NetApp

Replacing hardware and booting new controllers

ONTAP MetroCluster

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Replacing hardware at the disaster site

If hardware components have to be replaced, you must replace them using their individual hardware replacement and installation guides.

The storage controllers must be powered off or remain halted (showing the LOADER prompt).

1. Replace the components as necessary.

   > In this step, you replace and cable the components exactly as they were cabled prior to the disaster. You must not power up the components.

If you are replacing…	Perform these steps…	Using these guides…
FC switches in a MetroCluster FC configuration	a. Install the new switches. b. Cable the ISL links. Do not power on the FC switches at this time.	Maintain MetroCluster Components
IP switches in a MetroCluster IP configuration	a. Install the new switches. b. Cable the ISL links. Do not power on the IP switches at this time.	xref:MetroCluster IP installation and configuration

Disk shelves	a. Install the disk shelves and disks.
	
	  ◦ Disk shelf stacks should be the same configuration as at the surviving site.
	
	  ◦ Disks can be the same size or larger, but must be of the same type (SAS or SATA).
	
	b. Cable the disk shelves to adjacent shelves within the stack and to the FC-to-SAS bridge. Do not power on the disk shelves at this time.
		AFF and FAS Documentation Center

SAS cables	a. Install the new cables. Do not power on the disk shelves at this time.	AFF and FAS Documentation Center

If you are replacing…	Perform these steps…	Using these guides…
FC-to-SAS bridges in a MetroCluster FC configuration	a. Install the FC-to-SAS bridges. b. Cable the FC-to-SAS bridges. Cable them to the FC switches or to the controller modules, depending on your MetroCluster configuration type. Do not power on the FC-to-SAS bridges at this time.	xref:Fabric-attached MetroCluster installation and configuration + xref:Stretch MetroCluster installation and configuration

If you are replacing…	Perform these steps…	Using these guides…
Controller modules	a. Install the new controller modules: ◦ The controller modules must be the same model as those being replaced. For example, 8080 controller modules must be replaced with 8080 controller modules. ◦ The controller modules must not have previously been part of either cluster within the MetroCluster configuration or any previously existing cluster configuration. If they were, you must set defaults and perform a "wipeconfig" process. ◦ Ensure that all network interface cards (such as Ethernet or FC) are in the same slots used on the old controller modules. b. Cable the new controller modules exactly the same as the old ones. The ports connecting the controller module to the storage (either by connections to the IP or FC switches, FC-to-SAS bridges, or directly) should be the same as those used prior to the disaster. Do not power on the controller modules at this time.	AFF and FAS Documentation Center +

2. Verify that all components are cabled correctly according the *MetroCluster Installation and Configuration Guide* for your configuration.

Determining the system IDs and VLAN IDs of the old controller modules

After you have replaced all hardware at the disaster site, you must determine the system IDs of the replaced controller modules. You need the old system IDs when you reassign disks to the new controller modules. If the systems are AFF A220, AFF A250, AFF A400, AFF A800, FAS2750, FAS500f, FAS8300, or FAS8700 models, you must also determine the VLAN IDs used by the MCC IP interfaces.

All equipment at the disaster site must be powered off.

This discussion provides examples for two and four-node configurations. For eight-node configurations, you must account for any failures in the additional nodes on the second DR group.

For a two-node MetroCluster configuration, you can ignore references to the second controller module at each site.

The examples in this procedure are based on the following assumptions:

- Site A is the disaster site.
- node_A_1 has failed and is being completely replaced.
- node_A_2 has failed and is being completely replaced.

  node _A_2 is present in a four-node MetroCluster configuration only.

- Site B is the surviving site.
- node_B_1 is healthy.
- node_B_2 is healthy.

  node_B_2 is present in a four-node MetroCluster configuration only.

The controller modules have the following original system IDs:

Number of nodes in MetroCluster configuration	Node	Original system ID
Four	node_A_1	4068741258
	node_A_2	4068741260
	node_B_1	4068741254
	node_B_2	4068741256
Two	node_A_1	4068741258
	node_B_1	4068741254

1. From the surviving site, display the system IDs of the nodes in the MetroCluster configuration.

Number of nodes in MetroCluster configuration	Use this command
Four or eight	`metrocluster node show -fields node-systemid,ha-partner-systemid,dr-partner-systemid,dr-auxiliary-systemid`
Two	`metrocluster node show -fields node-systemid,dr-partner-systemid`

In this example for a four-node MetroCluster configuration, the following old system IDs are retrieved:

- Node_A_1: 4068741258

- Node_A_2: 4068741260 Disks owned by the old controller modules are still owned these system IDs.

```
metrocluster node show -fields node-systemid,ha-partner-systemid,dr-
partner-systemid,dr-auxiliary-systemid

dr-group-id cluster     node      node-systemid ha-partner-systemid
dr-partner-systemid dr-auxiliary-systemid
---------- ---------- --------   ------------- ------ -----------
------ ----------- ------ -------------
1           Cluster_A  Node_A_1  4068741258    4068741260
4068741254          4068741256
1           Cluster_A  Node_A_2  4068741260    4068741258
4068741256          4068741254
1           Cluster_B  Node_B_1  -             -                    -
-
1           Cluster_B  Node_B_2  -             -                    -
-
4 entries were displayed.
```

In this example for a two-node MetroCluster configuration, the following old system ID is retrieved:

- Node_A_1: 4068741258 Disks owned by the old controller module are still owned this system ID.

```
metrocluster node show -fields node-systemid,dr-partner-systemid

dr-group-id cluster     node      node-systemid dr-partner-systemid
---------- ---------- --------   ------------- -----------
1           Cluster_A  Node_A_1  4068741258    4068741254
1           Cluster_B  Node_B_1  -             -
2 entries were displayed.
```

2. For MetroCluster IP configurations using the ONTAP Mediator service, get the IP address of the ONTAP Mediator service: `storage iscsi-initiator show -node * -label mediator`

3. If the systems are AFF A220, AFF A400, FAS2750, FAS8300, or FAS8700 models, determine the VLAN IDs: `metrocluster interconnect show`

   The VLAN IDs are included in the adapter name shown in the Adapter column of the output.

   In this example the VLAN IDs are 120 and 130:

```
metrocluster interconnect show
                          Mirror   Mirror
                   Partner Admin   Oper
Node Partner Name Type     Status   Status  Adapter Type   Status
---- ------------ -------  -------- ------- ------- ------ ------
Node_A_1 Node_A_2 HA       enabled  online
                                            e0a-120 iWARP  Up
                                            e0b-130 iWARP  Up
         Node_B_1 DR       enabled  online
                                            e0a-120 iWARP  Up
                                            e0b-130 iWARP  Up
         Node_B_2 AUX      enabled  offline
                                            e0a-120 iWARP  Up
                                            e0b-130 iWARP  Up
Node_A_2 Node_A_1 HA       enabled  online
                                            e0a-120 iWARP  Up
                                            e0b-130 iWARP  Up
         Node_B_2 DR       enabled  online
                                            e0a-120 iWARP  Up
                                            e0b-130 iWARP  Up
         Node_B_1 AUX      enabled  offline
                                            e0a-120 iWARP  Up
                                            e0b-130 iWARP  Up
12 entries were displayed.
```

Isolating replacement drives from the surviving site (MetroCluster IP configurations)

You must isolate any replacement drives by taking down the MetroCluster iSCSI initiator connections from the surviving nodes.

This procedure is only required on MetroCluster IP configurations.

1. From either surviving 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 (*>).

2. Disconnect the iSCSI initiators on both surviving nodes in the DR group: `storage iscsi-initiator disconnect -node surviving-node -label *`

   This command must be issued twice, once for each of the surviving nodes.

   The following example shows the commands for disconnecting the initiators on site B:

   ```
   site_B::*> storage iscsi-initiator disconnect -node node_B_1 -label *
   site_B::*> storage iscsi-initiator disconnect -node node_B_2 -label *
   ```

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

Clearing the configuration on a controller module

Before using a new controller module in the MetroCluster configuration, you must clear the configuration.

1. If necessary, halt the node to display the LOADER prompt: `halt`

2. At the LOADER prompt, set the environmental variables to default values: `set-defaults`

3. Save the environment: `saveenv``bye`

4. At the LOADER prompt, launch the boot menu: `boot_ontap menu`

5. At the boot menu prompt, clear the configuration: `wipeconfig`

   Respond `yes` to the confirmation prompt.

   The node reboots and the boot menu is displayed again.

6. At the boot menu, select option **5** to boot the system into Maintenance mode.

   Respond `yes` to the confirmation prompt.

Netbooting the new controller modules

If the new controller modules have a different version of ONTAP from the version on the surviving controller modules, you must netboot the new controller modules.

- You must have access to an HTTP server.
- You must have access to the NetApp Support Site to download the necessary system files for your platform and version of ONTAP software that is running on it.

  NetApp Support

1. Access the NetApp Support Site to download the files used for performing the netboot of the system.

2. Download the appropriate ONTAP software from the software download section of the NetApp Support Site

and store the ontap-version_image.tgz file on a web-accessible directory.

3. Change to the web-accessible directory and verify that the files you need are available.

If the platform model is…	Then…
FAS/AFF8000 series systems	Extract the contents of the ontap-version_image.tgzfile to the target directory: tar -zxvf ontap-version_image.tgz **(i)** If you are extracting the contents on Windows, use 7-Zip or WinRAR to extract the netboot image.Your directory listing should contain a netboot folder with a kernel file:netboot/kernel Your directory listing should contain a netboot folder with a kernel file: netboot/kernel
All other systems	Your directory listing should contain a netboot folder with a kernel file: ontap-version_image.tgz You do not need to extract the ontap-version_image.tgz file.

4. At the LOADER prompt, configure the netboot connection for a management LIF:

    ◦ If IP addressing is DHCP, configure the automatic connection: `ifconfig e0M -auto`

    ◦ If IP addressing is static, configure the manual connection: `ifconfig e0M -addr=ip_addr -mask=netmask -gw=gateway`

5. Perform the netboot.

    ◦ If the platform is an 80xx series system, use this command: `netboot http://web_server_ip/path_to_web-accessible_directory/netboot/kernel`

    ◦ If the platform is any other system, use this command: `netboot http://web_server_ip/path_to_web-accessible_directory/ontap-version_image.tgz`

6. From the boot menu, select option \(7\) **Install new software first** to download and install the new software image to the boot device.

> ```
> Disregard the following message: "This procedure is not supported for
> Non-Disruptive Upgrade on an HA pair". It applies to nondisruptive
> upgrades of software, not to upgrades of controllers.
> ```

7. If you are prompted to continue the procedure, enter `y`, and when prompted for the package, enter the URL of the image file: `http://web_server_ip/path_to_web-accessible_directory/ontap-version_image.tgz`

> ```
> Enter username/password if applicable, or press Enter to continue.
> ```

8. Be sure to enter `n` to skip the backup recovery when you see a prompt similar to the following:

```
    Do you want to restore the backup configuration now? {y|n} **n**
```

9. Reboot by entering y when you see a prompt similar to the following:

```
    The node must be rebooted to start using the newly installed
software. Do you want to reboot now? {y|n}
// end include reference
```

10. From the Boot menu, select **option 5** to enter Maintenance mode.

11. If you have a four-node MetroCluster configuration, repeat this procedure on the other new controller module.

Determining the system IDs of the replacement controller modules

After you have replaced all hardware at the disaster site, you must determine the system ID of the newly installed storage controller module or modules.

You must perform this procedure with the replacement controller modules in Maintenance mode.

This section provides examples for two and four-node configurations. For two-node configurations, you can ignore references to the second node at each site. For eight-node configurations, you must account for the additional nodes on the second DR group. The examples make the following assumptions:

- Site A is the disaster site.
- node_A_1 has been replaced.
- node_A_2 has been replaced.

  Present only in four-node MetroCluster configurations.

- Site B is the surviving site.
- node_B_1 is healthy.
- node_B_2 is healthy.

  Present only in four-node MetroCluster configurations.

The examples in this procedure use controllers with the following system IDs:

Number of nodes in MetroCluster configuration	Node	Original system ID	New system ID	Will pair with this node as DR partner
Four	node_A_1	4068741258	1574774970	node_B_1
	node_A_2	4068741260	1574774991	node_B_2
	node_B_1	4068741254	unchanged	node_A_1
	node_B_2	4068741256	unchanged	node_A_2
Two	node_A_1	4068741258	1574774970	node_B_1
	node_B_1	4068741254	unchanged	node_A_1

Note: In a four-node MetroCluster configuration, the system determines DR partnerships by pairing the node with the lowest system ID at site_A and the node with the lowest system ID at site_B. Because the system IDs change, the DR pairs might be different after the controller replacements are completed than they were prior to the disaster.

In the preceding example:

- node_A_1 (1574774970) will be paired with node_B_1 (4068741254)
- node_A_2 (1574774991) will be paired with node_B_2 (4068741256)

1. With the node in Maintenance mode, display the local system ID of the node from each node: `disk show`

   In the following example, the new local system ID is 1574774970:

   ```
   *> disk show
    Local System ID: 1574774970
    ...
   ```

2. On the second node, repeat the previous step.

   > 🛈　This step is not required in a two-node MetroCluster configuration.

   In the following example, the new local system ID is 1574774991:

   ```
   *> disk show
    Local System ID: 1574774991
    ...
   ```

Verifying the ha-config state of components

In a MetroCluster configuration, the ha-config state of the controller module and chassis components must be set to mcc or mcc-2n so they boot up properly.

The system must be in Maintenance mode.

This task must be performed on each new controller module.

1. In Maintenance mode, display the HA state of the controller module and chassis: `ha-config show`

   The correct HA state depends on your MetroCluster configuration.

Number of controllers in the MetroCluster configuration	HA state for all components should be…
Eight- or four-node MetroCluster FC configuration	mcc
Two-node MetroCluster FC configuration	mcc-2n
MetroCluster IP configuration	mccip

2. If the displayed system state of the controller is not correct, set the HA state for the controller module:

Number of controllers in the MetroCluster configuration	Command
Eight- or four-node MetroCluster FC configuration	ha-config modify controller mcc
Two-node MetroCluster FC configuration	ha-config modify controller mcc-2n
MetroCluster IP configuration	ha-config modify controller mccip

3. If the displayed system state of the chassis is not correct, set the HA state for the chassis:

Number of controllers in the MetroCluster configuration	Command
Eight- or four-node MetroCluster FC configuration	ha-config modify chassis mcc
Two-node MetroCluster FC configuration	ha-config modify chassis mcc-2n
MetroCluster IP configuration	ha-config modify chassis mccip

4. Repeat these steps on the other replacement node.