Replacing the NVMEM battery

To replace an NVMEM battery in the system, you must remove the controller module from the system, open it, replace the battery, and close and replace the controller module.

About this task

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

Steps

1. Shutting down the impaired controller on page 1
2. Opening the controller module on page 4
3. Replacing the NVMEM battery on page 5
4. Reinstalling the controller on page 7
5. Running system-level diagnostics on page 7
6. Healing and switching back aggregates in a two-node MetroCluster configuration on page 9
7. Completing the replacement process on page 11

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 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.

Steps

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

   ```bash
   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:

      ```bash
      cluster modify -node impaired_node -epsilon false
      ```
   b. Assign Epsilon to a healthy node in the cluster:

      ```bash
      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:

   ```bash
   storage failover modify -node local -auto-giveback false
   ```

3. Take the impaired node to the LOADER prompt:
If the impaired node is displaying... Then...
The LOADER prompt Go to the next step.
Waiting for giveback... Press Ctrl-C, and then respond y when prompted.
System prompt or password prompt Take over or halt the impaired node:
  • For an HA pair, take over the impaired node from the healthy node:
    
    storage failover takeover -ofnode impaired_node_name
    
    When the impaired node shows Waiting for giveback..., press Ctrl-C, and then respond y.
  • For a stand-alone system:
    
    system node halt impaired_node_name

4. If the system is in a dual-chassis HA pair or stand-alone configuration, turn off the power supplies, and then unplug the impaired node's power cords from the power source.

5. If the system is in a stand-alone configuration, turn off the power supplies, and then unplug the impaired node’s power cords from the power source.

**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.
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. 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.

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

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

5. 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.
Replacing the NVMEM battery

To replace the NVMEM battery in your system, you must remove the failed NVMEM battery from the system and replace it with a new NVMEM battery.

Steps

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

2. Check the NVMEM LED:
   - If your system is in an HA configuration, go to the next step.
   - If your system is in a stand-alone configuration, cleanly shut down the controller module, and then check the NVRAM LED identified by the NV icon.

   ![NV icon]

   **Attention:** The NVRAM LED blinks while destaging contents to the flash memory when you halt the system. After the destage is complete, the LED turns off.
   - If power is lost without a clean shutdown, the NVMEM LED flashes until the destage is complete, and then the LED turns off.
   - If the LED is on and power is on, unwritten data is stored on NVMEM. This typically occurs during an uncontrolled shutdown after ONTAP has successfully booted.

3. Open the CPU air duct and locate the NVMEM battery.
4. Grasp the battery and press the blue locking tab marked PUSH, and then lift the battery out of the holder and controller module.

5. Remove the replacement battery from its package.

6. Align the tab or tabs on the battery holder with the notches in the controller module side, and then gently push down on the battery housing until the battery housing clicks into place.

7. Close the CPU air duct.
   Make sure that the plug locks down to the socket.
Reinstalling the controller

After you replace a component within the controller module, you must reinstall the controller module in the system chassis and boot it to a state where you can run diagnostic tests on the replaced component.

Steps

1. If you are not already grounded, properly ground yourself.
2. Align the end of the controller module with the opening in the chassis, and then gently push the controller module halfway into the system.
   
   **Note:** Do not completely insert the controller module in the chassis until instructed to do so.
3. Recable the system, as needed.
   
   If you removed the media converters (SFPs), remember to reinstall them if you are using fiber optic cables.
4. Complete the reinstallation of the controller module:
   The controller module begins to boot as soon as it is fully seated in the chassis. Be prepared to interrupt the boot process.
   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.
      
      **Attention:** Do not use excessive force when sliding the controller module into the chassis; you might damage the connectors.
   b. Tighten the thumbscrew on the cam handle on back of the controller module.
   c. If you have not already done so, reinstall the cable management device.
   d. Bind the cables to the cable management device with the hook and loop strap.
   e. As each node starts the booting, press Ctrl-C to interrupt the boot process when you see the message Press Ctrl-C for Boot Menu.
   f. Select the option to boot to Maintenance mode from the displayed menu.

Running system-level diagnostics

After installing a new NVMEM battery, 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 NVMEM memory:

   ```
   sldiag device run -dev nvmem
   ```

4. Verify that no hardware problems resulted from the replacement of the NVMEM battery:

   ```
   sldiag device status -dev nvmem -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...**

<table>
<thead>
<tr>
<th>Were completed without any failures</th>
<th>a. Clear the status logs:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><code>sldiag device clearstatus</code></td>
</tr>
<tr>
<td>b. Verify that the log was cleared:</td>
<td><code>sldiag device status</code></td>
</tr>
<tr>
<td></td>
<td>The following default response is displayed:</td>
</tr>
<tr>
<td></td>
<td>SLDIAG: No log messages are present.</td>
</tr>
<tr>
<td>c. Exit Maintenance mode:</td>
<td><code>halt</code></td>
</tr>
<tr>
<td></td>
<td>The node displays the LOADER prompt.</td>
</tr>
<tr>
<td>d. Boot the node from the LOADER prompt:</td>
<td><code>boot_ontap</code></td>
</tr>
<tr>
<td>e. Return the node to normal operation:</td>
<td></td>
</tr>
</tbody>
</table>

   **If your node is in... Then...**

<table>
<thead>
<tr>
<th>An HA pair</th>
<th>Perform a give back:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><code>storage failover giveback -ofnode replacement_node_name</code></td>
</tr>
</tbody>
</table>

   | A stand-alone configuration | Proceed to the next step. |
   |                           | No action is required. |

You have completed system-level diagnostics.
<table>
<thead>
<tr>
<th>If the system-level diagnostics tests...</th>
<th>Then...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resulted in some test failures</td>
<td>Determine the cause of the problem:</td>
</tr>
<tr>
<td></td>
<td>a. Exit Maintenance mode:</td>
</tr>
<tr>
<td></td>
<td><code>halt</code></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 <code>Ctrl-C</code> 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><code>halt</code></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

```bash
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

```bash
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

```bash
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,
```

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

Example

```bash
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

```bash
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:

```bash
metrocluster node show
```
Example

```
Example

cluster_B::> metrocluster node show
<table>
<thead>
<tr>
<th>DR Group</th>
<th>Cluster Node</th>
<th>State</th>
<th>Mirroring Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>cluster_A</td>
<td>controller_A_1</td>
<td>configured enabled heal roots completed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>controller_A_2</td>
<td>configured enabled heal roots completed</td>
</tr>
<tr>
<td></td>
<td>cluster_B</td>
<td>controller_B_1</td>
<td>configured enabled waiting for switchback recovery</td>
</tr>
<tr>
<td></td>
<td></td>
<td>controller_B_2</td>
<td>configured enabled waiting for switchback recovery</td>
</tr>
</tbody>
</table>

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:

```
Example

cluster_B::> metrocluster show
<table>
<thead>
<tr>
<th>Cluster</th>
<th>Configuration State</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local:</td>
<td>cluster_B configured</td>
<td>switchover</td>
</tr>
<tr>
<td>Remote:</td>
<td>cluster_A configured</td>
<td>waiting-for-switchback</td>
</tr>
</tbody>
</table>
```

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

```
Example

cluster_B::> metrocluster show
<table>
<thead>
<tr>
<th>Cluster</th>
<th>Configuration State</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local:</td>
<td>cluster_B configured</td>
<td>normal</td>
</tr>
<tr>
<td>Remote:</td>
<td>cluster_A configured</td>
<td>normal</td>
</tr>
</tbody>
</table>
```

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 WAF 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