NetApp CN1610 switches

ONTAP Systems Switches

NetApp
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The CN1610 is a high bandwidth, managed Layer 2 switch that provides 16 10-Gigabit Small Form-Factor Pluggable Plus (SFP+) ports. The switch includes redundant power supplies and fan trays that support hot swapping for high availability.

This 1U switch can be installed in a standard 19-inch NetApp 42U system cabinet or third-party cabinet.

The switch supports local management through the console port or remote management by using Telnet or SSH through a network connection. The CN1610 includes a dedicated 1-Gigabit Ethernet RJ45 management port for out-of-band switch management. You can manage the switch by entering commands into the command-line interface (CLI) or by using an SNMP-based network management system (NMS).

Install FASTPATH software and RCFs on a NetApp cluster switch

You must install the FASTPATH software and reference configuration files (RCFs) on a NetApp CN1610 cluster switch.

Before you begin

- The cluster must be a fully functioning cluster.
- There must be no defective cluster network interface cards (NICs), and all connected ports on the cluster switch must be functional.
- All cluster ports must be up.
- All cluster logical interfaces (LIFs) must be up and must not have been migrated.
- The ONTAP (privilege: advanced) `cluster ping-cluster -node node1` command must indicate that `larger than PMTU communication` is successful on all paths.
- You must consult the switch compatibility table on the NetApp CN1601 and CN1610 Switches page for the supported FASTPATH, RCF, and ONTAP versions.

  There can be command dependencies between command syntax in the RCF and FASTPATH versions.

> In RCF version 1.2, support for Telnet has been explicitly disabled because of security concerns. To avoid connectivity issues while installing RCF 1.2, you must verify that Secure Shell (SSH) is enabled. The NetApp® CN1610 Switch Administrator's Guide has more information about SSH.

About this task

The examples in this procedure use the following switch and node nomenclature:

- The procedures in this document use the clustered Data ONTAP 8.2 syntax. As a result, the cluster Vserver, LIF names, and CLI output will be different than those in Data ONTAP 8.3.
- The two NetApp switches are cs1 and cs2.
- The two cluster LIFs are clus1 and clus2.

- The Vservers are vs1 and vs2.
- The `cluster::*>` prompt indicates the name of the cluster.
- The cluster ports on each node are named e1a and e2a.

  The Hardware Universe has more information about the actual cluster ports that are supported on your platform.

- The Inter-Switch Links (ISLs) that are supported for the NetApp cluster switch are ports 0/13 through 0/16.
- The node connections that are supported for the NetApp cluster switch are ports 0/1 through 0/12.

This procedure has two parts:

- Install FASTPATH software describes how to install the FASTPATH software.
- Install an RCF on a CN1610 switch describes how to install RCFs.

Install FASTPATH software

When you install the FASTPATH software on your NetApp switches, you must begin the upgrade with the second switch, *cs2*.

Steps

1. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport message:

   `system node autosupport invoke -node * -type all - message MAINT=xh`

   x is the duration of the maintenance window in hours.

   > The AutoSupport message notifies technical support of this maintenance task so that automatic case creation is suppressed during the maintenance window.

2. Log into the switch as admin. There is no password by default. At the `(cs2) #` prompt, enter the `enable` command. Again, there is no password by default. This gives you access to Privileged EXEC mode, which allows you to configure the network interface.

   ```
   (cs2) # enable
   Password (Enter)
   (cs2) #
   ```

3. On the console of each node, migrate clus2 to port e1a: `network interface migrate`

   ```
   cluster::*> network interface migrate -vserver vs1 -lif clus2 -source
   -node node1 -destnode node1 -dest-port e1a
   cluster::*> network interface migrate -vserver vs2 -lif clus2 -source
   -node node2 -destnode node2 -dest-port e1a
   ```

4. On the console of each node, verify that the migration took place: `network interface show`

   The following example shows that clus2 has migrated to port e1a on both nodes:

```
cluster::*> network interface show -role cluster

         Logical    Status     Network         Current  Current  Is
Vserver  Interface  Admin/Open Address/Mask    Node     Port     Home
-------- ---------- ---------- --------------- -------- -------  ----
vs1
         clus1      up/up      10.10.10.1/16   node1    e1a      true
         clus2      up/up      10.10.10.2/16   node1    e1a      false
vs2
         clus1      up/up      10.10.10.1/16   node2    e1a      true
         clus2      up/up      10.10.10.2/16   node2    e1a      false
```

5. Shut down cluster port e2a on both nodes: `network port modify`

   The following example shows port e2a being shut down on both nodes:

```
cluster::*> network port modify -node node1 -port e2a -up-admin false
cluster::*> network port modify -node node2 -port e2a -up-admin false
```

6. Verify that port e2a is shut down on both nodes: `network port show`

```
cluster::*> network port show -role cluster

                                  Auto-Negot  Duplex      Speed (Mbps)
Node   Port Role     Link MTU    Admin/Oper  Admin/Oper  Admin/Oper
------ ---- -------- ---- -----  ----------  ----------  ------------
node1
       e1a  cluster  up   9000   true/true   full/full   auto/10000
       e2a  cluster  down 9000   true/true   full/full   auto/10000
node2
       e1a  cluster  up   9000   true/true   full/full   auto/10000
       e2a  cluster  down 9000   true/true   full/full   auto/10000
```

7. Shut down the Inter-Switch Link (ISL) ports on cs1, the active NetApp switch:

```
(cs1) # configure
(cs1)(config) # interface 0/13-0/16
(cs1)(Interface 0/13-0/16) # shutdown
(cs1)(Interface 0/13-0/16) # exit
(cs1)(config) # exit
```

8. Back up the current active image on cs2.

```
(cs2) # show bootvar

 Image Descriptions   .

  active:
  backup:

 Images currently available on Flash

--------------------------------------------------------------------
 unit        active       backup     current-active       next-active
--------------------------------------------------------------------

    1        1.1.0.3      1.1.0.1          1.1.0.3           1.1.0.3

(cs2) # copy active backup
Copying active to backup
Copy operation successful

(cs2) #
```

9. Download the image file to the switch.

   Copying the image file to the active image means that when you reboot, that image establishes the running FASTPATH version. The previous image remains available as a backup.

```
(cs2) # copy tftp://10.0.0.1/NetApp_CN1610_1.1.0.5.stk active


Mode..................................... TFTP
Set Server IP............................ 10.0.0.1
Path..................................... ./
Filename................................. NetApp_CN1610_1.1.0.5.stk
Data Type................................ Code
Destination Filename..................... active

Management access will be blocked for the duration of the transfer
Are you sure you want to start? (y/n) y
TFTP Code transfer starting...


File transfer operation completed successfully.
```

10. Verify the running version of the FASTPATH software.

```
(cs2) # show version

Switch: 1

System Description.................. Broadcom Scorpion 56820
                                     Development System - 16 TENGIG,
                                     1.1.0.3, Linux 2.6.21.7
Machine Type........................ Broadcom Scorpion 56820
                                     Development System - 16TENGIG
Machine Model....................... BCM-56820
Serial Number....................... 10611100004
FRU Number..........................
Part Number......................... BCM56820
Maintenance Level................... A
Manufacturer........................ 0xbc00
Burned In MAC Address............... 00:A0:98:4B:A9:AA
Software Version.................... 1.1.0.3
Operating System.................... Linux 2.6.21.7
Network Processing Device........... BCM56820_B0
Additional Packages................. FASTPATH QOS
                                     FASTPATH IPv6 Management
```

11. View the boot images for the active and backup configuration.

```
(cs2) # show bootvar

Image Descriptions

 active :
 backup :

 Images currently available on Flash

--------------------------------------------------------------------
 unit        active       backup     current-active       next-active
--------------------------------------------------------------------

    1        1.1.0.3      1.1.0.3          1.1.0.3           1.1.0.5
```

12. Reboot the switch.

```
(cs2) # reload

Are you sure you would like to reset the system? (y/n)  y

System will now restart!
```

13. Log in again, and verify the new version of the FASTPATH software.

```
(cs2) # show version

Switch: 1

System Description..................... Broadcom Scorpion 56820
                                        Development System - 16 TENGIG,
                                        1.1.0.5, Linux 2.6.21.7
Machine Type........................... Broadcom Scorpion 56820
                                        Development System - 16TENGIG
Machine Model.......................... BCM-56820
Serial Number.......................... 10611100004
FRU Number............................
Part Number............................ BCM56820
Maintenance Level...................... A
Manufacturer........................... 0xbc00
Burned In MAC Address.................. 00:A0:98:4B:A9:AA
Software Version....................... 1.1.0.5
Operating System....................... Linux 2.6.21.7
Network Processing Device.............. BCM56820_B0
Additional Packages.................... FASTPATH QOS
                                        FASTPATH IPv6 Management
```

14. Bring up the ISL ports on cs1, the active switch.

```
(cs1) # configure
(cs1) (config) # interface 0/13-0/16
(cs1) (Interface 0/13-0/16) # no shutdown
(cs1) (Interface 0/13-0/16) # exit
(cs1) (config) # exit
```

15. Verify that the ISLs are operational: `show port-channel 3/1`

    The Link State field should indicate `Up`.

```
(cs2) # show port-channel 3/1

Local Interface................................ 3/1
Channel Name................................... ISL-LAG
Link State..................................... Up
Admin Mode..................................... Enabled
Type........................................... Static
Load Balance Option............................ 7
(Enhanced hashing mode)

Mbr    Device/       Port      Port
Ports  Timeout       Speed     Active
------ ------------- --------- -------
0/13   actor/long    10G Full  True
       partner/long
0/14   actor/long    10G Full  True
       partner/long
0/15   actor/long    10G Full  True
       partner/long
0/16   actor/long    10G Full  True
       partner/long
```

16. Copy the `running-config` file to the `startup-config` file when you are satisfied with the software versions and switch settings.

```
(cs2) # write memory

This operation may take a few minutes.
Management interfaces will not be available during this time.

Are you sure you want to save? (y/n) y

Config file 'startup-config' created successfully .

Configuration Saved!
```

17. Enable the second cluster port, e2a, on each node: `network port modify`

```
cluster::*> network port modify -node node1 -port e2a -up-admin true
cluster::*> **network port modify -node node2 -port e2a -up-admin true**
```

18. Revert clus2 that is associated with port e2a: `network interface revert`

    The LIF might revert automatically, depending on your version of ONTAP software.

```
cluster::*> network interface revert -vserver Cluster -lif n1_clus2
cluster::*> network interface revert -vserver Cluster -lif n2_clus2
```

19. Verify that the LIF is now home (`true`) on both nodes: `network interface show -role cluster`

```
cluster::*> network interface show -role cluster

          Logical    Status     Network        Current  Current Is
Vserver   Interface  Admin/Oper Address/Mask   Node     Port    Home
--------  ---------- ---------- -------------- -------- ------- ----
vs1
          clus1      up/up      10.10.10.1/24  node1    e1a     true
          clus2      up/up      10.10.10.2/24  node1    e2a     true
vs2
          clus1      up/up      10.10.10.1/24  node2    e1a     true
          clus2      up/up      10.10.10.2/24  node2    e2a     true
```

20. View the status of the nodes: `cluster show`

```
cluster::> cluster show

Node                 Health  Eligibility
-------------------- ------- ------------
node1                true    true
node2                true    true
```

21. Repeat step 1 through step 18 to upgrade the FASTPATH software on the other switch, cs1.
22. If you suppressed automatic case creation, re-enable it by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all -message MAINT=END
```

Install a Reference Configuration File on a CN1610 switch

When you are installing a reference configuration file (RCF), you must first migrate the cluster LIFs away from switch cs2. After the RCF is installed and validated, the LIFs can be migrated back.

Before you begin

You must have saved the configuration that is currently running on your switch.

Steps

1. Save your current switch configuration information: `write memory`

The following example shows the current switch configuration being saved to the startup configuration (`startup-config`) file on switch cs2:

```
(cs2) # write memory
This operation may take a few minutes.
Management interfaces will not be available during this time.

Are you sure you want to save? (y/n) y

Config file 'startup-config' created successfully.

Configuration Saved!
```

2. On the console of each node, migrate clus2 to port e1a: `network interface migrate`

```
cluster::*> network interface migrate -vserver vs1 -lif clus2 -source
-node node1 -destnode node1 -dest-port e1a

cluster::*> network interface migrate -vserver vs2 -lif clus2 -source
-node node2 -destnode node2 -dest-port e1a
```

3. On the console of each node, verify that the migration occurred: `network interface show -role cluster`

   The following example shows that clus2 has migrated to port e1a on both nodes:

```
cluster::*> network port show -role cluster
         clus1      up/up      10.10.10.1/16   node2    e1a     true
         clus2      up/up      10.10.10.2/16   node2    e1a     false
```

4. Shut down port e2a on both nodes: `network port modify`

   The following example shows port e2a being shut down on both nodes:

```
cluster::*> network port modify -node node1 -port e2a -up-admin false
cluster::*> network port modify -node node2 -port e2a -up-admin false
```

5. Verify that port e2a is shut down on both nodes: `network port show`

```
cluster::*> network port show -role cluster

                                  Auto-Negot  Duplex      Speed (Mbps)
Node   Port   Role     Link MTU   Admin/Oper  Admin/Oper  Admin/Oper
------ ------ -------- ---- ----- ----------- ----------  -----------
node1
       e1a    cluster  up   9000  true/true   full/full   auto/10000
       e2a    cluster  down 9000  true/true   full/full   auto/10000
node2
       e1a    cluster  up   9000  true/true   full/full   auto/10000
       e2a    cluster  down 9000  true/true   full/full   auto/10000
```

6. Shut down the ISL ports on cs1, the active NetApp switch.

```
(cs1) # configure
(cs1) (config) # interface 0/13-0/16
(cs1) (interface 0/13-0/16) # shutdown
(cs1) (interface 0/13-0/16) # exit
(cs1) (config) # exit
```

7. Copy the RCF to the switch.

> You must set the `.scr` extension as part of the file name before invoking the script. This extension is the extension for the FASTPATH operating system.

The switch will validate the script automatically as it is downloaded to the switch, and the output will go to the console.

```
(cs2) # copy tftp://10.10.0.1/CN1610_CS_RCF_v1.1.txt nvram:script
CN1610_CS_RCF_v1.1.scr

[the script is now displayed line by line]
Configuration script validated.
File transfer operation completed successfully.
```

8. Verify that the script was downloaded and saved with the file name that you gave it.

```
(cs2) # script list
Configuration Script Name        Size(Bytes)
-------------------------------- -----------
running-config.scr               6960
CN1610_CS_RCF_v1.1.scr           2199

2 configuration script(s) found.
6038 Kbytes free.
```

9. Validate the script.

   The script is validated during the download to verify that each line is a valid switch command line.

```
(cs2) # script validate CN1610_CS_RCF_v1.1.scr
[the script is now displayed line by line]
Configuration script 'CN1610_CS_RCF_v1.1.scr' validated.
```

10. Apply the script to the switch.

```
(cs2) #script apply CN1610_CS_RCF_v1.1.scr

Are you sure you want to apply the configuration script? (y/n) y
[the script is now displayed line by line]...

Configuration script 'CN1610_CS_RCF_v1.1.scr' applied.
```

11. Verify that your changes have been implemented on the switch.

```
(cs2) # show running-config
```

    The example displays the `running-config` file on the switch. You must compare the file to the RCF to verify that the parameters that you set are as you expect.

12. Save the changes.
13. Set the `running-config` file to be the standard one.

```
(cs2) # write memory
This operation may take a few minutes.
Management interfaces will not be available during this time.

Are you sure you want to save? (y/n) y

Config file 'startup-config' created successfully.
```

14. Reboot the switch and verify that the `running-config` file is correct.

    After the reboot completes, you must log in, view the `running-config` file, and then look for the description on interface 3/64, which is the version label for the RCF.

```
(cs2) # reload

The system has unsaved changes.
Would you like to save them now? (y/n) y


Config file 'startup-config' created successfully.
Configuration Saved!
System will now restart!
```

15. Bring up the ISL ports on cs1, the active switch.

```
(cs1) # configure
(cs1) (config)# interface 0/13-0/16
(cs1) (Interface 0/13-0/16)# no shutdown
(cs1) (Interface 0/13-0/16)# exit
(cs1) (config)# exit
```

16. Verify that the ISLs are operational: `show port-channel 3/1`

    The Link State field should indicate `Up`.

```
(cs2) # show port-channel 3/1

Local Interface................................ 3/1
Channel Name................................... ISL-LAG
Link State..................................... Up
Admin Mode..................................... Enabled
Type........................................... Static
Load Balance Option............................ 7
(Enhanced hashing mode)

Mbr    Device/       Port      Port
Ports  Timeout       Speed     Active
------ ------------- --------- -------
0/13   actor/long    10G Full  True
       partner/long
0/14   actor/long    10G Full  True
       partner/long
0/15   actor/long    10G Full  True
       partner/long
0/16   actor/long    10G Full  True
       partner/long
```

17. Bring up cluster port e2a on both nodes: `network port modify`

    The following example shows port e2a being brought up on node1 and node2:

```
cluster::*> network port modify -node node1 -port e2a -up-admin true
cluster::*> network port modify -node node2 -port e2a -up-admin true
```

18. Verify that port e2a is up on both nodes: `network port show -role cluster`

```
cluster::*> network port show -role cluster

                                 Auto-Negot  Duplex      Speed (Mbps)
Node   Port Role     Link MTU   Admin/Oper  Admin/Oper  Admin/Oper
------ ---- -------- ---- ----  ----------- ----------  ------------
node1
       e1a  cluster  up   9000  true/true   full/full   auto/10000
       e2a  cluster  up   9000  true/true   full/full   auto/10000
node2
       e1a  cluster  up   9000  true/true   full/full   auto/10000
       e2a  cluster  up   9000  true/true   full/full   auto/10000
```

19. On both nodes, revert clus2 that is associated with port e2a: `network interface revert`

    The LIF might revert automatically, depending on your version of ONTAP.

```
cluster::*> network interface revert -vserver node1 -lif clus2
cluster::*> network interface revert -vserver node2 -lif clus2
```

20. Verify that the LIF is now home (`true`) on both nodes: `network interface show -role cluster`

```
cluster::*> network interface show -role cluster

        Logical    Status     Network        Current  Current Is
Vserver Interface  Admin/Oper Address/Mask   Node     Port    Home
------- ---------- ---------- -------------- -------- ------- ----
vs1
        clus1      up/up      10.10.10.1/24  node1    e1a     true
        clus2      up/up      10.10.10.2/24  node1    e2a     true
vs2
        clus1      up/up      10.10.10.1/24  node2    e1a     true
        clus2      up/up      10.10.10.2/24  node2    e2a     true
```

21. View the status of the node members: `cluster show`

```
cluster::> cluster show

Node           Health  Eligibility
-------------- ------- ------------
node1
               true    true
node2
               true    true
```

22. Copy the `running-config` file to the `startup-config` file when you are satisfied with the software versions and switch settings.

```
(cs2) # write memory
This operation may take a few minutes.
Management interfaces will not be available during this time.

Are you sure you want to save? (y/n) y

Config file 'startup-config' created successfully.

Configuration Saved!
```

23. Repeat step 1 through step 22 to upgrade the RCF on the other switch, cs1.

Related information

NetApp Support

Install FASTPATH software and RCFs on NetApp cluster switches running ONTAP 8.3.1 and later

The installation steps are the same for both NetApp CN1601 management switches and CN1610 cluster switches running ONTAP 8.3.1 or later. However, the two models require different software and RCFs.

Before you begin

- The cluster must be a fully functioning cluster.
- There must be no defective cluster NICs, and all connected ports on both cluster switches must be functional.
- All cluster ports must be up.
- All cluster logical interfaces (LIFs) must be up and must not have been migrated.
- The ONTAP (privilege: advanced) `cluster ping-cluster -node node1` command must indicate that `larger than PMTU communication` is successful on all paths.
- You must be using supported FASTPATH, RCF, and ONTAP versions.

  There can be command dependencies between command syntax in the RCF and FASTPATH versions. The switch compatibility page lists the supported versions. See NetApp CN1601 and CN1610 Switches for details.

About this task

The examples in this procedure use the following switch and node nomenclature:

- The two NetApp switch names are cs1 and cs2.
- The cluster logical interface (LIF) names are node1_clus1 and node1_clus2 for node1, and node2_clus1 and node2_clus2 for node2.
- The storage virtual machine (SVM) name is Cluster.
- The `cluster1::*>` prompt indicates the name of the cluster.

- The cluster ports on each node are named e0a and e0b.

  The Hardware Universe contains the actual cluster ports supported on your platform.

- The Inter-Switch Links (ISLs) supported for the NetApp cluster switches are ports 0/13 through 0/16.
- The node connections supported for the NetApp cluster switches are ports 0/1 through 0/12.
- The example in this procedure begins the upgrade on the second switch, *cs2*.
- The examples in this procedure use two nodes, but you can have up to 24 nodes in a cluster.
- The examples and outputs might vary depending on different releases of FASTPATH, RCF, and ONTAP.

Steps

1. Display information about the network ports on the cluster:

   `network port show -ipspace cluster`

   The following example shows the type of output from the command:

```
cluster1::> network port show -ipspace cluster
                                                                  Speed
(Mbps)
Node   Port      IPspace      Broadcast Domain Link   MTU    Admin/Oper
------ --------- ------------ ---------------- ----- -------
------------
node1
       e0a       Cluster      Cluster          up       9000  auto/10000
       e0b       Cluster      Cluster          up       9000  auto/10000
node2
       e0a       Cluster      Cluster          up       9000  auto/10000
       e0b       Cluster      Cluster          up       9000  auto/10000
4 entries were displayed.
```

2. Display information about the LIFs on the cluster:

   `network interface show -role cluster`

   The following example shows the logical interfaces on the cluster. In this example the `-role` parameter displays information about the LIFs that are associated with cluster ports:

```
cluster1::> network interface show -role cluster
  (network interface show)
            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node          Port
Home
----------- ---------- ---------- ------------------ -------------
------- ----
Cluster
            node1_clus1  up/up    10.254.66.82/16    node1         e0a
true
            node1_clus2  up/up    10.254.206.128/16  node1         e0b
true
            node2_clus1  up/up    10.254.48.152/16   node2         e0a
true
            node2_clus2  up/up    10.254.42.74/16    node2         e0b
true
4 entries were displayed.
```

3. On each respective node, using a node management LIF, migrate node1_clus2 to e0a on node1 and node2_clus2 to e0a on node2:

   `network interface migrate`

   You must enter the commands on the controller consoles that own the respective cluster LIFs.

```
cluster1::> network interface migrate -vserver Cluster -lif node1_clus2
-destination-node node1 -destination-port e0a
cluster1::> network interface migrate -vserver Cluster -lif node2_clus2
-destination-node node2 -destination-port e0a
```

   For this command, the name of the cluster is case-sensitive and the command should be run on each node. It is not possible to run this command in the general cluster LIF.

4. Verify that the migration took place by using the `network interface show` command on a node.

   The following example shows that clus2 has migrated to port e0a on nodes node1 and node2:

```
cluster1::> **network interface show -role cluster**
            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node          Port
Home
----------- ---------- ---------- ------------------ -------------
------- ----
Cluster
            node1_clus1  up/up    10.254.66.82/16   node1         e0a
true
            node1_clus2  up/up    10.254.206.128/16 node1         e0a
false
            node2_clus1  up/up    10.254.48.152/16  node2         e0a
true
            node2_clus2  up/up    10.254.42.74/16   node2         e0a
false
4 entries were displayed.
```

5. Change the privilege level to advanced, entering y when prompted to continue:

   `set -privilege advanced`

   The advanced prompt (*>) appears.

6. Shut down cluster port e0b on both nodes:

   `network port modify -node node_name -port port_name -up-admin false`

   You must enter the commands on the controller consoles that own the respective cluster LIFs.

   The following example shows the commands to shut down port e0b on all nodes:

   ```
   cluster1::*> network port modify -node node1 -port e0b -up-admin false
   cluster1::*> network port modify -node node2 -port e0b -up-admin false
   ```

7. Verify that port e0b is shut down on both nodes:

   `network port show`

```
cluster1::*> network port show -role cluster

                                                                  Speed
(Mbps)
Node   Port      IPspace      Broadcast Domain Link   MTU    Admin/Oper
------ --------- ------------ ---------------- ----- -------
------------
node1
       e0a       Cluster      Cluster          up       9000  auto/10000
       e0b       Cluster      Cluster          down     9000  auto/10000
node2
       e0a       Cluster      Cluster          up       9000  auto/10000
       e0b       Cluster      Cluster          down     9000  auto/10000
4 entries were displayed.
```

8. Shut down the Inter-Switch Link (ISL) ports on cs1.

```
(cs1) #configure
(cs1) (Config)#interface 0/13-0/16
(cs1) (Interface 0/13-0/16)#shutdown
(cs1) (Interface 0/13-0/16)#exit
(cs1) (Config)#exit
```

9. Back up the current active image on cs2.

```
(cs2) # show bootvar

 Image Descriptions

 active :
 backup :


 Images currently available on Flash

--------------------------------------------------------------------
 unit      active      backup     current-active        next-active
--------------------------------------------------------------------

    1     1.1.0.5     1.1.0.3            1.1.0.5            1.1.0.5

(cs2) # copy active backup
Copying active to backup
Copy operation successful
```

10. Verify the running version of the FASTPATH software.

```
(cs2) # show version

Switch: 1

System Description.............................. NetApp CN1610, 1.1.0.5,
Linux
                                                 2.6.21.7
Machine Type.................................... NetApp CN1610
Machine Model................................... CN1610
Serial Number................................... 20211200106
Burned In MAC Address........................... 00:A0:98:21:83:69
Software Version................................ 1.1.0.5
Operating System................................ Linux 2.6.21.7
Network Processing Device....................... BCM56820_B0
Part Number..................................... 111-00893

--More-- or (q)uit


Additional Packages............................. FASTPATH QOS
                                                 FASTPATH IPv6 Management
```

11. Download the image file to the switch.

    Copying the image file to the active image means that when you reboot, that image establishes the running FASTPATH version. The previous image remains available as a backup.

```
(cs2) #copy sftp://root@10.22.201.50//tftpboot/NetApp_CN1610_1.2.0.7.stk
active
Remote Password:********

Mode........................................... SFTP
Set Server IP.................................. 10.22.201.50
Path........................................... /tftpboot/
Filename.......................................
NetApp_CN1610_1.2.0.7.stk
Data Type...................................... Code
Destination Filename........................... active

Management access will be blocked for the duration of the transfer
Are you sure you want to start? (y/n) y
SFTP Code transfer starting...


File transfer operation completed successfully.
```

12. Confirm the current and next-active boot image versions:

    `show bootvar`

```
(cs2) #show bootvar

Image Descriptions

 active :
 backup :


 Images currently available on Flash

--------------------------------------------------------------------
 unit      active      backup     current-active        next-active
--------------------------------------------------------------------

    1     1.1.0.8     1.1.0.8            1.1.0.8            1.2.0.7
```

13. Install the compatible RCF for the new image version to the switch.

If the RCF version is already correct, skip to step 18 to bring up the ISL ports.

```
(cs2) #copy tftp://10.22.201.50//CN1610_CS_RCF_v1.2.txt nvram:script
CN1610_CS_RCF_v1.2.scr

Mode........................................... TFTP
Set Server IP.................................. 10.22.201.50
Path........................................... /
Filename....................................... CN1610_CS_RCF_v1.2.txt
Data Type...................................... Config Script
Destination Filename........................... CN1610_CS_RCF_v1.2.scr

File with same name already exists.
WARNING:Continuing with this command will overwrite the existing file.


Management access will be blocked for the duration of the transfer
Are you sure you want to start? (y/n) y


Validating configuration script...
[the script is now displayed line by line]

Configuration script validated.
File transfer operation completed successfully.
```

The `.scr` extension must be set as part of the file name before invoking the script. This extension is for the FASTPATH operating system.

The switch validates the script automatically as it is downloaded to the switch. The output goes to the console.

14. Verify that the script was downloaded and saved to the file name you gave it.

```
(cs2) #script list

Configuration Script Name        Size(Bytes)
-------------------------------- -----------
CN1610_CS_RCF_v1.2.scr                  2191

1 configuration script(s) found.
2541 Kbytes free.
```

15. Apply the script to the switch.

```
(cs2) #script apply CN1610_CS_RCF_v1.2.scr

Are you sure you want to apply the configuration script? (y/n) y
[the script is now displayed line by line]...

Configuration script 'CN1610_CS_RCF_v1.2.scr' applied.
```

16. Verify that the changes have been applied to the switch, and then save them:

    `show running-config`

```
(cs2) #show running-config
```

17. Save the running configuration so it becomes the startup configuration when you reboot the switch.

```
(cs2) #write memory
This operation may take a few minutes.
Management interfaces will not be available during this time.

Are you sure you want to save? (y/n) y

Config file 'startup-config' created successfully.

Configuration Saved!
```

18. Reboot the switch.

```
(cs2) #reload

The system has unsaved changes.
Would you like to save them now? (y/n) y

Config file 'startup-config' created successfully.
Configuration Saved!
System will now restart!
```

19. Log in again, and then verify that the switch is running the new version of the FASTPATH software.

```
(cs2) #show version

Switch: 1

System Description..............................  NetApp CN1610,
1.2.0.7,Linux
                                                   3.8.13-4ce360e8
Machine Type....................................  NetApp CN1610
Machine Model...................................  CN1610
Serial Number...................................  20211200106
Burned In MAC Address...........................  00:A0:98:21:83:69
Software Version................................  1.2.0.7
Operating System................................  Linux 3.8.13-4ce360e8
Network Processing Device.......................  BCM56820_B0
Part Number.....................................  111-00893
CPLD version....................................  0x5


Additional Packages.............................  FASTPATH QOS
                                                   FASTPATH IPv6 Management
```

After the reboot completes, you must log in to verify the image version, view the running configuration, and look for the description on interface 3/64, which is the version label for the RCF.

20. Bring up the ISL ports on cs1, the active switch.

```
(cs1) #configure
(cs1) (Config) #interface 0/13-0/16
(cs1) (Interface 0/13-0/16) #no shutdown
(cs1) (Interface 0/13-0/16) #exit
(cs1) (Config) #exit
```

21. Verify that the ISLs are operational:

```
show port-channel 3/1
```

The Link State field should indicate `Up`.

```
(cs1) #show port-channel 3/1

Local Interface................................ 3/1
Channel Name................................... ISL-LAG
Link State..................................... Up
Admin Mode..................................... Enabled
Type........................................... Static
Load Balance Option............................ 7
(Enhanced hashing mode)

Mbr    Device/       Port      Port
Ports  Timeout       Speed     Active
------ ------------- --------- -------
0/13   actor/long    10G Full  True
       partner/long
0/14   actor/long    10G Full  True
       partner/long
0/15   actor/long    10G Full  False
       partner/long
0/16   actor/long    10G Full  True
       partner/long
```

22. Bring up cluster port e0b on all nodes:

    `network port modify`

    You must enter the commands on the controller consoles that own the respective cluster LIFs.

    The following example shows port e0b being brought up on node1 and node2:

```
cluster1::*> network port modify -node node1 -port e0b -up-admin true
cluster1::*> network port modify -node node2 -port e0b -up-admin true
```

23. Verify that the port e0b is up on all nodes:

    `network port show -ipspace cluster`

```
cluster1::*> network port show -ipspace cluster

                                                                  Speed
(Mbps)
Node   Port      IPspace      Broadcast Domain Link   MTU    Admin/Oper
------ --------- ------------ ---------------- ----- -------
------------
node1
       e0a       Cluster      Cluster          up       9000  auto/10000
       e0b       Cluster      Cluster          up       9000  auto/10000
node2
       e0a       Cluster      Cluster          up       9000  auto/10000
       e0b       Cluster      Cluster          up       9000  auto/10000
4 entries were displayed.
```

24. Verify that the LIF is now home (`true`) on both nodes:

    `network interface show -role cluster`

```
cluster1::*> network interface show -role cluster

            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node          Port
Home
----------- ---------- ---------- ------------------ -------------
------- ----
Cluster
            node1_clus1  up/up    169.254.66.82/16   node1         e0a
true
            node1_clus2  up/up    169.254.206.128/16 node1         e0b
true
            node2_clus1  up/up    169.254.48.152/16  node2         e0a
true
            node2_clus2  up/up    169.254.42.74/16   node2         e0b
true
4 entries were displayed.
```

25. Show the status of the node members:

    `cluster show`

```
cluster1::*> cluster show

Node                  Health  Eligibility   Epsilon
--------------------- ------- ------------  ------------
node1                 true    true          false
node2                 true    true          false
2 entries were displayed.
```

26. Return to the admin privilege level:

```
set -privilege admin
```

27. Repeat the steps 1 through 18 to upgrade the FASTPATH software and RCF on the other switch, cs1.

If you…	Then…
Do not need to install the RCF	Go to Step 18 to finish the installation.
Need to install the RCF	Go to Step 13.

Migrate to a two-node switched cluster with NetApp CN1610 cluster switches

If you have a two-node switchless cluster, you can migrate, non-disruptively, to a two-node switched cluster that includes NetApp CN1610 cluster-network switches. The procedure you use depends on whether you have two dedicated cluster-network ports on each controller or a single cluster port on each controller.

About this task

Most systems require two dedicated cluster-network ports on each controller.

FAS22xx nodes allow a single cluster port on each controller.

There are two migration options available:

- Migrate from a switchless cluster to a switched NetApp CN1610 cluster environment
- Migrate from a switchless cluster (FAS22xx systems with a single cluster-network connection)

Migrate from a switchless cluster environment to a switched NetApp CN1610 cluster environment

If you have an existing two-node switchless cluster environment, you can migrate to a two-node switched cluster environment using CN1610 cluster network switches that enables you to scale beyond two nodes.

Before you begin

Two-node switchless configuration:

- The two-node switchless configuration must be properly set up and functioning.
- The nodes must be running ONTAP 8.2 or later.
- All cluster ports must be in the `up` state.
- All cluster logical interfaces (LIFs) must be in the `up` state and on their home ports.

CN1610 cluster switch configuration:

- The CN1610 cluster switch infrastructure must be and fully functional on both switches.
- Both switches must have management network connectivity.
- There must be console access to the cluster switches.
- CN1610 node-to-node switch and switch-to-switch connections must use twinax or fiber cables.

  The Hardware Universe contains more information about cabling.

- Inter-Switch Link (ISL) cables must be connected to ports 13 through 16 on both CN1610 switches.
- Initial customization of both the CN1610 switches must be completed.

  Any previous site customization, such as SMTP, SNMP, and SSH should be copied to the new switches.

About this task

The examples in this procedure use the following cluster switch and node nomenclature:

- The names of the CN1610 switches are cs1 and cs2.
- The names of the LIFs are clus1 and clus2.
- The names of the nodes are node1 and node2.
- The `cluster::*>` prompt indicates the name of the cluster.
- The cluster ports used in this procedure are e1a and e2a.

  The Hardware Universe contains the latest information about the actual cluster ports for your platforms.

Steps

1. Change the privilege level to advanced, entering `y` when prompted to continue: `set -privilege advanced`

   The advanced prompt (*>) appears.

2. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport message: `system node autosupport invoke -node * -type all -message MAINT=xh`

   x is the duration of the maintenance window in hours.

   The AutoSupport message notifies technical support of this maintenance task so that automatic case creation is suppressed during the maintenance window.

The following command suppresses automatic case creation for two hours:

```
cluster::*> system node autosupport invoke -node * -type all -message
MAINT=2h
```

3. Disable all of the node-facing ports (not ISL ports) on both the new cluster switches cs1 and cs2.

   You must not disable the ISL ports.

   The following example shows that node-facing ports 1 through 12 are disabled on switch cs1:

```
(cs1)> enable
(cs1)# configure
(cs1)(Config)# interface 0/1-0/12
(cs1)(Interface 0/1-0/12)# shutdown
(cs1)(Interface 0/1-0/12)# exit
(cs1)(Config)# exit
```

   The following example shows that node-facing ports 1 through 12 are disabled on switch cs2:

```
(c2)> enable
(cs2)# configure
(cs2)(Config)# interface 0/1-0/12
(cs2)(Interface 0/1-0/12)# shutdown
(cs2)(Interface 0/1-0/12)# exit
(cs2)(Config)# exit
```

4. Verify that the ISL and the physical ports on the ISL between the two CN1610 cluster switches cs1 and cs2 are `up`: `show port-channel`

   The following example shows that the ISL ports are `up` on switch cs1:

```
(cs1)# show port-channel 3/1
Local Interface................................ 3/1
Channel Name................................... ISL-LAG
Link State..................................... Up
Admin Mode..................................... Enabled
Type........................................... Static
Load Balance Option............................ 7
(Enhanced hashing mode)

Mbr    Device/       Port      Port
Ports  Timeout       Speed     Active
------ ------------- --------- -------
0/13   actor/long    10G Full  True
       partner/long
0/14   actor/long    10G Full  True
       partner/long
0/15   actor/long    10G Full  True
       partner/long
0/16   actor/long    10G Full  True
       partner/long
```

The following example shows that the ISL ports are `up` on switch cs2:

```
(cs2)# show port-channel 3/1
Local Interface................................ 3/1
Channel Name................................... ISL-LAG
Link State..................................... Up
Admin Mode..................................... Enabled
Type........................................... Static
Load Balance Option............................ 7
(Enhanced hashing mode)

Mbr    Device/       Port      Port
Ports  Timeout       Speed     Active
------ ------------- --------- -------
0/13   actor/long    10G Full  True
       partner/long
0/14   actor/long    10G Full  True
       partner/long
0/15   actor/long    10G Full  True
       partner/long
0/16   actor/long    10G Full  True
       partner/long
```

5. Display the list of neighboring devices: `show isdp neighbors`

   This command provides information about the devices that are connected to the system.

   The following example lists the neighboring devices on switch cs1:

```
(cs1)# show isdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge,
                  S - Switch, H - Host, I - IGMP, r - Repeater
Device ID              Intf         Holdtime  Capability   Platform
Port ID
---------------------- ------------ --------- ------------ ---------
------------
cs2                    0/13         11        S            CN1610
0/13
cs2                    0/14         11        S            CN1610
0/14
cs2                    0/15         11        S            CN1610
0/15
cs2                    0/16         11        S            CN1610
0/16
```

   The following example lists the neighboring devices on switch cs2:

```
(cs2)# show isdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge,
                  S - Switch, H - Host, I - IGMP, r - Repeater
Device ID              Intf         Holdtime  Capability   Platform
Port ID
---------------------- ------------ --------- ------------ ---------
------------
cs1                    0/13         11        S            CN1610
0/13
cs1                    0/14         11        S            CN1610
0/14
cs1                    0/15         11        S            CN1610
0/15
cs1                    0/16         11        S            CN1610
0/16
```

6. Display the list of cluster ports: `network port show`

   The following example shows the available cluster ports:

```
cluster::*> network port show -ipspace Cluster
Node: node1

Ignore
                                                  Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- ----------- --------
------
e0a       Cluster      Cluster          up   9000  auto/10000 healthy
false
e0b       Cluster      Cluster          up   9000  auto/10000 healthy
false
e0c       Cluster      Cluster          up   9000  auto/10000 healthy
false
e0d       Cluster      Cluster          up   9000  auto/10000 healthy
false
e4a       Cluster      Cluster          up   9000  auto/10000 healthy
false
e4b       Cluster      Cluster          up   9000  auto/10000 healthy
false

Node: node2

Ignore
                                                  Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- ----------- --------
------
e0a       Cluster      Cluster          up   9000  auto/10000 healthy
false
e0b       Cluster      Cluster          up   9000  auto/10000 healthy
false
e0c       Cluster      Cluster          up   9000  auto/10000 healthy
false
e0d       Cluster      Cluster          up   9000  auto/10000 healthy
false
e4a       Cluster      Cluster          up   9000  auto/10000 healthy
false
e4b       Cluster      Cluster          up   9000  auto/10000 healthy
false
12 entries were displayed.
```

7. Verify that each cluster port is connected to the corresponding port on its partner cluster node: `run * cdpd show-neighbors`

   The following example shows that cluster ports e1a and e2a are connected to the same port on their cluster partner node:

```
cluster::*> run * cdpd show-neighbors
2 entries were acted on.

Node: node1
Local  Remote          Remote                 Remote           Hold
Remote
Port   Device          Interface              Platform         Time
Capability
------ --------------- ---------------------- ---------------- -----
----------
e1a    node2           e1a                    FAS3270           137   H
e2a    node2           e2a                    FAS3270           137   H


Node: node2

Local  Remote          Remote                 Remote           Hold
Remote
Port   Device          Interface              Platform         Time
Capability
------ --------------- ---------------------- ---------------- -----
----------
e1a    node1           e1a                    FAS3270           161   H
e2a    node1           e2a                    FAS3270           161   H
```

8. Verify that all of the cluster LIFs are `up` and operational: `network interface show -vserver Cluster`

   Each cluster LIF should display `true` in the “Is Home” column.

```
cluster::*> network interface show -vserver Cluster
            Logical    Status     Network       Current       Current Is
Vserver     Interface  Admin/Oper Address/Mask  Node          Port
Home
----------- ---------- ---------- ------------ ------------- -------
----
node1
            clus1      up/up      10.10.10.1/16 node1         e1a
true
            clus2      up/up      10.10.10.2/16 node1         e2a
true
node2
            clus1      up/up      10.10.11.1/16 node2         e1a
true
            clus2      up/up      10.10.11.2/16 node2         e2a
true

4 entries were displayed.
```

The following modification and migration commands in steps 10 through 13 must be done from the local node.

9. Verify that all cluster ports are `up`: `network port show -ipspace Cluster`

```
cluster::*> network port show -ipspace Cluster

                                        Auto-Negot  Duplex     Speed
(Mbps)
Node   Port   Role         Link  MTU   Admin/Oper  Admin/Oper Admin/Oper
------ ------ ------------ ----- ----- ----------- ----------
------------
node1
       e1a    clus1        up    9000  true/true  full/full   auto/10000
       e2a    clus2        up    9000  true/true  full/full   auto/10000
node2
       e1a    clus1        up    9000  true/true  full/full   auto/10000
       e2a    clus2        up    9000  true/true  full/full   auto/10000

4 entries were displayed.
```

10. Set the `-auto-revert` parameter to `false` on cluster LIFs clus1 and clus2 on both nodes: `network interface modify`

```
cluster::*> network interface modify -vserver node1 -lif clus1 -auto
-revert false
cluster::*> network interface modify -vserver node1 -lif clus2 -auto
-revert false
cluster::*> network interface modify -vserver node2 -lif clus1 -auto
-revert false
cluster::*> network interface modify -vserver node2 -lif clus2 -auto
-revert false
```

For release 8.3 and later, use the following command: `network interface modify -vserver Cluster -lif * -auto-revert false`

11. Ping the cluster ports to verify the cluster connectivity: `cluster ping-cluster local`

    The command output shows connectivity between all of the cluster ports.

12. Migrate clus1 to port e2a on the console of each node: `network interface migrate`

    The following example shows the process for migrating clus1 to port e2a on node1 and node2:

```
cluster::*> network interface migrate -vserver node1 -lif clus1 -source
-node node1 -dest-node node1 -dest-port e2a
cluster::*> network interface migrate -vserver node2 -lif clus1 -source
-node node2 -dest-node node2 -dest-port e2a
```

For release 8.3 and later, use the following command: `network interface migrate -vserver Cluster -lif clus1 -destination-node node1 -destination -port e2a`

13. Verify that the migration took place: `network interface show -vserver Cluster`

    The following example verifies that clus1 is migrated to port e2a on node1 and node2:

```
cluster::*> network interface show -vserver Cluster
            Logical    Status     Network       Current       Current Is
Vserver     Interface  Admin/Oper Address/Mask  Node          Port
Home
----------- ---------- ---------- ------------ ------------- -------
----
node1
            clus1      up/up    10.10.10.1/16   node1         e2a
false
            clus2      up/up    10.10.10.2/16   node1         e2a
true
node2
            clus1      up/up    10.10.11.1/16   node2         e2a
false
            clus2      up/up    10.10.11.2/16   node2         e2a
true

4 entries were displayed.
```

14. Shut down cluster port e1a on both nodes: `network port modify`

    The following example shows how to shut down the port e1a on node1 and node2:

```
cluster::*> network port modify -node node1 -port e1a -up-admin false
cluster::*> network port modify -node node2 -port e1a -up-admin false
```

15. Verify the port status: `network port show`

    The following example shows that port e1a is `down` on node1 and node2:

```
cluster::*> network port show -role cluster
                                        Auto-Negot  Duplex     Speed
(Mbps)
Node   Port   Role         Link   MTU  Admin/Oper  Admin/Oper Admin/Oper
------ ------ ------------ ---- ----- ----------- ----------
------------
node1
       e1a    clus1        down  9000  true/true  full/full   auto/10000
       e2a    clus2        up    9000  true/true  full/full   auto/10000
node2
       e1a    clus1        down  9000  true/true  full/full   auto/10000
       e2a    clus2        up    9000  true/true  full/full   auto/10000

4 entries were displayed.
```

16. Disconnect the cable from cluster port e1a on node1, and then connect e1a to port 1 on cluster switch cs1, using the appropriate cabling supported by the CN1610 switches.

    The Hardware Universe contains more information about cabling.

17. Disconnect the cable from cluster port e1a on node2, and then connect e1a to port 2 on cluster switch cs1, using the appropriate cabling supported by the CN1610 switches.
18. Enable all of the node-facing ports on cluster switch cs1.

    The following example shows that ports 1 through 12 are enabled on switch cs1:

```
(cs1)# configure
(cs1)(Config)# interface 0/1-0/12
(cs1)(Interface 0/1-0/12)# no shutdown
(cs1)(Interface 0/1-0/12)# exit
(cs1)(Config)# exit
```

19. Enable the first cluster port e1a on each node: `network port modify`

    The following example shows how to enable the port e1a on node1 and node2:

```
cluster::*> network port modify -node node1 -port e1a -up-admin true
cluster::*> network port modify -node node2 -port e1a -up-admin true
```

20. Verify that all of the cluster ports are `up`: `network port show -ipspace Cluster`

    The following example shows that all of the cluster ports are `up` on node1 and node2:

```
cluster::*> network port show -ipspace Cluster
                                         Auto-Negot  Duplex     Speed
(Mbps)
Node   Port   Role         Link   MTU Admin/Oper  Admin/Oper Admin/Oper
------ ------ ------------ ---- ----- ----------- ----------
------------
node1
       e1a    clus1        up    9000  true/true  full/full   auto/10000
       e2a    clus2        up    9000  true/true  full/full   auto/10000
node2
       e1a    clus1        up    9000  true/true  full/full   auto/10000
       e2a    clus2        up    9000  true/true  full/full   auto/10000

4 entries were displayed.
```

21. Revert clus1 (which was previously migrated) to e1a on both nodes: `network interface revert`

    The following example shows how to revert clus1 to the port e1a on node1 and node2:

```
cluster::*> network interface revert -vserver node1 -lif clus1
cluster::*> network interface revert -vserver node2 -lif clus1
```

    For release 8.3 and later, use the following command: `network interface revert -vserver Cluster -lif <nodename_clus<N>>`

22. Verify that all of the cluster LIFs are `up`, operational, and display as `true` in the "Is Home" column: `network interface show -vserver Cluster`

    The following example shows that all of the LIFs are `up` on node1 and node2 and that the "Is Home" column results are `true`:

```
cluster::*> network interface show -vserver Cluster
            Logical    Status     Network       Current       Current Is
Vserver     Interface  Admin/Oper Address/Mask  Node          Port
Home
----------- ---------- ---------- ------------ ------------- -------
----
node1
            clus1      up/up    10.10.10.1/16   node1         e1a
true
            clus2      up/up    10.10.10.2/16   node1         e2a
true
node2
            clus1      up/up    10.10.11.1/16   node2         e1a
true
            clus2      up/up    10.10.11.2/16   node2         e2a
true

4 entries were displayed.
```

23. Display information about the status of the nodes in the cluster: `cluster show`

    The following example displays information about the health and eligibility of the nodes in the cluster:

```
cluster::*> cluster show
Node                 Health  Eligibility   Epsilon
-------------------- ------- ------------  ------------
node1                true    true          false
node2                true    true          false
```

24. Migrate clus2 to port e1a on the console of each node: `network interface migrate`

    The following example shows the process for migrating clus2 to port e1a on node1 and node2:

```
cluster::*> network interface migrate -vserver node1 -lif clus2 -source
-node node1 -dest-node node1 -dest-port e1a
cluster::*> network interface migrate -vserver node2 -lif clus2 -source
-node node2 -dest-node node2 -dest-port e1a
```

    For release 8.3 and later, use the following command: `network interface migrate -vserver Cluster -lif node1_clus2 -dest-node node1 -dest-port e1a`

25. Verify that the migration took place: `network interface show -vserver Cluster`

    The following example verifies that clus2 is migrated to port e1a on node1 and node2:

```
cluster::*> network interface show -vserver Cluster
            Logical    Status     Network       Current       Current Is
Vserver     Interface  Admin/Oper Address/Mask  Node          Port
Home
----------- ---------- ---------- ------------ ------------- -------
----
node1
            clus1      up/up    10.10.10.1/16   node1         e1a
true
            clus2      up/up    10.10.10.2/16   node1         e1a
false
node2
            clus1      up/up    10.10.11.1/16   node2         e1a
true
            clus2      up/up    10.10.11.2/16   node2         e1a
false

4 entries were displayed.
```

26. Shut down cluster port e2a on both nodes: `network port modify`

    The following example shows how to shut down the port e2a on node1 and node2:

```
cluster::*> network port modify -node node1 -port e2a -up-admin false
cluster::*> network port modify -node node2 -port e2a -up-admin false
```

27. Verify the port status: `network port show`

    The following example shows that port e2a is `down` on node1 and node2:

```
cluster::*> network port show -role cluster
                                        Auto-Negot  Duplex     Speed
(Mbps)
Node   Port   Role         Link   MTU Admin/Oper  Admin/Oper Admin/Oper
------ ------ ------------ ---- ----- ----------- ----------
------------
node1
       e1a    clus1        up    9000  true/true  full/full   auto/10000
       e2a    clus2        down  9000  true/true  full/full   auto/10000
node2
       e1a    clus1        up    9000  true/true  full/full   auto/10000
       e2a    clus2        down  9000  true/true  full/full   auto/10000

4 entries were displayed.
```

28. Disconnect the cable from cluster port e2a on node1, and then connect e2a to port 1 on cluster switch cs2, using the appropriate cabling supported by the CN1610 switches.
29. Disconnect the cable from cluster port e2a on node2, and then connect e2a to port 2 on cluster switch cs2, using the appropriate cabling supported by the CN1610 switches.
30. Enable all of the node-facing ports on cluster switch cs2.

    The following example shows that ports 1 through 12 are enabled on switch cs2:

```
(cs2)# configure
(cs2)(Config)# interface 0/1-0/12
(cs2)(Interface 0/1-0/12)# no shutdown
(cs2)(Interface 0/1-0/12)# exit
(cs2)(Config)# exit
```

31. Enable the second cluster port e2a on each node:

    The following example shows how to enable the port e2a on node1 and node2:

```
cluster::*> network port modify -node node1 -port e2a -up-admin true
cluster::*> network port modify -node node2 -port e2a -up-admin true
```

32. Verify that all of the cluster ports are `up`: `network port show -ipspace Cluster`

    The following example shows that all of the cluster ports are `up` on node1 and node2:

```
cluster::*> network port show -ipspace Cluster
                                         Auto-Negot  Duplex     Speed
(Mbps)
Node   Port   Role         Link   MTU Admin/Oper  Admin/Oper Admin/Oper
------ ------ ------------ ---- ----- ----------- ----------
------------
node1
       e1a    clus1        up    9000  true/true  full/full   auto/10000
       e2a    clus2        up    9000  true/true  full/full   auto/10000
node2
       e1a    clus1        up    9000  true/true  full/full   auto/10000
       e2a    clus2        up    9000  true/true  full/full   auto/10000

4 entries were displayed.
```

33. Revert clus2 (which was previously migrated) to e2a on both nodes: `network interface revert`

    The following example shows how to revert clus2 to the port e2a on node1 and node2:

```
cluster::*> network interface revert -vserver node1 -lif clus2
cluster::*> network interface revert -vserver node2 -lif clus2
```

> For release 8.3 and later, the commands are: `cluster::*> network interface revert -vserver Cluster -lif node1_clus2` and `cluster::*> network interface revert -vserver Cluster -lif node2_clus2`

34. Verify that all of the interfaces display `true` in the "Is Home" column: `network interface show -vserver Cluster`

    The following example shows that all of the LIFs are `up` on node1 and node2 and that the "Is Home" column results are `true`:

```
cluster::*> network interface show -vserver Cluster

             Logical    Status     Network            Current
Current Is
Vserver      Interface  Admin/Oper Address/Mask       Node        Port
Home
-----------  ---------- ---------- ------------------ -----------
------- ----
node1
             clus1      up/up      10.10.10.1/16      node1       e1a
true
             clus2      up/up      10.10.10.2/16      node1       e2a
true
node2
             clus1      up/up      10.10.11.1/16      node2       e1a
true
             clus2      up/up      10.10.11.2/16      node2       e2a
true
```

35. Ping the cluster ports to verify the cluster connectivity: `cluster ping-cluster local`

    The command output shows connectivity between all of the cluster ports.

36. Verify that both nodes have two connections to each switch: `show isdp neighbors`

    The following example shows the appropriate results for both switches:

```
(cs1)# show isdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge,
                  S - Switch, H - Host, I - IGMP, r - Repeater
Device ID              Intf         Holdtime  Capability   Platform
Port ID
---------------------- ------------ --------- ------------ ---------
------------
node1                  0/1          132       H            FAS3270   e1a
node2                  0/2          163       H            FAS3270   e1a
cs2                    0/13         11        S            CN1610
0/13
cs2                    0/14         11        S            CN1610
0/14
cs2                    0/15         11        S            CN1610
0/15
cs2                    0/16         11        S            CN1610
0/16

(cs2)# show isdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge,
                  S - Switch, H - Host, I - IGMP, r - Repeater
Device ID              Intf         Holdtime  Capability   Platform
Port ID
---------------------- ------------ --------- ------------ ---------
------------
node1                  0/1          132       H            FAS3270   e2a
node2                  0/2          163       H            FAS3270   e2a
cs1                    0/13         11        S            CN1610
0/13
cs1                    0/14         11        S            CN1610
0/14
cs1                    0/15         11        S            CN1610
0/15
cs1                    0/16         11        S            CN1610
0/16
```

37. Display information about the devices in your configuration: `network device discovery show`
38. Disable the two-node switchless configuration settings on both nodes using the advanced privilege command: `network options detect-switchless modify`

    The following example shows how to disable the switchless configuration settings:

```
cluster::*> network options detect-switchless modify -enabled false
```

For release 9.2 and later, skip this step since the configuration is automatically converted.

39. Verify that the settings are disabled: `network options detect-switchless-cluster show`

    The `false` output in the following example shows that the configuration settings are disabled:

```
cluster::*> network options detect-switchless-cluster show
Enable Switchless Cluster Detection: false
```

    For release 9.2 and later, wait until `Enable Switchless Cluster` is set to false. This can take up to three minutes.

40. Configure clusters clus1 and clus2 to auto revert on each node and confirm:

```
cluster::*> network interface modify -vserver node1 -lif clus1 -auto
-revert true
cluster::*> network interface modify -vserver node1 -lif clus2 -auto
-revert true
cluster::*> network interface modify -vserver node2 -lif clus1 -auto
-revert true
cluster::*> network interface modify -vserver node2 -lif clus2 -auto
-revert true
```

    For release 8.3 and later, use the following command: `network interface modify -vserver Cluster -lif * -auto-revert true` to enable auto-revert on all nodes in the cluster.

41. Verify the status of the node members in the cluster: `cluster show`

    The following example shows information about the health and eligibility of the nodes in the cluster:

```
cluster::*> cluster show
Node                 Health  Eligibility   Epsilon
-------------------- ------- ------------  ------------
node1                true    true          false
node2                true    true          false
```

42. If you suppressed automatic case creation, reenable it by invoking an AutoSupport message:

    `system node autosupport invoke -node * -type all -message MAINT=END`

```
cluster::*> system node autosupport invoke -node * -type all -message
MAINT=END
```

43. Change the privilege level back to admin: `set -privilege admin`

Related information

Hardware Universe

NetApp CN1601 and CN1610 description page

CN1601 and CN1610 Switch Setup and Configuration Guide

NetApp KB Article 1010449: How to suppress automatic case creation during scheduled maintenance windows

Migrate to a two-node switched cluster in FAS22xx systems with a single cluster-network connection

If you have FAS22xx systems in an existing two-node switchless cluster in which each controller module has a single, back-to-back 10 GbE connection for cluster connectivity, you can use the switchless cluster networking option and replace the direct back-to-back connectivity with switch connections.

Before you begin

- Two cluster connections are required to migrate from a switchless configuration to a switched configuration.
- The cluster must be healthy and consist of two nodes connected with back-to-back connectivity.
- The nodes must be running ONTAP 8.2 or later.
- The switchless cluster feature cannot be used with more than two nodes.
- All cluster ports must be in the `up` state.

About this task

This procedure is a nondisruptive procedure that removes the direct cluster connectivity in a switchless environment and replaces each connection to the switch with a connection to the partner node.

Steps

1. Change the privilege level to advanced, entering `y` when prompted to continue: `set -privilege advanced`

   The advanced prompt (`*>`) appears.

2. Check the cluster status of the nodes at the system console of either node: `cluster show`

   The following example displays information about the health and eligibility of the nodes in the cluster:

```
cluster::*> cluster show
Node                  Health  Eligibility   Epsilon
--------------------- ------- ------------  ------------
node1                 true    true          false
node2                 true    true          false

2 entries were displayed.
```

3. Check the status of the HA pair at the system console of either node: `storage failover show`

   The following example shows the status of node1 and node2:

```
Node           Partner        Possible State Description
-------------- -------------- --------
-------------------------------------
node1          node2          true      Connected to node2
node2          node1          true      Connected to node1

2 entries were displayed.
```

4. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport message: `system node autosupport invoke -node * -type all -message MAINT=xh`

   `x` is the duration of the maintenance window in hours.

   > The message notifies technical support of this maintenance task so that automatic case creation is suppressed during the maintenance window.

   The following command suppresses automatic case creation for two hours:

```
cluster::*> system node autosupport invoke -node * -type all -message
MAINT=2h
```

5. Verify that the current state of the switchless cluster is `true`, and then disable the switchless cluster mode: `network options switchless-cluster modify -enabled false`
6. Take over the target node: `storage failover takeover -ofnode` *`target_node_name`*

   It does not matter which node is the target node. When it is taken over, the target node automatically reboots and displays the `Waiting for giveback…` message.

   The active node is now serving data for the partner (target) node that was taken over.

7. Wait for two minutes after takeover of the impaired node to confirm that the takeover was completed successfully.
8. With the target node showing the `Waiting for giveback…` message, shut it down.

The method you use to shut down the node depends on whether you use remote management through the node Service Processor (SP).

If SP	Then…
Is configured	Log in to the impaired node SP, and then power off the system: `system power off`
Is not configured	At the impaired node prompt, press `Ctrl-C`, and then respond `y` to halt the node.

9. On each controller module, disconnect the cable that connects the 10 GbE cluster port to the switchless cluster.
10. Connect the 10 GbE cluster port to the switch on both controller modules.
11. Verify that the 10 GbE cluster ports connected on the switch are configured to be part of the same VLAN.

    If you plan to connect the cluster ports on each controller module to different switches, then you must verify that the ports on which the cluster ports are connected on each switch are configured for the same VLAN and that trunking is properly configured on both switches.

12. Give back storage to the target node: `storage failover giveback -ofnode node2`
13. Monitor the progress of the giveback operation: `storage failover show-giveback`
14. After the giveback operation is complete, confirm that the HA pair is healthy and takeover is possible: `storage failover show`

    The output should be similar to the following:

```
Node           Partner        Possible State Description
-------------- -------------- --------
-------------------------------------
node1          node2          true      Connected to node2
node2          node1          true      Connected to node1

2 entries were displayed.
```

15. Verify that the cluster port LIFs are operating correctly: `network interface show -role cluster`

    The following example shows that the LIFs are `up` on node1 and node2 and that the "Is Home" column results are `true`:

```
cluster::*> network interface show -role cluster
            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node          Port
Home
----------- ---------- ---------- ------------------ -------------
------- ----
node1
            clus1        up/up    192.168.177.121/24  node1        e1a
true
node2
            clus1        up/up    192.168.177.123/24  node2        e1a
true

2 entries were displayed.
```

16. Check the cluster status of the nodes at the system console of either node: `cluster show`

    The following example displays information about the health and eligibility of the nodes in the cluster:

```
cluster::*> cluster show
Node                 Health  Eligibility   Epsilon
-------------------- ------- ------------  ------------
node1                true    true          false
node2                true    true          false

2 entries were displayed.
```

17. Ping the cluster ports to verify the cluster connectivity: `cluster ping-cluster local`

    The command output should show connectivity between all of the cluster ports.

18. If you suppressed automatic case creation, reenable it by invoking an AutoSupport message:

    `system node autosupport invoke -node * -type all -message MAINT=END`

```
cluster::*> system node autosupport invoke -node * -type all -message
MAINT=END
```

19. Change the privilege level back to admin: `set -privilege admin`

Related information

NetApp KB Article 1010449: How to suppress automatic case creation during scheduled maintenance windows

CN1601 and CN1610 Switch Setup and Configuration

Details how to configure the switch hardware and software for your cluster environment.

Setup and Configuration

CN1610 Network Switch CLI Command Reference - Version 1.2.x.x

Details of the command-line interface (CLI) commands you use to configure the CN1610 software.

Command Reference

CN1610 Network Switch CLI Command Reference - Version 1.2.x.x

Details of the command-line interface (CLI) commands you use to configure the CN1610 software.

Command Reference

NetApp 10G Cluster-Mode Switch Installation

An overview of the CN1610 switch hardware and software features and describes the features to install the switch and access the CLI.

10G Installation Guide

NetApp CN1610 Switch Administrator’s Guide - Version 1.1.x.x

Examples of how to use the CN1610 switch in a typical network.

Administrator’s Guide

NetApp CN1610 Switch Administrator’s Guide - Version 1.2.x.x

Examples of how to use the CN1610 switch in a typical network.

Administrator’s Guide

CN1601 Network Switch CLI Command Reference

Details of the command-line interface (CLI) commands you use to configure the CN1601

software.

Command Reference

CN1601 Switch Administrator

Examples of how to use the CN1601 switch in a typical network.

Administrator's Guide

NetApp 1G Cluster-Mode Switch Installation

An overview of the CN1601 switch hardware and software features and installation process.

1G Installation Guide