



Controller module

ONTAP Systems

NetApp
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Controller module

Overview of controller module replacement - AFF A300

You must review the prerequisites for the replacement procedure and select the correct one for your version of the ONTAP operating system.

- All drive shelves must be working properly.
- If your system is in an HA pair, the healthy controller must be able to take over the controller that is being replaced (referred to in this procedure as the “impaired controller”).
- If your system is in a MetroCluster configuration, you must review the section [Choosing the correct recovery procedure](#) to determine whether you should use this procedure.

If this is the procedure you should use, note that the controller replacement procedure for a controller in a four or eight node MetroCluster configuration is the same as that in an HA pair. No MetroCluster-specific steps are required because the failure is restricted to an HA pair and storage failover commands can be used to provide nondisruptive operation during the replacement.

- This procedure includes steps for automatically or manually reassigning drives to the *replacement* controller, depending on your system’s configuration.

You should perform the drive reassignment as directed in the procedure.

- You must replace the failed component with a replacement FRU component you received from your provider.
- You must be replacing 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.
- In this procedure, the boot device is moved from the impaired controller to the *replacement* controller so that the *replacement* controller will boot up in the same version of ONTAP as the old controller module.
- Any PCIe cards moved from the old controller module to the new controller module or added from existing customer site inventory must be supported by the replacement controller module.

[NetApp Hardware Universe](#)

- 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 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 - AFF A300

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

configuration.

Option 1: Most configurations

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

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

Steps

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

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

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

2. If the impaired controller is part of an HA pair, 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 Remove controller module..
Waiting for giveback...	Press Ctrl-C, and then respond <code>y</code> .
System prompt or password prompt (enter system password)	Take over or halt the impaired controller from the healthy controller: <code>storage failover takeover -ofnode impaired_node_name</code> + When the impaired controller shows Waiting for giveback..., press Ctrl-C, and then respond <code>y</code> .

Option 2: Controller is in a two-node MetroCluster configuration

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

About this task

- If you are using NetApp Storage Encryption, you must have reset the MSID using the instructions in the "Return a FIPS drive or SED to unprotected mode" section of [NetApp Encryption overview with the CLI](#).
- You must leave the power supplies turned on at the end of this procedure to provide power to the healthy controller.

Steps

1. Check the MetroCluster status to determine whether the impaired controller has automatically switched over to the healthy controller: `metrocluster show`
2. Depending on whether an automatic switchover has occurred, proceed according to the following table:

If the impaired controller...	Then...
Has automatically switched over	Proceed to the next step.
Has not automatically switched over	Perform a planned switchover operation from the healthy controller: <code>metrocluster switchover</code>
Has not automatically switched over, you attempted switchover with the <code>metrocluster switchover</code> command, and the switchover was vetoed	Review the veto messages and, if possible, resolve the issue and try again. If you are unable to resolve the issue, contact technical support.

3. Resynchronize the data aggregates by running the `metrocluster heal -phase aggregates` command from the surviving cluster.

```
controller_A_1::> metrocluster heal -phase aggregates
[Job 130] Job succeeded: Heal Aggregates is successful.
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

4. Verify that the operation has been completed by using the `metrocluster operation show` command.

```
controller_A_1::> metrocluster operation show
Operation: heal-aggregates
State: successful
Start Time: 7/25/2016 18:45:55
End Time: 7/25/2016 18:45:56
Errors: -
```

5. Check the state of the aggregates by using the `storage aggregate show` command.

```

controller_A_1::> storage aggregate show
Aggregate      Size Available Used% State    #Vols  Nodes      RAID
Status
-----
...
aggr_b2        227.1GB    227.1GB    0% online      0 mcc1-a2
raid_dp, mirrored, normal...

```

6. Heal the root aggregates by using the `metrocluster heal -phase root-aggregates` command.

```

mcc1A::> metrocluster heal -phase root-aggregates
[Job 137] Job succeeded: Heal Root Aggregates is successful

```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

7. Verify that the heal operation is complete by using the `metrocluster operation show` command on the destination cluster:

```

mcc1A::> metrocluster operation show
Operation: heal-root-aggregates
State: successful
Start Time: 7/29/2016 20:54:41
End Time: 7/29/2016 20:54:42
Errors: -

```

8. On the impaired controller module, disconnect the power supplies.

Option 3: Controller is in a two-node MetroCluster

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

About this task

- If you are using NetApp Storage Encryption, you must have reset the MSID using the instructions in the "Return a FIPS drive or SED to unprotected mode" section of [NetApp Encryption overview with the CLI](#).
- You must leave the power supplies turned on at the end of this procedure to provide power to the healthy controller.

Steps

1. Check the MetroCluster status to determine whether the impaired controller has automatically switched over to the healthy controller: `metrocluster show`
2. Depending on whether an automatic switchover has occurred, proceed according to the following table:

If the impaired controller...	Then...
Has automatically switched over	Proceed to the next step.
Has not automatically switched over	Perform a planned switchover operation from the healthy controller: <code>metrocluster switchover</code>
Has not automatically switched over, you attempted switchover with the <code>metrocluster switchover</code> command, and the switchover was vetoed	Review the veto messages and, if possible, resolve the issue and try again. If you are unable to resolve the issue, contact technical support.

3. Resynchronize the data aggregates by running the `metrocluster heal -phase aggregates` command from the surviving cluster.

```
controller_A_1::> metrocluster heal -phase aggregates
[Job 130] Job succeeded: Heal Aggregates is successful.
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

4. Verify that the operation has been completed by using the `metrocluster operation show` command.

```
controller_A_1::> metrocluster operation show
Operation: heal-aggregates
State: successful
Start Time: 7/25/2016 18:45:55
End Time: 7/25/2016 18:45:56
Errors: -
```

5. Check the state of the aggregates by using the `storage aggregate show` command.

```
controller_A_1::> storage aggregate show
Aggregate      Size Available Used% State    #Vols  Nodes      RAID
Status
-----
...
aggr_b2        227.1GB    227.1GB    0% online      0 mcc1-a2
raid_dp, mirrored, normal...
```

6. Heal the root aggregates by using the `metrocluster heal -phase root-aggregates` command.

```
mccl1A::> metrocluster heal -phase root-aggregates
[Job 137] Job succeeded: Heal Root Aggregates is successful
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

7. Verify that the heal operation is complete by using the `metrocluster operation show` command on the destination cluster:

```
mccl1A::> metrocluster operation show
Operation: heal-root-aggregates
State: successful
Start Time: 7/29/2016 20:54:41
End Time: 7/29/2016 20:54:42
Errors: -
```

8. On the impaired controller module, disconnect the power supplies.

Restore and verify the system configuration - AFF A300

After completing the hardware replacement and booting to Maintenance mode, you verify the low-level system configuration of the replacement controller and reconfigure system settings as necessary.

Step 1: Set and verify system time after replacing the controller

You should check the time and date on the replacement controller module against the healthy controller module in an HA pair, or against a reliable time server in a stand-alone configuration. If the time and date do not match, you must reset them on the replacement controller module to prevent possible outages on clients due to time differences.

About this task

It is important that you apply the commands in the steps on the correct systems:

- The *replacement* node is the new node that replaced the impaired node as part of this procedure.
- The *healthy* node is the HA partner of the *replacement* node.

Steps

1. If the *replacement* node is not at the LOADER prompt, halt the system to the LOADER prompt.
2. On the *healthy* node, check the system time: `show date`

The date and time are given in GMT.

3. At the LOADER prompt, check the date and time on the *replacement* node: `show date`

The date and time are given in GMT.

4. If necessary, set the date in GMT on the replacement node: `set date mm/dd/yyyy`
5. If necessary, set the time in GMT on the replacement node: `set time hh:mm:ss`
6. At the LOADER prompt, confirm the date and time on the *replacement* node: `show date`

The date and time are given in GMT.

Step 2: Verify and set the HA state of the controller module

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

1. In Maintenance mode from the new controller module, verify that all components display the same HA state: `ha-config show`

The HA state should be the same for all components.

2. 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`
- `mcc-2n`
- `mccip`
- `non-ha`

3. 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`
4. Confirm that the setting has changed: `ha-config show`

Step 3: Run system-level diagnostics

You should run comprehensive or focused diagnostic tests for specific components and subsystems whenever you replace the controller.

All commands in the diagnostic procedures are issued from the controller where the component is being replaced.

1. If the controller to be serviced is not at the LOADER prompt, reboot the controller: `halt`

After you issue the command, you should wait until the system stops at the LOADER prompt.

2. At the LOADER prompt, access the special drivers specifically designed for system-level diagnostics to function properly: `boot_diags`

During the boot process, you can safely respond `y` to the prompts until the Maintenance mode prompt (`*>`) appears.

3. Display and note the available devices on the controller module: `sldiag device show -dev mb`

The controller module devices and ports displayed can be any one or more of the following:

- `bootmedia` is the system booting device..
- `cna` is a Converged Network Adapter or interface not connected to a network or storage device.
- `fcal` is a Fibre Channel-Arbitrated Loop device not connected to a Fibre Channel network.
- `env` is motherboard environmentals.
- `mem` is system memory.
- `nic` is a network interface card.
- `nvr` is nonvolatile RAM.
- `nvmem` is a hybrid of NVRAM and system memory.
- `sas` is a Serial Attached SCSI device not connected to a disk shelf.

4. Run diagnostics as desired.

If you want to run diagnostic tests on...	Then...
Individual components	<p>a. Clear the status logs: <code>sldiag device clearstatus</code></p> <p>b. Display the available tests for the selected devices: <code>sldiag device show -dev dev_name</code></p> <p><i>dev_name</i> can be any one of the ports and devices identified in the preceding step.</p> <p>c. Examine the output and, if applicable, select only the tests that you want to run: <code>sldiag device modify -dev dev_name -selection only</code></p> <p>-selection only disables all other tests that you do not want to run for the device.</p> <p>d. Run the selected tests: <code>sldiag device run -dev dev_name</code></p> <p>After the test is complete, the following message is displayed:</p> <div><pre>*> <SLDIAG:_ALL_TESTS_COMPLETED></pre></div> <p>e. Verify that no tests failed: <code>sldiag device status -dev dev_name -long -state failed</code></p> <p>System-level diagnostics returns you to the prompt if there are no test failures, or lists the full status of failures resulting from testing the component.</p>

If you want to run diagnostic tests on...	Then...
Multiple components at the same time	<p>a. Review the enabled and disabled devices in the output from the preceding procedure and determine which ones you want to run concurrently.</p> <p>b. List the individual tests for the device: <code>sldiag device show -dev dev_name</code></p> <p>c. Examine the output and, if applicable, select only the tests that you want to run: <code>sldiag device modify -dev dev_name -selection only</code></p> <p>-selection only disables all other tests that you do not want to run for the device.</p> <p>d. Verify that the tests were modified: <code>sldiag device show</code></p> <p>e. Repeat these substeps for each device that you want to run concurrently.</p> <p>f. Run diagnostics on all of the devices: <code>sldiag device run</code></p> <div data-bbox="699 867 756 926"></div> <p>Do not add to or modify your entries after you start running diagnostics.</p> <p>After the test is complete, the following message is displayed:</p> <div data-bbox="670 1039 1485 1140" style="border: 1px solid #ccc; padding: 10px; background-color: #f9f9f9;"> <pre>*> <SLDIAG:_ALL_TESTS_COMPLETED></pre> </div> <p>g. Verify that there are no hardware problems on the controller: <code>sldiag device status -long -state failed</code></p> <p>System-level diagnostics returns you to the prompt if there are no test failures, or lists the full status of failures resulting from testing the component.</p>

5. Proceed based on the result of the preceding step.

If the system-level diagnostics tests...	Then...
Were completed without any failures	<p>a. Clear the status logs: <code>sldiag device clearstatus</code></p> <p>b. Verify that the log was cleared: <code>sldiag device status</code></p> <p>The following default response is displayed:</p> <div style="border: 1px solid #ccc; padding: 10px; margin: 10px 0;"> <pre>SLDIAG: No log messages are present.</pre> </div> <p>c. Exit Maintenance mode: <code>halt</code></p> <p>The system displays the LOADER prompt.</p> <p>You have completed system-level diagnostics.</p>
Resulted in some test failures	<p>Determine the cause of the problem.</p> <p>a. Exit Maintenance mode: <code>halt</code></p> <p>b. Perform a clean shutdown, and then disconnect the power supplies.</p> <p>c. Verify that you have observed all of the considerations identified for running system-level diagnostics, that cables are securely connected, and that hardware components are properly installed in the storage system.</p> <p>d. Reconnect the power supplies, and then power on the storage system.</p> <p>e. Rerun the system-level diagnostics test.</p>

Recable the system and reassign disks - AFF A300

Continue the replacement procedure by recabling the storage and confirming disk reassignment.

Step 1: Recable the system

After running diagnostics, you must recable the controller module's storage and network connections.

Steps

1. Recable the system.
2. Verify that the cabling is correct by using [Active IQ Config Advisor](#).
 - a. Download and install Config Advisor.
 - b. Enter the information for the target system, and then click Collect Data.
 - c. Click the Cabling tab, and then examine the output. Make sure that all disk shelves are displayed and

all disks appear in the output, correcting any cabling issues you find.

d. Check other cabling by clicking the appropriate tab, and then examining the output from Config Advisor.

Step 2: Reassign disks

If the storage system is in an HA pair, the system ID of the new controller module is automatically assigned to the disks when the giveback occurs at the end of the procedure. You must use the correct procedure for your configuration.

Option 1: Verify the system ID change on an HA system

You must confirm the system ID change when you boot the *replacement* node and then verify that the change was implemented.

This procedure applies only to systems running ONTAP in an HA pair.

1. If the *replacement* node is in Maintenance mode (showing the `*>` prompt, exit Maintenance mode and go to the LOADER prompt: `halt`
2. From the LOADER prompt on the *replacement* node, boot the node, entering `y` if you are prompted to override the system ID due to a system ID mismatch: `boot_ontap`
3. Wait until the `Waiting for giveback...` message is displayed on the *replacement* node console and then, from the healthy node, verify that the new partner system ID has been automatically assigned:
`storage failover show`

In the command output, you should see a message that the system ID has changed on the impaired node, showing the correct old and new IDs. In the following example, node2 has undergone replacement and has a new system ID of 151759706.

```
node1> `storage failover show`
```

Node	Partner	Takeover Possible	State Description
-----	-----	-----	

node1	node2	false	System ID changed on partner (Old: 151759755, New: 151759706), In takeover
node2	node1	-	Waiting for giveback (HA mailboxes)

4. From the healthy node, verify that any coredumps are saved:
 - a. Change to the advanced privilege level: `set -privilege advanced`

You can respond `y` when prompted to continue into advanced mode. The advanced mode prompt appears (`*>`).
 - b. Save any coredumps: `system node run -node local-node-name partner savecore`
 - c. Wait for the `savecore` command to complete before issuing the giveback.

You can enter the following command to monitor the progress of the savecore command: `system node run -node local-node-name partner savecore -s`

d. Return to the admin privilege level: `set -privilege admin`

5. Give back the node:

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

The *replacement* node takes back its storage and completes booting.

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



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

[Find the High-Availability Configuration content for your version of ONTAP 9](#)

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

The output from the `storage failover show` command should not include the System ID changed on partner message.

6. Verify that the disks were assigned correctly: `storage disk show -ownership`

The disks belonging to the *replacement* node should show the new system ID. In the following example, the disks owned by node1 now show the new system ID, 1873775277:

```
node1> `storage disk show -ownership`

Disk   Aggregate Home   Owner   DR Home   Home ID   Owner ID   DR Home ID
Reserver Pool
-----
1.0.0  aggr0_1  node1 node1   -         1873775277 1873775277 -
1873775277 Pool10
1.0.1  aggr0_1  node1 node1           1873775277 1873775277 -
1873775277 Pool10
.
.
.
```

Option 2: Manually reassign the system ID on systems in a two-node MetroCluster configuration

In a two-node MetroCluster configuration running ONTAP, you must manually reassign disks to the new controller's system ID before you return the system to normal operating condition.

About this task

This procedure applies only to systems in a two-node MetroCluster configuration running ONTAP.

You must be sure to issue the commands in this procedure on the correct node:

- The *impaired* node is the node on which you are performing maintenance.
- The *replacement* node is the new node that replaced the impaired node as part of this procedure.
- The *healthy* node is the DR partner of the impaired node.

Steps

1. If you have not already done so, reboot the *replacement* node, interrupt the boot process by entering Ctrl-C, and then select the option to boot to Maintenance mode from the displayed menu.

You must enter *Y* when prompted to override the system ID due to a system ID mismatch.

2. View the old system IDs from the healthy node: ``metrocluster node show -fields node-systemid,dr-partner-systemid``

In this example, the Node_B_1 is the old node, with the old system ID of 118073209:

```
dr-group-id cluster      node                node-systemid dr-
partner-systemid
-----
1           Cluster_A    Node_A_1         536872914
118073209
1           Cluster_B    Node_B_1         118073209
536872914
2 entries were displayed.
```

3. View the new system ID at the Maintenance mode prompt on the impaired node: `disk show`

In this example, the new system ID is 118065481:

```
Local System ID: 118065481
...
...
```

4. Reassign disk ownership (for FAS systems) or LUN ownership (for FlexArray systems), by using the system ID information obtained from the disk show command: `disk reassign -s old system ID`

In the case of the preceding example, the command is: `disk reassign -s 118073209`

You can respond *Y* when prompted to continue.

5. Verify that the disks (or FlexArray LUNs) were assigned correctly: `disk show -a`

Verify that the disks belonging to the *replacement* node show the new system ID for the *replacement* node. In the following example, the disks owned by system-1 now show the new system ID, 118065481:

```
*> disk show -a
Local System ID: 118065481
```

DISK	OWNER		POOL	SERIAL NUMBER	HOME
-----	-----		-----	-----	-----
disk_name (118065481)	system-1	(118065481)	Pool0	J8Y0TDZC	system-1
disk_name (118065481)	system-1	(118065481)	Pool0	J8Y09DXC	system-1
.					
.					
.					

6. From the healthy node, verify that any coredumps are saved:

a. Change to the advanced privilege level: `set -privilege advanced`

You can respond `Y` when prompted to continue into advanced mode. The advanced mode prompt appears (`*>`).

b. Verify that the coredumps are saved: `system node run -node local-node-name partner savecore`

If the command output indicates that `savecore` is in progress, wait for `savecore` to complete before issuing the `giveback`. You can monitor the progress of the `savecore` using the `system node run -node local-node-name partner savecore -s command.</info>`.

c. Return to the admin privilege level: `set -privilege admin`

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

8. Boot the *replacement* node: `boot_ontap`

9. After the *replacement* node has fully booted, perform a switchback: `metrocluster switchback`

10. Verify the MetroCluster configuration: `metrocluster node show - fields configuration-state`

```
node1_siteA::> metrocluster node show -fields configuration-state
```

dr-group-id	cluster node	configuration-state
-----	-----	-----
1 node1_siteA	node1mcc-001	configured
1 node1_siteA	node1mcc-002	configured
1 node1_siteB	node1mcc-003	configured
1 node1_siteB	node1mcc-004	configured

4 entries were displayed.

11. Verify the operation of the MetroCluster configuration in Data ONTAP:

- a. Check for any health alerts on both clusters: `system health alert show`
- b. Confirm that the MetroCluster is configured and in normal mode: `metrocluster show`
- c. Perform a MetroCluster check: `metrocluster check run`
- d. Display the results of the MetroCluster check: `metrocluster check show`
- e. Run Config Advisor. Go to the Config Advisor page on the NetApp Support Site at support.netapp.com/NOW/download/tools/config_advisor/.

After running Config Advisor, review the tool's output and follow the recommendations in the output to address any issues discovered.

12. Simulate a switchover operation:

- a. From any node's prompt, change to the advanced privilege level: `set -privilege advanced`

You need to respond with `y` when prompted to continue into advanced mode and see the advanced mode prompt (`*>`).

- b. Perform the switchover operation with the `-simulate` parameter: `metrocluster switchover -simulate`
- c. Return to the admin privilege level: `set -privilege admin`

Complete system restoration - AFF A300

To restore your system to full operation, you must restore the NetApp Storage Encryption configuration (if necessary), and install licenses for the new controller, and return the failed part to NetApp, as described in the RMA instructions shipped with the kit.

Step 1: Install licenses for the replacement node in ONTAP

You must install new licenses for the *replacement* 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 *replacement* node. However, if the impaired 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 *replacement* 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.

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`

Step 2: Restore Storage and Volume Encryption functionality

After replacing the controller module or NVRAM module for a storage system that you previously configured to use Storage or Volume Encryption, you must perform additional steps to provide uninterrupted Encryption functionality. You can skip this task on storage systems that do not have Storage or Volume Encryption enabled.

Step

1. Restore Storage or Volume Encryption functionality by using the appropriate procedure in [NetApp Encryption overview with the CLI](#).
2. Use one of the following procedures, depending on whether you are using onboard or external key management:
 - [Restore onboard key management encryption keys](#)
 - [Restore external key management encryption keys](#)

Step 3: Verify LIFs and register the serial number

Before returning the *replacement* node to service, you should verify that the LIFs are on their home ports, and register the serial number of the *replacement* node if AutoSupport is enabled, 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 LIFs are listed as false, revert them to their home ports: `network interface revert`
2. 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.
3. If automatic giveback was disabled, reenable it: `storage failover modify -node local -auto-giveback true`

Step 4: Switch back aggregates in a two-node MetroCluster configuration

After you have completed the FRU replacement in a two-node MetroCluster configuration, you can perform the MetroCluster switchback operation. This returns the configuration to its normal operating state, with the sync-

source storage virtual machines (SVMs) on the formerly impaired site now active and serving data from the local disk pools.

This task only applies to two-node MetroCluster configurations.

Steps

1. Verify that all nodes are in the enabled state: `metrocluster node show`

```
cluster_B::> metrocluster node show
```

DR Group	Cluster	Node	Configuration State	DR Mirroring Mode
1	cluster_A	controller_A_1	configured	enabled
			completed	heal roots
	cluster_B	controller_B_1	configured	enabled
			switchback recovery	waiting for

2 entries were displayed.

2. Verify that resynchronization is complete on all SVMs: `metrocluster vserver show`
3. Verify that any automatic LIF migrations being performed by the healing operations were completed successfully: `metrocluster check lif show`
4. Perform the switchback by using the `metrocluster switchback` command from any node in the surviving cluster.
5. Verify that the switchback operation has completed: `metrocluster show`

The switchback operation is still running when a cluster is in the `waiting-for-switchback` state:

```
cluster_B::> metrocluster show
```

Cluster	Configuration	State	Mode
Local: cluster_B	configured		switchover
Remote: cluster_A	configured		waiting-for-switchback

The switchback operation is complete when the clusters are in the `normal` state.:

```
cluster_B::> metrocluster show
Cluster           Configuration State      Mode
-----
Local: cluster_B configured          normal
Remote: cluster_A configured          normal
```

If a switchback is taking a long time to finish, you can check on the status of in-progress baselines by using the `metrocluster config-replication resync-status show` command.

6. Reestablish any SnapMirror or SnapVault configurations.

Step 5: Return the failed part to NetApp

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

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