NetApp

Chassis

Install and maintain

NetApp
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Chassis

Overview of chassis replacement - FAS8200

To replace the chassis, you must move the power supplies, fans, and controller modules from the impaired chassis to the new chassis, and swap out the impaired chassis from the equipment rack or system cabinet with the new chassis of the same model as the impaired chassis.

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

- You can use this procedure with all versions of ONTAP supported by your system.
- This procedure is written with the assumption that you are moving the controller module or modules to the new chassis, and that the chassis is a new component from NetApp.
- This procedure is disruptive. For a two-controller cluster, you will have a complete service outage and a partial outage in a multi-node cluster.

Shut down the controllers - FAS8200

To replace the chassis, you must shutdown the controllers.

Option 1: Most configurations

You must shut down the controller or controller in the chassis prior to moving them to the new chassis.

About this task

- If you have a cluster with more than two controllers, 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.
- If AutoSupport is enabled, suppress automatic case creation by invoking an AutoSupport message: `system node autosupport invoke -node * -type all -message MAINT=number_of_hours_downh`

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

Steps

1. If your system has two controller modules, disable the HA pair.

If your system is running clustered ONTAP with…	Then…
Two controllers in the cluster	`cluster ha modify -configured false storage failover modify -node node0 -enabled false`
More than two controllers in the cluster	`storage failover modify -node node0 -enabled false`

2. Halt the controller, pressing `y` when you are prompted to confirm the halt: `system node halt -node node_name`

   The confirmation message looks like the following:

   ```
   Warning: This operation will cause controller "node-name" to be marked
   as unhealthy. Unhealthy nodes do not participate in quorum voting. If
   the controller goes out of service and one more controller goes out of
   service there will be a data serving failure for the entire cluster.
   This will cause a client disruption. Use "cluster show" to verify
   cluster state. If possible bring other nodes online to improve the
   resiliency of this cluster.

   Do you want to continue? {y|n}:
   ```

   > ⓘ You must perform a clean system shutdown before replacing the chassis to avoid losing unwritten data in the nonvolatile memory (NVMEM/NVRAM). Depending on your system, if the NVMEM/NVRAM LED is flashing, there is content in the NVMEM/NVRAM that has not been saved to disk. You need to reboot the controller and start from the beginning of this procedure. If repeated attempts to cleanly shut down the controller fail, be aware that you might lose any data that was not saved to disk.

3. Where applicable, halt the second controller to avoid a possible quorum error message in an HA pair configuration: `system node halt -node second_node_name -ignore-quorum-warnings true -skip-lif-migration-before-shutdown true`

   Answer `y` when prompted.

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.

If the impaired controller…	Then…
Has not automatically switched over	Perform a planned switchover operation from the healthy controller: `metrocluster switchover`
Has not automatically switched over, you attempted switchover with the `metrocluster switchover` 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.

Replace hardware - FAS8200

Move the power supplies, fans, and controller modules from the impaired chassis to the new chassis, and swap out the impaired chassis from the equipment rack or system cabinet with the new chassis of the same model as the impaired chassis.

Step 1: Move a power supply

Moving out a power supply when replacing a chassis involves turning off, disconnecting, and removing the power supply from the old chassis and installing and connecting it on the replacement chassis.

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

2. Turn off the power supply and disconnect the power cables:

    a. Turn off the power switch on the power supply.

    b. Open the power cable retainer, and then unplug the power cable from the power supply.

    c. Unplug the power cable from the power source.

3. Press down the release latch on the power supply cam handle, and then lower the cam handle to the fully open position to release the power supply from the mid plane.

❶	Power supply
❷	Cam handle release latch
❸	Power and Fault LEDs
❹	Cam handle

⑤	Power cable locking mechanism

4. Use the cam handle to slide the power supply out of the system.

⚠️ When removing a power supply, always use two hands to support its weight.

5. Repeat the preceding steps for any remaining power supplies.

6. Using both hands, support and align the edges of the power supply with the opening in the system chassis, and then gently push the power supply into the chassis using the cam handle.

The power supplies are keyed and can only be installed one way.

ⓘ Do not use excessive force when sliding the power supply into the system. You can damage the connector.

7. Push firmly on the power supply cam handle to seat it all the way into the chassis, and then push the cam handle to the closed position, making sure that the cam handle release latch clicks into its locked position.

8. Reconnect the power cable and secure it to the power supply using the power cable locking mechanism.

ⓘ Only connect the power cable to the power supply. Do not connect the power cable to a power source at this time.

Step 2: Move a fan

Moving out a fan module when replacing the chassis involves a specific sequence of tasks.

1. Remove the bezel (if necessary) with two hands, by grasping the openings on each side of the bezel, and then pulling it toward you until the bezel releases from the ball studs on the chassis frame.

2. Press down the release latch on the fan module cam handle, and then pull the cam handle downward.

The fan module moves a little bit away from the chassis.

1	Cam handle
2	Fan module
3	Cam handle release latch
4	Fan module Attention LED

3. Pull the fan module straight out from the chassis, making sure that you support it with your free hand so that it does not swing out of the chassis.

> ⚠ The fan modules are short. Always support the bottom of the fan module with your free hand so that it does not suddenly drop free from the chassis and injure you.

4. Set the fan module aside.

5. Repeat the preceding steps for any remaining fan modules.

6. Insert the fan module into the replacement chassis by aligning it with the opening, and then sliding it into the chassis.

7. Push firmly on the fan module cam handle so that it is seated all the way into the chassis.

   The cam handle raises slightly when the fan module is completely seated.

8. Swing the cam handle up to its closed position, making sure that the cam handle release latch clicks into the locked position.

   The fan LED should be green after the fan is seated and has spun up to operational speed.

9. Repeat these steps for the remaining fan modules.

10. Align the bezel with the ball studs, and then gently push the bezel onto the ball studs.

Step 3: Remove the controller module

To replace the chassis, you must remove the controller module or modules from the old chassis.

1. Loosen the hook and loop strap binding the cables to the cable management device, and then unplug the system cables and SFPs (if needed) from the controller module, keeping track of where the cables were connected.

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

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

3. Loosen the thumbscrew on the cam handle on the controller module.

❶	Thumbscrew
❷	Cam handle

4. Pull the cam handle downward and begin to slide the controller module out of the chassis.

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

5. Set the controller module aside in a safe place, and repeat these steps if you have another controller module in the chassis.

Step 4: Replace a chassis from within the equipment rack or system cabinet

You must remove the existing chassis from the equipment rack or system cabinet before you can install the replacement chassis.

1. Remove the screws from the chassis mount points.

    > ⓘ   If the system is in a system cabinet, you might need to remove the rear tie-down bracket.

2. With the help of two or three people, slide the old chassis off the rack rails in a system cabinet or *L* brackets in an equipment rack, and then set it aside.

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

4. Using two or three people, install the replacement chassis into the equipment rack or system cabinet by guiding the chassis onto the rack rails in a system cabinet or *L* brackets in an equipment rack.

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

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

7. If you have not already done so, install the bezel.

Step 5: Install the controller

After you install the controller module and any other components into the new chassis, boot it to a state where you can run the interconnect diagnostic test.

For HA pairs with two controller modules in the same chassis, the sequence in which you install the controller module is especially important because it attempts to reboot as soon as you completely seat it in the chassis.

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

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

2. Recable the console to the controller module, and then reconnect the management port.

3. Repeat the preceding steps if there is a second controller to install in the new chassis.

4. Complete the installation of the controller module:

If your system is in…	Then perform these steps…
An HA pair	a. With the cam handle in the open position, firmly push the controller module in until it meets the midplane and is fully seated, and then close the cam handle to the locked position. Tighten the thumbscrew on the cam handle on back of the controller module. (i) Do not use excessive force when sliding the controller module into the chassis to avoid damaging the connectors. b. If you have not already done so, reinstall the cable management device. c. Bind the cables to the cable management device with the hook and loop strap. d. Repeat the preceding steps for the second controller module in the new chassis.
A stand-alone configuration	a. With the cam handle in the open position, firmly push the controller module in until it meets the midplane and is fully seated, and then close the cam handle to the locked position. Tighten the thumbscrew on the cam handle on back of the controller module. (i) Do not use excessive force when sliding the controller module into the chassis to avoid damaging the connectors. b. If you have not already done so, reinstall the cable management device. c. Bind the cables to the cable management device with the hook and loop strap. d. Reinstall the blanking panel and then go to the next step.

5. Connect the power supplies to different power sources, and then turn them on.

6. Boot each controller to Maintenance mode:

   a. As each controller starts the booting, press `Ctrl-C` to interrupt the boot process when you see the message `Press Ctrl-C for Boot Menu`.

   (i) If you miss the prompt and the controller modules boot to ONTAP, enter `halt`, and then at the LOADER prompt enter `boot_ontap`, press `Ctrl-C` when prompted, and then repeat this step.

   b. From the boot menu, select the option for Maintenance mode.

Restore and verify the configuration - FAS8200

You must verify the HA state of the chassis and run System-Level diagnostics, switch

back aggregates, and return the failed part to NetApp, as described in the RMA instructions shipped with the kit.

Step 1: Verify and set the HA state of the chassis

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

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

   The HA state should be the same for all components.

2. If the displayed system state for the chassis does not match your system configuration:

   a. Set the HA state for the chassis: `ha-config modify chassis` *HA-state*

      The value for HA-state can be one of the following: *** ha** * mcc *** mcc-2n** * mccip * non-ha

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

3. If you have not already done so, recable the rest of your system.

4. The next step depends on your system configuration.

If your system is in…	Then…
A stand-alone configuration	a. Exit Maintenance mode: `halt` b. Go to "Completing the replacement process.
An HA pair with a second controller module	Exit Maintenance mode: `halt` The LOADER prompt appears.

Step 2: Run system-level diagnostics

After installing a new chassis, you should run interconnect diagnostics.

Your system must be at the LOADER prompt to start System Level Diagnostics.

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, perform the following steps:

   a. Select the Maintenance mode option from the displayed menu.

   b. After the controller boots to Maintenance mode, halt the controller: `halt`

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

      > (i)   During the boot process, you can safely respond `y` to prompts:

2. Repeat the previous step on the second controller if you are in an HA configuration.

(i) | Both controllers must be in Maintenance mode to run the interconnect test.

3. 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.

4. Enable the interconnect diagnostics tests from the Maintenance mode prompt: `sldiag device modify -dev interconnect -sel enable`

   The interconnect tests are disabled by default and must be enabled to run separately.

5. Run the interconnect diagnostics test from the Maintenance mode prompt: `sldiag device run -dev interconnect`

   You only need to run the interconnect test from one controller.

6. Verify that no hardware problems resulted from the replacement of the chassis: `sldiag device status -dev interconnect -long -state failed`

   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.

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

If the system-level diagnostics tests…	Then…

Were completed without any failures	a. Clear the status logs: `sldiag device clearstatus`
	
	b. Verify that the log was cleared: `sldiag device status`
	
	   The following default response is displayed:
	
	   `SLDIAG: No log messages are present.`
	
	c. Exit Maintenance mode on both controllers: `halt`
	
	   The system displays the LOADER prompt.
	
	   (i) You must exit Maintenance mode on both controllers before proceeding any further.
	
	d. Enter the following command on both controllers at the LOADER prompt: `bye`
	
	e. Return the controller to normal operation:

If your system is running ONTAP…	Then…
With two nodes in the cluster	Issue these commands: `node::> cluster ha modify -configured true` `node::> storage failover modify -node node0 -enabled true`
With more than two nodes in the cluster	Issue this command:`node::> storage failover modify -node node0 -enabled true`
In a two-node MetroCluster configuration	Proceed to the next step. The MetroCluster switchback procedure is done in the next task in the replacement process.
In a stand-alone configuration	You have no further steps in this particular task. You have completed system-level diagnostics.
Resulted in some test failures	Determine the cause of the problem. a. Exit Maintenance mode: `halt` b. Perform a clean shutdown, and then disconnect the power supplies. 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. d. Reconnect the power supplies, and then power on the storage system. e. Rerun the system-level diagnostics test.

Step 3: 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                               Configuration  DR
Group Cluster Node               State          Mirroring Mode
----- ------- --------------     --------------  ---------
--------------------
1     cluster_A
              controller_A_1 configured     enabled   heal roots
completed
      cluster_B
              controller_B_1 configured     enabled   waiting for
switchback recovery
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 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 & Replacements page for further information.