Replacing a PCIe card

To replace a PCIe card, you must perform a specific sequence of tasks.

About this task

- You can use this procedure with all versions of ONTAP supported by your system
- All other components in the system must be functioning properly; if not, you must contact technical support.

Steps

1. Shutting down the impaired controller
2. Opening the controller module
3. Replacing a PCIe card
4. Reinstalling the controller
5. Healing and switching back aggregates in a two-node MetroCluster configuration
6. Completing the replacement process

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:
   
   ```
   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:
If the impaired node is displaying... Then...

<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 when prompted.</td>
</tr>
<tr>
<td>System prompt or password prompt</td>
<td>Take over or halt the impaired node:</td>
</tr>
<tr>
<td></td>
<td>• For an HA pair, take over the impaired node from the healthy 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>
<tr>
<td></td>
<td>• For a stand-alone system:</td>
</tr>
<tr>
<td></td>
<td>system node halt impaired_node_name</td>
</tr>
</tbody>
</table>

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</td>
<td></td>
</tr>
<tr>
<td>metrocluster switchover command fails</td>
<td></td>
</tr>
<tr>
<td>a. Halt the impaired node:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>system node halt</td>
</tr>
<tr>
<td>b. Perform a forced switchover operation:</td>
<td></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.
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 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 a PCIe card

To replace a PCIe card, locate it within the controller and follow the specific sequence of steps.

**Steps**

1. If you are not already grounded, properly ground yourself.
2. Loosen the thumbscrew on the controller module side panel.
3. Swing the side panel off the controller module.
4. Remove the PCIe card from the controller module and set it aside.
5. Install the replacement PCIe card.

   Be sure that you properly align the card in the slot and exert even pressure on the card when seating it in the socket. The adapter must be fully and evenly seated in the slot.

   **Note:** If you are installing a card in the bottom slot and cannot see the card socket well, remove the top card so that you can see the card socket, install the card, and then reinstall the card you removed from the top slot.
6. Close the side panel and tighten the thumbscrew.

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.

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. Reconnect the power cables to the power supplies and to the power sources, and then turn on the power to start the boot process.

5. If your system is configured to support 10GbE cluster interconnect and data connections on 40GbE NICs or onboard ports, you must convert these ports to 10GbE connections with the `nicadmin convert` command from Maintenance mode.
   
   **Note:** Be sure to exit Maintenance mode after completing the conversion.

6. Return the node to normal operation:

<table>
<thead>
<tr>
<th>If your system is in...</th>
<th>Issue this command from the partner's console...</th>
</tr>
</thead>
<tbody>
<tr>
<td>An HA pair</td>
<td><code>storage failover giveback -ofnode impaired_node_name</code></td>
</tr>
<tr>
<td>A stand-alone configuration</td>
<td>None required</td>
</tr>
</tbody>
</table>

7. If automatic giveback was disabled, reenable it:

   ```
   storage failover modify -node local -auto-giveback true
   ```
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
   Aggregate     Size Available Used% State   #Vols  Nodes            RAID Status
   --------- -------- --------- ----- ------- ------ ---------------- ------------
   ...          ...        ...       ...    ...      ...     ...              ...
   aggr_b2      227.1GB   227.1GB    0% online       0 mcc1-a2          raid_dp, mirrored,
   normal...
   ```

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           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.
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.

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