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

   > ⓘ   Make sure that the console cable is connected to the repaired controller module so that it receives console messages when it reboots. The repaired controller receives power from the healthy controller and begins to reboot as soon as it is seated completely in the chassis.

4. Complete the reinstallation of the controller module:

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

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

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

    b. Rotate the locking latches upward into the locked position.

> **ⓘ** If the controller boots to the LOADER prompt, reboot it with the `boot_ontap` command.

5. Plug the power cords into the power supplies.

> **ⓘ** If you have DC power supplies, reconnect the power block to the power supplies after the controller module is fully seated in the chassis.

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

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

8. If AutoSupport is enabled, restore/unsuppress automatic case creation: `system node autosupport invoke -node * -type all -message MAINT=END`.

Step 5: Return the failed part to NetApp

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

I/O module

Overview of add and replace I/O module - ASA A70 and ASA A90

The ASA A70 and ASA A90 systems offer flexibility in expanding or replacing I/O modules to enhance network connectivity and performance. Adding or replacing an I/O module is essential when upgrading network capabilities or addressing a failed module.

You can replace a failed I/O module in your ASA A70 or ASA A90 storage system with the same type of I/O module, or with a different kind of I/O module. You can also add an I/O module into a system with empty slots.
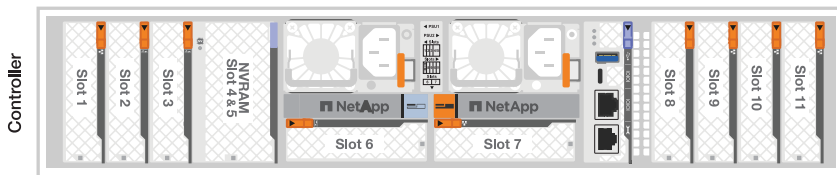
- Add an I/O module

  Adding additional modules can improve redundancy, helping to ensure that the system remains operational even if one module fails.

- Replace an I/O module

  Replacing a failing I/O module can restore the system to its optimal operating state.

I/O slot numbering

The I/O slots on ASA A70 and ASA A90 controllers are numbered 1 through 11, as shown in the following illustration.

Add I/O module - ASA A70 and ASA A90

Add an I/O module to your ASA A70 or ASA A90 system to enhance network connectivity and expand your system's ability to handle data traffic.

You can add an I/O module to your ASA A70 and ASA A90 storage system when there are empty slots available or when all slots are fully populated.

Step 1: Shut down the impaired controller module

Shut down or take over the impaired controller module.

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.

Before you begin

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

   The following AutoSupport command 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.

If the impaired controller is displaying…	Then…
System prompt or password prompt (enter system password)	Halt or take over 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`.

Step 2: Add the new I/O module

If the storage system has available slots, install the new I/O module into one of the available slots. If all slots are occupied, remove an existing I/O module to make space and then install the new one.

Before you begin

- Check the NetApp Hardware Universe to make sure that the new I/O module is compatible with your storage system and version of ONTAP you're running.
- If multiple slots are available, check the slot priorities in NetApp Hardware Universe and use the best one available for your I/O module.
- Make sure that all other components are functioning properly.

Add I/O module to an available slot

You can add a new I/O module into a storage system with available slots.

Steps

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

2. Rotate the cable management tray down by pulling the buttons on the inside of the cable management tray and rotating it down.

3. Remove the target slot blanking module from the carrier:

   a. Depress the cam latch on the blanking module in the target slot.

   b. Rotate the cam latch away from the module as far as it will go.

   c. Remove the module from the enclosure by hooking your finger into the cam lever opening and pulling the module out of the enclosure.

4. Install the I/O module:

   a. Align the I/O module with the edges of the enclosure slot opening.

   b. Gently slide the module into the slot all the way into the enclosure, and then rotate the cam latch all the way up to lock the module in place.

5. Cable the I/O module to the designated device.

   (i) Make sure that any unused I/O slots have blanks installed to prevent possible thermal issues.

6. Rotate the cable management tray up to the closed position.

7. From the LOADER prompt, reboot the node:

   `bye`

   (i) This reinitializes the I/O module and other components and reboots the node.

8. Give back the controller from the partner controller:

   `storage failover giveback -ofnode target_node_name`

9. Repeat these steps for controller B.

10. From the healthy node, restore automatic giveback if you disabled it:

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

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

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

Add I/O module to a fully-populated system

You can add an I/O module to a fully-populated system by removing an existing I/O module and installing a new one in its place.

About this task

Make sure you understand the following scenarios for adding a new I/O module to a fully-populated system:

Scenario	Action required
NIC to NIC (same number of ports)	The LIFs will automatically migrate when its controller module is shut down.
NIC to NIC (different number of ports)	Permanently reassign the selected LIFs to a different home port. See Migrating a LIF for more information.
NIC to storage I/O module	Use System Manager to permanently migrate the LIFs to different home ports, as described in Migrating a LIF.

Steps

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

2. Unplug any cabling on the target I/O module.

3. Rotate the cable management tray down by pulling the buttons on the inside of the cable management tray and rotating it down.

4. Remove the target I/O module from the chassis:

   a. Depress the cam latch button.

   b. Rotate the cam latch away from the module as far as it will go.

   c. Remove the module from the enclosure by hooking your finger into the cam lever opening and pulling the module out of the enclosure.

   Make sure that you keep track of which slot the I/O module was in.

5. Install the I/O module into the target slot in the enclosure:

   a. Align the module with the edges of the enclosure slot opening.

   b. Gently slide the module into the slot all the way into the enclosure, and then rotate the cam latch all the way up to lock the module in place.

6. Cable the I/O module to the designated device.

7. Repeat the remove and install steps to replace additional modules for the controller.

8. Rotate the cable management tray up to the closed position.

9. Reboot the controller from the LOADER prompt:_bye_

   This reinitializes the PCIe cards and other components and reboots the node.

   (i) If you encounter an issue during reboot, see BURT 1494308 - Environment shutdown might be triggered during I/O module replacement

10. Give back the controller from the partner controller:

    storage failover giveback -ofnode target_node_name

11. Enable automatic giveback if it was disabled:

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

12. Do one of the following:

    ○ If you removed a NIC I/O module and installed a new NIC I/O module, use the following network command for each port:

    ```
    storage port modify -node *<node name> -port *<port name> -mode network
    ```

    ○ If you removed a NIC I/O module and installed a storage I/O module, install and cable your NS224 shelves, as described in Hot-add workflow.

13. Repeat these steps for controller B.

Replace I/O module - ASA A70 and ASA A90

Replace an I/O module in your ASA A70 or ASA A90 system when the module fails or requires an upgrade to support higher performance or additional features. The replacement process involves shutting down the controller, replacing the failed I/O module, rebooting the controller, and returning the failed part to NetApp.

You can use this procedure with all versions of ONTAP supported by your storage system.

Before you begin

- You must have the replacement part available.
- Make sure all other components in the storage system are functioning properly; if not, contact technical support.

Step 1: Shut down the impaired controller

Shut down or take over the impaired controller.

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

About this task

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

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

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

Steps

1. If AutoSupport is enabled, suppress automatic case creation by invoking an AutoSupport message:
   ```
   system node autosupport invoke -node * -type all -message MAINT=<# of hours>h
   ```

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

2. Disable automatic giveback from the console of the healthy controller: `storage failover modify -node local -auto-giveback false`

> ℹ️ 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 `y` when prompted.
System prompt or password prompt	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`.

Step 2: Replace a failed I/O module

To replace an I/O module, locate it within the controller module and follow the specific sequence of steps.

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

2. Unplug any cabling on the target I/O module.

   Make sure to label the cables so that you know where they came from.

3. Rotate the cable management tray down by pulling the buttons on the inside of the cable management tray and rotating it down.

4. Remove the I/O module from the controller module:

> ℹ️ This following illustration shows removing a horizontal and vertical I/O module. Typically, you will only remove one I/O module.
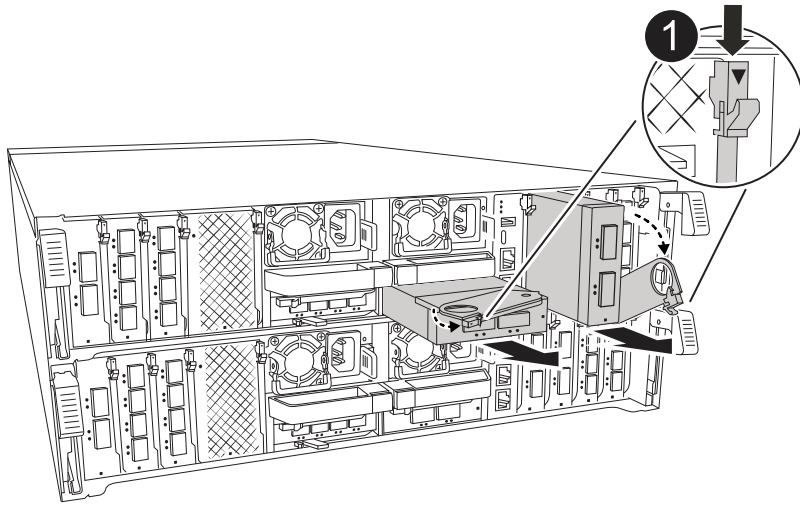
1	Cam locking button

    a. Depress the cam latch button.

    b. Rotate the cam latch do away from the module as far as it will go.

    c. Remove the module from the controller module by hooking your finger into the cam lever opening and pulling the module out of the controller module.

       Make sure that you keep track of which slot the I/O module was in.

5. Set the I/O module aside.

6. Install the replacement I/O module into the target slot:

    a. Align the I/O module with the edges of the slot.

    b. Gently slide the module into the slot all the way into the controller module, and then rotate the cam latch all the way up to lock the module in place.

7. Cable the I/O module.

8. Repeat the remove and install steps to replace additional modules for the controller.

9. Rotate the cable management tray into the locked position.

Step 3: Reboot the controller

After you replace an I/O module, you must reboot the controller module.

Steps

1. From the LOADER prompt, reboot the node:`bye`

           This reinitializes the I/O cards and other components and reboots the node.

           Be sure to exit Maintenance mode after completing the conversion.

2. Return the node to normal operation: `storage failover giveback -ofnode impaired_node_name`

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

Step 4: Return the failed part to NetApp

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

Replace a power supply - ASA A70 and ASA A90

Replace an AC or DC power supply unit (PSU) in your ASA A70 or ASA A90 system when it fails or becomes faulty, ensuring that your system continues to receive the required power for stable operation. The replacement process involves disconnecting the target PSU from the power source, unplugging the power cable, removing the faulty PSU and installing the replacement PSU, and then reconnecting it to the power source.

The power supplies are redundant and hot-swappable.

About this task

This procedure is written for replacing one PSU at a time.

> (i) Do not mix PSUs with different efficiency ratings or different input types. Always replace like for like.

Use the appropriate procedure for your type of PSU: AC or DC.

Option 1: Replace an AC PSU

To replace an AC PSU, complete the following steps.

Steps

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

2. Identify the PSU you want to replace, based on console error messages or through the red Fault LED on the PSU.

3. Disconnect the PSU:

    a. Open the power cable retainer, and then unplug the power cable from the PSU.

4. Remove the PSU by rotating the handle up, press the locking tab, and then pull PSU out of the controller module.

> ⚠️ The PSU is short. Always use two hands to support it when removing it from the controller module so that it does not suddenly swing free from the controller module and injure you.
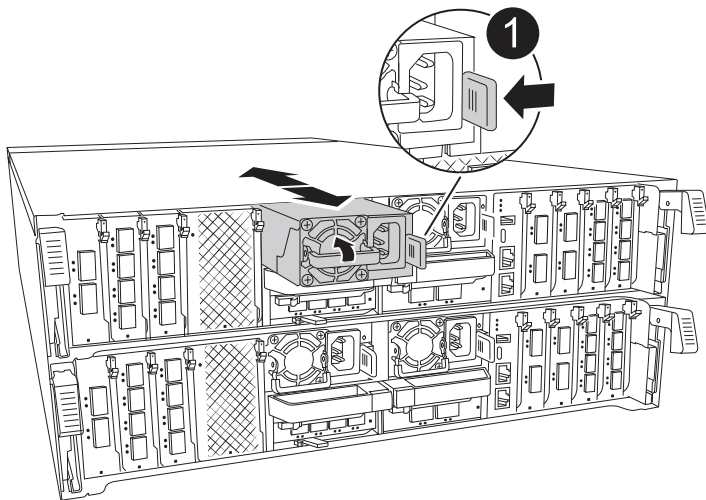
❶	Terracotta PSU locking tab

5. Install the replacement PSU in the controller module:

    a. Using both hands, support and align the edges of the replacement PSU with the opening in the controller module.

    b. Gently push the PSU into the controller module until the locking tab clicks into place.

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

    > ℹ️ To avoid damaging the internal connector, do not use excessive force when sliding the PSU into the system.

6. Reconnect the PSU cabling:

    a. Reconnect the power cable to the PSU.

b. Secure the power cable to the PSU using the power cable retainer.

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

7. 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.

Option 2: Replace a DC PSU

To replace a DC PSU, complete the following steps.

Steps

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

2. Identify the PSU you want to replace, based on console error messages or through the red Fault LED on the PSU.

3. Disconnect the PSU:

   a. Unscrew the D-SUB DC cable connector using the thumb screws on the plug.

   b. Unplug the cable from the PSU and set it aside.

4. Remove the PSU by rotating the handle up, press the locking tab, and then pull the PSU out of the controller module.

> ⚠️ The PSU is short. Always use two hands to support it when removing it from the controller module so that it does not suddenly swing free from the controller module and injure you.
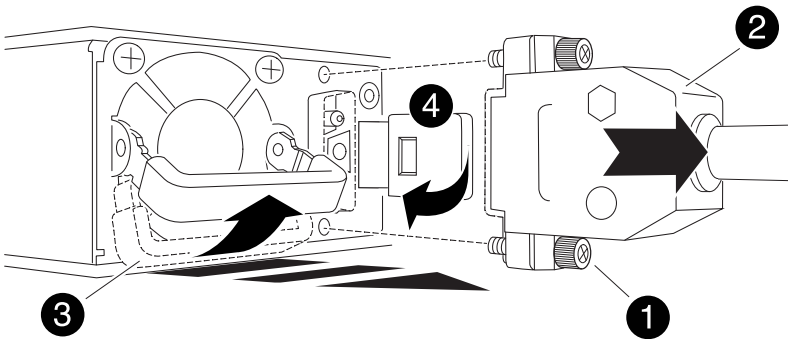
❶	Thumb screws
❷	D-SUB DC power PSU cable connector
❸	Power supply handle
❹	Blue PSU locking tab

5. Install the replacement PSU in the controller module:

   a. Using both hands, support and align the edges of the replacement PSU with the opening in the controller module.

b. Gently push the PSU into the controller module until the locking tab clicks into place.

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

> ⓘ To avoid damaging the internal connector, do not use excessive force when sliding the PSU into the system.

6. Reconnect the D-SUB DC power cable:

   a. Plug the power cable connector into the PSU.

   b. Secure the power cable to the PSU with the thumbscrews.

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

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

Replace the real-time clock battery - ASA A70 and ASA A90

Replace the real-time clock (RTC) battery, commonly known as a coin cell battery, in your ASA A70 or ASA A90 system to ensure that services and applications relying on accurate time synchronization remain operational.

You can use this procedure with all versions of ONTAP supported by your system.

Make sure all other components in the system are functioning properly; if not, you must contact technical support.

Step 1: Shut down the impaired controller

Shut down or take over the impaired controller.

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

About this task

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

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

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

Steps

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

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

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

2. Disable automatic giveback from the console of the healthy controller: `storage failover modify`
`-node local -auto-giveback false`

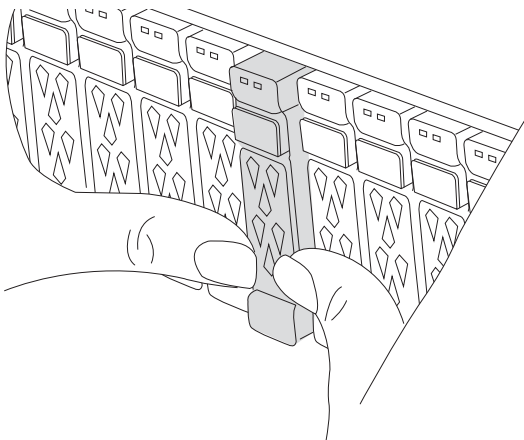> (i) When you see *Do you want to disable auto-giveback?*, enter `y`.

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 `y` when prompted.
System prompt or password prompt	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`.

Step 2: Remove the controller module

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

1. On the front of the chassis, use your thumbs to firmly push each drive in until you feel a positive stop. This ensures that the drives are firmly seated against the chassis midplane.

2. Check the amber NVRAM that status LED located in slot 4/5 on the back of the impaired controller module is off. Look for the NV icon.

1	NVRAM status LED
2	NVRAM attention LED

- If the NV LED is off, go to the next step.
- If the NV LED is flashing, wait for the flashing to stop. If flashing continues for longer than 5 minutes, contact Technical Support for assistance.

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

4. Unplug the controller module power supply cables from the controller module power supplies (PSU).

> ℹ️ If your system has DC power, disconnect the power block from the PSUs.

5. Unplug the system cables and SFP and QSFP modules (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.

6. Remove the cable management device from the controller module.

7. Press down on both of the locking latches, and then rotate both latches downward at the same time.

   The controller module moves slightly out of the chassis.

❶	Locking latch
❷	Locking pin

8. Slide the controller module out of the chassis and place it on a flat, stable surface.

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

Step 3: Replace the RTC battery

Remove failed RTC battery and install the replacement RTC battery.

1. Open the controller air duct on the top of the controller.

   a. Insert your fingers in the recesses at the far ends of the air duct.

   b. Lift the air duct and rotate it upward as far as it will go.

2. Locate the RTC battery under the air duct.
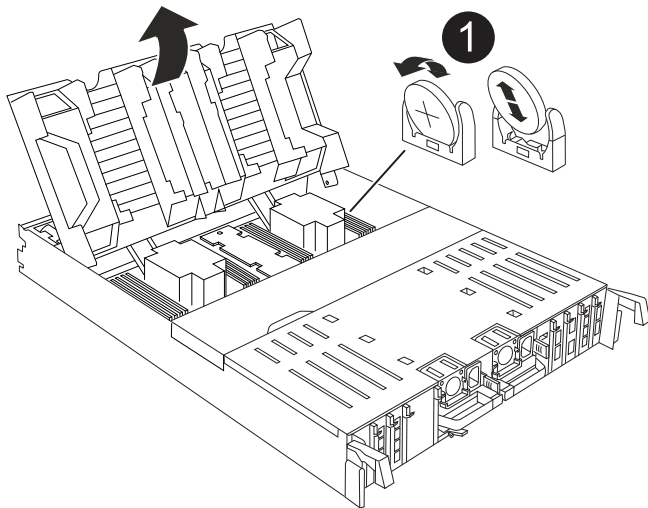
1	RTC battery and housing

3. Gently push the battery away from the holder, rotate it away from the holder, and then lift it out of the holder.

> (i) Note the polarity of the battery as you remove it from the holder. The battery is marked with a plus sign and must be positioned in the holder correctly. A plus sign near the holder tells you how the battery should be positioned.

4. Remove the replacement battery from the antistatic shipping bag.

5. Note the polarity of the RTC battery, and then insert it into the holder by tilting the battery at an angle and pushing down.

6. Visually inspect the battery to make sure that it is completely installed into the holder and that the polarity is correct.

Step 4: Reinstall the controller module

Reinstall the controller module and reboot it.

1. Ensure the air duct is completely closed by rotating it down as far as it will go.

   It must lie flush against the controller module sheet metal.

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

   > (i) Do not completely insert the controller module in the chassis until instructed to do so.

3. Recable the storage system, as needed.

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

   > (i) Make sure that the console cable is connected to the repaired controller module so that it receives console messages when it reboots. The repaired controller receives power from the healthy controller and begins to reboot as soon as it is seated completely in the chassis.

4. Complete the reinstallation of the controller module:

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

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

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

   b. Rotate the locking latches upward into the locked position.

      > (i) If the controller boots to the LOADER prompt, reboot it with the `boot_ontap` command.

5. Plug the power cords into the power supplies.

> ℹ️ If you have DC power supplies, reconnect the power block to the power supplies after the controller module is fully seated in the chassis.

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

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

8. If AutoSupport is enabled, restore/unsuppress automatic case creation: `system node autosupport invoke -node * -type all -message MAINT=END.`

Step 5: Reset the time and date on the controller

> ℹ️ After replacing the RTC battery, inserting controller and powering on first BIOS reset, you will see the following error messages: `RTC date/time error. Reset date/time to default` `RTC power failure error` These messages are excpected and you can continue with this procedure.

1. Check the date and time on the healthy controller with the `cluster date show` command.

> ℹ️ If your system stops at the boot menu, select the option for `Reboot node` and respond *y* when prompted, then boot to LOADER by pressing *Ctrl-C*

   a. At the LOADER prompt on the target controller, check the time and date with the `cluster date show` command.

   b. If necessary, modify the date with the `set date mm/dd/yyyy` command.

   c. If necessary, set the time, in GMT, using the `set time hh:mm:ss` command.

      1. Confirm the date and time on the target controller.

      2. At the LOADER prompt, enter *bye* to reinitialize the PCIe cards and other components and let the controller reboot.

Step 6: Return the failed part to NetApp

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

Replace the system management module - ASA A70 and ASA A90

Replace the System Management module in your ASA A70 or ASA A90 system when it becomes defective or its firmware is corrupted. The replacement process involves shutting down the controller, replacing the failed System Management module, rebooting the controller, updating the license keys, and returning the failed part to NetApp.

The System Management module, located at the back of the controller in slot 8, contains onboard components

for system management, as well as ports for external management. The target controller must be shut down to replace an impaired System Management module or replace the boot media.

The System Management module has the following onboard components:

- Boot media, allowing boot media replacement without removing the controller module.
- BMC
- Management switch

The System Management module also contains the following ports for external management:

- RJ45 Serial
- USB Serial (Type-C)
- USB Type-A (Boot recovery)
- e0M RJ45 Ethernet

Before you begin

- This procedure uses the following terminology:
  - The impaired controller is the controller on which you are performing maintenance.
  - The healthy controller is the HA partner of the impaired controller.
- All other system components must be working properly.
- The partner controller must be able to take over the impaired controller.
- You must replace the failed component with a replacement FRU component you received from your provider.

Step 1: Shut down the impaired controller

Shut down or take over the impaired controller.

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

About this task

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

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

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

Steps

1. If AutoSupport is enabled, suppress automatic case creation by invoking an AutoSupport message:
   `system node autosupport invoke -node * -type all -message MAINT=<# of hours>h`

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

2. Disable automatic giveback 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 `y` when prompted.
System prompt or password prompt	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`.

Step 2: Replace the impaired System Management module

Replace the impaired system management module.

1. On the front of the chassis, use your thumbs to firmly push each drive in until you feel a positive stop. This ensures that the drives are firmly seated against the chassis midplane.

> ⓘ　Make sure NVRAM destage has completed before proceeding.
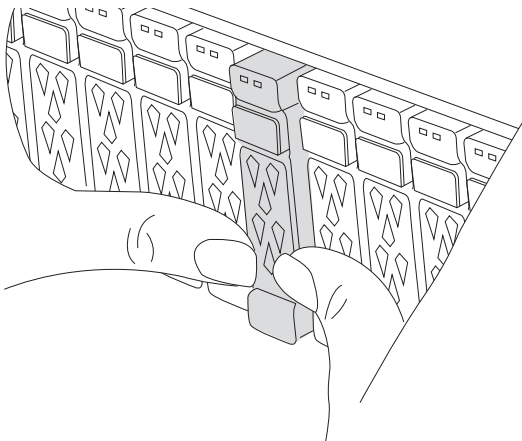
2. Go to the rear of the chassis. If you are not already grounded, properly ground yourself.

3. Disconnect power to the controller module by pulling the controller module out about three inches:

a. Press down on both of the controller module locking latches, and then rotate both latches downward at the same time.

b. Pull the controller module about 3 inches out of the chassis to disengage power.

4. Rotate the cable management tray down by pulling the buttons on both sides on the inside of the cable management tray and then rotate the tray down.

5. Remove the System Management module:

a. Remove any cables connected to the System Management module. Make sure that label where the cables were connected, so that you can connect them to the correct ports when you reinstall the module.
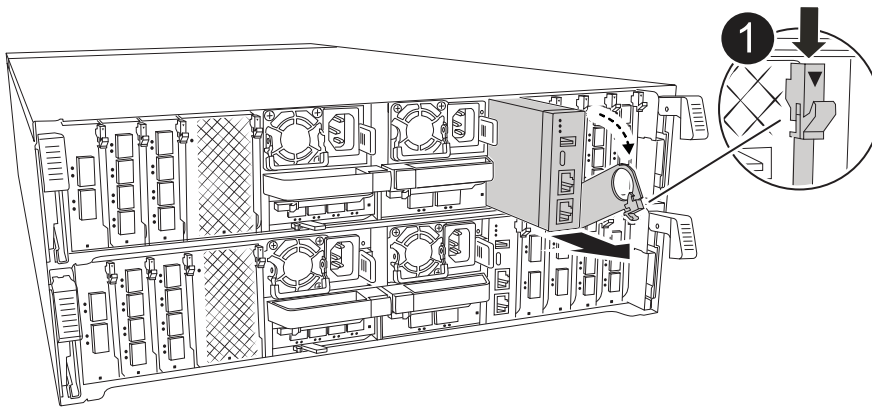
❶	System Management module cam latch

6. Remove the System Management module:

a. Depress the system management cam button. The cam lever moves away from the chassis.

b. Rotate the cam lever all the way down.

c. Loop your finger into the cam lever and pull the module straight out of the system.

d. Place the System Management module on an anti-static mat, so that the boot media is accessible.

7. Move the boot media to the replacement System Management module:
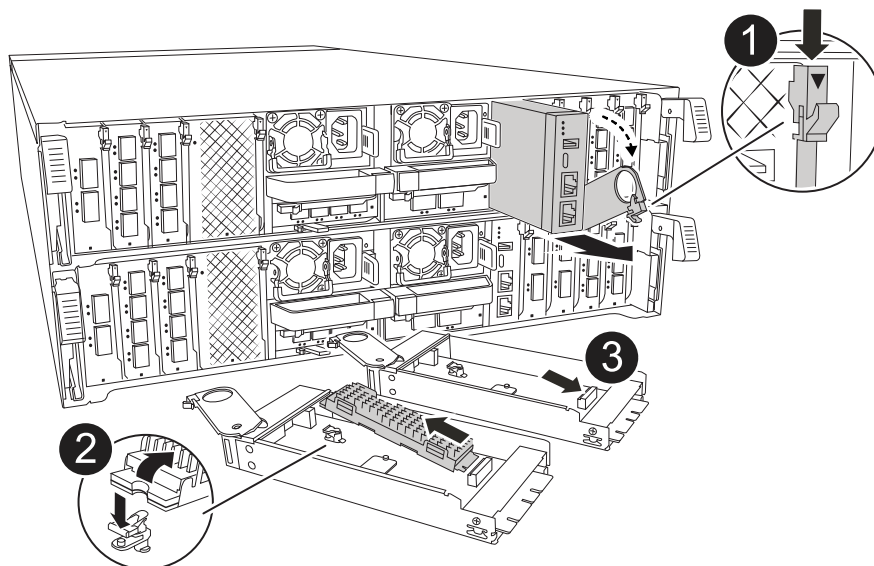
1	System Management module cam latch
2	Boot media locking button
3	Boot media

    a. Press the blue locking button. The boot media rotates slightly upward.

    b. Rotate the boot media up, slide it out of the socket.

    c. Install the boot media in the replacement System Management module:

        i. Align the edges of the boot media with the socket housing, and then gently push it squarely into the socket.

        ii. Rotate the boot media down toward until it engages the locking button. Depress the blue locking if necessary.

8. Install the system management module:

    a. Align the edges of the replacement System Management module with the system opening and gently push it into the controller module.

    b. Gently slide the module into the slot until the cam latch begins to engage with the I/O cam pin, and then rotate the cam latch all the way up to lock the module in place.

9. Recable the System Management module.

10. Reconnect power to the controller module:

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

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

    b. Rotate the locking latches upward into the locked position.

11. Rotate the cable management tray up to the closed position.

Step 3: Reboot the controller module

Reboot the controller module.

1. Enter *bye* at the LOADER prompt.

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

3. Restore automatic giveback by using the `storage failover modify -node local -auto -giveback true` command.

4. If an AutoSupport maintenance window was triggered, end it by using the `system node autosupport invoke -node * -type all -message MAINT=END` command.

Step 4: Install licenses and register serial number

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

About this task

Until you install license keys, features requiring standard licenses continue to be available to the node. However, if the node was the only node in the cluster with a license for the feature, no configuration changes to the feature are allowed. Also, using unlicensed features on the node might put you out of compliance with your license agreement, so you should install the replacement license key or keys on the for the node as soon as possible.

Before you begin

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

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

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

Steps

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

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

2. Install each license key: `system license add -license-code license-key, license-key...`

3. Remove the old licenses, if desired:

   a. Check for unused licenses: `license clean-up -unused -simulate`

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

4. Register the system serial number with NetApp Support.

   ◦ If AutoSupport is enabled, send an AutoSupport message to register the serial number.

   ◦ If AutoSupport is not enabled, call NetApp Support to register the serial number.

Step 5: Return the failed part to NetApp

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