Replacing DIMMs

You must replace a DIMM in the controller module when your system registers an increasing number of correctable error correction codes (ECC); failure to do so causes a system panic.

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.

Steps
1. Shutting down the impaired controller on page 1
2. Opening the controller module on page 3
3. Replacing the DIMMs on page 5
4. Installing the controller on page 7
5. Running system-level diagnostics on page 8
6. Healing and switching back aggregates in a two-node MetroCluster configuration on page 10
7. Completing the replacement process on page 12

Shutting down the impaired controller

You can shut down or take over the impaired controller using different procedures, depending on the storage system hardware configuration.

Shutting down the impaired node

To shut down the impaired node, you must determine the status of the node and, if necessary, take over the node so that the healthy node continues to serve data from the impaired node 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 node shows false for eligibility and health, you must correct the issue before shutting down the impaired node.

Steps
1. If you have a cluster with more than two nodes, check the health and Epsilon from advanced mode:

   cluster show -epsilon *

   If the cluster is not in quorum or a node that is not the impaired node shows false for eligibility and health, correct the issue before proceeding to the next step.

   If Epsilon resides in the impaired node:
   a. Remove Epsilon from the impaired node:

      cluster modify -node impaired_node -epsilon false

   b. Assign Epsilon to a healthy node in the cluster:
cluster modify -node healthy_node -epsilon true

2. If the impaired node is part of an HA pair, disable automatic giveback from the console of the healthy node:
   storage failover modify -node local -auto-giveback false

3. Take the impaired node to the LOADER prompt:

<table>
<thead>
<tr>
<th>If the impaired node is displaying...</th>
<th>Then...</th>
</tr>
</thead>
<tbody>
<tr>
<td>The LOADER prompt</td>
<td>Go to the next step.</td>
</tr>
<tr>
<td>Waiting for giveback...</td>
<td>Press Ctrl-C, and then respond y.</td>
</tr>
<tr>
<td>System prompt or password prompt</td>
<td>Take over or halt the impaired node:</td>
</tr>
<tr>
<td></td>
<td>storage failover takeover -ofnode impaired_node_name</td>
</tr>
<tr>
<td></td>
<td>When the impaired node shows Waiting for giveback..., press Ctrl-C, and then respond y.</td>
</tr>
</tbody>
</table>

**Shutting down a node in a two-node MetroCluster configuration running ONTAP**

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

**About this task**

You must leave the power supplies turned on at the end of this procedure to provide power to the healthy node.

**Steps**

1. Check the MetroCluster status to determine whether the impaired node has automatically switched over to the healthy node:
   metrocluster show

2. Depending on whether an automatic switchover has occurred, proceed according to the following table:

<table>
<thead>
<tr>
<th>If the impaired node...</th>
<th>Then...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has automatically switched over</td>
<td>Proceed to the next step.</td>
</tr>
<tr>
<td>Has not automatically switched over</td>
<td>Perform a planned switchover operation from the healthy node:</td>
</tr>
<tr>
<td></td>
<td>metrocluster switchover</td>
</tr>
<tr>
<td>Has not automatically switched over and planned switchover with the metrocluster switchover command fails</td>
<td>a. Halt the impaired node:</td>
</tr>
<tr>
<td></td>
<td>system node halt</td>
</tr>
<tr>
<td></td>
<td>b. Perform a forced switchover operation:</td>
</tr>
<tr>
<td></td>
<td>metrocluster switchover -forced on disaster true</td>
</tr>
</tbody>
</table>

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

**Example**

```
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.

FAS9000 systems: Replacing DIMMs
4. Verify that the operation has been completed by running the `metrocluster operation show` command.

Example

```
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 running the `storage aggregate show` command.

Example

```
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 running the `metrocluster heal -phase root-aggregates` command.

Example

```
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 running the `metrocluster operation show` command on the destination cluster:

Example

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

---

**Opening the controller module**

To access components inside the controller, you must first remove the controller module from the system and then remove the cover on the controller module.

**Steps**

1. If you are not already grounded, properly ground yourself.
2. Unplug the cables from the impaired controller module, and keep track of where the cables were connected.
3. Slide the orange button on the cam handle downward until it unlocks.
4. Rotate the cam handle so that it completely disengages the controller module from the chassis, and then slide the controller module out of the chassis.

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

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

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

Steps

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

2. Locate the DIMMs on your controller.

   **Note:** Each system memory DIMM has an LED located on the board next to each DIMM slot. The LED for the faulty blinks every two seconds.
3. Slowly push apart on the two DIMM ejector tabs, on either side of the DIMM to eject the DIMM from its slot, and then slide it out of the socket and set it aside.

**Attention:** Carefully hold the DIMM by the edges to avoid pressure on the components on the DIMM circuit board.
1. DIMM ejector tabs
2. DIMM

4. 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.

5. Make sure that the DIMM latches 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.
   **Attention:** Visually inspect the DIMM to verify that it is evenly aligned and fully inserted into the slot.

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

7. Close the controller module cover.

**Installing the controller**

After you install the components into the controller module, you must install the controller module back into the system chassis and boot the operating system.

**About this task**

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.

**Note:** The system might update system firmware when it boots. Do not abort this process.

**Steps**

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

2. If you have not already done so, replace the cover on the controller module.

3. Align the end of the controller module with the opening in the chassis, and then gently push the controller module halfway into the system.
   **Note:** Do not completely insert the controller module in the chassis until instructed to do so.

4. Cable the management and console ports so that you can access the system to perform the tasks in the following sections.

5. Complete the reinstallation of the controller module:
   a. If you have not already done so, reinstall the cable management device.
   b. 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.
      **Attention:** Do not use excessive force when sliding the controller module into the chassis; you might damage the connectors.
      The controller module begins to boot as soon as it is fully seated in the chassis. Be prepared to interrupt the boot process.
   c. Rotate the locking latches upward, tilting them so that they clear the locking pins, and then lower them into the locked position.
d. Interrupt the boot process by pressing **Ctrl-C** when you see **Press Ctrl-C for Boot Menu**.

e. Select the option to boot to Maintenance mode from the displayed menu.

**Running system-level diagnostics**

After installing a new DIMM, you should run diagnostics.

**Before you begin**

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

**About this task**

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

**Steps**

1. If the node 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 node boots to Maintenance mode, halt the node:
      ```
      halt
      ```
      After you issue the command, you should wait until the system stops at the LOADER prompt.
      **Important:** During the boot process, you can safely respond **y** to prompts:
      - A prompt warning that when entering Maintenance mode in an HA configuration, you must ensure that the healthy node remains down.

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. Run diagnostics on the system memory:
   ```
   sldiag device run -dev mem
   ```

4. Verify that no hardware problems resulted from the replacement of the DIMMs:
   ```
   sldiag device status -dev mem -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.

5. 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:
   \texttt{sldiag device clearstatus}

b. Verify that the log was cleared:
   \texttt{sldiag device status}
   The following default response is displayed:
   \texttt{SLDIAG: No log messages are present.}

c. Exit Maintenance mode:
   \texttt{halt}
   The node displays the LOADER prompt.

d. Boot the node from the LOADER prompt:
   \texttt{boot_ontap}

e. Return the node to normal operation:

<table>
<thead>
<tr>
<th>If your node is in...</th>
<th>Then...</th>
</tr>
</thead>
<tbody>
<tr>
<td>An HA pair</td>
<td>Perform a give back: \texttt{storage failover giveback - ofnode replacement_node_name}</td>
</tr>
<tr>
<td>A two-node MetroCluster configuration</td>
<td>Proceed to the next step. The MetroCluster healing and switchback procedures are done in the next task in the replacement process.</td>
</tr>
<tr>
<td>A stand-alone configuration</td>
<td>Proceed to the next step. No action is required.</td>
</tr>
</tbody>
</table>

You have completed system-level diagnostics.
If the system-level diagnostics tests... Then...

<table>
<thead>
<tr>
<th>Resulted in some test failures</th>
<th>Determine the cause of the problem:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a. Exit Maintenance mode:</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>halt</td>
</tr>
<tr>
<td></td>
<td>After you issue the command, wait until the system stops at the LOADER prompt.</td>
</tr>
<tr>
<td></td>
<td>b. Turn off or leave on the power supplies, depending on how many controller modules are in the chassis:</td>
</tr>
<tr>
<td></td>
<td>• If you have two controller modules in the chassis, leave the power supplies turned on to provide power to the other controller module.</td>
</tr>
<tr>
<td></td>
<td>• If you have one controller module in the chassis, turn off the power supplies and unplug them from the power sources.</td>
</tr>
<tr>
<td></td>
<td>c. Verify that you have observed all the considerations identified for running system-level diagnostics, that cables are securely connected, and that hardware components are properly installed in the storage system.</td>
</tr>
<tr>
<td></td>
<td>d. Boot the controller module you are servicing, interrupting the boot by pressing <strong>Ctrl-C</strong> when prompted to get to the Boot menu:</td>
</tr>
<tr>
<td></td>
<td>• If you have two controller modules in the chassis, fully seat the controller module you are servicing in the chassis. The controller module boots up when fully seated.</td>
</tr>
<tr>
<td></td>
<td>• If you have one controller module in the chassis, connect the power supplies, and then turn them on.</td>
</tr>
<tr>
<td></td>
<td>e. Select Boot to maintenance mode from the menu.</td>
</tr>
<tr>
<td></td>
<td>f. Exit Maintenance mode by entering the following command:</td>
</tr>
<tr>
<td></td>
<td>halt</td>
</tr>
<tr>
<td></td>
<td>After you issue the command, wait until the system stops at the LOADER prompt.</td>
</tr>
<tr>
<td></td>
<td>g. Rerun the system-level diagnostic test.</td>
</tr>
</tbody>
</table>

---

Healing and switching 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 healing and switchback operations. These operations return 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.

**About this task**

This task only applies to two-node MetroCluster configurations.

**Steps**

1. Resynchronize the aggregates by using the `metrocluster heal -phase aggregates` command from the surviving cluster.
Example

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.

2. Verify that the operation was completed successfully by using the metrocluster operation show command.

Example

controller_A_1::> metrocluster operation show
Operation: heal-aggregates
State: successful
Start Time: 7/25/2014 18:45:55
End Time: 7/25/2014 18:45:56
Errors: -

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

Example

controller_A_1::> storage aggregate show
<table>
<thead>
<tr>
<th>Aggregate</th>
<th>Size Available</th>
<th>Used%</th>
<th>State</th>
<th>#Vols</th>
<th>Nodes</th>
<th>RAID Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>aggr_b2</td>
<td>227.1GB</td>
<td>0%</td>
<td>online</td>
<td>0</td>
<td>mcc1-a2</td>
<td>raid_dp, mirrored, normal...</td>
</tr>
</tbody>
</table>

4. Switch back the mirrored aggregates by using the metrocluster heal -phase root-aggregates command.

Example

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.

5. Verify that the heal operation was completed successfully by using the metrocluster operation show command on the healthy cluster:

Example

mcc1A::> metrocluster operation show
Operation: heal-root-aggregates
State: successful
End Time: 7/29/2014 20:54:42
Errors: -

6. Verify that all nodes are in the enabled state:

    metrocluster node show
Example

```
cluster_B::> metrocluster node show

DR Group         Cluster Node          Configuration State Mirroring Mode
---- ------- -------------- -------------- --------------------
1     cluster_A controller_A_1 configured enabled heal roots completed
      controller_A_2 configured enabled heal roots completed
cluster_B controller_B_1 configured enabled waiting for switchback recovery
      controller_B_2 configured enabled waiting for switchback recovery
4 entries were displayed.
```

7. Verify that resynchronization is complete on all SVMs:

```
metrocluster vserver show
```

8. Verify that any automatic LIF migrations being performed by the healing operations were completed successfully:

```
metrocluster check lif show
```

9. Perform the switchback by using the `metrocluster switchback` command from any node in the surviving cluster.

10. Verify that the switchback operation has completed:

```
metrocluster show
```

Example

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.

11. Reestablish any SnapMirror or SnapVault configurations.

```
ONTAP 9 Data Protection Guide Using SnapMirror and SnapVault Technology
```

Completing the replacement process

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.

Copyright information

Copyright © 1994–2017 NetApp, Inc. All rights reserved. Printed in the U.S.
No part of this document covered by copyright may be reproduced in any form or by any means—graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system—without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP "AS IS" AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.277-7103 (October 1988) and FAR 52.227-19 (June 1987).

Trademark information

Active IQ, AltaVault, Arch Design, ASUP, AutoSupport, Campaign Express, Clustered Data ONTAP, Customer Fitness, Data ONTAP, DataMotion, Element, Fitness, Flash Accel, Flash Cache, Flash Pool, FlexArray, FlexCache, FlexClone, FlexPod, FlexScale, FlexShare, FlexVol, FPolicy, Fueled by SolidFire, GetSuccessful, Helix Design, LockVault, Manage ONTAP, MetroCluster, MultiStore, NetApp, NetApp Insight, OnCommand, ONTAP, ONTAPI, RAID DP, RAID-TEC, SANscreen, SANshare, SANtricity, SecureShare, Simplicity, Simulate ONTAP, Snap Creator, SnapCenter, SnapCopy, SnapDrive, SnapIntegrator, SnapLock, SnapManager, SnapMirror, SnapMover, SnapProtect, SnapRestore, Snapshot, SnapValidator, SnapVault, SolidFire, SolidFire Helix, StorageGRID, SyncMirror, Tech OnTap, Unbound Cloud, and WAFL and other names are trademarks or registered trademarks of NetApp, Inc., in the United States, and/or other countries. All other brands or products are trademarks or registered trademarks of their respective holders and should be treated as such. A current list of NetApp trademarks is available on the web.


How to send comments about documentation and receive update notifications

You can help us to improve the quality of our documentation by sending us your feedback. You can receive automatic notification when production-level (GA/FCS) documentation is initially released or important changes are made to existing production-level documents.

If you have suggestions for improving this document, send us your comments by email.

doccomments@netapp.com

To help us direct your comments to the correct division, include in the subject line the product name, version, and operating system.

If you want to be notified automatically when production-level documentation is released or important changes are made to existing production-level documents, follow Twitter account @NetAppDoc.
You can also contact us in the following ways:

• NetApp, Inc., 495 East Java Drive, Sunnyvale, CA 94089 U.S.
• Telephone: +1 (408) 822-6000
• Fax: +1 (408) 822-4501
• Support telephone: +1 (888) 463-8277