Cisco Nexus 3232C switches

ONTAP Systems Switches

NetApp
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You can use Cisco Nexus 3232C switches as cluster switches in your AFF or FAS cluster.

- You can install the switch, migrate from an existing switch, replace a switch, and update the RCF files on the switch.
- You can install NX-OS and reference configuration files (RCF's) on the Cisco Nexus 3232C cluster switch.
- You can migrate from a two-node switchless cluster to a cluster with Cisco Nexus 3232C cluster switches.
- You can replace a Cisco Nexus 3232C cluster or storage switch.
- You can install the Cisco Nexus 3232C switch (X190100) NetApp system cabinet with the custom brackets that come with the switch, or you can install it in a rack with the standard brackets that are also included with the switch.

Migrate a CN1610 switch to a Cisco Nexus 3232C cluster switch

You must be aware of certain configuration information, port connections, and cabling requirements when you replace CN1610 cluster switches with Cisco Nexus 3232C cluster switches.

The cluster switches support the following node connections:

- NetApp CN1610: ports 0/1 through 0/12 (10 GbE)
- Cisco Nexus 3232C: ports e1/1-30 (40 or 100 or 4x10GbE)

The cluster switches use the following inter-switch link (ISL) ports.

- NetApp CN1610: ports 0/13 through 0/16 (10 GbE)
- Cisco Nexus 3232C: ports 1/31-32 (100GbE)

You must use 4x10G breakout cables on the Cisco Nexus 3232C cluster switch.

The following table shows the cabling connections that are required at each stage as you make the transition from NetApp CN1610 switches to Cisco Nexus 3232C cluster switches:

Stage	Description	Required cables
Initial	CN1610 to CN1610 (SFP+ to SFP+)	4 SFP+ optical fiber or copper direct-attach cables
Transition	CN1610 to 3232C (QSFP to SFP+)	1 QSFP and 4 SFP+ optical fiber or copper breakout cables

Stage	Description	Required cables
Final	3232C to 3232C (QSFP to QSFP)	2 QSFP optical fiber or copper direct-attach cables

You must have downloaded the applicable reference configuration files (RCFs). The number of 10 GbE and 40/100 GbE ports are defined in the RCFs available on the Cisco® Cluster Network Switch Reference Configuration File Download page.

The ONTAP and NX-OS versions that are supported in this procedure are listed on the Cisco Ethernet Switches page.

The ONTAP and FASTPATH versions that are supported in this procedure are listed on the NetApp CN1601 and CN1610 Switches page.

How to migrate a CN1610 cluster switch to a Cisco Nexus 3232C cluster switch

To replace the existing CN1610 cluster switches in a cluster with Cisco Nexus 3232C cluster switches, you must perform a specific sequence of tasks.

About this task

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

- The nodes are n1, n2, n3, and n4.
- The command outputs might vary depending on different releases of ONTAP software.
- The CN1610 switches to be replaced are CL1 and CL2.
- The Nexus 3232C switches to replace the CN1610 switches are C1 and C2.
- n1_clus1 is the first cluster logical interface (LIF) that is connected to cluster switch 1 (CL1 or C1) for node n1.
- n1_clus2 is the first cluster LIF that is connected to cluster switch 2 (CL2 or C2) for node n1.
- n1_clus3 is the second LIF that is connected to cluster switch 2 (CL2 or C2) for node n1.
- n1_clus4 is the second LIF that is connected to cluster switch 1 (CL1 or C1) for node n1.
- The number of 10 GbE and 40/100 GbE ports are defined in the reference configuration files (RCFs) available on the Cisco® Cluster Network Switch Reference Configuration File Download page.

Procedure summary

The following list describes the stages you must complete when changing the cluster switches:

- I. Replace cluster switch CL2 with C2 (Steps 1-22)
- II. Replace cluster switch CL1 with C1 (Steps 23-40)

The examples in this procedure use four nodes: Two nodes use four 10 GbE cluster interconnect ports: e0a, e0b, e0c, and e0d. The other two nodes use two 40 GbE cluster interconnect fiber cables: e4a and e4e. The *Hardware Universe* has information about the cluster fiber cables on your platforms.

The procedure requires the use of both ONTAP commands and Cisco Nexus 3000 Series Switches commands; ONTAP commands are used unless otherwise indicated.

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

2. Display information about the devices in your configuration: `network device-discovery show`

   The following example displays how many cluster interconnect interfaces have been configured in each node for each cluster interconnect switch:

```
cluster::> network device-discovery show

       Local  Discovered
Node   Port   Device       Interface   Platform
------ ------ ------------ ----------- ----------
n1     /cdp
        e0a   CL1          0/1         CN1610
        e0b   CL2          0/1         CN1610
        e0c   CL2          0/2         CN1610
        e0d   CL1          0/2         CN1610
n2     /cdp
        e0a   CL1          0/3         CN1610
        e0b   CL2          0/3         CN1610
        e0c   CL2          0/4         CN1610
        e0d   CL1          0/4         CN1610

8 entries were displayed.
```

3. Determine the administrative or operational status for each cluster interface.

   a. Display the cluster network port attributes: `network port show -role cluster`

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

Node: n1
                 Broadcast               Speed (Mbps) Health Ignore
Port  IPspace   Domain     Link  MTU   Admin/Open   Status Health
Status
----- --------- ---------- ----- ----- ------------ ------
-------------
e0a   cluster   cluster    up    9000  auto/10000     -
e0b   cluster   cluster    up    9000  auto/10000     -
e0c   cluster   cluster    up    9000  auto/10000     -        -
e0d   cluster   cluster    up    9000  auto/10000     -        -
Node: n2
                 Broadcast               Speed (Mbps) Health Ignore
Port  IPspace   Domain     Link  MTU   Admin/Open   Status Health
Status
----- --------- ---------- ----- ----- ------------ ------
-------------
e0a   cluster   cluster    up    9000  auto/10000     -
e0b   cluster   cluster    up    9000  auto/10000     -
e0c   cluster   cluster    up    9000  auto/10000     -
e0d   cluster   cluster    up    9000  auto/10000     -

8 entries were displayed.
```

b. Display information about the logical interfaces: `network interface show -role cluster`

```
cluster::*> network interface show -role cluster
(network interface show)
         Logical    Status      Network         Current  Current  Is
Vserver  Interface  Admin/Oper  Address/Mask    Node     Port     Home
-------- ---------- ----------- --------------- -------- --------
-----
Cluster
         n1_clus1   up/up       10.10.0.1/24    n1       e0a      true
         n1_clus2   up/up       10.10.0.2/24    n1       e0b      true
         n1_clus3   up/up       10.10.0.3/24    n1       e0c      true
         n1_clus4   up/up       10.10.0.4/24    n1       e0d      true
         n2_clus1   up/up       10.10.0.5/24    n2       e0a      true
         n2_clus2   up/up       10.10.0.6/24    n2       e0b      true
         n2_clus3   up/up       10.10.0.7/24    n2       e0c      true
         n2_clus4   up/up       10.10.0.8/24    n2       e0d      true

 8 entries were displayed.
```

c. Display information about the discovered cluster switches: `system cluster-switch show`

The following example displays the cluster switches that are known to the cluster along with their management IP addresses:

```
cluster::> system cluster-switch show
Switch                        Type              Address        Model
----------------------------- ----------------- -------------- --------
CL1                           cluster-network   10.10.1.101    CN1610
     Serial Number: 01234567
      Is Monitored: true
            Reason:
  Software Version: 1.2.0.7
    Version Source: ISDP
CL2                           cluster-network   10.10.1.102    CN1610
     Serial Number: 01234568
      Is Monitored: true
            Reason:
  Software Version: 1.2.0.7
    Version Source: ISDP

2   entries displayed.
```

4. Verify that the appropriate RCF and image are installed on the new 3232C switches as necessary for your requirements, and make any essential site customizations.

You should prepare both switches at this time. If you need to upgrade the RCF and image, you must

complete the following procedure:

a. See the Cisco Ethernet Switch page on the NetApp Support Site.
b. Note your switch and the required software versions in the table on that page.
c. Download the appropriate version of the RCF.
d. Click **CONTINUE** on the **Description** page, accept the license agreement, and then follow the instructions on the **Download** page to download the RCF.
e. Download the appropriate version of the image software at Cisco® Cluster and Management Network Switch Reference Configuration File Download.

5. Migrate the LIFs associated with the second CN1610 switch that you plan to replace: `network interface migrate -verser cluster -lif` *`lif-name`* `-source-node` *`source-node-name`* `destination-node` *`destination-node-name`* `-destination-port` *`destination-port-name`*

   You must migrate each LIF individually as shown in the following example:

```
cluster::*> network interface migrate -vserver cluster -lif n1_clus2
-source-node n1
-destination-node  n1  -destination-port  e0a
cluster::*> network interface migrate -vserver cluster -lif n1_clus3
-source-node n1
-destination-node  n1  -destination-port  e0d
cluster::*> network interface migrate -vserver cluster -lif n2_clus2
-source-node n2
-destination-node  n2  -destination-port  e0a
cluster::*> network interface migrate -vserver cluster -lif n2_clus3
-source-node n2
-destination-node  n2  -destination-port  e0d
```

6. Verify the cluster's health: `network interface show -role cluster`

```
cluster::*> network interface show -role cluster
(network interface show)
         Logical    Status      Network         Current  Current  Is
Vserver  Interface  Admin/Oper  Address/Mask    Node     Port     Home
-------- ---------- ----------- --------------- -------- -------- -----
Cluster
         n1_clus1   up/up       10.10.0.1/24    n1        e0a     true
         n1_clus2   up/up       10.10.0.2/24    n1        e0a     false
         n1_clus3   up/up       10.10.0.3/24    n1        e0d     false
         n1_clus4   up/up       10.10.0.4/24    n1        e0d     true
         n2_clus1   up/up       10.10.0.5/24    n2        e0a     true
         n2_clus2   up/up       10.10.0.6/24    n2        e0a     false
         n2_clus3   up/up       10.10.0.7/24    n2        e0d     false
         n2_clus4   up/up       10.10.0.8/24    n2        e0d     true

8 entries were displayed.
```

7. Shut down the cluster interconnect ports that are physically connected to switch CL2:

   `network port modify -node` *`node-name`* `-port` *`port-name`* `-up-admin false`

   The following example shows the four cluster interconnect ports being shut down for node n1 and node n2:

```
cluster::*> network port modify -node n1 -port e0b -up-admin false
cluster::*> network port modify -node n1 -port e0c -up-admin false
cluster::*> network port modify -node n2 -port e0b -up-admin false
cluster::*> network port modify -node n2 -port e0c -up-admin false
```

8. Ping the remote cluster interfaces, and then perform a remote procedure call server check:

   `cluster ping-cluster -node` *`node-name`*

   The following example shows node n1 being pinged and the RPC status indicated afterward:

```
cluster::*> cluster ping-cluster -node n1
Host is n1
Getting addresses from network interface table...
Cluster n1_clus1 n1       e0a    10.10.0.1
Cluster n1_clus2 n1       e0b    10.10.0.2
Cluster n1_clus3 n1       e0c    10.10.0.3
Cluster n1_clus4 n1       e0d    10.10.0.4
Cluster n2_clus1 n2       e0a    10.10.0.5
Cluster n2_clus2 n2       e0b    10.10.0.6
Cluster n2_clus3 n2       e0c    10.10.0.7
Cluster n2_clus4 n2       e0d    10.10.0.8
Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8
Cluster Vserver Id = 4294967293 Ping status:
....
Basic connectivity succeeds on 16 path(s)
Basic connectivity fails on 0 path(s)
................
Detected 9000 byte MTU on 16 path(s):
    Local 10.10.0.1 to Remote 10.10.0.5
    Local 10.10.0.1 to Remote 10.10.0.6
    Local 10.10.0.1 to Remote 10.10.0.7
    Local 10.10.0.1 to Remote 10.10.0.8
    Local 10.10.0.2 to Remote 10.10.0.5
    Local 10.10.0.2 to Remote 10.10.0.6
    Local 10.10.0.2 to Remote 10.10.0.7
    Local 10.10.0.2 to Remote 10.10.0.8
    Local 10.10.0.3 to Remote 10.10.0.5
    Local 10.10.0.3 to Remote 10.10.0.6
    Local 10.10.0.3 to Remote 10.10.0.7
    Local 10.10.0.3 to Remote 10.10.0.8
    Local 10.10.0.4 to Remote 10.10.0.5
    Local 10.10.0.4 to Remote 10.10.0.6
    Local 10.10.0.4 to Remote 10.10.0.7
    Local 10.10.0.4 to Remote 10.10.0.8

Larger than PMTU communication succeeds on 16 path(s)
RPC status:
4 paths up, 0 paths down (tcp check)
4 paths up, 0 paths down (udp check)
```

9. Shut down the ISL ports 13 through 16 on the active CN1610 switch CL1 using the appropriate command.

   For more information on Cisco commands, see the guides listed in the Cisco Nexus 3000 Series NX-OS Command References.

The following example shows ISL ports 13 through 16 being shut down on the CN1610 switch CL1:

```
(CL1)# configure
(CL1)(Config)# interface 0/13-0/16
(CL1)(Interface 0/13-0/16)# shutdown (CL1)(Interface 0/13-0/16)# exit
(CL1)(Config)# exit
(CL1)#
```

10. Build a temporary ISL between CL1 and C2:

    For more information on Cisco commands, see the guides listed in the Cisco Nexus 3000 Series NX-OS Command References.

    The following example shows a temporary ISL being built between CL1 (ports 13-16) and C2 (ports e1/24/1-4) using the Cisco `switchport mode trunk` command:

```
C2# configure
C2(config)# interface port-channel 2
C2(config-if)# switchport mode trunk
C2(config-if)# spanning-tree port type network
C2(config-if)# mtu 9216
C2(config-if)# interface breakout module 1 port 24 map 10g-4x
C2(config)# interface e1/24/1-4
C2(config-if-range)# switchport mode trunk
C2(config-if-range)# mtu 9216
C2(config-if-range)# channel-group 2 mode active
C2(config-if-range)# exit
C2(config-if)# exit
```

11. Remove the cables that are attached to the CN1610 switch CL2 on all the nodes.

    Using supported cabling, you must reconnect the disconnected ports on all the nodes to the Nexus 3232C switch C2.

12. Remove four ISL cables from ports 13 to 16 on the CN1610 switch CL1.

    You must attach the appropriate Cisco QSFP28 to SFP+ breakout cables connecting port 1/24 on the new Cisco 3232C switch C2 to ports 13 to 16 on the existing CN1610 switch CL1.

    When reconnecting any cables to the new Cisco 3232C switch, the cables used must be either optical fiber or Cisco twinax cables.

13. Make the ISL dynamic by configuring the ISL interface 3/1 on the active CN1610 switch to disable the static mode.

    This configuration matches with the ISL configuration on the 3232C switch C2 when the ISLs are brought up on both switches in Step 10.

For more information on Cisco commands, see the guides listed in the Cisco Nexus 3000 Series NX-OS Command References.

The following example shows the ISL interface 3/1 being configured to make the ISL dynamic:

```
(CL1)# configure
(CL1)(Config)# interface 3/1
(CL1)(Interface 3/1)# no port-channel static
(CL1)(Interface 3/1)# exit
(CL1)(Config)# exit
(CL1)#
```

14. Bring up ISLs 13 through 16 on the active CN1610 switch CL1.

    For more information on Cisco commands, see the guides listed in the Cisco Nexus 3000 Series NX-OS Command References.

    The following example shows ISL ports 13 through 16 being brought up on the port-channel interface 3/1:

    ```
    (CL1)# configure
    (CL1)(Config)# interface 0/13-0/16,3/1
    (CL1)(Interface 0/13-0/16,3/1)# no shutdown
    (CL1)(Interface 0/13-0/16,3/1)# exit
    (CL1)(Config)# exit
    (CL1)#
    ```

15. Verify that the ISLs are `up` on the CN1610 switch CL1.

    The "Link State" should be `Up`, "Type" should be `Dynamic`, and the "Port Active" column should be `True` for ports 0/13 to 0/16.

    The following example shows the ISLs being verified as `up` on the CN1610 switch CL1:

```
(CL1)# show port-channel 3/1
Local Interface................................ 3/1
Channel Name................................... ISL-LAG
Link State..................................... Up
Admin Mode..................................... Enabled
Type........................................... Dynamic
Load Balance Option............................ 7
(Enhanced hashing mode)

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

16. Verify that the ISLs are `up` on the 3232C switch C2: `show port-channel summary`

    For more information on Cisco commands, see the guides listed in the Cisco Nexus 3000 Series NX-OS Command References.

    Ports Eth1/24/1 through Eth1/24/4 should indicate `(P)`, meaning that all four ISL ports are up in the port channel. Eth1/31 and Eth1/32 should indicate `(D)` as they are not connected.

    The following example shows the ISLs being verified as `up` on the 3232C switch C2:

```
C2# show port-channel summary

Flags:  D - Down        P - Up in port-channel (members)
        I - Individual  H - Hot-standby (LACP only)
        s - Suspended   r - Module-removed
        S - Switched    R - Routed
        U - Up (port-channel)
        M - Not in use. Min-links not met
--------------------------------------------------------------------------
------
Group Port-       Type     Protocol  Member Ports
      Channel
--------------------------------------------------------------------------
------
1       Po1(SU)     Eth      LACP      Eth1/31(D)   Eth1/32(D)
2       Po2(SU)     Eth      LACP      Eth1/24/1(P) Eth1/24/2(P)
Eth1/24/3(P)
                                       Eth1/24/4(P)
```

17. Bring up all of the cluster interconnect ports that are connected to the 3232C switch C2 on all of the nodes: `network port modify -node` *`node-name`* `-port` *`port-name`* `-up-admin true`

    The following example shows how to bring up the cluster interconnect ports connected to the 3232C switch C2:

```
cluster::*> network port modify -node n1 -port e0b -up-admin true
cluster::*> network port modify -node n1 -port e0c -up-admin true
cluster::*> network port modify -node n2 -port e0b -up-admin true
cluster::*> network port modify -node n2 -port e0c -up-admin true
```

18. Revert all of the migrated cluster interconnect LIFs that are connected to C2 on all of the nodes: `network interface revert -vserver cluster -lif` *`lif-name`*

```
cluster::*> network interface revert -vserver cluster -lif n1_clus2
cluster::*> network interface revert -vserver cluster -lif n1_clus3
cluster::*> network interface revert -vserver cluster -lif n2_clus2
cluster::*> network interface revert -vserver cluster -lif n2_clus3
```

19. Verify that all of the cluster interconnect ports are reverted to their home ports: `network interface show -role cluster`

    The following example shows that the LIFs on clus2 are reverted to their home ports; the LIFs are successfully reverted if the ports in the "Current Port" column have a status of `true` in the "Is Home" column. If the "Is Home" value is `false`, then the LIF is not reverted.

```
cluster::*> network interface show -role cluster
(network interface show)
         Logical    Status      Network         Current  Current  Is
Vserver  Interface  Admin/Oper  Address/Mask    Node     Port     Home
-------- ---------- ----------- --------------- -------- -------- -----
Cluster
         n1_clus1   up/up       10.10.0.1/24    n1       e0a      true
         n1_clus2   up/up       10.10.0.2/24    n1       e0b      true
         n1_clus3   up/up       10.10.0.3/24    n1       e0c      true
         n1_clus4   up/up       10.10.0.4/24    n1       e0d      true
         n2_clus1   up/up       10.10.0.5/24    n2       e0a      true
         n2_clus2   up/up       10.10.0.6/24    n2       e0b      true
         n2_clus3   up/up       10.10.0.7/24    n2       e0c      true
         n2_clus4   up/up       10.10.0.8/24    n2       e0d      true

8 entries were displayed.
```

20. Verify that all of the cluster ports are connected: `network port show -role cluster`

    The following example shows the output verifying all of the cluster interconnects are `up`:

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

Node: n1
                 Broadcast               Speed (Mbps) Health   Ignore
Port  IPspace   Domain      Link  MTU   Admin/Open   Status   Health
Status
----- --------- ----------- ----- ----- ------------ --------
-------------
e0a   cluster   cluster     up    9000  auto/10000     -
e0b   cluster   cluster     up    9000  auto/10000     -
e0c   cluster   cluster     up    9000  auto/10000     -        -
e0d   cluster   cluster     up    9000  auto/10000     -        -
Node: n2

                 Broadcast               Speed (Mbps) Health   Ignore
Port  IPspace   Domain      Link  MTU   Admin/Open   Status   Health
Status
----- --------- ----------- ----- ----- ------------ --------
-------------
e0a   cluster   cluster     up    9000  auto/10000     -
e0b   cluster   cluster     up    9000  auto/10000     -
e0c   cluster   cluster     up    9000  auto/10000     -
e0d   cluster   cluster     up    9000  auto/10000     -

8 entries were displayed.
```

21. Ping the remote cluster interfaces and then perform a remote procedure call server check: `cluster ping-cluster -node` *`node-name`*

    The following example shows node n1 being pinged and the RPC status indicated afterward:

```
cluster::*> cluster ping-cluster -node n1
Host is n1
Getting addresses from network interface table...
Cluster n1_clus1 n1       e0a    10.10.0.1
Cluster n1_clus2 n1       e0b    10.10.0.2
Cluster n1_clus3 n1       e0c    10.10.0.3
Cluster n1_clus4 n1       e0d    10.10.0.4
Cluster n2_clus1 n2       e0a    10.10.0.5
Cluster n2_clus2 n2       e0b    10.10.0.6
Cluster n2_clus3 n2       e0c    10.10.0.7
Cluster n2_clus4 n2       e0d    10.10.0.8
Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 16 path(s)
Basic connectivity fails on 0 path(s)
................
Detected 1500 byte MTU on 16 path(s):
    Local 10.10.0.1 to Remote 10.10.0.5
    Local 10.10.0.1 to Remote 10.10.0.6
    Local 10.10.0.1 to Remote 10.10.0.7
    Local 10.10.0.1 to Remote 10.10.0.8
    Local 10.10.0.2 to Remote 10.10.0.5
    Local 10.10.0.2 to Remote 10.10.0.6
    Local 10.10.0.2 to Remote 10.10.0.7
    Local 10.10.0.2 to Remote 10.10.0.8
    Local 10.10.0.3 to Remote 10.10.0.5
    Local 10.10.0.3 to Remote 10.10.0.6
    Local 10.10.0.3 to Remote 10.10.0.7
    Local 10.10.0.3 to Remote 10.10.0.8
    Local 10.10.0.4 to Remote 10.10.0.5
    Local 10.10.0.4 to Remote 10.10.0.6
    Local 10.10.0.4 to Remote 10.10.0.7
    Local 10.10.0.4 to Remote 10.10.0.8

Larger than PMTU communication succeeds on 16 path(s)
RPC status:
4 paths up, 0 paths down (tcp check)
4 paths up, 0 paths down (udp check)
```

22. Migrate the LIFs that are associated with the first CN1610 switch CL1: `network interface migrate -vserver cluster -lif` *`lif-name`* `-source-node` *`node-name`*

You must migrate each cluster LIF individually to the appropriate cluster ports hosted on cluster switch C2 as shown in the following example:

```
cluster::*> network interface migrate -vserver cluster -lif n1_clus1
-source-node n1
-destination-node n1 -destination-port e0b
cluster::*> network interface migrate -vserver cluster -lif n1_clus4
-source-node n1
-destination-node n1 -destination-port e0c
cluster::*> network interface migrate -vserver cluster -lif n2_clus1
-source-node n2
-destination-node n2 -destination-port e0b
cluster::*> network interface migrate -vserver cluster -lif n2_clus4
-source-node n2
-destination-node n2 -destination-port e0c
```

23. Verify the cluster's status: `network interface show -role cluster`

The following example shows that the required cluster LIFs have been migrated to the appropriate cluster ports hosted on cluster switch C2:

```
cluster::*> network interface show -role cluster
(network interface show)
         Logical    Status      Network         Current  Current  Is
Vserver  Interface  Admin/Oper  Address/Mask    Node     Port     Home
-------- ---------- ----------- --------------- -------- -------- -----
Cluster
         n1_clus1   up/up       10.10.0.1/24    n1       e0b      false
         n1_clus2   up/up       10.10.0.2/24    n1       e0b      true
         n1_clus3   up/up       10.10.0.3/24    n1       e0c      true
         n1_clus4   up/up       10.10.0.4/24    n1       e0c      false
         n2_clus1   up/up       10.10.0.5/24    n2       e0b      false
         n2_clus2   up/up       10.10.0.6/24    n2       e0b      true
         n2_clus3   up/up       10.10.0.7/24    n2       e0c      true
         n2_clus4   up/up       10.10.0.8/24    n2       e0c      false

8 entries were displayed.
```

24. Shut down the node ports that are connected to CL1 on all of the nodes: `network port modify -node` *`node-name`* `-port` *`port-name`* `-up-admin false`

The following example shows specific ports being shut down on nodes n1 and n2:

```
cluster::*> network port modify -node n1 -port e0a -up-admin false
cluster::*> network port modify -node n1 -port e0d -up-admin false
cluster::*> network port modify -node n2 -port e0a -up-admin false
cluster::*> network port modify -node n2 -port e0d -up-admin false
```

25. Shut down the ISL ports 24, 31, and 32 on the active 3232C switch C2.

    For more information on Cisco commands, see the guides listed in the Cisco Nexus 3000 Series NX-OS Command References.

    The following example shows ISLs 24, 31, and 32 being shut down on the active 3232C switch C2:

```
C2# configure
C2(config)# interface ethernet 1/24/1-4
C2(config-if-range)# shutdown
C2(config-if-range)# exit
C2(config)# interface ethernet 1/31-32
C2(config-if-range)# shutdown
C2(config-if-range)# exit
C2(config)# exit
C2#
```

26. Remove the cables that are attached to the CN1610 switch CL1 on all of the nodes.

    Using the appropriate cabling, you must reconnect the disconnected ports on all the nodes to the Nexus 3232C switch C1.

27. Remove the QSFP28 cables from Nexus 3232C C2 port e1/24.

    You must connect ports e1/31 and e1/32 on C1 to ports e1/31 and e1/32 on C2 using supported Cisco QSFP28 optical fiber or direct-attach cables.

28. Restore the configuration on port 24 and remove the temporary port-channel 2 on C2:

    For more information on Cisco commands, see the guides listed in the Cisco Nexus 3000 Series NX-OS Command References.

    The following example shows the `running-configuration` file being copied to the `startup-configuration` file:

```
C2# configure
C2(config)# no interface breakout module 1 port 24 map 10g-4x
C2(config)# no interface port-channel 2
C2(config-if)# interface e1/24
C2(config-if)# description 100GbE/40GbE Node Port
C2(config-if)# spanning-tree port type edge
Edge port type (portfast) should only be enabled on ports connected to a
single
host. Connecting hubs, concentrators, switches, bridges, etc...  to this
interface when edge port type (portfast) is enabled, can cause temporary
bridging loops.
Use with CAUTION

Edge Port Type (Portfast) has been configured on Ethernet 1/24 but will
only
have effect when the interface is in a non-trunking mode.

C2(config-if)# spanning-tree bpduguard enable
C2(config-if)# mtu 9216
C2(config-if-range)# exit
C2(config)# exit
C2# copy running-config startup-config
[########################################] 100%
Copy Complete.
```

29. Bring up ISL ports 31 and 32 on C2, the active 3232C switch.

    For more information on Cisco commands, see the guides listed in the Cisco Nexus 3000 Series NX-OS Command References.

    The following example shows ISLs 31 and 32 being brought upon the 3232C switch C2:

```
C2# configure
C2(config)# interface ethernet 1/31-32
C2(config-if-range)# no shutdown
C2(config-if-range)# exit
C2(config)# exit
C2# copy running-config startup-config
[########################################] 100%
Copy Complete.
```

30. Verify that the ISL connections are `up` on the 3232C switch C2.

    For more information on Cisco commands, see the guides listed in the Cisco Nexus 3000 Series NX-OS Command References.

The following example shows the ISL connections being verified. Ports Eth1/31 and Eth1/32 indicate `(P)`, meaning that both the ISL ports are `up` in the port-channel:

```
C1# show port-channel summary
Flags:  D - Down        P - Up in port-channel (members)
        I - Individual  H - Hot-standby (LACP only)
        s - Suspended   r - Module-removed
        S - Switched    R - Routed
        U - Up (port-channel)
        M - Not in use. Min-links not met
------------------------------------------------------------------------------
------
Group Port-       Type     Protocol  Member Ports
      Channel
------------------------------------------------------------------------------
-----
1     Po1(SU)     Eth      LACP      Eth1/31(P)   Eth1/32(P)

C2# show port-channel summary
Flags:  D - Down        P - Up in port-channel (members)
        I - Individual  H - Hot-standby (LACP only)
        s - Suspended   r - Module-removed
        S - Switched    R - Routed
        U - Up (port-channel)
        M - Not in use. Min-links not met
------------------------------------------------------------------------------
------
Group Port-       Type     Protocol  Member Ports
      Channel
------------------------------------------------------------------------------
------
1     Po1(SU)     Eth      LACP      Eth1/31(P)   Eth1/32(P)
```

31. Bring up all of the cluster interconnect ports connected to the new 3232C switch C1 on all of the nodes: `network port modify -node` *`node-name`* `-port` *`port-name`* `-up-admin true`

    The following example shows all of the cluster interconnect ports connected to the new 3232C switch C1 being brought up:

```
cluster::*> network port modify -node n1 -port e0a -up-admin true
cluster::*> network port modify -node n1 -port e0d -up-admin true
cluster::*> network port modify -node n2 -port e0a -up-admin true
cluster::*> network port modify -node n2 -port e0d -up-admin true
```

32. Verify the status of the cluster node port: `network port show -role cluster`

The following example shows output that verifies that the cluster interconnect ports on nodes n1 and n2 on the new 3232C switch C1 are `up`:

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

Node: n1
                 Broadcast              Speed (Mbps) Health   Ignore
Port  IPspace    Domain     Link  MTU   Admin/Open   Status   Health
Status
----- --------- ---------- ----- ----- ------------ --------
-------------
e0a   cluster   cluster    up    9000  auto/10000     -
e0b   cluster   cluster    up    9000  auto/10000     -
e0c   cluster   cluster    up    9000  auto/10000     -        -
e0d   cluster   cluster    up    9000  auto/10000     -        -

Node: n2
                 Broadcast              Speed (Mbps) Health   Ignore
Port  IPspace    Domain     Link  MTU   Admin/Open   Status   Health
Status
----- --------- ---------- ----- ----- ------------ --------
-------------
e0a   cluster   cluster    up    9000  auto/10000     -
e0b   cluster   cluster    up    9000  auto/10000     -
e0c   cluster   cluster    up    9000  auto/10000     -
e0d   cluster   cluster    up    9000  auto/10000     -

8 entries were displayed.
```

33. Revert all of the migrated cluster interconnect LIFs that were originally connected to C1 on all of the nodes: `network interface revert -server cluster -lif` *`lif-name`*

    You must migrate each LIF individually as shown in the following example:

```
cluster::*> network interface revert -vserver cluster -lif n1_clus1
cluster::*> network interface revert -vserver cluster -lif n1_clus4
cluster::*> network interface revert -vserver cluster -lif n2_clus1
cluster::*> network interface revert -vserver cluster -lif n2_clus4
```

34. Verify that the interface is now home: `network interface show -role cluster`

    The following example shows the status of cluster interconnect interfaces is `up` and "Is Home" for nodes n1 and n2:

```
cluster::*> network interface show -role cluster
(network interface show)
         Logical    Status      Network         Current  Current  Is
Vserver  Interface  Admin/Oper  Address/Mask    Node     Port     Home
-------- ---------- ----------- --------------- -------- -------- -----
Cluster
         n1_clus1   up/up       10.10.0.1/24    n1       e0a      true
         n1_clus2   up/up       10.10.0.2/24    n1       e0b      true
         n1_clus3   up/up       10.10.0.3/24    n1       e0c      true
         n1_clus4   up/up       10.10.0.4/24    n1       e0d      true
         n2_clus1   up/up       10.10.0.5/24    n2       e0a      true
         n2_clus2   up/up       10.10.0.6/24    n2       e0b      true
         n2_clus3   up/up       10.10.0.7/24    n2       e0c      true
         n2_clus4   up/up       10.10.0.8/24    n2       e0d      true

8 entries were displayed.
```

35. Ping the remote cluster interfaces and then perform a remote procedure call server check: `cluster ping-cluster -node` *`host-name`*

    The following example shows node n1 being pinged and the RPC status indicated afterward:

```
cluster::*> cluster ping-cluster -node n1
Host is n1
Getting addresses from network interface table...
Cluster n1_clus1 n1       e0a    10.10.0.1
Cluster n1_clus2 n1       e0b    10.10.0.2
Cluster n1_clus3 n1       e0c    10.10.0.3
Cluster n1_clus4 n1       e0d    10.10.0.4
Cluster n2_clus1 n2       e0a    10.10.0.5
Cluster n2_clus2 n2       e0b    10.10.0.6
Cluster n2_clus3 n2       e0c    10.10.0.7
Cluster n2_clus4 n2       e0d    10.10.0.8
Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 16 path(s)
Basic connectivity fails on 0 path(s)
................
Detected 9000 byte MTU on 16 path(s):
    Local 10.10.0.1 to Remote 10.10.0.5
    Local 10.10.0.1 to Remote 10.10.0.6
    Local 10.10.0.1 to Remote 10.10.0.7
    Local 10.10.0.1 to Remote 10.10.0.8
    Local 10.10.0.2 to Remote 10.10.0.5
    Local 10.10.0.2 to Remote 10.10.0.6
    Local 10.10.0.2 to Remote 10.10.0.7
    Local 10.10.0.2 to Remote 10.10.0.8
    Local 10.10.0.3 to Remote 10.10.0.5
    Local 10.10.0.3 to Remote 10.10.0.6
    Local 10.10.0.3 to Remote 10.10.0.7
    Local 10.10.0.3 to Remote 10.10.0.8
    Local 10.10.0.4 to Remote 10.10.0.5
    Local 10.10.0.4 to Remote 10.10.0.6
    Local 10.10.0.4 to Remote 10.10.0.7
    Local 10.10.0.4 to Remote 10.10.0.8

Larger than PMTU communication succeeds on 16 path(s)
RPC status:
4 paths up, 0 paths down (tcp check)
3   paths up, 0 paths down (udp check)
```

36. Expand the cluster by adding nodes to the Nexus 3232C cluster switches.
37. Display the information about the devices in your configuration:

- `network device-discovery show`
- `network port show -role cluster`
- `network interface show -role cluster`
- `system cluster-switch show`
  The following examples show nodes n3 and n4 with 40 GbE cluster ports connected to ports e1/7 and e1/8, respectively, on both the Nexus 3232C cluster switches. Both nodes are joined to the cluster. The 40 GbE cluster interconnect ports used are e4a and e4e.

```
cluster::*> network device-discovery show

       Local  Discovered
Node   Port   Device       Interface       Platform
------ ------ ------------ --------------- -------------
n1     /cdp
        e0a   C1           Ethernet1/1/1   N3K-C3232C
        e0b   C2           Ethernet1/1/1   N3K-C3232C
        e0c   C2           Ethernet1/1/2   N3K-C3232C
        e0d   C1           Ethernet1/1/2   N3K-C3232C
n2     /cdp
        e0a   C1           Ethernet1/1/3   N3K-C3232C
        e0b   C2           Ethernet1/1/3   N3K-C3232C
        e0c   C2           Ethernet1/1/4   N3K-C3232C
        e0d   C1           Ethernet1/1/4   N3K-C3232C

n3     /cdp
        e4a   C1           Ethernet1/7     N3K-C3232C
        e4e   C2           Ethernet1/7     N3K-C3232C

n4     /cdp
        e4a   C1           Ethernet1/8     N3K-C3232C
        e4e   C2           Ethernet1/8     N3K-C3232C

12 entries were displayed.
cluster::*> network port show -role cluster
(network port show)

Node: n1
                 Broadcast              Speed (Mbps) Health   Ignore
Port  IPspace    Domain     Link  MTU   Admin/Open   Status   Health
Status
----- --------- ---------- ----- ----- ------------ --------
-------------
e0a   cluster   cluster    up    9000  auto/10000     -
e0b   cluster   cluster    up    9000  auto/10000     -
e0c   cluster   cluster    up    9000  auto/10000     -        -
e0d   cluster   cluster    up    9000  auto/10000     -        -
```

```
Node: n2
                  Broadcast              Speed (Mbps) Health   Ignore
Port  IPspace     Domain     Link  MTU   Admin/Open   Status   Health
Status
----- --------- ---------- ----- ----- ------------ --------
-------------
e0a   cluster   cluster    up    9000  auto/10000     -
e0b   cluster   cluster    up    9000  auto/10000     -
e0c   cluster   cluster    up    9000  auto/10000     -
e0d   cluster   cluster    up    9000  auto/10000     -        -

Node: n3
                  Broadcast              Speed (Mbps) Health   Ignore
Port  IPspace     Domain     Link  MTU   Admin/Open   Status   Health
Status
----- --------- ---------- ----- ----- ------------ --------
-------------
e4a   cluster   cluster    up    9000  auto/40000     -
e4e   cluster   cluster    up    9000  auto/40000     -        -

Node: n4
                  Broadcast              Speed (Mbps) Health   Ignore
Port  IPspace     Domain     Link  MTU   Admin/Open   Status   Health
Status
----- --------- ---------- ----- ----- ------------ --------
-------------
e4a   cluster   cluster    up    9000  auto/40000     -
e4e   cluster   cluster    up    9000  auto/40000     -

12 entries were displayed.

cluster::*> network interface show -role cluster
(network interface show)
         Logical    Status      Network        Current  Current  Is
Vserver  Interface  Admin/Oper  Address/Mask   Node     Port     Home
-------- ---------- ----------- -------------- -------- -------- -----
Cluster
         n1_clus1   up/up       10.10.0.1/24   n1       e0a      true
         n1_clus2   up/up       10.10.0.2/24   n1       e0b      true
         n1_clus3   up/up       10.10.0.3/24   n1       e0c      true
         n1_clus4   up/up       10.10.0.4/24   n1       e0d      true
         n2_clus1   up/up       10.10.0.5/24   n2       e0a      true
         n2_clus2   up/up       10.10.0.6/24   n2       e0b      true
         n2_clus3   up/up       10.10.0.7/24   n2       e0c      true
         n2_clus4   up/up       10.10.0.8/24   n2       e0d      true
```

```
          n3_clus1   up/up       10.10.0.9/24   n3       e4a      true
          n3_clus2   up/up       10.10.0.10/24  n3       e4e      true
          n4_clus1   up/up       10.10.0.11/24  n4       e4a     true
          n4_clus2   up/up       10.10.0.12/24  n4       e4e     true

12 entries were displayed.

cluster::> system cluster-switch show

Switch                      Type              Address       Model
--------------------------- ----------------- ------------- ---------
C1                          cluster-network  10.10.1.103   NX3232C

     Serial Number: FOX000001
      Is Monitored: true
            Reason:
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    7.0(3)I6(1)
    Version Source: CDP

C2                          cluster-network  10.10.1.104   NX3232C

     Serial Number: FOX000002
      Is Monitored: true
            Reason:
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    7.0(3)I6(1)
    Version Source: CDP
CL1                         cluster-network  10.10.1.101   CN1610

     Serial Number: 01234567
      Is Monitored: true
            Reason:
  Software Version: 1.2.0.7
    Version Source: ISDP
CL2                         cluster-network  10.10.1.102    CN1610

     Serial Number: 01234568
      Is Monitored: true
            Reason:
  Software Version: 1.2.0.7
    Version Source: ISDP 4 entries were displayed.
```

38. Remove the replaced CN1610 switches if they are not automatically removed: `system cluster-switch`

`delete -device switch-name`

You must delete both devices individually as shown in the following example:

```
cluster::> system cluster-switch delete –device CL1
cluster::> system cluster-switch delete –device CL2
```

39. Verify that the proper cluster switches are monitored: `system cluster-switch show`

The following example shows cluster switches C1 and C2 are being monitored:

```
cluster::> system cluster-switch show

Switch                        Type               Address          Model
----------------------------- ------------------ ----------------
---------------
C1                            cluster-network    10.10.1.103      NX3232C

     Serial Number: FOX000001
      Is Monitored: true
            Reason:
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    7.0(3)I6(1)
    Version Source: CDP

C2                            cluster-network    10.10.1.104      NX3232C
     Serial Number: FOX000002
      Is Monitored: true
          Reason:
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    7.0(3)I6(1)
    Version Source: CDP

2 entries were displayed.
```

40. Enable the cluster switch health monitor log collection feature for collecting switch-related log files: `system cluster-switch log setup-password`

`system cluster-switch log enable-collection`

```
cluster::*> system cluster-switch log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
C1
C2

cluster::*> system cluster-switch log setup-password

Enter the switch name: C1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster::*> system cluster-switch log setup-password

Enter the switch name: C2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster::*> system cluster-switch log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster::*>
```

If any of these commands return an error, contact NetApp support.

41. If you suppressed automatic case creation, reenable it by invoking an AutoSupport message: `system node autosupport invoke -node * -type all -message MAINT=END`

Related information

NetApp CN1601 and CN1610 description page

Cisco Ethernet Switch description page

Hardware Universe

Install a Cisco Nexus 3232C cluster switch and a pass-through panel in a NetApp cabinet

You can install the Cisco Nexus 3232C switch and pass-through panel in a NetApp cabinet with the standard brackets that are included with the switch.

Before you begin

You must have reviewed the initial preparation requirements, kit contents, and safety precautions in the Cisco Nexus 3000 Series Hardware Installation Guide.

About this task

- Fo- each switch, you must supply the eight 10-32 or 12-24 screws and clip nuts to mount the brackets and slider rails to the front and rear cabinet posts.
- You must use the Cisco standard rail kit to install the switch in a NetApp cabinet.

> The jumper cords are not included with the pass-through kit and should be included with your switches. If they were not shipped with the switches, you can order them from NetApp (part number X1558A-R6).

Steps

1. Install the pass-through blanking panel in the NetApp cabinet.

   The pass-through panel kit is available from NetApp (part number X8784-R6).

   The NetApp pass-through panel kit contains the following hardware:

   - One pass-through blanking panel
   - Four 10-32 x .75 screws
   - Four 10-32 clip nuts

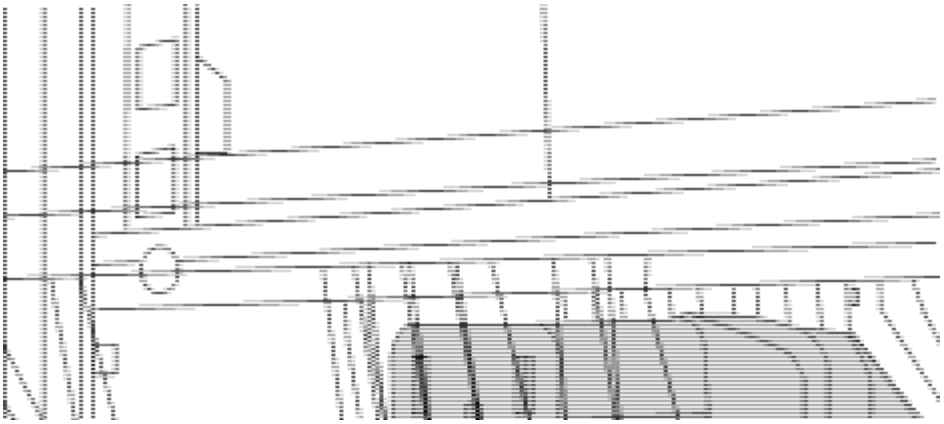
     a. Determine the vertical location of the switches and blanking panel in the cabinet.

        In this procedure, the blanking panel will be installed in U40.

     b. Install two clip nuts on each side in the appropriate square holes for front cabinet rails.

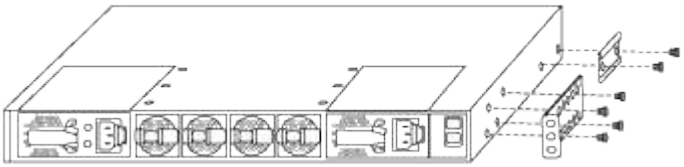
     c. Center the panel vertically to prevent intrusion into adjacent rack space, and then tighten the screws.

     d. Insert the female connectors of both 48-inch jumper cords from the rear of the panel and through the brush assembly.

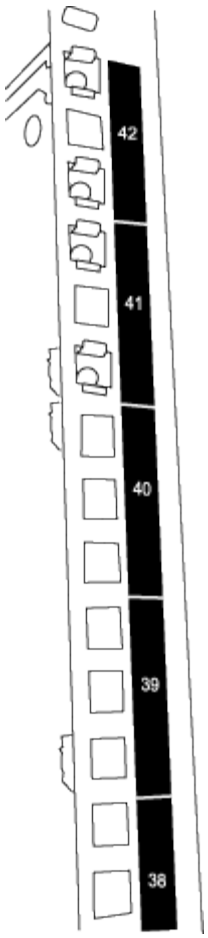


1. Female connector of the jumper cord.

2. Install the rack-mount brackets on the Nexus 3232C switch chassis.
   a. Position a front rack-mount bracket on one side of the switch chassis so that the mounting ear is aligned with the chassis faceplate (on the PSU or fan side), and then use four M4 screws to attach the bracket to the chassis.

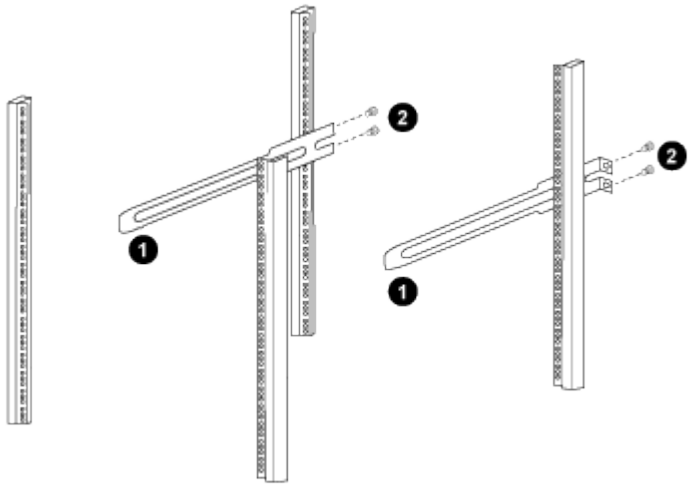


   b. Repeat step 2a with the other front rack-mount bracket on the other side of the switch.
   c. Install the rear rack-mount bracket on the switch chassis.
   d. Repeat step 2c with the other rear rack-mount bracket on the other side of the switch.
3. Install the clip nuts in the square hole locations for all four IEA posts.



The two 3232C switches will always be mounted in the top 2U of the cabinet RU41 and 42.

4. Install the slider rails in the cabinet.
   a. Position the first slider rail at the RU42 mark on the back side of the rear left post, insert screws with the matching thread type, and then tighten the screws with your fingers.



      1. As you gently slide the slider rail, align it to the screw holes in the rack.
      2. Tighten the screws of the slider rails to the cabinet posts.

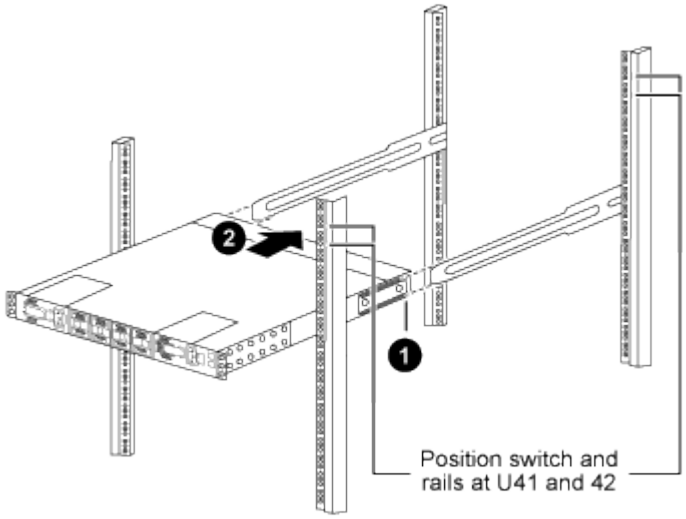
   b. Repeat step 4a for the right side rear post.

c. Repeat steps 4a and 4b at the RU41 locations on the cabinet.

5. Install the switch in the cabinet.

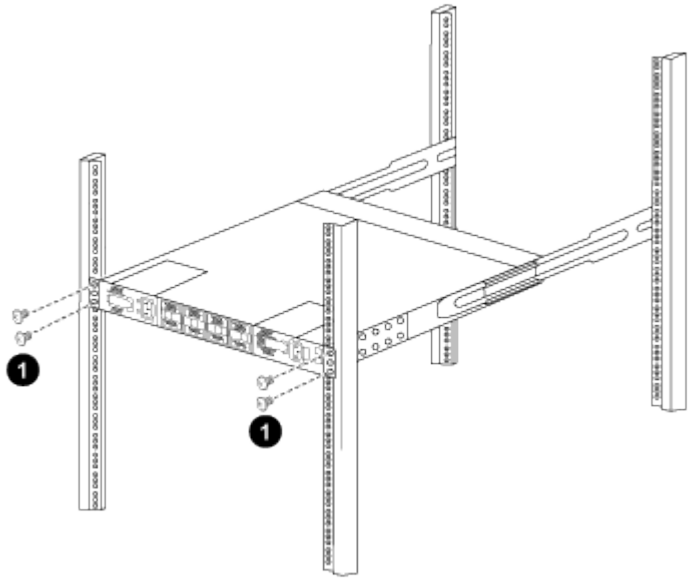
> This step requires two people: one person to support the switch from the front and another to guide the switch into the rear slider rails.

a. Position the back of the switch at RU41.



1. As the chassis is pushed toward the rear posts, align the two rear rack-mount guides with the slider rails.
2. Gently slide the switch until the front rack-mount brackets are flush with the front posts.

b. Attach the switch to the cabinet.



1. With one person holding the front of the chassis level, the other person should fully tighten the four rear screws to the cabinet posts.

c. With the chassis now supported without assistance, fully tighten the front screws to the posts.

d. Repeat steps 5a through 5c for the second switch at the RU42 location.

By using the fully installed switch as a support, it is not necessary to hold the front of the second switch during the installation process.

6. When the switches are installed, connect the jumper cords to the switch power inlets.
7. Connect the male plugs of both jumper cords to the closest available PDU outlets.

   To maintain redundancy, the two cords must be connected to different PDUs.

8. Connect the management port on each 3232C switch to either of the management switches (if ordered) or connect them directly to your management network.

   The management port is the upper-right port located on the PSU side of the switch. The CAT6 cable for each switch needs to be routed through the pass-through panel after the switches are installed to connect to the management switches or management network.

Install NX-OS software and RCFs on Cisco Nexus 3232C cluster switches

The Cisco NX-OS software and reference configuration files (RCFs) must be installed on Cisco Nexus 3232C cluster switches.

Before you begin

The following conditions must exist before you install the NX-OS software and Reference Configurations Files (RCFs) on the cluster switch:

- The cluster must be fully functioning (there should be no errors in the logs or similar -ssues).
- You must have checked or set your desired boot configuration in the RCF to reflect the desired boot images if you are installing only NX-OS and keeping your current RCF version.
- If you need to change the boot configuration to reflect the current boot images, you must do so before reapplying the RCF so that the correct version is instantiated on future reboots.
- You must have a console connection to the switch, required when installing the RCF.
- You must have consulted the switch compatibility table on the Cisco Ethernet switch page for the supported ONTAP, NX-OS, and RCF versions.
- There can be command dependencies between the command syntax in the RCF and that found in versions of NX-OS.
- You must have referred to the appropriate software and upgrade guides available on the Cisco web site for complete documentation on the Cisco switch upgrade and downgrade procedures on Cisco Nexus 3000 Series Switches.
- You must have the current RCF.

About this task

The examples in this procedure use two nodes. These nodes use two 10GbE cluster interconnect ports `e0a` and `e0b`.

See the Hardware Universe to verify the correct cluster ports on your platforms.

The command outputs might vary depending on different releases of ONTAP.

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

- The names of the two Cisco switches are `cs1` and `cs2`.
- The node names are `cluster1-01` and `cluster1-02`.
- The cluster LIF names are `cluster1-01_clus1` and `cluster1-01_clus2` for cluster1-01 and `cluster1-02_clus1` and `cluster1-02_clus2` for cluster1-02.
- The `cluster1::*>` prompt indicates the name of the cluster.

The procedure requires the use of both ONTAP commands and Cisco Nexus 3000 Series Switches commands; ONTAP commands are used unless otherwise indicated.

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=x h`

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

   `set -privilege advanced`

   The advanced prompt (`*>`) appears.

3. Display how many cluster interconnect interfaces are configured in each node for each cluster interconnect switch: `network device-discovery show -protocol cdp`

```
cluster1::*> network device-discovery show -protocol cdp

Node/       Local  Discovered
Protocol    Port   Device (LLDP: ChassisID)  Interface         Platform
----------- ------ ------------------------- ----------------- --------
cluster1-02/cdp
            e0a    cs1                       Eth1/2            N3K-
C3232C
            e0b    cs2                       Eth1/2            N3K-
C3232C
cluster1-01/cdp
            e0a    cs1                       Eth1/1            N3K-
C3232C
            e0b    cs2                       Eth1/1            N3K-
C3232C

4 entries were displayed.
```

4. Check the administrative or operational status of each cluster interface.
   a. Display the network port attributes: `network port show –ipspace Cluster`

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

Node: cluster1-02
                                                  Speed(Mbps) Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
--------- ------------ ---------------- ---- ---- ----------- ------
e0a       Cluster      Cluster          up   9000  auto/10000 healthy
e0b       Cluster      Cluster          up   9000  auto/10000 healthy

Node: cluster1-01
                                                  Speed(Mbps) Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
--------- ------------ ---------------- ---- ---- ----------- ------
e0a       Cluster      Cluster          up   9000  auto/10000 healthy
e0b       Cluster      Cluster          up   9000  auto/10000 healthy

4 entries were displayed.
```

   b. Display information about the LIFs: `network interface show -vserver Cluster`

```
cluster1::*> network interface show -vserver Cluster

            Logical            Status     Network            Current
Current Is
Vserver     Interface          Admin/Oper Address/Mask       Node
Port    Home
----------- ------------------ ---------- ------------------
------------ ------- ----
Cluster
            cluster1-01_clus1  up/up      169.254.209.69/16
cluster1-01   e0a     true
            cluster1-01_clus2  up/up      169.254.49.125/16
cluster1-01   e0b     true
            cluster1-02_clus1  up/up      169.254.47.194/16
cluster1-02   e0a     true
            cluster1-02_clus2  up/up      169.254.19.183/16
cluster1-02   e0b     true

4 entries were displayed.
```

5. Ping the remote cluster LIFs: `cluster ping-cluster -node` *`node-name`*

```
cluster1::*> **cluster ping-cluster -node cluster1-02**
Host is cluster1-02
Getting addresses from network interface table...
Cluster cluster1-01_clus1 169.254.209.69 cluster1-01     e0a
Cluster cluster1-01_clus2 169.254.49.125 cluster1-01     e0b
Cluster cluster1-02_clus1 169.254.47.194 cluster1-02     e0a
Cluster cluster1-02_clus2 169.254.19.183 cluster1-02     e0b
Local = 169.254.47.194 169.254.19.183
Remote = 169.254.209.69 169.254.49.125
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s)
................
Detected 9000 byte MTU on 4 path(s):
    Local 169.254.19.183 to Remote 169.254.209.69
    Local 169.254.19.183 to Remote 169.254.49.125
    Local 169.254.47.194 to Remote 169.254.209.69
    Local 169.254.47.194 to Remote 169.254.49.125
Larger than PMTU communication succeeds on 4 path(s)
RPC status:
2 paths up, 0 paths down (tcp check)
2 paths up, 0 paths down (udp check)
```

6. Verify that the `auto-revert` command is enabled on all cluster LIFs: `network interface show -vserver Cluster -fields auto-revert`

```
cluster1::*> network interface show -vserver Cluster -fields auto-revert

          Logical
Vserver   Interface          Auto-revert
--------- -------------------- ------------
Cluster
          cluster1-01_clus1   true
          cluster1-01_clus2   true
          cluster1-02_clus1   true
          cluster1-02_clus2   true
4 entries were displayed.
```

7. For ONTAP 9.8 and later, enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the commands: `system switch ethernet log setup-password`

   `system switch ethernet log enable-collection`

```
cluster1::*> system switch ethernet log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
cs1
cs2

cluster1::*> system switch ethernet log setup-password

Enter the switch name: cs1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system switch ethernet log setup-password

Enter the switch name: cs2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system  switch ethernet log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster1::*>
```

If any of these commands return an error, contact NetApp support.

8. For ONTAP releases 9.5P16, 9.6P12, and 9.7P10 and later patch releases, enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the commands: `system cluster-switch log setup-password`

   `system cluster-switch log enable-collection`

```
cluster1::*> system cluster-switch log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
cs1
cs2

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster1::*>
```

If any of these commands return an error, contact NetApp support.

Install the NX-OS software

You can use this procedure to install the NX-OS software on the Nexus 3232C cluster switch.

Steps

1. Connect the cluster switch to the management network.

2. Use the `ping` command to verify connectivity to the server hosting the NX-OS software and the RCF.

   This example verifies that the switch can reach the server at IP address 172.19.2.1:

```
cs2# ping 172.19.2.1
Pinging 172.19.2.1 with 0 bytes of data:

Reply From 172.19.2.1: icmp_seq = 0. time= 5910 usec.
```

3. Copy the NX-OS software and EPLD images to the Nexus 3232C switch.

```
cs2# copy sftp: bootflash: vrf management
Enter source filename: /code/nxos.9.3.4.bin
Enter hostname for the sftp server: 172.19.2.1
Enter username: user1

Outbound-ReKey for 172.19.2.1:22
Inbound-ReKey for 172.19.2.1:22
user1@172.19.2.1's password:
sftp> progress
Progress meter enabled
sftp> get   /code/nxos.9.3.4.bin  /bootflash/nxos.9.3.4.bin
/code/nxos.9.3.4.bin  100% 1261MB   9.3MB/s   02:15
sftp> exit
Copy complete, now saving to disk (please wait)...
Copy complete.


cs2# copy sftp: bootflash: vrf management
Enter source filename: /code/n9000-epld.9.3.4.img
Enter hostname for the sftp server: 172.19.2.1
Enter username: user1

Outbound-ReKey for 172.19.2.1:22
Inbound-ReKey for 172.19.2.1:22
user1@172.19.2.1's password:
sftp> progress
Progress meter enabled
sftp> get   /code/n9000-epld.9.3.4.img  /bootflash/n9000-epld.9.3.4.img
/code/n9000-epld.9.3.4.img  100%  161MB   9.5MB/s   00:16
sftp> exit
Copy complete, now saving to disk (please wait)...
Copy complete.
```

4. Verify the running version of the NX-OS software:

```
cs2# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
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Lesser General Public License (LGPL) Version 2.0.
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http://www.opensource.org/licenses/gpl-2.0.php and
http://opensource.org/licenses/gpl-3.0.html and
http://www.opensource.org/licenses/lgpl-2.1.php and
http://www.gnu.org/licenses/old-licenses/library.txt.

Software
  BIOS: version 08.37
  NXOS: version 9.3(3)
  BIOS compile time:  01/28/2020
  NXOS image file is: bootflash:///nxos.9.3.3.bin
 NXOS compile time:  12/22/2019 2:00:00 [12/22/2019 14:00:37]


Hardware
  cisco Nexus3000 C3232C Chassis (Nexus 9000 Series)
  Intel(R) Xeon(R) CPU E5-2403 v2 @ 1.80GHz with 8154432 kB of memory.
  Processor Board ID FO??????GD

  Device name: cs2
  bootflash:   53298520 kB
Kernel uptime is 0 day(s), 0 hour(s), 3 minute(s), 36 second(s)

Last reset at 74117 usecs after Tue Nov 24 06:24:23 2020
  Reason: Reset Requested by CLI command reload
  System version: 9.3(3)
  Service:
```

```
plugin
  Core Plugin, Ethernet Plugin

Active Package(s):

cs2#
```

5. Install the NX-OS image.

   Installing the image file causes it to be loaded every time the switch is rebooted.

```
cs2# install all nxos bootflash:nxos.9.3.4.bin
Installer will perform compatibility check first. Please wait.
Installer is forced disruptive

Verifying image bootflash:/nxos.9.3.4.bin for boot variable "nxos".
[####################] 100% -- SUCCESS

Verifying image type.
[####################] 100% -- SUCCESS

Preparing "nxos" version info using image bootflash:/nxos.9.3.4.bin.
[####################] 100% -- SUCCESS

Preparing "bios" version info using image bootflash:/nxos.9.3.4.bin.
[####################] 100% -- SUCCESS

Performing module support checks.
[####################] 100% -- SUCCESS

Notifying services about system upgrade.
[####################] 100% -- SUCCESS


Compatibility check is done:
Module  bootable          Impact              Install-type  Reason
------- ----------------- ------------------- ------------- ------
     1     yes            disruptive          reset         default
upgrade is not hitless


Images will be upgraded according to following table:
Module       Image       Running-Version(pri:alt)                New-
Version          Upg-Required
------------ ----------- --------------------------------------
-------------------- ------------
```

```
     1       nxos        9.3(3)                                    9.3(4)
yes
     1       bios        v08.37(01/28/2020):v08.32(10/18/2016)
v08.37(01/28/2020)   no


Switch will be reloaded for disruptive upgrade.
Do you want to continue with the installation (y/n)?  [n] y

Install is in progress, please wait.

Performing runtime checks.
[####################] 100% -- SUCCESS

Setting boot variables.
[####################] 100% -- SUCCESS

Performing configuration copy.
[####################] 100% -- SUCCESS

Module 1: Refreshing compact flash and upgrading bios/loader/bootrom.
Warning: please do not remove or power off the module at this time.
[####################] 100% -- SUCCESS


Finishing the upgrade, switch will reboot in 10 seconds.
cs2#
```

6. Verify the new version of NX-OS software after the switch has rebooted: `show version`

```
cs2# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
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All rights reserved.
The copyrights to certain works contained in this software are
owned by other third parties and used and distributed under their own
licenses, such as open source.  This software is provided "as is," and
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otherwise stated, there is no warranty, express or implied, including
but not
limited to warranties of merchantability and fitness for a particular
purpose.
Certain components of this software are licensed under
the GNU General Public License (GPL) version 2.0 or
```

```
GNU General Public License (GPL) version 3.0  or the GNU
Lesser General Public License (LGPL) Version 2.1 or
Lesser General Public License (LGPL) Version 2.0.
A copy of each such license is available at
http://www.opensource.org/licenses/gpl-2.0.php and
http://opensource.org/licenses/gpl-3.0.html and
http://www.opensource.org/licenses/lgpl-2.1.php and
http://www.gnu.org/licenses/old-licenses/library.txt.

Software
  BIOS: version 08.37
  NXOS: version 9.3(4)
  BIOS compile time:  01/28/2020
  NXOS image file is: bootflash:///nxos.9.3.4.bin
  NXOS compile time:  4/28/2020 21:00:00 [04/29/2020 06:28:31]


Hardware
 cisco Nexus3000 C3232C Chassis (Nexus 9000 Series)
  Intel(R) Xeon(R) CPU E5-2403 v2 @ 1.80GHz with 8154432 kB of memory.
  Processor Board ID FO??????GD

  Device name: rtpnpi-mcc01-8200-ms-A1
  bootflash:   53298520 kB
Kernel uptime is 0 day(s), 0 hour(s), 3 minute(s), 14 second(s)

Last reset at 196755 usecs after Tue Nov 24 06:37:36 2020
  Reason: Reset due to upgrade
  System version: 9.3(3)
  Service:

plugin
  Core Plugin, Ethernet Plugin

Active Package(s):

cs2#
```

7. Upgrade the EPLD image and reboot the switch.

```
cs2# show version module 1 epld

EPLD Device                       Version
------------------------------------
MI   FPGA                         0x12
IO   FPGA                         0x11

cs2# install epld bootflash:n9000-epld.9.3.4.img module 1
Compatibility check:
Module        Type         Upgradable     Impact      Reason
------  -----------------  ----------    ----------   ------
     1         SUP          Yes           disruptive   Module Upgradable

Retrieving EPLD versions.... Please wait.
Images will be upgraded according to following table:
Module  Type   EPLD              Running-Version   New-Version  Upg-
Required
------  ----  -------------      ---------------   -----------
------------
     1   SUP   MI FPGA                   0x12        0x12            No
     1   SUP   IO FPGA                   0x11        0x12            Yes
The above modules require upgrade.
The switch will be reloaded at the end of the upgrade
Do you want to continue (y/n) ?  [n] y

Proceeding to upgrade Modules.

Starting Module 1 EPLD Upgrade

Module 1 : IO FPGA [Programming] : 100.00% (     64 of      64 sectors)
Module 1 EPLD upgrade is successful.
Module        Type  Upgrade-Result
------  ------------------  --------------
     1         SUP         Success

Module 1 EPLD upgrade is successful.
cs2#
```

8. After the switch reboot, log in again, upgrade the EPLD golden image and reboot the switch once again.

```
cs2# install epld bootflash:n9000-epld.9.3.4.img module 1 golden
Digital signature verification is successful
Compatibility check:
Module        Type         Upgradable        Impact   Reason
------  -----------------  ----------    ----------   ------
     1            SUP           Yes       disruptive   Module Upgradable

Retrieving EPLD versions.... Please wait.
The above modules require upgrade.
The switch will be reloaded at the end of the upgrade
Do you want to continue (y/n) ?  [n] y

Proceeding to upgrade Modules.

 Starting Module 1 EPLD Upgrade

Module 1 : MI FPGA [Programming] : 100.00% (     64 of      64 sect
Module 1 : IO FPGA [Programming] : 100.00% (     64 of      64 sect
Module 1 EPLD upgrade is successful.
Module        Type  Upgrade-Result
------  ------------------  --------------
     1         SUP         Success

EPLDs upgraded.

Module 1 EPLD upgrade is successful.
cs2#
```

9. After the switch reboot, log in to verify that the new version of EPLD loaded successfully.

```
cs2# show version module 1 epld

EPLD Device                      Version
---------------------------------------
MI   FPGA                         0x12
IO   FPGA                         0x12
```

Install the Reference Configuration File (RCF)

You can install the RCF after setting up the Nexus 3232C switch for the first time. You can also use this procedure to upgrade your RCF version.

About this task

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

- The names of the two Cisco switches are `cs1` and `cs2`.
- The node names are `cluster1-01`, `cluster1-02`, `cluster1-03`, and `cluster1-04`.
- The cluster LIF names are `cluster1-01_clus1`, `cluster1-01_clus2`, `cluster1-02_clus1`, `cluster1-02_clus2` , `cluster1-03_clus1`, `cluster1-03_clus2`, `cluster1-04_clus1`, and `cluster1-04_clus2`.
- The `cluster1::*>` prompt indicates the name of the cluster.

The procedure requires the -se of both ONTAP commands and Cisco Nexus 3000 Series Switches commands; ONTAP commands are used unless otherwise indicated.

Steps

1. Display the cluster ports on each node that are connected to the cluster switches: `network device-discovery show`

```
cluster1::*> network device-discovery show
Node/       Local  Discovered
Protocol    Port   Device (LLDP: ChassisID)  Interface         Platform
----------- ------ ------------------------- ----------------  --------
cluster1-01/cdp
            e0a    cs1                       Ethernet1/7       N3K-
C3232C
            e0d    cs2                       Ethernet1/7       N3K-
C3232C
cluster1-02/cdp
            e0a    cs1                       Ethernet1/8       N3K-
C3232C
            e0d    cs2                       Ethernet1/8       N3K-
C3232C
cluster1-03/cdp
            e0a    cs1                       Ethernet1/1/1     N3K-
C3232C
            e0b    cs2                       Ethernet1/1/1     N3K-
C3232C
cluster1-04/cdp
            e0a    cs1                       Ethernet1/1/2     N3K-
C3232C
            e0b    cs2                       Ethernet1/1/2     N3K-
C3232C
cluster1::*>
```

2. Check the administrative and operational status of each cluster port.
   a. Verify that all the cluster ports are up with a healthy status: `network port show -role cluster`

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

```
Node: cluster1-01

Ignore
                                                       Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- -----------
-------- ------
e0a       Cluster      Cluster          up   9000  auto/100000
healthy false
e0d       Cluster      Cluster          up   9000  auto/100000
healthy false

Node: cluster1-02

Ignore
                                                       Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- -----------
-------- ------
e0a       Cluster      Cluster          up   9000  auto/100000
healthy false
e0d       Cluster      Cluster          up   9000  auto/100000
healthy false
8 entries were displayed.

Node: cluster1-03

   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

Node: cluster1-04
```

```
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
cluster1::*>
```

b. Verify that all the cluster interfaces (LIFs) are on the home port: `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
            cluster1-01_clus1  up/up     169.254.3.4/23     cluster1-
01  e0a     true
            cluster1-01_clus2  up/up     169.254.3.5/23     cluster1-
01  e0d     true
            cluster1-02_clus1  up/up     169.254.3.8/23     cluster1-
02  e0a     true
            cluster1-02_clus2  up/up     169.254.3.9/23     cluster1-
02  e0d     true
            cluster1-03_clus1  up/up     169.254.1.3/23     cluster1-
03  e0a     true
            cluster1-03_clus2  up/up     169.254.1.1/23     cluster1-
03  e0b     true
            cluster1-04_clus1  up/up     169.254.1.6/23     cluster1-
04  e0a     true
            cluster1-04_clus2  up/up     169.254.1.7/23     cluster1-
04  e0b     true
8 entries were displayed.
cluster1::*>
```

c. Verify that the cluster displays information for both cluster switches: `system cluster-switch show -is-monitoring-enabled-operational true`

```
cluster1::*> system cluster-switch show -is-monitoring-enabled
-operational true
Switch                       Type               Address          Model
---------------------------- ------------------ ----------------
---------------
cs1                          cluster-network    10.233.205.92
NX3232C
     Serial Number: FOXXXXXXXGS
      Is Monitored: true
            Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(4)
    Version Source: CDP

cs2                          cluster-network    10.233.205.93
NX3232C
     Serial Number: FOXXXXXXXGD
      Is Monitored: true
            Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(4)
    Version Source: CDP

2 entries were displayed.
```

3. Disable auto-revert on the cluster LIFs.

```
cluster1::*> network interface modify -vserver Cluster -lif \* -auto
-revert false
```

4. On cluster switch cs2, shut down the ports connected to the cluster ports of the nodes.

```
cs2(config)# interface eth1/1/1-2,eth1/7-8
cs2(config-if-range)# shutdown
```

5. Verify that the cluster ports have migrated to the ports hosted on cluster switch cs1. This might take a few seconds. `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
            cluster1-01_clus1 up/up      169.254.3.4/23     cluster1-01
e0a     true
            cluster1-01_clus2 up/up      169.254.3.5/23     cluster1-01
e0a     false
            cluster1-02_clus1 up/up      169.254.3.8/23     cluster1-02
e0a     true
            cluster1-02_clus2 up/up      169.254.3.9/23     cluster1-02
e0a     false
            cluster1-03_clus1 up/up      169.254.1.3/23     cluster1-03
e0a     true
            cluster1-03_clus2 up/up      169.254.1.1/23     cluster1-03
e0a     false
            cluster1-04_clus1 up/up      169.254.1.6/23     cluster1-04
e0a     true
            cluster1-04_clus2 up/up      169.254.1.7/23     cluster1-04
e0a     false
8 entries were displayed.
cluster1::*>
```

6. Verify that the cluster is healthy: `cluster show`

```
cluster1::*> cluster show
Node                 Health  Eligibility   Epsilon
-------------------- ------- ------------  -------
cluster1-01          true    true          false
cluster1-02          true    true          false
cluster1-03          true    true          true
cluster1-04          true    true          false
4 entries were displayed.
cluster1::*>
```

7. Clean the configuration on switch cs2 and perform a basic setup.
   a. Clean the configuration. This step requires a console connection to the switch.

```
cs2# write erase
Warning: This command will erase the startup-configuration.
Do you wish to proceed anyway? (y/n)  [n] y
cs2# reload
This command will reboot the system. (y/n)?  [n] y
cs2#
```

b. Perform a basic setup of the switch.

8. Copy the RCF to the bootflash of switch cs2 using one of the following transfer protocols: FTP, TFTP, SFTP, or SCP. For more information on Cisco commands, see the appropriate guide in the Cisco Nexus 3000 Series NX-OS Command Reference guides.

   This example shows TFTP being used to copy an RCF to the bootflash on switch cs2:

```
cs2# copy tftp: bootflash: vrf management
Enter source filename: Nexus_3232C_RCF_v1.6-Cluster-HA-Breakout.txt
Enter hostname for the tftp server: 172.22.201.50
Trying to connect to tftp server......Connection to Server Established.
TFTP get operation was successful
Copy complete, now saving to disk (please wait)...
```

9. Apply the RCF previously downloaded to the bootflash.

   For more information on Cisco commands, see the appropriate guide in the Cisco Nexus 3000 Series NX-OS Command Reference guides.

   This example shows the RCF file `Nexus_3232C_RCF_v1.6-Cluster-HA-Breakout.txt` being installed on switch cs2:

```
cs2# copy Nexus_3232C_RCF_v1.6-Cluster-HA-Breakout.txt running-config
echo-commands
```

10. Examine the banner output from the `show banner motd` command. You must read and follow the instructions under **Important Notes** to ensure the proper configuration and operation of the switch.

```
cs2# show banner motd

******************************************************************************
******
* NetApp Reference Configuration File (RCF)
*
* Switch   : Cisco Nexus 3232C
* Filename : Nexus_3232C_RCF_v1.6-Cluster-HA-Breakout.txt
* Date     : Oct-20-2020
```

```
* Version  : v1.6
*
* Port Usage : Breakout configuration
* Ports  1- 3: Breakout mode (4x10GbE) Intra-Cluster Ports, int e1/1/1-
4,
* e1/2/1-4, e1/3/1-4
* Ports  4- 6: Breakout mode (4x25GbE) Intra-Cluster/HA Ports, int
e1/4/1-4,
* e1/5/1-4, e1/6/1-4
* Ports  7-30: 40/100GbE Intra-Cluster/HA Ports, int e1/7-30
* Ports 31-32: Intra-Cluster ISL Ports, int e1/31-32
* Ports 33-34: 10GbE Intra-Cluster 10GbE Ports, int e1/33-34
*
* IMPORTANT NOTES
* - Load Nexus_3232C_RCF_v1.6-Cluster-HA.txt for non breakout config
*
* - This RCF utilizes QoS and requires TCAM re-configuration, requiring
RCF
*   to be loaded twice with the Cluster Switch rebooted in between.
*
* - Perform the following 4 steps to ensure proper RCF installation:
*
*   (1) Apply RCF first time, expect following messages:
*       - Please save config and reload the system...
*       - Edge port type (portfast) should only be enabled on ports...
*       - TCAM region is not configured for feature QoS class IPv4
ingress...
*
*   (2) Save running-configuration and reboot Cluster Switch
*
*   (3) After reboot, apply same RCF second time and expect following
messages:
*       - % Invalid command at '^' marker
*       - Syntax error while parsing...
*
*   (4) Save running-configuration again
**********************************************************************
******
```

11. Verify that the RCF file is the correct newer version: `show running-config`

    When you check the output to verify you have the correct RCF, make sure that the following information is correct:

    - The RCF banner
    - The node and port settings

◦ Customizations The output varies according to your site configuration. Check the port settings and refer to the release notes for any changes specific to the RCF that you have installed.

12. After you verify the RCF versions and switch settings are correct, copy the running-config file to the startup-config file.

    For more information on Cisco commands, see the appropriate guide in the Cisco Nexus 3000 Series NX-OS Command Reference guides.

```
cs2# copy running-config startup-config
\[\#\#\#\#\#\#\#\#\#\#\#\#\#\#\#\#\#\#\#\#\#\#\#\#\#\#\#\#\#\#\#\#\#\#\#
\#\#\#\#\#\] 100% Copy complete
```

13. Reboot switch cs2. You can ignore the "cluster ports down" events reported on the nodes while the switch reboots.

```
cs2# reload
This command will reboot the system. (y/n)?  [n] y
```

14. Apply the same RCF and save the running configuration for a second time.

```
cs2# copy Nexus_3232C_RCF_v1.6-Cluster-HA-Breakout.txt running-config
echo-commands
cs2# copy running-config startup-config
[########################################] 100% Copy complete
```

15. Verify the health of cluster ports on the cluster.

    a. Verify that e0d ports are up and healthy across all nodes in the cluster: `network port show -role cluster`

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

Node: cluster1-01

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

Node: cluster1-02

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

Node: cluster1-03

Ignore
                                                  Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- -----------
-------- ------
e0a       Cluster      Cluster          up   9000  auto/100000
healthy false
e0d       Cluster      Cluster          up   9000  auto/100000
healthy false

Node: cluster1-04

Ignore
                                                  Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- -----------
-------- ------
e0a       Cluster      Cluster          up   9000  auto/100000
healthy false
e0d       Cluster      Cluster          up   9000  auto/100000
healthy false
8 entries were displayed.
```

b. Verify the switch health from the cluster (this might not show switch cs2, since LIFs are not homed on

e0d).

```
cluster1::*> network device-discovery show -protocol cdp
Node/       Local  Discovered
Protocol    Port   Device (LLDP: ChassisID)  Interface
Platform
----------- ------ ------------------------- -----------------
--------
cluster1-01/cdp
            e0a    cs1                       Ethernet1/7       N3K-
C3232C
            e0d    cs2                       Ethernet1/7       N3K-
C3232C
cluster01-2/cdp
            e0a    cs1                       Ethernet1/8       N3K-
C3232C
            e0d    cs2                       Ethernet1/8       N3K-
C3232C
cluster01-3/cdp
            e0a    cs1                       Ethernet1/1/1     N3K-
C3232C
            e0b    cs2                       Ethernet1/1/1     N3K-
C3232C
cluster1-04/cdp
            e0a    cs1                       Ethernet1/1/2     N3K-
C3232C
            e0b    cs2                       Ethernet1/1/2     N3K-
C3232C

cluster1::*> system cluster-switch show -is-monitoring-enabled
-operational true
Switch                       Type               Address          Model
---------------------------- ------------------ ---------------- -----
cs1                          cluster-network    10.233.205.90    N3K-
C3232C
     Serial Number: FOXXXXXXXGD
      Is Monitored: true
            Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(4)
    Version Source: CDP

cs2                          cluster-network    10.233.205.91    N3K-
C3232C
     Serial Number: FOXXXXXXXGS
```

```
      Is Monitored: true
            Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(4)
    Version Source: CDP

2 entries were displayed.
```

You might observe the following output on the cs1 switch console depending on the RCF version previously loaded on the switch

```
2020 Nov 17 16:07:18 cs1 %$ VDC-1 %$ %STP-2-
UNBLOCK_CONSIST_PORT: Unblocking port port-channel1 on
VLAN0092. Port consistency restored.
2020 Nov 17 16:07:23 cs1 %$ VDC-1 %$ %STP-2-BLOCK_PVID_PEER:
Blocking port-channel1 on VLAN0001. Inconsistent peer vlan.
2020 Nov 17 16:07:23 cs1 %$ VDC-1 %$ %STP-2-BLOCK_PVID_LOCAL:
Blocking port-channel1 on VLAN0092. Inconsistent local vlan.
```

16. On cluster switch cs1, shut down the ports connected to the cluster ports of the nodes.

    The following example uses the interface example output from step 1:

```
cs1(config)# interface eth1/1/1-2,eth1/7-8
cs1(config-if-range)# shutdown
```

17. Verify that the cluster LIFs have migrated to the ports hosted on switch cs2. This might take a few seconds. `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
            cluster1-01_clus1  up/up      169.254.3.4/23     cluster1-01
e0d     false
            cluster1-01_clus2  up/up      169.254.3.5/23     cluster1-01
e0d     true
            cluster1-02_clus1  up/up      169.254.3.8/23     cluster1-02
e0d     false
            cluster1-02_clus2  up/up      169.254.3.9/23     cluster1-02
e0d     true
            cluster1-03_clus1  up/up      169.254.1.3/23     cluster1-03
e0b     false
            cluster1-03_clus2  up/up      169.254.1.1/23     cluster1-03
e0b     true
            cluster1-04_clus1  up/up      169.254.1.6/23     cluster1-04
e0b     false
            cluster1-04_clus2  up/up      169.254.1.7/23     cluster1-04
e0b     true
8 entries were displayed.
cluster1::*>
```

18. Verify that the cluster is healthy: `cluster show`

```
cluster1::*> cluster show
Node                 Health   Eligibility   Epsilon
-------------------- -------- ------------- -------
cluster1-01          true     true          false
cluster1-02          true     true          false
cluster1-03          true     true          true
cluster1-04          true     true          false
4 entries were displayed.
cluster1::*>
```

19. Repeat Steps 7 to 14 on switch cs1.
20. Enable auto-revert on the cluster LIFs.

```
cluster1::*> network interface modify -vserver Cluster -lif \* -auto
-revert True
```

21. Reboot switch cs1.You do this to trigger the cluster LIFs to revert to their home ports. You can ignore the "cluster ports down" events reported on the nodes while the switch reboots.

```
cs1# reload
This command will reboot the system. (y/n)?  [n] y
```

22. Verify that the switch ports connected to the cluster ports are up.

```
cs1# show interface brief \| grep up
.
.
Eth1/1/1      1       eth  access up      none                    10G(D)
--
Eth1/1/2      1       eth  access up      none                    10G(D)
--
Eth1/7        1       eth  trunk  up      none                   100G(D)
--
Eth1/8        1       eth  trunk  up      none                   100G(D)
--
.
.
```

23. Verify that the ISL between cs1 and cs2 is functional: `show port-channel summary`

```
cs1# show port-channel summary
Flags:  D - Down        P - Up in port-channel (members)
        I - Individual  H - Hot-standby (LACP only)
        s - Suspended   r - Module-removed
        b - BFD Session Wait
        S - Switched    R - Routed
        U - Up (port-channel)
        p - Up in delay-lacp mode (member)
        M - Not in use. Min-links not met
--------------------------------------------------------------------------
--------
Group Port-       Type     Protocol  Member Ports
      Channel
--------------------------------------------------------------------------
--------
1     Po1(SU)     Eth      LACP      Eth1/31(P)   Eth1/32(P)
cs1#
```

24. Verify that the cluster LIFs have reverted to their home port: `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
            cluster1-01_clus1  up/up      169.254.3.4/23     cluster1-01
e0d     true
            cluster1-01_clus2  up/up      169.254.3.5/23     cluster1-01
e0d     true
            cluster1-02_clus1  up/up      169.254.3.8/23     cluster1-02
e0d     true
            cluster1-02_clus2  up/up      169.254.3.9/23     cluster1-02
e0d     true
            cluster1-03_clus1  up/up      169.254.1.3/23     cluster1-03
e0b     true
            cluster1-03_clus2  up/up      169.254.1.1/23     cluster1-03
e0b     true
            cluster1-04_clus1  up/up      169.254.1.6/23     cluster1-04
e0b     true
            cluster1-04_clus2  up/up      169.254.1.7/23     cluster1-04
e0b     true
8 entries were displayed.
cluster1::*>
```

25. Verify that the cluster is healthy: `cluster show`

```
cluster1::*> cluster show
Node                 Health  Eligibility   Epsilon
-------------------- ------- ------------- -------
cluster1-01          true    true          false
cluster1-02          true    true          false
cluster1-03          true    true          true
cluster1-04          true    true          false
4 entries were displayed.
cluster1::*>
```

26. Ping the remote cluster interfaces to verify connectivity: `cluster ping-cluster -node local`

```
cluster1::*> cluster ping-cluster -node local
Host is cluster1-03
Getting addresses from network interface table...
Cluster cluster1-03_clus1 169.254.1.3 cluster1-03 e0a
Cluster cluster1-03_clus2 169.254.1.1 cluster1-03 e0b
Cluster cluster1-04_clus1 169.254.1.6 cluster1-04 e0a
Cluster cluster1-04_clus2 169.254.1.7 cluster1-04 e0b
Cluster cluster1-01_clus1 169.254.3.4 cluster1-01 e0a
Cluster cluster1-01_clus2 169.254.3.5 cluster1-01 e0d
Cluster cluster1-02_clus1 169.254.3.8 cluster1-02 e0a
Cluster cluster1-02_clus2 169.254.3.9 cluster1-02 e0d
Local = 169.254.1.3 169.254.1.1
Remote = 169.254.1.6 169.254.1.7 169.254.3.4 169.254.3.5 169.254.3.8
169.254.3.9
Cluster Vserver Id = 4294967293
Ping status:
............
Basic connectivity succeeds on 12 path(s)
Basic connectivity fails on 0 path(s)
................................................
Detected 9000 byte MTU on 12 path(s):
    Local 169.254.1.3 to Remote 169.254.1.6
    Local 169.254.1.3 to Remote 169.254.1.7
    Local 169.254.1.3 to Remote 169.254.3.4
    Local 169.254.1.3 to Remote 169.254.3.5
    Local 169.254.1.3 to Remote 169.254.3.8
    Local 169.254.1.3 to Remote 169.254.3.9
    Local 169.254.1.1 to Remote 169.254.1.6
    Local 169.254.1.1 to Remote 169.254.1.7
    Local 169.254.1.1 to Remote 169.254.3.4
    Local 169.254.1.1 to Remote 169.254.3.5
    Local 169.254.1.1 to Remote 169.254.3.8
    Local 169.254.1.1 to Remote 169.254.3.9
Larger than PMTU communication succeeds on 12 path(s)
RPC status:
6 paths up, 0 paths down (tcp check)
6 paths up, 0 paths down (udp check)
```

Migrate from a Cisco Nexus 5596 switch to a Cisco Nexus 3232C switch

You must be aware of certain configuration information, port connections and cabling requirements when you are replacing Cisco Nexus 5596 cluster switches with Cisco Nexus 3232C cluster switches.

- The following cluster switches are used as examples in this procedure:
  - Nexus 5596
  - Nexus 3232C
- The cluster switches use the following ports for connections to nodes:
  - Ports e1/1-40 (10 GbE): Nexus 5596
  - Ports e1/1-30 (10/40/100 GbE): Nexus 3232C
- The cluster switches use the following Inter-Switch Link (ISL) ports:
  - Ports e1/41-48 (10 GbE): Nexus 5596
  - Ports e1/31-32 (40/100 GbE): Nexus 3232C
- The *Hardware Universe* contains information about supported cabling to Nexus 3232C switches:
  - Nodes with 10 GbE cluster connections require QSFP to SFP+ optical fiber breakout cables or QSFP to SFP+ copper breakout cables.
  - Nodes with 40/100 GbE cluster connections require supported QSFP/QSFP28 optical modules with fiber cables or QSFP/QSFP28 copper direct-attach cables.
- The cluster switches use the appropriate ISL cabling:
  - Beginning: Nexus 5596 (SFP+ to SFP+)
    - 8x SFP+ fiber or copper direct-attach cables
  - Interim: Nexus 5596 to Nexus 3232C (QSFP to 4xSFP+ break-out)
    - 1x QSFP to SFP+ fiber break-out or copper break-out cables
  - Final: Nexus 3232C to Nexus 3232C (QSFP28 to QSFP28)
    - 2x QSFP28 fiber or copper direct-attach cables
- On Nexus 3232C switches, you can operate QSFP/QSFP28 ports in either 40/100 Gigabit Ethernet or 4 x10 Gigabit Ethernet modes.

  By default, there are 32 ports in the 40/100 Gigabit Ethernet mode. These 40 Gigabit Ethernet ports are numbered in a 2-tuple naming convention. For example, the second 40 Gigabit Ethernet port is numbered as 1/2. The process of changing the configuration from 40 Gigabit Ethernet to 10 Gigabit Ethernet is called *breakout* and the process of changing the configuration from 10 Gigabit Ethernet to 40 Gigabit Ethernet is called *breakin*. When you break out a 40/100 Gigabit Ethernet port into 10 Gigabit Ethernet ports, the resulting ports are numbered using a 3-tuple naming convention. For example, the break-out ports of the second 40/100 Gigabit Ethernet port are numbered as 1/2/1, 1/2/2, 1/2/3, and 1/2/4.

- On the left side of Nexus 3232C switches are 2 SFP+ ports, called 1/33 and 1/34.
- You have configured some of the ports on Nexus 3232C switches to run at 10 GbE or 40/100 GbE.

  You can break out the first six ports into 4x10 GbE mode by using the `interface breakout module 1 port 1-6 map 10g-4x` command. Similarly, you can regroup the first six QSFP+ ports from breakout configuration by using the `no interface breakout module 1 port 1-6 map 10g-4x` command.

- You have done the planning, migration, and read the required documentation on 10 GbE and 40/100 GbE connectivity from nodes to Nexus 3232C cluster switches.
- The ONTAP and NX-OS versions supported in this procedure are on the Cisco Ethernet Switches page.

How to migrate from a Cisco Nexus 5596 cluster switch to a Cisco Nexus 3232C cluster switch

To replace existing Cisco Nexus 5596 cluster switches in a cluster with Nexus 3232C cluster switches, you must perform a specific sequence of tasks.

About this task

The examples in this procedure describe replacing Cisco Nexus 5596 switches with Cisco Nexus 3232C switches. You can use these steps (with modifications) for other older Cisco switches (for example, 3132Q-V). The procedure also uses the following switch and node nomenclature:

- The command outputs might vary depending on different releases of ONTAP.
- The Nexus 5596 switches to be replaced are CL1 and CL2.
- The Nexus 3232C switches to replace the Nexus 5596 switches are C1 and C2.
- n1_clus1 is the first cluster logical interface (LIF) connected to cluster switch 1 (CL1 or C1) for node n1.
- n1_clus2 is the first cluster LIF connected to cluster switch 2 (CL2 or C2) for node n1.
- n1_clus3 is the second LIF connected to cluster switch 2 (CL2 or C2) for node n1.
- n1_clus4 is the second LIF connected to cluster switch 1 (CL1 or C1) for node n1.-
- The number of 10 GbE and 40/100 GbE ports are defined in the reference configuration files (RCFs) available on the Cisco® Cluster Network Switch Reference Configuration File Download page.
- The nodes are n1, n2, n3, and n4.

The examples in this procedure use four nodes: Two nodes use four 10 GbE cluster interconnect ports: e0a, e0b, e0c, and e0d. The other two nodes use two 40 GbE cluster interconnect ports: e4a, e4e. The *Hardware Universe* lists the actual cluster ports on your platforms.

This procedure covers the following scenarios:

- The cluster starts with two nodes connected and functioning in a two Nexus 5596 cluster switches.
- The cluster switch CL2 to be replaced by C2 (steps 1 to 19):
  - Traffic on all cluster ports and LIFs on all nodes connected to CL2 are migrated onto the first cluster ports and LIFs connected to CL1.
  - Disconnect cabling from all cluster ports on all nodes connected to CL2, and then use supported break-out cabling to reconnect the ports to new cluster switch C2.
  - Disconnect cabling between ISL ports between CL1 and CL2, and then use supported break-out cabling to reconnect the ports from CL1 to C2.
  - Traffic on all cluster ports and LIFs connected to C2 on all nodes is reverted.
- The cluster switch CL2 to be replaced by C2 (steps 20 to 33)
  - Traffic on all cluster ports or LIFs on all nodes connected to CL1 are migrated onto the second cluster ports or LIFs connected to C2.
  - Disconnect cabling from all cluster port on all nodes connected to CL1 and reconnect, using supported break-out cabling, to new cluster switch C1.
  - Disconnect cabling between ISL ports between CL1 and C2, and reconnect using supported cabling, from C1 to C2.

- Traffic on all cluster ports or LIFs connected to C1 on all nodes is reverted.

- Two FAS9000 nodes have been added to cluster with examples showing cluster details (steps 34 to 37).

The procedure requires the use of both ONTAP commands and Cisco Nexus 3000 Series Switches commands; ONTAP commands are used unless otherwise indicated.

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. Display information about the devices in your configuration:

   `network device-discovery show`

   The following example shows how many cluster interconnect interfaces have been configured in each node for each cluster interconnect switch:

```
cluster::> network device-discovery show
            Local  Discovered
Node        Port   Device               Interface         Platform
----------- ------ ------------------ ---------------- ----------------
n1         /cdp
            e0a    CL1                  Ethernet1/1      N5K-C5596UP
            e0b    CL2                  Ethernet1/1      N5K-C5596UP
            e0c    CL2                  Ethernet1/2      N5K-C5596UP
            e0d    CL1                  Ethernet1/2      N5K-C5596UP
n2         /cdp
            e0a    CL1                  Ethernet1/3      N5K-C5596UP
            e0b    CL2                  Ethernet1/3      N5K-C5596UP
            e0c    CL2                  Ethernet1/4      N5K-C5596UP
            e0d    CL1                  Ethernet1/4      N5K-C5596UP
8 entries were displayed.
```

3. Determine the administrative or operational status for each cluster interface:

   a. Display the network port attributes:

      `network port show -role cluster`

      The following example displays the network port attributes on nodes n1 and n2:

```
cluster::*> network port show -role cluster
  (network port show)
Node: n1

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

Node: n2

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

b. Display information about the logical interfaces:

```
network interface show -role cluster
```

The following example displays the general information about all of the LIFs on the cluster, including their current ports:

```
cluster::*> network interface show -role cluster
 (network interface show)
            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node
Port    Home
----------- ---------- ---------- ------------------ -------------
------- ----
Cluster
            n1_clus1   up/up      10.10.0.1/24       n1
e0a     true
            n1_clus2   up/up      10.10.0.2/24       n1
e0b     true
            n1_clus3   up/up      10.10.0.3/24       n1
e0c     true
            n1_clus4   up/up      10.10.0.4/24       n1
e0d     true
            n2_clus1   up/up      10.10.0.5/24       n2
e0a     true
            n2_clus2   up/up      10.10.0.6/24       n2
e0b     true
            n2_clus3   up/up      10.10.0.7/24       n2
e0c     true
            n2_clus4   up/up      10.10.0.8/24       n2
e0d     true
8 entries were displayed.
```

c. Display information about the discovered cluster switches:

   `system cluster-switch show`

   The following example shows the active cluster switches:

```
cluster::*> system cluster-switch show

Switch                        Type               Address
Model
----------------------------- ------------------ ---------------
---------------
CL1                           cluster-network    10.10.1.101
NX5596
     Serial Number: 01234567
      Is Monitored: true
            Reason:
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    7.1(1)N1(1)
    Version Source: CDP
CL2                           cluster-network    10.10.1.102
NX5596
     Serial Number: 01234568
      Is Monitored: true
            Reason:
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    7.1(1)N1(1)
    Version Source: CDP

2 entries were displayed.
```

4. Verify that the appropriate RCF and image are installed on the new 3232C switches as necessary for your requirements, and make the essential site customizations, such as users and passwords, network addresses, and other customizations.

   You must prepare both switches at this time.

   If you need to upgrade the RCF and image, you must complete the following steps:

   a. Go to the *Cisco Ethernet Switches* page on the NetApp Support Site.

      Cisco Ethernet Switches

   b. Note your switch and the required software versions in the table on that page.
   c. Download the appropriate version of the RCF.
   d. Click **CONTINUE** on the **Description** page, accept the license agreement, and then follow the instructions on the **Download** page to download the RCF.
   e. Download the appropriate version of the image software.

      See the *ONTAP 8.x or later Cluster and Management Network Switch Reference Configuration Files* Download page, and then click the appropriate version.

To find the correct version, see the *ONTAP 8.x or later Cluster Network Switch Download page*.

5. Migrate the LIFs associated with the second Nexus 5596 switch to be replaced:

   `network interface migrate -vserver Cluster -lif` *`lif-name`* `-source-node` *`source-node-name`* `– destination-node` *`node-name`* `-destination-port` *`destination-port-name`*

   The following example shows the LIFs being migrated for nodes n1 and n2; LIF migration must be done on all of the nodes:

   ```
   cluster::*> network interface migrate -vserver Cluster -lif n1_clus2
   -source-node n1 –
   destination-node n1 -destination-port e0a
   cluster::*> network interface migrate -vserver Cluster -lif n1_clus3
   -source-node n1 –
   destination-node n1 -destination-port e0d
   cluster::*> network interface migrate -vserver Cluster -lif n2_clus2
   -source-node n2 –
   destination-node n2 -destination-port e0a
   cluster::*> network interface migrate -vserver Cluster -lif n2_clus3
   -source-node n2 –
   destination-node n2 -destination-port e0d
   ```

6. Verify the cluster's health:

   `network interface show -role cluster`

   The following example shows the current status of each cluster:

```
cluster::*> network interface show -role cluster
 (network interface show)
            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node          Port
Home
----------- ---------- ---------- ------------------ -------------
------- ----
Cluster
            n1_clus1   up/up      10.10.0.1/24       n1            e0a
true
            n1_clus2   up/up      10.10.0.2/24       n1            e0a
false
            n1_clus3   up/up      10.10.0.3/24       n1            e0d
false
            n1_clus4   up/up      10.10.0.4/24       n1            e0d
true
            n2_clus1   up/up      10.10.0.5/24       n2            e0a
true
            n2_clus2   up/up      10.10.0.6/24       n2            e0a
false
            n2_clus3   up/up      10.10.0.7/24       n2            e0d
false
            n2_clus4   up/up      10.10.0.8/24       n2            e0d
true
8 entries were displayed.
```

7. Shut down the cluster interconnect ports that are physically connected to switch CL2:

   `network port modify -node` *`node-name`* `-port` *`port-name`* `-up-admin false`

   The following commands shut down the specified ports on n1 and n2, but the ports must be shut down on all nodes:

```
cluster::*> network port modify -node n1 -port e0b -up-admin false
cluster::*> network port modify -node n1 -port e0c -up-admin false
cluster::*> network port modify -node n2 -port e0b -up-admin false
cluster::*> network port modify -node n2 -port e0c -up-admin false
```

8. Ping the remote cluster interfaces and perform an RPC server check:

   `cluster ping-cluster -node` *`node-name`*

   The following example shows node n1 being pinged and the RPC status indicated afterward:

```
cluster::*> cluster ping-cluster -node n1
Host is n1
Getting addresses from network interface table...
Cluster n1_clus1 n1     e0a 10.10.0.1
Cluster n1_clus2 n1     e0b 10.10.0.2
Cluster n1_clus3 n1     e0c 10.10.0.3
Cluster n1_clus4 n1     e0d 10.10.0.4
Cluster n2_clus1 n2     e0a 10.10.0.5
Cluster n2_clus2 n2     e0b 10.10.0.6
Cluster n2_clus3 n2     e0c 10.10.0.7
Cluster n2_clus4 n2     e0d 10.10.0.8

Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 16 path(s)
Basic connectivity fails on 0 path(s)
................
Detected 1500 byte MTU on 16 path(s):
    Local 10.10.0.1 to Remote 10.10.0.5
    Local 10.10.0.1 to Remote 10.10.0.6
    Local 10.10.0.1 to Remote 10.10.0.7
    Local 10.10.0.1 to Remote 10.10.0.8
    Local 10.10.0.2 to Remote 10.10.0.5
    Local 10.10.0.2 to Remote 10.10.0.6
    Local 10.10.0.2 to Remote 10.10.0.7
    Local 10.10.0.2 to Remote 10.10.0.8
    Local 10.10.0.3 to Remote 10.10.0.5
    Local 10.10.0.3 to Remote 10.10.0.6
    Local 10.10.0.3 to Remote 10.10.0.7
    Local 10.10.0.3 to Remote 10.10.0.8
    Local 10.10.0.4 to Remote 10.10.0.5
    Local 10.10.0.4 to Remote 10.10.0.6
    Local 10.10.0.4 to Remote 10.10.0.7
    Local 10.10.0.4 to Remote 10.10.0.8
Larger than PMTU communication succeeds on 16 path(s)
RPC status:
4 paths up, 0 paths down (tcp check)
4 paths up, 0 paths down (udp check
```

9. Shut down ISLs 41 through 48 on CL1, the active Nexus 5596 switch using the Cisco `shutdown` command.

For more information on Cisco commands, see the appropriate guide in the Cisco Nexus 3000 Series NX-OS Command References.

The following example shows ISLs 41 through 48 being shut down on the Nexus 5596 switch CL1:

```
(CL1)# configure
(CL1)(Config)# interface e1/41-48
(CL1)(config-if-range)# shutdown
(CL1)(config-if-range)# exit
(CL1)(Config)# exit
(CL1)#
```

10. Build a temporary ISL between CL1 and C2 using the appropriate Cisco commands.

    For more information on Cisco commands, see the appropriate guide in the Cisco Nexus 3000 Series NX-OS Command References.

    The following example shows a temporary ISL being set up between CL1 and C2:

```
C2# configure
C2(config)# interface port-channel 2
C2(config-if)# switchport mode trunk
C2(config-if)# spanning-tree port type network
C2(config-if)# mtu 9216
C2(config-if)# interface breakout module 1 port 24 map 10g-4x
C2(config)# interface e1/24/1-4
C2(config-if-range)# switchport mode trunk
C2(config-if-range)# mtu 9216
C2(config-if-range)# channel-group 2 mode active
C2(config-if-range)# exit
C2(config-if)# exit
```

11. On all nodes, remove all cables attached to the Nexus 5596 switch CL2.

    With supported cabling, reconnect disconnected ports on all nodes to the Nexus 3232C switch C2.

12. Remove all the cables from the Nexus 5596 switch CL2.

    Attach the appropriate Cisco QSFP to SFP+ break-out cables connecting port 1/24 on the new Cisco 3232C switch, C2, to ports 45 to 48 on existing Nexus 5596, CL1.

13. Bring up ISLs ports 45 through 48 on the active Nexus 5596 switch CL1.

    For more information on Cisco commands, see the appropriate guide in the Cisco Nexus 3000 Series NX-OS Command References.

    The following example shows ISLs ports 45 through 48 being brought up:

```
(CL1)# configure
(CL1)(Config)# interface e1/45-48
(CL1)(config-if-range)# no shutdown
(CL1)(config-if-range)# exit
(CL1)(Config)# exit
(CL1)#
```

14. Verify that the ISLs are `up` on the Nexus 5596 switch CL1.

    For more information on Cisco commands, see the appropriate guide in the Cisco Nexus 3000 Series NX-OS Command References.

    The following example shows Ports eth1/45 through eth1/48 indicating (P), meaning that the ISL ports are `up` in the port-channel.

```
CL1# show port-channel summary
Flags: D - Down         P - Up in port-channel (members)
       I - Individual   H - Hot-standby (LACP only)
       s - Suspended    r - Module-removed
       S - Switched     R - Routed
       U - Up (port-channel)
       M - Not in use. Min-links not met
--------------------------------------------------------------------------
--------
Group Port-        Type   Protocol  Member Ports
      Channel
--------------------------------------------------------------------------
--------
1     Po1(SU)      Eth    LACP      Eth1/41(D)   Eth1/42(D)   Eth1/43(D)
                                    Eth1/44(D)   Eth1/45(P)   Eth1/46(P)
                                    Eth1/47(P)   Eth1/48(P)
```

15. Verify that interfaces eth1/45-48 already have `channel-group 1 mode active`in their running configuration.
16. On all nodes, bring up all the cluster interconnect ports connected to the 3232C switch C2:

    `network port modify -node` *`node-name`* `-port` *`port-name`* `-up-admin true`

    The following example shows the specified ports being brought up on nodes n1 and n2:

```
cluster::*> network port modify -node n1 -port e0b -up-admin true
cluster::*> network port modify -node n1 -port e0c -up-admin true
cluster::*> network port modify -node n2 -port e0b -up-admin true
cluster::*> network port modify -node n2 -port e0c -up-admin true
```

17. On all nodes, revert all of the migrated cluster interconnect LIFs connected to C2:

    `network interface revert -vserver Cluster -lif` *`lif-name`*

    The following example shows the migrated cluster LIFs being reverted to their home ports:

```
cluster::*> network interface revert -vserver Cluster -lif n1_clus2
cluster::*> network interface revert -vserver Cluster -lif n1_clus3
cluster::*> network interface revert -vserver Cluster -lif n2_clus2
cluster::*> network interface revert -vserver Cluster -lif n2_clus3
```

18. Verify all the cluster interconnect ports are now reverted to their home:

    `network interface show -role cluster`

    The following example shows that the LIFs on clus2 reverted to their home ports and shows that the LIFs are successfully reverted if the ports in the Current Port column have a status of `true` in the `Is Home` column. If the `Is Home` value is `false`, the LIF has not been reverted.

```
cluster::*> network interface show -role cluster
(network interface show)
            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node          Port
Home
----------- ---------- ---------- ------------------ -------------
------- ----
Cluster
            n1_clus1   up/up      10.10.0.1/24       n1            e0a
true
            n1_clus2   up/up      10.10.0.2/24       n1            e0b
true
            n1_clus3   up/up      10.10.0.3/24       n1            e0c
true
            n1_clus4   up/up      10.10.0.4/24       n1            e0d
true
            n2_clus1   up/up      10.10.0.5/24       n2            e0a
true
            n2_clus2   up/up      10.10.0.6/24       n2            e0b
true
            n2_clus3   up/up      10.10.0.7/24       n2            e0c
true
            n2_clus4   up/up      10.10.0.8/24       n2            e0d
true
8 entries were displayed.
```

19. Verify that the clustered ports are connected:

    `network port show -role cluster`

    The following example shows the result of the previous `network port modify` command, verifying that all the cluster interconnects are `up`:

```
cluster::*> network port show -role cluster
  (network port show)
Node: n1

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

Node: n2

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

20. Ping the remote cluster interfaces and perform an RPC server check:

    `cluster ping-cluster -node node-name`

    The following example shows node n1 being pinged and the RPC status indicated afterward:

```
cluster::*> cluster ping-cluster -node n1
Host is n1
Getting addresses from network interface table...
Cluster n1_clus1 n1     e0a 10.10.0.1
Cluster n1_clus2 n1     e0b 10.10.0.2
Cluster n1_clus3 n1     e0c 10.10.0.3
Cluster n1_clus4 n1     e0d 10.10.0.4
Cluster n2_clus1 n2     e0a 10.10.0.5
Cluster n2_clus2 n2     e0b 10.10.0.6
Cluster n2_clus3 n2     e0c 10.10.0.7
Cluster n2_clus4 n2     e0d 10.10.0.8

Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 16 path(s)
Basic connectivity fails on 0 path(s)
................
Detected 1500 byte MTU on 16 path(s):
    Local 10.10.0.1 to Remote 10.10.0.5
    Local 10.10.0.1 to Remote 10.10.0.6
    Local 10.10.0.1 to Remote 10.10.0.7
    Local 10.10.0.1 to Remote 10.10.0.8
    Local 10.10.0.2 to Remote 10.10.0.5
    Local 10.10.0.2 to Remote 10.10.0.6
    Local 10.10.0.2 to Remote 10.10.0.7
    Local 10.10.0.2 to Remote 10.10.0.8
    Local 10.10.0.3 to Remote 10.10.0.5
    Local 10.10.0.3 to Remote 10.10.0.6
    Local 10.10.0.3 to Remote 10.10.0.7
    Local 10.10.0.3 to Remote 10.10.0.8
    Local 10.10.0.4 to Remote 10.10.0.5
    Local 10.10.0.4 to Remote 10.10.0.6
    Local 10.10.0.4 to Remote 10.10.0.7
    Local 10.10.0.4 to Remote 10.10.0.8
Larger than PMTU communication succeeds on 16 path(s)
RPC status:
4 paths up, 0 paths down (tcp check)
4 paths up, 0 paths down (udp check)
```

21. On each node in the cluster, migrate the interfaces associated with the first Nexus 5596 switch, CL1, to be replaced:

`network interface migrate -vserver Cluster -lif` *`lif-name`* `-source-node` *`source-node-name`* `- destination-node` *`destination-node-name`* `-destination-port` *`destination-port-name`*

The following example shows the ports or LIFs being migrated on nodes n1 and n2:

```
cluster::*> network interface migrate -vserver Cluster -lif n1_clus1
-source-node n1 -
destination-node n1 -destination-port e0b
cluster::*> network interface migrate -vserver Cluster -lif n1_clus4
-source-node n1 -
destination-node n1 -destination-port e0c
cluster::*> network interface migrate -vserver Cluster -lif n2_clus1
-source-node n2 -
destination-node n2 -destination-port e0b
cluster::*> network interface migrate -vserver Cluster -lif n2_clus4
-source-node n2 -
destination-node n2 -destination-port e0c
```

22. Verify the cluster's status:

    `network interface show`

    The following example shows that the required cluster LIFs have been migrated to appropriate cluster ports hosted on cluster switch, C2:

```
cluster::*> network interface show

            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node          Port
Home
----------- ---------- ---------- ------------------ -------------
------- ----
Cluster
            n1_clus1   up/up      10.10.0.1/24       n1            e0b
false
            n1_clus2   up/up      10.10.0.2/24       n1            e0b
true
            n1_clus3   up/up      10.10.0.3/24       n1            e0c
true
            n1_clus4   up/up      10.10.0.4/24       n1            e0c
false
            n2_clus1   up/up      10.10.0.5/24       n2            e0b
false
            n2_clus2   up/up      10.10.0.6/24       n2            e0b
true
            n2_clus3   up/up      10.10.0.7/24       n2            e0c
true
            n2_clus4   up/up      10.10.0.8/24       n2            e0c
false
8 entries were displayed.

----- ------- ----
```

23. On all the nodes, shut down the node ports that are connected to CL1:

    `network port modify -node` *`node-name`* `-port` *`port-name`* `-up-admin false`

    The following example shows the specified ports being shut down on nodes n1 and n2:

```
cluster::*> network port modify -node n1 -port e0a -up-admin false
cluster::*> network port modify -node n1 -port e0d -up-admin false
cluster::*> network port modify -node n2 -port e0a -up-admin false
cluster::*> network port modify -node n2 -port e0d -up-admin false
```

24. Shut down ISL 24, 31 and 32 on the active 3232C switch C2.

    For more information on Cisco commands, see the appropriate guide in the Cisco Nexus 3000 Series NX-OS Command References.

    The following example shows ISLs being shutdown:

```
C2# configure
C2(Config)# interface e1/24/1-4
C2(config-if-range)# shutdown
C2(config-if-range)# exit
C2(config)# interface 1/31-32
C2(config-if-range)# shutdown
C2(config-if-range)# exit
C2(config-if)# exit
C2#
```

25. On all nodes, remove all cables attached to the Nexus 5596 switch CL1.

    With supported cabling, reconnect disconnected ports on all nodes to the Nexus 3232C switch C1.

26. Remove the QSFP breakout cable from Nexus 3232C C2 ports e1/24.

    Connect ports e1/31 and e1/32 on C1 to ports e1/31 and e1/32 on C2 using supported Cisco QSFP optical fiber or direct-attach cables.

27. Restore the configuration on port 24 and remove the temporary Port Channel 2 on C2.

    For more information on Cisco commands, see the appropriate guide in the Cisco Nexus 3000 Series NX-OS Command References.

    The following example shows the configuration on port m24 being restored using the appropriate Cisco commands:

```
C2# configure
C2(config)# no interface breakout module 1 port 24 map 10g-4x
C2(config)# no interface port-channel 2
C2(config-if)# int e1/24
C2(config-if)# description 40GbE Node Port
C2(config-if)# spanning-tree port type edge
C2(config-if)# spanning-tree bpduguard enable
C2(config-if)# mtu 9216
C2(config-if-range)# exit
C2(config)# exit
C2# copy running-config startup-config
[########################################] 100%
Copy Complete.
```

28. Bring up ISL ports 31 and 32 on C2, the active 3232C switch, by entering the following Cisco command: `no shutdown`

    For more information on Cisco commands, see the appropriate guide in the Cisco Nexus 3000 Series NX-OS Command References.

The following example shows the Cisco commands `switchname configure` brought up on the 3232C switch C2:

```
C2# configure
C2(config)# interface ethernet 1/31-32
C2(config-if-range)# no shutdown
```

29. Verify that the ISL connections are `up` on the 3232C switch C2.

    For more information on Cisco commands, see the appropriate guide in the Cisco Nexus 3000 Series NX-OS Command References.

    Ports eth1/31 and eth1/32 should indicate (P) meaning that both ISL ports up in the port-channel

```
C1# show port-channel summary
Flags: D - Down         P - Up in port-channel (members)
       I - Individual   H - Hot-standby (LACP only)
       s - Suspended    r - Module-removed
       S - Switched     R - Routed
       U - Up (port-channel)
       M - Not in use. Min-links not met
--------------------------------------------------------------------------
--------
Group Port-        Type   Protocol  Member Ports
      Channel
--------------------------------------------------------------------------
--------
1     Po1(SU)      Eth    LACP      Eth1/31(P)   Eth1/32(P)
```

30. On all nodes, bring up all the cluster interconnect ports connected to the new 3232C switch C1: `network port modify`

    The following example shows all the cluster interconnect ports being brought up for n1 and n2 on the 3232C switch C1:

```
cluster::*> network port modify -node n1 -port e0a -up-admin true
cluster::*> network port modify -node n1 -port e0d -up-admin true
cluster::*> network port modify -node n2 -port e0a -up-admin true
cluster::*> network port modify -node n2 -port e0d -up-admin true
```

31. Verify the status of the cluster node port:

    `network port show`

    The following example shows verifies that all cluster interconnect ports on all nodes on the new 3232C switch C1 are up:

```
cluster::*> network port show -role cluster
  (network port show)
Node: n1

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

Node: n2

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

32. On all nodes, revert the specific cluster LIFs to their home ports:

    `network interface revert -server Cluster -lif` *`lif-name`*

    The following example shows the specific cluster LIFs being reverted to their home ports on nodes n1 and n2:

```
cluster::*> network interface revert -vserver Cluster -lif n1_clus1
cluster::*> network interface revert -vserver Cluster -lif n1_clus4
cluster::*> network interface revert -vserver Cluster -lif n2_clus1
cluster::*> network interface revert -vserver Cluster -lif n2_clus4
```

33. Verify that the interface is home:

```
network interface show -role cluster
```

The following example shows the status of cluster interconnect interfaces are `up` and `Is Home` for n1 and n2:

```
cluster::*> network interface show -role cluster
 (network interface show)
            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node          Port
Home
----------- ---------- ---------- ------------------ -------------
------- ----
Cluster
            n1_clus1   up/up      10.10.0.1/24       n1            e0a
true
            n1_clus2   up/up      10.10.0.2/24       n1            e0b
true
            n1_clus3   up/up      10.10.0.3/24       n1            e0c
true
            n1_clus4   up/up      10.10.0.4/24       n1            e0d
true
            n2_clus1   up/up      10.10.0.5/24       n2            e0a
true
            n2_clus2   up/up      10.10.0.6/24       n2            e0b
true
            n2_clus3   up/up      10.10.0.7/24       n2            e0c
true
            n2_clus4   up/up      10.10.0.8/24       n2            e0d
true
8 entries were displayed.
```

34. Ping the remote cluster interfaces and perform an RPC server check:

```
cluster ping-cluster -node node-name
```

The following example shows node n1 being pinged and the RPC status indicated afterward:

```
cluster::*> cluster ping-cluster -node n1
Host is n1
Getting addresses from network interface table...
Cluster n1_clus1 n1     e0a 10.10.0.1
Cluster n1_clus2 n1     e0b 10.10.0.2
Cluster n1_clus3 n1     e0c 10.10.0.3
Cluster n1_clus4 n1     e0d 10.10.0.4
Cluster n2_clus1 n2     e0a 10.10.0.5
Cluster n2_clus2 n2     e0b 10.10.0.6
Cluster n2_clus3 n2     e0c 10.10.0.7
Cluster n2_clus4 n2     e0d 10.10.0.8

Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 16 path(s)
Basic connectivity fails on 0 path(s)
................
Detected 1500 byte MTU on 16 path(s):
    Local 10.10.0.1 to Remote 10.10.0.5
    Local 10.10.0.1 to Remote 10.10.0.6
    Local 10.10.0.1 to Remote 10.10.0.7
    Local 10.10.0.1 to Remote 10.10.0.8
    Local 10.10.0.2 to Remote 10.10.0.5
    Local 10.10.0.2 to Remote 10.10.0.6
    Local 10.10.0.2 to Remote 10.10.0.7
    Local 10.10.0.2 to Remote 10.10.0.8
    Local 10.10.0.3 to Remote 10.10.0.5
    Local 10.10.0.3 to Remote 10.10.0.6
    Local 10.10.0.3 to Remote 10.10.0.7
    Local 10.10.0.3 to Remote 10.10.0.8
    Local 10.10.0.4 to Remote 10.10.0.5
    Local 10.10.0.4 to Remote 10.10.0.6
    Local 10.10.0.4 to Remote 10.10.0.7
    Local 10.10.0.4 to Remote 10.10.0.8
Larger than PMTU communication succeeds on 16 path(s)
RPC status:
4 paths up, 0 paths down (tcp check)
4 paths up, 0 paths down (udp check)
```

35. Expand the cluster by adding nodes to the Nexus 3232C cluster switches.

    The following examples show nodes n3 and n4 have 40 GbE cluster ports connected to ports e1/7 and e1/8 respectively on both the Nexus 3232C cluster switches, and both nodes have joined the cluster. The

40 GbE cluster interconnect ports used are e4a and e4e.

36. Display the information about the devices in your configuration:

    - `network device-discovery show`
    - `network port show -role cluster`
    - `network interface show -role cluster`
    - `system cluster-switch show`

```
cluster::> network device-discovery show
            Local  Discovered
Node        Port   Device               Interface        Platform
----------- ------ ------------------ ----------------
----------------
n1         /cdp
            e0a    C1                 Ethernet1/1/1    N3K-C3232C
            e0b    C2                 Ethernet1/1/1    N3K-C3232C
            e0c    C2                 Ethernet1/1/2    N3K-C3232C
            e0d    C1                 Ethernet1/1/2    N3K-C3232C
n2         /cdp
            e0a    C1                 Ethernet1/1/3    N3K-C3232C
            e0b    C2                 Ethernet1/1/3    N3K-C3232C
            e0c    C2                 Ethernet1/1/4    N3K-C3232C
            e0d    C1                 Ethernet1/1/4    N3K-C3232C
n3         /cdp
            e4a    C1                 Ethernet1/7      N3K-C3232C
            e4e    C2                 Ethernet1/7      N3K-C3232C
n4         /cdp
            e4a    C1                 Ethernet1/8      N3K-C3232C
            e4e    C2                 Ethernet1/8      N3K-C3232C
12 entries were displayed.
```

```
cluster::*> network port show –role cluster
  (network port show)
Node: n1

Ignore
                                                  Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- -----------
-------- ------
e0a       Cluster      Cluster          up   9000 auto/10000  -
```

```
-
e0b       Cluster      Cluster          up   9000 auto/10000  -
-
e0c       Cluster      Cluster          up   9000 auto/10000  -
-
e0d       Cluster      Cluster          up   9000 auto/10000  -
-

Node: n2

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

Node: n3

Ignore
                                                  Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- -----------
-------- ------
e4a       Cluster      Cluster          up   9000 auto/40000  -
-
e4e       Cluster      Cluster          up   9000 auto/40000  -
-

Node: n4

Ignore
                                                  Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
```

```
Status
--------- ------------ ---------------- ---- ---- -----------
-------- ------
e4a       Cluster      Cluster          up   9000 auto/40000  -
-
e4e       Cluster      Cluster          up   9000 auto/40000  -
-
12 entries were displayed.
```

```
cluster::*> network interface show -role cluster
 (network interface show)
            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node
Port    Home
----------- ---------- ---------- ------------------ -------------
------- ----
Cluster
            n1_clus1   up/up      10.10.0.1/24       n1
e0a     true
            n1_clus2   up/up      10.10.0.2/24       n1
e0b     true
            n1_clus3   up/up      10.10.0.3/24       n1
e0c     true
            n1_clus4   up/up      10.10.0.4/24       n1
e0d     true
            n2_clus1   up/up      10.10.0.5/24       n2
e0a     true
            n2_clus2   up/up      10.10.0.6/24       n2
e0b     true
            n2_clus3   up/up      10.10.0.7/24       n2
e0c     true
            n2_clus4   up/up      10.10.0.8/24       n2
e0d     true
            n3_clus1   up/up      10.10.0.9/24       n3
e4a     true
            n3_clus2   up/up      10.10.0.10/24      n3
e4e     true
            n4_clus1   up/up      10.10.0.11/24      n4
e4a     true
            n4_clus2   up/up      10.10.0.12/24      n4
e4e     true
12 entries were displayed.
```

```
cluster::*> system cluster-switch show

Switch                      Type               Address          Model
--------------------------- ------------------ ---------------
---------------
C1                          cluster-network    10.10.1.103      NX3232C
     Serial Number: FOX000001
      Is Monitored: true
            Reason:
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    7.0(3)I4(1)
    Version Source: CDP

C2                          cluster-network     10.10.1.104      NX3232C
     Serial Number: FOX000002
      Is Monitored: true
            Reason:
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    7.0(3)I4(1)
    Version Source: CDP

CL1                           cluster-network   10.10.1.101     NX5596
     Serial Number: 01234567
      Is Monitored: true
            Reason:
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    7.1(1)N1(1)
    Version Source: CDP
CL2                           cluster-network    10.10.1.102     NX5596
     Serial Number: 01234568
      Is Monitored: true
            Reason:
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    7.1(1)N1(1)
    Version Source: CDP

4 entries were displayed.
```

37. Remove the replaced Nexus 5596 by using the `system cluster-switch delete` command, if it is not automatically removed: `system cluster-switch delete -device switch-name`

```
cluster::> system cluster-switch delete -device CL1
cluster::> system cluster-switch delete -device CL2
```

38. Verify that the proper cluster switches are monitored: `system cluster-switch show`

```
cluster::> system cluster-switch show

Switch                        Type               Address          Model
----------------------------- ------------------ ----------------
---------------
C1                            cluster-network    10.10.1.103      NX3232C
     Serial Number: FOX000001
      Is Monitored: true
            Reason:
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    7.0(3)I4(1)
    Version Source: CDP

C2                            cluster-network     10.10.1.104      NX3232C
     Serial Number: FOX000002
      Is Monitored: true
            Reason:
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    7.0(3)I4(1)
    Version Source: CDP

2 entries were displayed.
```

39. Enable the cluster switch health monitor log collection feature for collecting switch-related log files:

```
system cluster-switch log setup-password

system cluster-switch log enable-collection
```

```
cluster::*> system cluster-switch log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
C1
C2

cluster::*> system cluster-switch log setup-password

Enter the switch name: C1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log setup-password

Enter the switch name: C2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster::*> system cluster-switch log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster::*>
```

If any of these commands return an error, contact NetApp support.

40. If you suppressed automatic case creation, re-enable it by invoking an AutoSupport message:

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

Related information

Cisco Ethernet Switch description page

Hardware Universe

Migrate from a two-node switchless cluster to a cluster with Cisco Nexus 3232C cluster switches

You must be aware of certain configuration information, port connections, and cabling requirements when you migrate a two-node switchless cluster to a cluster with Cisco Nexus 3232C cluster switches.

The Cisco Ethernet Switches page has information about the ONTAP and NX-OS versions supported in this procedure.

You must have the following before you begin the migration process:

- Available ports for node connections

  The cluster switches use the Inter-Switch Link (ISL) ports e1/31-32. -

- Appropriate cables for cluster connections:
  - The nodes with 10 GbE cluster connections require QSFP optical modules with breakout fiber cables or QSFP to SFP+ copper breakout cables.
  - The nodes with 40/100 GbE cluster connections require supportedQSFP/ QSFP28 optical modules with fiber cables or QSFP/QSFP28 copper direct-attach cables.
  - The cluster switches require the appropriate ISL cabling: 2x QSFP28 fiber or copper direct-attach cables.

  See the *Hardware Universe* for further information on cabling systems with Nexus 3232C switches.

How to migrate from a two-node switchless cluster to a cluster with Cisco Nexus 3232C cluster switches

If you have a two-node switchless cluster, you can migrate nondisruptively to a two-node switched cluster that includes Cisco Nexus 3232C cluster network switches.

Before you begin

- The configurations must be properly set up and functioning.

  The two nodes must be connected and functioning in a two-node switchless cluster setting.

- All cluster ports must be in the `up` state.
- Th- Cisco Nexus 3232C cluster switch must be supported.
- The existing cluster network configuration must have the following:
  - A redundant and fully functional Nexus 3232C cluster infrastructure on both switches
  - The latest RCF and NX-OS versions on your switches
  - Management connectivity on both switches
  - Console access to both switches
  - All cluster logical interfaces (LIFs) in the `up` state without having been migrated

- Initial customization of the switch
- All ISL ports enabled and cabled

About this task

Procedure summary

- **I. Display and migrate physical and logical ports (Steps 1-10)**
- **II. Shut down the reassigned LIFs and disconnect the cables (Steps 11-14))**
- **III. Enable the cluster ports (Steps 15-20)**
- **IV. Enable the reassigned LIFs (Steps 21-33)**

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

- Nexus 3232C cluster switches, C1 and C2.
- The nodes are n1 and n2.

> The examples in this procedure use two nodes, each utilizing two 40 GbE cluster interconnect ports e4a and e4e. The *Hardware Universe* has details about the cluster ports on your platforms.

- n1_clus1 is the first cluster logical interface (LIF) to be connected to cluster switch C1 for node n1.
- n1_clus2 is the first cluster LIF to be connected to cluster switch C2 for node n1.
- n2_clus1 is the first cluster LIF to be connected to cluster switch C1 for node n2.
- n2_clus2 is the second cluster LIF to be connected to cluster switch C2 for node n2.
- The number of 10 GbE and 40/100 GbE ports are defined in the reference configuration files (RCFs) available on the Cisco® Cluster Network Switch Reference Configuration File Download page.

> The procedure requires the use of both ONTAP commands and Cisco Nexus 3000 Series Switches commands; ONTAP commands are used unless otherwise indicated.

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. Determine the administrative or operational status for each cluster interface:
   a. Display the network port attributes:

      ```
      network port show -role cluster
      ```

```
cluster::*> network port show -role cluster
  (network port show)
Node: n1

Ignore
                                                  Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- -----------
-------- -----
e4a       Cluster      Cluster          up   9000 auto/40000  -
e4e       Cluster      Cluster          up   9000 auto/40000  -
-
Node: n2

Ignore
                                                  Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- -----------
-------- -----
e4a       Cluster      Cluster          up   9000 auto/40000  -
e4e       Cluster      Cluster          up   9000 auto/40000  -
4 entries were displayed.
```

b. Display information about the logical interfaces and their designated home nodes:

```
network interface show -role cluster
```

```
cluster::*> network interface show -role cluster
 (network interface show)
            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node
Port    Home
----------- ---------- ---------- ------------------ -------------
------- ---
Cluster
            n1_clus1   up/up      10.10.0.1/24       n1
e4a     true
            n1_clus2   up/up      10.10.0.2/24       n1
e4e     true
            n2_clus1   up/up      10.10.0.3/24       n2
e4a     true
            n2_clus2   up/up      10.10.0.4/24       n2
e4e     true

4 entries were displayed.
```

c. Verify that switchless cluster detection is enabled using the advanced privilege command:

`network options detect-switchless-cluster show`

The output in the following example shows that switchless cluster detection is enabled:

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

3. Verify that the appropriate RCFs and image are installed on the new 3232C switches and make any necessary site customizations such as adding users, passwords, and network addresses.

You must prepare both switches at this time. If you need to upgrade the RCF and image software, you must follow these steps:

a. Go to the *Cisco Ethernet Switches* page on the NetApp Support Site.

Cisco Ethernet Switches

b. Note your switch and the required software versions in the table on that page.

c. Download the appropriate version of RCF.

d. Click **CONTINUE** on the **Description** page, accept the license agreement, and then follow the instructions on the **Download** page to download the RCF.

e. Download the appropriate version of the image software.

Cisco Cluster and Management Network Switch Reference Configuration File download page

4. Click **CONTINUE** on the **Description** page, accept the license agreement, and then follow the instructions on the **Download** page to download the RCF.
5. On Nexus 3232C switches C1 and C2, disable all node-facing ports C1 and C2, but do not disable the ISL ports e1/31-32.

   For more information on Cisco commands, see the guides listed in the Cisco Nexus 3000 Series NX-OS Command References.

   The following example shows ports 1 through 30 being disabled on Nexus 3232C cluster switches C1 and C2 using a configuration supported in RCF `NX3232_RCF_v1.0_24p10g_24p100g.txt`:

   ```
   C1# copy running-config startup-config
   [########################################] 100% Copy complete.
   C1# configure
   C1(config)# int e1/1/1-4,e1/2/1-4,e1/3/1-4,e1/4/1-4,e1/5/1-4,e1/6/1-
   4,e1/7-30
   C1(config-if-range)# shutdown
   C1(config-if-range)# exit
   C1(config)# exit
   C2# copy running-config startup-config
   [########################################] 100% Copy complete.
   C2# configure
   C2(config)# int e1/1/1-4,e1/2/1-4,e1/3/1-4,e1/4/1-4,e1/5/1-4,e1/6/1-
   4,e1/7-30
   C2(config-if-range)# shutdown
   C2(config-if-range)# exit
   C2(config)# exit
   ```
6. Connect ports 1/31 and 1/32 on C1 to the same ports on C2 using supported cabling.
7. Verify that the ISL ports are operational on C1 and C2:

   `show port-channel summary`

   For more information on Cisco commands, see the guides listed in the Cisco Nexus 3000 Series NX-OS Command References.

   The following example shows the Cisco `show port-channel summary` command being used to verify the ISL ports are operational on C1 and C2:

```
C1# show port-channel summary
Flags: D - Down         P - Up in port-channel (members)
       I - Individual   H - Hot-standby (LACP only)        s - Suspended
r - Module-removed
       S - Switched     R - Routed
       U - Up (port-channel)
       M - Not in use. Min-links not met
--------------------------------------------------------------------------
--------
      Port-
Group Channel      Type   Protocol  Member Ports
--------------------------------------------------------------------------
-------
1     Po1(SU)      Eth    LACP      Eth1/31(P)   Eth1/32(P)

C2# show port-channel summary
Flags: D - Down         P - Up in port-channel (members)
       I - Individual   H - Hot-standby (LACP only)        s - Suspended
r - Module-removed
       S - Switched     R - Routed
       U - Up (port-channel)
       M - Not in use. Min-links not met
--------------------------------------------------------------------------
--------

Group Port-        Type   Protocol  Member Ports
      Channel
--------------------------------------------------------------------------
--------
1     Po1(SU)      Eth    LACP      Eth1/31(P)   Eth1/32(P)
```

8. Display the list of neighboring devices on the switch.

   For more information on Cisco commands, see the guides listed in the Cisco Nexus 3000 Series NX-OS Command References.

   The following example shows the Cisco command `show cdp neighbors` being used to display the neighboring devices on the switch:

```
C1# show cdp neighbors
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater,
                  V - VoIP-Phone, D - Remotely-Managed-Device,
s - Supports-STP-Dispute
Device-ID          Local Intrfce  Hldtme Capability  Platform      Port
ID
C2                 Eth1/31        174    R S I s     N3K-C3232C  Eth1/31
C2                 Eth1/32        174    R S I s     N3K-C3232C  Eth1/32
Total entries displayed: 2
C2# show cdp neighbors
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater,
                  V - VoIP-Phone, D - Remotely-Managed-Device,
s - Supports-STP-Dispute
Device-ID          Local Intrfce  Hldtme Capability  Platform      Port
ID
C1                 Eth1/31        178    R S I s     N3K-C3232C  Eth1/31
C1                 Eth1/32        178    R S I s     N3K-C3232C  Eth1/32
Total entries displayed: 2
```

9. Display the cluster port connectivity on each node:

   `network device-discovery show`

   The following example shows the cluster port connectivity displayed for a two-node switchless cluster configuration:

```
cluster::*> network device-discovery show
            Local  Discovered
Node        Port   Device              Interface        Platform
----------- ------ ------------------- ---------------- ----------------
n1         /cdp
            e4a    n2                  e4a              FAS9000
            e4e    n2                  e4e              FAS9000
n2         /cdp
            e4a    n1                  e4a              FAS9000
            e4e    n1                  e4e              FAS9000
```

10. Migrate the n1_clus1 and n2_clus1 LIFs to the physical ports of their destination nodes:

    `network interface migrate -vserver cluster -lif` *`lif-name`* `source-node` *`source-node-name`* `-destination-port` *`destination-port-name`*

    You must execute the command for each local node as shown in the following example:

```
cluster::*> network interface migrate -vserver cluster -lif n1_clus1
-source-node n1
–destination-node n1 -destination-port e4e
cluster::*> network interface migrate -vserver cluster -lif n2_clus1
-source-node n2
–destination-node n2 -destination-port e4e
```

11. Verify the cluster interfaces have successfully migrated:

    `network interface show -role cluster`

    The following example shows the "Is Home" status for the n1_clus1 and n2_clus1 LIFs has become "false" after the migration is completed:

```
cluster::*> network interface show -role cluster
 (network interface show)
            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node          Port
Home
----------- ---------- ---------- ------------------ -------------
------- ----
Cluster
            n1_clus1   up/up      10.10.0.1/24       n1            e4e
false
            n1_clus2   up/up      10.10.0.2/24       n1            e4e
true
            n2_clus1   up/up      10.10.0.3/24       n2            e4e
false
            n2_clus2   up/up      10.10.0.4/24       n2            e4e
true
 4 entries were displayed.
```

12. Shut down cluster ports for the n1_clus1 and n2_clus1 LIFs, which were migrated in step 9:

    `network port modify -node` *`node-name`* `-port` *`port-name`* `-up-admin false`

    You must execute the command for each port as shown in the following example:

```
cluster::*> network port modify -node n1 -port e4a -up-admin false
cluster::*> network port modify -node n2 -port e4a -up-admin false
```

13. Ping the remote cluster interfaces and perform an RPC server check:

    `cluster ping-cluster -node` *`node-name`*

The following example shows node n1 being pinged and the RPC status indicated afterward:

```
cluster::*> cluster ping-cluster -node n1

Host is n1 Getting addresses from network interface table...
Cluster n1_clus1 n1        e4a    10.10.0.1
Cluster n1_clus2 n1        e4e    10.10.0.2
Cluster n2_clus1 n2        e4a    10.10.0.3
Cluster n2_clus2 n2        e4e    10.10.0.4
Local = 10.10.0.1 10.10.0.2
Remote = 10.10.0.3 10.10.0.4
Cluster Vserver Id = 4294967293 Ping status:
....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s) ................
Detected 9000 byte MTU on 32 path(s):
    Local 10.10.0.1 to Remote 10.10.0.3
    Local 10.10.0.1 to Remote 10.10.0.4
    Local 10.10.0.2 to Remote 10.10.0.3
    Local 10.10.0.2 to Remote 10.10.0.4
Larger than PMTU communication succeeds on 4 path(s) RPC status:
1 paths up, 0 paths down (tcp check)
1 paths up, 0 paths down (ucp check)
```

14. Disconnect the cable from e4a on node n1.

    You can refer to the running configuration and connect the first 40 GbE port on the switch C1 (port 1/7 in this example) to e4a on n1 using cabling supported for Nexus 3232C switches.

15. Disconnect the cable from e4a on node n2.

    You can refer to the running configuration and connect e4a to the next available 40 GbE port on C1, port 1/8, using supported cabling.

16. Enable all node-facing ports on C1.

    For more information on Cisco commands, see the guides listed in the Cisco Nexus 3000 Series NX-OS Command References.

    The following example shows ports 1 through 30 being enabled on Nexus 3232C cluster switches C1 and C2 using the configuration supported in RCF `NX3232_RCF_v1.0_24p10g_26p100g.txt`:

```
C1# configure
C1(config)# int e1/1/1-4,e1/2/1-4,e1/3/1-4,e1/4/1-4,e1/5/1-4,e1/6/1-
4,e1/7-30
C1(config-if-range)# no shutdown
C1(config-if-range)# exit
C1(config)# exit
```

17. Enable the first cluster port, e4a, on each node:

`network port modify -node *node-name* -port *port-name* -up-admin true`

```
cluster::*> network port modify -node n1 -port e4a -up-admin true
cluster::*> network port modify -node n2 -port e4a -up-admin true
```

18. Verify that the clusters are up on both nodes:

`network port show -role cluster`

```
cluster::*> network port show -role cluster
  (network port show)
Node: n1

Ignore
                                                  Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- ----------- --------
-----
e4a       Cluster      Cluster          up   9000 auto/40000  -
e4e       Cluster      Cluster          up   9000 auto/40000  -        -

Node: n2

Ignore
                                                  Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- ----------- --------
-----
e4a       Cluster      Cluster          up   9000 auto/40000  -
e4e       Cluster      Cluster          up   9000 auto/40000  -

4 entries were displayed.
```

19. For each node, revert all of the migrated cluster interconnect LIFs:

    `network interface revert -vserver cluster -lif` *lif-name*

    You must revert each LIF to its home port individually as shown in the following example:

```
cluster::*> network interface revert -vserver cluster -lif n1_clus1
cluster::*> network interface revert -vserver cluster -lif n2_clus1
```

20. Verify that all the LIFs are now reverted to their home ports:

    `network interface show -role cluster`

    The `Is Home` column should display a value of `true` for all of the ports listed in the `Current Port` column. If the displayed value is `false`, the port has not been reverted.

```
cluster::*> network interface show -role cluster
 (network interface show)
            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node          Port
Home
----------- ---------- ---------- ------------------ -------------
------- ----
Cluster
            n1_clus1   up/up      10.10.0.1/24       n1            e4a
true
            n1_clus2   up/up      10.10.0.2/24       n1            e4e
true
            n2_clus1   up/up      10.10.0.3/24       n2            e4a
true
            n2_clus2   up/up      10.10.0.4/24       n2            e4e
true
4 entries were displayed.
```

21. Display the cluster port connectivity on each node:

    `network device-discovery show`

```
cluster::*> network device-discovery show
            Local  Discovered
Node        Port   Device               Interface        Platform
----------- ------ -------------------- ---------------- ----------------
n1         /cdp
            e4a    C1                   Ethernet1/7      N3K-C3232C
            e4e    n2                   e4e              FAS9000
n2         /cdp
            e4a    C1                   Ethernet1/8      N3K-C3232C
            e4e    n1                   e4e              FAS9000
```

22. Migrate clus2 to port e4a on the console of each node:

    `network interface migrate cluster -lif` *`lif-name`* `-source-node` *`source-node-name`* `-destination-node` *`destination-node-name`* `-destination-port` *`destination-port-name`*

    You must migrate each LIF to its home port individually as shown in the following example:

```
cluster::*> network interface migrate -vserver cluster -lif n1_clus2
-source-node n1
–destination-node n1 -destination-port e4a
cluster::*> network interface migrate -vserver cluster -lif n2_clus2
-source-node n2 –destination-node n2 -destination-port e4a
```

23. Shut down cluster ports clus2 LIF on both nodes:

    `network port modify`

    The following example shows the specified ports being set to `false`, shutting the ports down on both nodes:

```
cluster::*> network port modify -node n1 -port e4e -up-admin false
cluster::*> network port modify -node n2 -port e4e -up-admin false
```

24. Verify the cluster LIF status:

    `network interface show`

```
cluster::*> network interface show -role cluster
 (network interface show)
            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node          Port
Home
----------- ---------- ---------- ------------------ -------------
------- ----
Cluster
            n1_clus1   up/up      10.10.0.1/24       n1            e4a
true
            n1_clus2   up/up      10.10.0.2/24       n1            e4a
false
            n2_clus1   up/up      10.10.0.3/24       n2            e4a
true
            n2_clus2   up/up      10.10.0.4/24       n2            e4a
false
4 entries were displayed.
```

25. Disconnect the cable from e4e on node n1.

    You can refer to the running configuration and connect the first 40 GbE port on switch C2 (port 1/7 in this example) to e4e on node n1, using the appropriate cabling for the Nexus 3232C switch model.

26. Disconnect the cable from e4e on node n2.

You can refer to the running configuration and connect e4e to the next available 40 GbE port on C2, port 1/8, using the appropriate cabling for the Nexus 3232C switch model.

27. Enable all node-facing ports on C2.

    The following example shows ports 1 through 30 being enabled on Nexus 3132Q-V cluster switches C1 and C2 using a configuration supported in RCF `NX3232C_RCF_v1.0_24p10g_26p100g.txt`:

    ```
    C2# configure
    C2(config)# int e1/1/1-4,e1/2/1-4,e1/3/1-4,e1/4/1-4,e1/5/1-4,e1/6/1-
    4,e1/7-30
    C2(config-if-range)# no shutdown
    C2(config-if-range)# exit
    C2(config)# exit
    ```

28. Enable the second cluster port, e4e, on each node:

    `network port modify`

    The following example shows the second cluster port e4e being brought up on each node:

    ```
    cluster::*> network port modify -node n1 -port e4e -up-admin true
    cluster::*> network port modify -node n2 -port e4e -up-admin true
    ```

29. For each node, revert all of the migrated cluster interconnect LIFs: `network interface revert`

    The following example shows the migrated LIFs being reverted to their home ports.

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

30. Verify that all of the cluster interconnect ports are now reverted to their home ports:

    `network interface show -role cluster`

    The `Is Home` column should display a value of `true` for all of the ports listed in the `Current Port` column. If the displayed value is `false`, the port has not been reverted.

```
cluster::*> network interface show -role cluster
 (network interface show)
            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node          Port
Home
----------- ---------- ---------- ------------------ -------------
------- ----
Cluster
            n1_clus1   up/up      10.10.0.1/24       n1            e4a
true
            n1_clus2   up/up      10.10.0.2/24       n1            e4e
true
            n2_clus1   up/up      10.10.0.3/24       n2            e4a
true
            n2_clus2   up/up      10.10.0.4/24       n2            e4e
true
4 entries were displayed.
```

31. Verify that all of the cluster interconnect ports are in the `up` state:

    `network port show -role cluster`

32. Display the cluster switch port numbers through which each cluster port is connected to each node: `network device-discovery show`

```
cluster::*> network device-discovery show
            Local  Discovered
Node        Port   Device               Interface        Platform
----------- ------ -------------------- ---------------- ----------------
n1          /cdp
            e4a    C1                   Ethernet1/7      N3K-C3232C
            e4e    C2                   Ethernet1/7      N3K-C3232C
n2          /cdp
            e4a    C1                   Ethernet1/8      N3K-C3232C
            e4e    C2                   Ethernet1/8      N3K-C3232C
```

33. Display discovered and monitored cluster switches:

    `system cluster-switch show`

```
cluster::*> system cluster-switch show

Switch                        Type               Address          Model
----------------------------- ------------------ ----------------
---------------
C1                            cluster-network    10.10.1.101      NX3232CV
Serial Number: FOX000001
Is Monitored: true
Reason:
Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
7.0(3)I6(1)
Version Source: CDP

C2                            cluster-network     10.10.1.102
NX3232CV
Serial Number: FOX000002
Is Monitored: true
Reason:
Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
7.0(3)I6(1)
Version Source: CDP 2 entries were displayed.
```

34. Verify that switchless cluster detection changed the switchless cluster option to disabled:

    `network options switchless-cluster show`

35. Ping the remote cluster interfaces and perform an RPC server check:

    `cluster ping-cluster -node` *node-name*

```
cluster::*> cluster ping-cluster -node n1
Host is n1 Getting addresses from network interface table...
Cluster n1_clus1 n1        e4a    10.10.0.1
Cluster n1_clus2 n1        e4e    10.10.0.2
Cluster n2_clus1 n2        e4a    10.10.0.3
Cluster n2_clus2 n2        e4e    10.10.0.4
Local = 10.10.0.1 10.10.0.2
Remote = 10.10.0.3 10.10.0.4
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s) ................
Detected 9000 byte MTU on 32 path(s):
    Local 10.10.0.1 to Remote 10.10.0.3
    Local 10.10.0.1 to Remote 10.10.0.4
    Local 10.10.0.2 to Remote 10.10.0.3
    Local 10.10.0.2 to Remote 10.10.0.4
Larger than PMTU communication succeeds on 4 path(s) RPC status:
1 paths up, 0 paths down (tcp check)
1 paths up, 0 paths down (ucp check)
```

36. Enable the cluster switch health monitor log collection feature for collecting switch-related log files:
    `+system cluster-switch log setup-password`

    `system cluster-switch log enable-collection`

```
cluster::*> system cluster-switch log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
C1
C2

cluster::*> system cluster-switch log setup-password

Enter the switch name: C1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster::*> system cluster-switch log setup-password

Enter the switch name: C2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster::*> system cluster-switch log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster::*>
```

If any of these commands return an error, contact NetApp support.

37. If you suppressed automatic case creation, re-enable it by invoking an AutoSupport message:

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

Replace a Cisco Nexus 3232C cluster switch

You must be aware of certain configuration information, port connections and cabling requirements when you replace Cisco Nexus 3232C cluster switches.

You -ust verify the following conditions exist before installing the NX-OS software and RCFs on a Cisco Nexus cluster switch:

- Your system can support Cisco Nexus 3232C switches.
- The cluster must be fully functioning.
- You must have consulted the switch compatibility table on the Cisco Ethernet Switch page for the supported ONTAP, NX-OS, and RCF versions.

> You should be aware there can be dependencies between command syntax in the RCF and NX-OS versions.

- You must have referred to the appropriate software and upgrade guides available on the Cisco web site for complete documentation on the Cisco switch upgrade and downgrade procedures.
- You must have downloaded the applicable RCFs.

How to replace a Cisco Nexus 3232C cluster switch

You can nondisruptively replace a defective Cisco Nexus 3232C switch in a cluster by performing a specific sequence of tasks.

Before you begin

The existing cluster and network configuration must have the following characteristics:

- The Nexus 3232C cluster infrastructure must be redundant and fully functional on both switches.

  The Cisco Ethernet Switches page has the latest RCF and NX-OS versions on your switches.

- All cluster ports must be in the up state.
- Management connectivity must exist on both switches.
- All cluster logical interfaces (LIFs) must be in the up state and must not have been migrated.

The replacement Cisco Nexus 3232C switch must have the following characteristics:

- Management network connectivity must be functional.
- Console access to the replacement switch must be in place.
- The appropriate RCF and NX-OS operating system image must be loaded onto the switch.
- Initial customization of the switch must be complete.

About this task

Procedure summary

- **Display and migrate the cluster ports to switch C2 (Steps 1-7)**
- **Reconnect ISL cables from switch CL2 to switch C2, then migrate ISLs to switch CL1 and C2 (Steps 8-14)**
- **Revert all LIFs to originally assigned ports (Steps 15-18)**
- **Verify all ports and LIF are correctly migrated (Steps 19-21)**

This procedure replaces the second Nexus 3232C cluster switch CL2 with the new 3232C switch C2. The

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

- The four nodes are n1, n2, n3, and n4.
- n1_clus1 is the first cluster logical interface (LIF) connected to cluster switch C1 for node n1.
- n1_clus2 is the first cluster LIF connected to cluster switch CL2 or C2 for node n1.
- n1_clus3 is the second LIF connected to cluster switch C2 for node n1.-
- n1_clus4 is the second LIF connected to cluster switch CL1, for node n1.

The number of 10 GbE and 40/100 GbE ports are defined in the reference configuration files (RCFs) available on the Cisco® Cluster Network Switch Reference Configuration File Download page.

The examples in this procedure use four nodes. Two of the nodes use four 10 GB cluster interconnect ports: e0a, e0b, e0c, and e0d. The other two nodes use two 40 GB cluster interconnect ports: e4a and e4e. See the Hardware Universe to verify the correct cluster ports for your platform.

This procedure describes the following scenario:

- The cluster initially has four nodes connected to two Nexus 3232C cluster switches, CL1 and CL2.
- You plan to replace cluster switch CL2 with C2 (steps 1 to 21):
  - On each node, you migrate the cluster LIFs connected to cluster switch CL2 to cluster ports connected to cluster switch CL1.
  - You disconnect the cabling from all ports on cluster switch CL2 and reconnect the cabling to the same ports on the replacement cluster switch C2.
  - You revert the migrated cluster LIFs on each node.

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.

1. Display information about the devices in your configuration:

```
network device-discovery show
```

```
cluster::> network device-discovery show
            Local  Discovered
Node        Port   Device               Interface         Platform
----------- ------ ------------------ ----------------
----------------
n1         /cdp
            e0a    CL1                  Ethernet1/1/1    N3K-C3232C
            e0b    CL2                  Ethernet1/1/1    N3K-C3232C
            e0c    CL2                  Ethernet1/1/2    N3K-C3232C
            e0d    CL1                  Ethernet1/1/2    N3K-C3232C

n2         /cdp
            e0a    CL1                  Ethernet1/1/3    N3K-C3232C
            e0b    CL2                  Ethernet1/1/3    N3K-C3232C
            e0c    CL2                  Ethernet1/1/4    N3K-C3232C
            e0d    CL1                  Ethernet1/1/4    N3K-C3232C

n3         /cdp
            e4a    CL1                  Ethernet1/7      N3K-C3232C
            e4e    CL2                  Ethernet1/7      N3K-C3232C

n4         /cdp
            e4a    CL1                  Ethernet1/8      N3K-C3232C
            e4e    CL2                  Ethernet1/8      N3K-C3232C

12 entries were displayed
```

2. Determine the administrative or operational status for each cluster interface.
   a. Display the network port attributes:

      `network port show -role cluster`

```
cluster::*> network port show -role cluster
(network port show)
Node: n1

Ignore
                                                  Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- -----------
------------
e0a       Cluster      Cluster          up   9000 auto/10000  -
e0b       Cluster      Cluster          up   9000 auto/10000  -
```

```
e0c       Cluster      Cluster          up   9000 auto/10000  -
e0d       Cluster      Cluster          up   9000 auto/10000  -
-

Node: n2

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

Node: n3

Ignore
                                                  Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- -----------
-------- -----
e4a       Cluster      Cluster          up   9000 auto/40000  -
-
e4e       Cluster      Cluster          up   9000 auto/40000  -
-

Node: n4

Ignore
                                                  Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- -----------
-------- -----
e4a       Cluster      Cluster          up   9000 auto/40000  -
e4e       Cluster      Cluster          up   9000 auto/40000  -

12 entries were displayed.
```

b. Display information about the logical interfaces (LIFs):

```
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
----------- ---------- ---------- ------------------ -------------
------- ---
Cluster
            n1_clus1   up/up      10.10.0.1/24       n1
e0a     true
            n1_clus2   up/up      10.10.0.2/24       n1
e0b     true
            n1_clus3   up/up      10.10.0.3/24       n1
e0c     true
            n1_clus4   up/up      10.10.0.4/24       n1
e0d     true
            n2_clus1   up/up      10.10.0.5/24       n2
e0a     true
            n2_clus2   up/up      10.10.0.6/24       n2
e0b     true
            n2_clus3   up/up      10.10.0.7/24       n2
e0c     true
            n2_clus4   up/up      10.10.0.8/24       n2
e0d     true
            n3_clus1   up/up      10.10.0.9/24       n3
e0a     true
            n3_clus2   up/up      10.10.0.10/24      n3
e0e     true
            n4_clus1   up/up      10.10.0.11/24      n4
e0a     true
            n4_clus2   up/up      10.10.0.12/24      n4
e0e     true

12 entries were displayed.
```

c. Display the discovered cluster switches:

```
system cluster-switch show
```

The following output example displays the cluster switches:

```
cluster::> system cluster-switch show
Switch                      Type               Address          Model
--------------------------- ------------------ ----------------
---------------
CL1                         cluster-network    10.10.1.101
NX3232C
Serial Number: FOX000001
Is Monitored: true
Reason:
Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                   7.0(3)I6(1)
Version Source: CDP

CL2                         cluster-network    10.10.1.102
NX3232C
Serial Number: FOX000002
Is Monitored: true
Reason:
Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                   7.0(3)I6(1)
Version Source: CDP

2 entries were displayed.
```

3. Verify that the appropriate RCF and image are installed on the new Nexus 3232C switch and make any necessary site customizations.
   a. Go to the NetApp Support Site.

      mysupport.netapp.com

   b. Go to the **Cisco Ethernet Switches** page and note the required software versions in the table.

      Cisco Ethernet Switches

   c. Download the appropriate version of the RCF.
   d. Click **CONTINUE** on the **Description** page, accept the license agreement, and then navigate to the **Download** page.
   e. Download the correct version of the image software from the **Cisco® Cluster and Management Network Switch Reference Configuration File Download** page.

      Cisco® Cluster and Management Network Switch Reference Configuration File Download

4. Migrate the cluster LIFs to the physical node ports connected to the replacement switch C2:

   `network interface migrate -vserver Cluster -lif` *`lif-name`* `-source-node` *`node-`*

name -destination-node *node-name* -destination-port *port-name*

You must migrate all the cluster LIFs individually as shown in the following example:

```
cluster::*> network interface migrate -vserver Cluster -lif n1_clus2
-source-node n1 –destination-
node n1 -destination-port e0a
cluster::*> network interface migrate -vserver Cluster -lif n1_clus3
-source-node n1 –destination-
node n1 -destination-port e0d
cluster::*> network interface migrate -vserver Cluster -lif n2_clus2
-source-node n2 –destination-
node n2 -destination-port e0a
cluster::*> network interface migrate -vserver Cluster -lif n2_clus3
-source-node n2 –destination-
node n2 -destination-port e0d
cluster::*> network interface migrate -vserver Cluster -lif n3_clus2
-source-node n3 –destination-
node n3 -destination-port e4a
cluster::*> network interface migrate -vserver Cluster -lif n4_clus2
-source-node n4 –destinationnode
n4 -destination-port e4a
```

5. Verify the status of the cluster ports and their home designations:

   `network interface show -role cluster`

```
cluster::*> network interface show -role cluster
(network interface show)
            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node          Port
Home
----------- ---------- ---------- ------------------ -------------
------- ----
Cluster
            n1_clus1   up/up      10.10.0.1/24       n1            e0a
true
            n1_clus2   up/up      10.10.0.2/24       n1            e0a
false
            n1_clus3   up/up      10.10.0.3/24       n1            e0d
false
            n1_clus4   up/up      10.10.0.4/24       n1            e0d
true
            n2_clus1   up/up      10.10.0.5/24       n2            e0a
true
            n2_clus2   up/up      10.10.0.6/24       n2            e0a
false
            n2_clus3   up/up      10.10.0.7/24       n2            e0d
false
            n2_clus4   up/up      10.10.0.8/24       n2            e0d
true
            n3_clus1   up/up      10.10.0.9/24       n3            e4a
true
            n3_clus2   up/up      10.10.0.10/24      n3            e4a
false
            n4_clus1   up/up      10.10.0.11/24      n4            e4a
true
            n4_clus2   up/up      10.10.0.12/24      n4            e4a
false
12 entries were displayed.
```

6. Shut down the cluster interconnect ports that are physically connected to the original switch CL2: `network port modify -node` *`node-name`* `-port` *`port-name`* `-up-admin false`

   The following example shows the cluster interconnect ports are shut down on all nodes:

```
cluster::*> network port modify -node n1 -port e0b -up-admin false
cluster::*> network port modify -node n1 -port e0c -up-admin false
cluster::*> network port modify -node n2 -port e0b -up-admin false
cluster::*> network port modify -node n2 -port e0c -up-admin false
cluster::*> network port modify -node n3 -port e4e -up-admin false
cluster::*> network port modify -node n4 -port e4e -up-admin false
```

7. Ping the remote cluster interfaces and perform an RPC server check:

   `cluster ping-cluster -node` *node-name*

   The following example shows node n1 being pinged and the RPC status indicated afterward:

```
cluster::*> cluster ping-cluster -node n1
Host is n1 Getting addresses from network interface table...
Cluster n1_clus1 n1        e0a    10.10.0.1
Cluster n1_clus2 n1        e0b    10.10.0.2
Cluster n1_clus3 n1        e0c    10.10.0.3
Cluster n1_clus4 n1        e0d    10.10.0.4
Cluster n2_clus1 n2        e0a    10.10.0.5
Cluster n2_clus2 n2        e0b    10.10.0.6
Cluster n2_clus3 n2        e0c    10.10.0.7
Cluster n2_clus4 n2        e0d    10.10.0.8
Cluster n3_clus1 n4        e0a    10.10.0.9
Cluster n3_clus2 n3        e0e    10.10.0.10
Cluster n4_clus1 n4        e0a    10.10.0.11
Cluster n4_clus2 n4        e0e    10.10.0.12
Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8 10.10.0.9 10.10.0.10
10.10.0.11
10.10.0.12 Cluster Vserver Id = 4294967293 Ping status:
....
Basic connectivity succeeds on 32 path(s)
Basic connectivity fails on 0 path(s) ................
Detected 9000 byte MTU on 32 path(s):
    Local 10.10.0.1 to Remote 10.10.0.5
    Local 10.10.0.1 to Remote 10.10.0.6
    Local 10.10.0.1 to Remote 10.10.0.7
    Local 10.10.0.1 to Remote 10.10.0.8
    Local 10.10.0.1 to Remote 10.10.0.9
    Local 10.10.0.1 to Remote 10.10.0.10
    Local 10.10.0.1 to Remote 10.10.0.11
    Local 10.10.0.1 to Remote 10.10.0.12
    Local 10.10.0.2 to Remote 10.10.0.5
    Local 10.10.0.2 to Remote 10.10.0.6
```

```
    Local 10.10.0.2 to Remote 10.10.0.7
    Local 10.10.0.2 to Remote 10.10.0.8
    Local 10.10.0.2 to Remote 10.10.0.9
    Local 10.10.0.2 to Remote 10.10.0.10
    Local 10.10.0.2 to Remote 10.10.0.11
    Local 10.10.0.2 to Remote 10.10.0.12
    Local 10.10.0.3 to Remote 10.10.0.5
    Local 10.10.0.3 to Remote 10.10.0.6
    Local 10.10.0.3 to Remote 10.10.0.7
    Local 10.10.0.3 to Remote 10.10.0.8
    Local 10.10.0.3 to Remote 10.10.0.9
    Local 10.10.0.3 to Remote 10.10.0.10
    Local 10.10.0.3 to Remote 10.10.0.11
    Local 10.10.0.3 to Remote 10.10.0.12
    Local 10.10.0.4 to Remote 10.10.0.5
    Local 10.10.0.4 to Remote 10.10.0.6
    Local 10.10.0.4 to Remote 10.10.0.7
    Local 10.10.0.4 to Remote 10.10.0.8
    Local 10.10.0.4 to Remote 10.10.0.9
    Local 10.10.0.4 to Remote 10.10.0.10
    Local 10.10.0.4 to Remote 10.10.0.11
    Local 10.10.0.4 to Remote 10.10.0.12
Larger than PMTU communication succeeds on 32 path(s) RPC status:
8 paths up, 0 paths down (tcp check)
8   paths up, 0 paths down (udp check)
```

8. Shut down the ports 1/31 and 1/32 on cluster switch CL1.

   For more information on Cisco commands, see the guides listed in the Cisco Nexus 3000 Series NX-OS Command References.

```
(CL1)# configure
(CL1)(Config)# interface e1/31-32
(CL1(config-if-range)# shutdown
(CL1(config-if-range)# exit
(CL1)(Config)# exit (CL1)#
```

9. Remove all the cables attached to the cluster switch CL2 and reconnect them to the replacement switch C2 for all the nodes.
10. Remove the inter-switch link (ISL) cables from ports e1/31 and e1/32 on cluster switch CL2 and reconnect them to the same ports on the replacement switch C2.
11. Bring up ISL ports 1/31 and 1/32 on the cluster switch CL1.

    For more information on Cisco commands, see the guides listed in the Cisco Nexus 3000 Series NX-OS Command References.

```
(CL1)# configure
(CL1)(Config)# interface e1/31-32
(CL1(config-if-range)# no shutdown
(CL1(config-if-range)# exit
(CL1)(Config)# exit
(CL1)#
```

12. Verify that the ISLs are up on CL1.

    For more information on Cisco commands, see the guides listed in the Cisco Nexus 3000 Series NX-OS Command References.

    Ports Eth1/31 and Eth1/32 should indicate `(P)`, which means that the ISL ports are up in the port-channel:

```
CL1# show port-channel summary
Flags: D - Down         P - Up in port-channel (members)
       I - Individual   H - Hot-standby (LACP only)
       s - Suspended    r - Module-removed
       S - Switched     R - Routed
       U - Up (port-channel)
       M - Not in use. Min-links not met
--------------------------------------------------------------------------------
--------
Group Port-        Type   Protocol  Member Ports
      Channel
--------------------------------------------------------------------------------
--------
1     Po1(SU)      Eth    LACP      Eth1/31(P)   Eth1/32(P)
```

13. Verify that the ISLs are up on cluster switch C2.

    For more information on Cisco commands, see the guides listed in the Cisco Nexus 3000 Series NX-OS Command References.

```
Ports Eth1/31 and Eth1/32 should indicate (P), which means that both ISL
ports are up in the port-channel.
Example
C2# show port-channel summary
Flags: D - Down         P - Up in port-channel (members)
       I - Individual   H - Hot-standby (LACP only)        s - Suspended
r - Module-removed
       S - Switched     R - Routed
       U - Up (port-channel)
       M - Not in use. Min-links not met
------------------------------------------------------------------------
--------
Group Port-        Type   Protocol  Member Ports
      Channel
------------------------------------------------------------------------
--------
1     Po1(SU)      Eth    LACP      Eth1/31(P)   Eth1/32(P)
```

14. On all nodes, bring up all the cluster interconnect ports connected to the replacement switch C2:
`network port modify -node node-name -port port-name -up-admin true`

```
cluster::*> network port modify -node n1 -port e0b -up-admin true
cluster::*> network port modify -node n1 -port e0c -up-admin true
cluster::*> network port modify -node n2 -port e0b -up-admin true
cluster::*> network port modify -node n2 -port e0c -up-admin true
cluster::*> network port modify -node n3 -port e4e -up-admin true
cluster::*> network port modify -node n4 -port e4e -up-admin true
```

15. Revert all the migrated cluster interconnect LIFs on all the nodes:

`network interface revert -vserver cluster -lif lif-name`

You must revert all the cluster interconnect LIFs individually as shown in the following example:

```
cluster::*> network interface revert -vserver cluster -lif n1_clus2
cluster::*> network interface revert -vserver cluster -lif n1_clus3
cluster::*> network interface revert -vserver cluster -lif n2_clus2
cluster::*> network interface revert -vserver cluster -lif n2_clus3
Cluster::*> network interface revert –vserver cluster –lif n3_clus2
Cluster::*> network interface revert –vserver cluster –lif n4_clus2
```

16. Verify that the cluster interconnect ports are now reverted to their home:

`network interface show`

The following example shows that all the LIFs have been successfully reverted because the ports listed under the `Current Port` column have a status of `true` in the `Is Home` column. If a port has a value of `false`, the LIF has not been reverted.

```
cluster::*> network interface show -role cluster
 (network interface show)
            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node           Port
Home
----------- ---------- ---------- ------------------ -------------
------- ----
Cluster
             n1_clus1   up/up      10.10.0.1/24       n1             e0a
true
             n1_clus2   up/up      10.10.0.2/24       n1             e0b
true
             n1_clus3   up/up      10.10.0.3/24       n1             e0c
true
             n1_clus4   up/up      10.10.0.4/24       n1             e0d
true
             n2_clus1   up/up      10.10.0.5/24       n2             e0a
true
             n2_clus2   up/up      10.10.0.6/24       n2             e0b
true
             n2_clus3   up/up      10.10.0.7/24       n2             e0c
true
             n2_clus4   up/up      10.10.0.8/24       n2             e0d
true
             n3_clus1   up/up      10.10.0.9/24       n3             e4a
true
             n3_clus2   up/up      10.10.0.10/24      n3             e4e
true
             n4_clus1   up/up      10.10.0.11/24      n4             e4a
true
             n4_clus2   up/up      10.10.0.12/24      n4             e4e
true
12 entries were displayed.
```

17. Verify that the cluster ports are connected:

`network port show -role cluster`

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

```
Node: n1

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

Node: n2

Ignore
                                                     Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
 --------- ------------ ---------------- ---- ---- ----------- --------
-----
e0a       Cluster      Cluster          up   9000  auto/10000 -
e0b       Cluster      Cluster          up   9000  auto/10000 -
e0c       Cluster      Cluster          up   9000  auto/10000 -
e0d       Cluster      Cluster          up   9000  auto/10000 -        -
Node: n3

Ignore
                                                     Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- ----------- --------
-----
e4a       Cluster      Cluster          up   9000 auto/40000  -
e4e       Cluster      Cluster          up   9000 auto/40000  -        -
Node: n4

Ignore
                                                     Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- ----------- --------
```

```
-----
e4a       Cluster      Cluster          up   9000 auto/40000  -
e4e       Cluster      Cluster          up   9000 auto/40000  -
        12 entries were displayed.
```

18. Ping the remote cluster interfaces and perform an RPC server check:

`cluster ping-cluster -node node-name`

The following example shows node n1 being pinged and the RPC status indicated afterward:

```
cluster::*> cluster ping-cluster -node n1
Host is n1 Getting addresses from network interface table...
Cluster n1_clus1 n1        e0a    10.10.0.1
Cluster n1_clus2 n1        e0b    10.10.0.2
Cluster n1_clus3 n1        e0c    10.10.0.3
Cluster n1_clus4 n1        e0d    10.10.0.4
Cluster n2_clus1 n2        e0a    10.10.0.5
Cluster n2_clus2 n2        e0b    10.10.0.6
Cluster n2_clus3 n2        e0c    10.10.0.7
Cluster n2_clus4 n2        e0d    10.10.0.8
Cluster n3_clus1 n3        e0a    10.10.0.9
Cluster n3_clus2 n3        e0e    10.10.0.10
Cluster n4_clus1 n4        e0a    10.10.0.11
Cluster n4_clus2 n4        e0e    10.10.0.12
Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8 10.10.0.9 10.10.0.10
10.10.0.11 10.10.0.12
Cluster Vserver Id = 4294967293 Ping status:
....
Basic connectivity succeeds on 32 path(s)
Basic connectivity fails on 0 path(s) ................
Detected 1500 byte MTU on 32 path(s):
    Local 10.10.0.1 to Remote 10.10.0.5
    Local 10.10.0.1 to Remote 10.10.0.6
    Local 10.10.0.1 to Remote 10.10.0.7
    Local 10.10.0.1 to Remote 10.10.0.8
    Local 10.10.0.1 to Remote 10.10.0.9
    Local 10.10.0.1 to Remote 10.10.0.10
    Local 10.10.0.1 to Remote 10.10.0.11
    Local 10.10.0.1 to Remote 10.10.0.12
    Local 10.10.0.2 to Remote 10.10.0.5
    Local 10.10.0.2 to Remote 10.10.0.6
    Local 10.10.0.2 to Remote 10.10.0.7
    Local 10.10.0.2 to Remote 10.10.0.8
    Local 10.10.0.2 to Remote 10.10.0.9
```

```
    Local 10.10.0.2 to Remote 10.10.0.10
    Local 10.10.0.2 to Remote 10.10.0.11
    Local 10.10.0.2 to Remote 10.10.0.12
    Local 10.10.0.3 to Remote 10.10.0.5
    Local 10.10.0.3 to Remote 10.10.0.6
    Local 10.10.0.3 to Remote 10.10.0.7
    Local 10.10.0.3 to Remote 10.10.0.8
    Local 10.10.0.3 to Remote 10.10.0.9
    Local 10.10.0.3 to Remote 10.10.0.10
    Local 10.10.0.3 to Remote 10.10.0.11
    Local 10.10.0.3 to Remote 10.10.0.12
    Local 10.10.0.4 to Remote 10.10.0.5
    Local 10.10.0.4 to Remote 10.10.0.6
    Local 10.10.0.4 to Remote 10.10.0.7
    Local 10.10.0.4 to Remote 10.10.0.8
    Local 10.10.0.4 to Remote 10.10.0.9
    Local 10.10.0.4 to Remote 10.10.0.10
    Local 10.10.0.4 to Remote 10.10.0.11
    Local 10.10.0.4 to Remote 10.10.0.12
Larger than PMTU communication succeeds on 32 path(s) RPC status:
8 paths up, 0 paths down (tcp check)
8   paths up, 0 paths down (udp check)
```

19. Display the information about the devices in your configuration by entering the following commands:

    You can execute the following commands in any order:

    - `network device-discovery show`
    - `network port show -role cluster`
    - `network interface show -role cluster`
    - `system cluster-switch show`

```
cluster::> network device-discovery show
            Local  Discovered
Node        Port   Device               Interface        Platform
----------- ------ ------------------ ----------------
----------------
n1         /cdp
            e0a    C1                 Ethernet1/1/1    N3K-C3232C
            e0b    C2                 Ethernet1/1/1    N3K-C3232C
            e0c    C2                 Ethernet1/1/2    N3K-C3232C
            e0d    C1                 Ethernet1/1/2    N3K-C3232C
n2         /cdp
            e0a    C1                 Ethernet1/1/3    N3K-C3232C
            e0b    C2                 Ethernet1/1/3    N3K-C3232C
            e0c    C2                 Ethernet1/1/4    N3K-C3232C
            e0d    C1                 Ethernet1/1/4    N3K-C3232C
n3         /cdp
            e4a    C1                 Ethernet1/7      N3K-C3232C
            e4e    C2                 Ethernet1/7      N3K-C3232C

n4         /cdp
            e4a    C1                 Ethernet1/8      N3K-C3232C
            e4e    C2                 Ethernet1/8      N3K-C3232C

12 entries were displayed.
```

```
cluster::*> network port show -role cluster
  (network port show)
Node: n1

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

Node: n2
```

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

Node: n3

Ignore
                                                          Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- -----------
-------- -----
e4a       Cluster      Cluster          up   9000 auto/40000  -
e4e       Cluster      Cluster          up   9000 auto/40000  -
-
Node: n4

Ignore
                                                          Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- -----------
-------- -----
e4a       Cluster      Cluster          up   9000 auto/40000  -
e4e       Cluster      Cluster          up   9000 auto/40000  -

12 entries were displayed.
```

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

            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node
Port    Home
----------- ---------- ---------- ------------------ -------------
------- ----
Cluster
            nm1_clus1  up/up      10.10.0.1/24       n1
e0a     true
            n1_clus2   up/up      10.10.0.2/24       n1
e0b     true
            n1_clus3   up/up      10.10.0.3/24       n1
e0c     true
            n1_clus4   up/up      10.10.0.4/24       n1
e0d     true
            n2_clus1   up/up      10.10.0.5/24       n2
e0a     true
            n2_clus2   up/up      10.10.0.6/24       n2
e0b     true
            n2_clus3   up/up      10.10.0.7/24       n2
e0c     true
            n2_clus4   up/up      10.10.0.8/24       n2
e0d     true
            n3_clus1   up/up      10.10.0.9/24       n3
e4a     true
            n3_clus2   up/up      10.10.0.10/24      n3
e4e     true
            n4_clus1   up/up      10.10.0.11/24      n4
e4a     true
            n4_clus2   up/up      10.10.0.12/24      n4
e4e     true
 12 entries were displayed.
```

```
cluster::*> system cluster-switch show
Switch                      Type               Address          Model
--------------------------- ------------------ ---------------
--------------
CL1                          cluster-network   10.10.1.101      NX3232C
Serial Number: FOX000001
Is Monitored: true
Reason:
Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
7.0(3)I6(1)
Version Source: CDP
CL2                          cluster-network   10.10.1.102      NX3232C
Serial Number: FOX000002
Is Monitored: true
Reason:
Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
7.0(3)I6(1)
Version Source: CDP

C2                          cluster-network    10.10.1.103      NX3232C
Serial Number: FOX000003
Is Monitored: true
Reason:
Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
                    7.0(3)I6(1)     Version Source: CDP 3 entries were
displayed.
```

20. Delete the replaced cluster switch CL2 if it has not been removed automatically:

    `system cluster-switch delete -device cluster-switch-name`

21. Verify that the proper cluster switches are monitored: `system cluster-switch show`

    The following example shows the cluster switches are monitored because the `Is Monitored` state is `true`.

```
cluster::> system cluster-switch show
Switch                      Type               Address          Model
--------------------------- ------------------ ----------------
--------------
CL1                         cluster-network    10.10.1.101      NX3232C
Serial Number: FOX000001
Is Monitored: true
Reason:
Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
7.0(3)I6(1)
Version Source: CDP

C2                          cluster-network    10.10.1.103      NX3232C
Serial Number: FOX000002
Is Monitored: true
Reason:

Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
7.0(3)I6(1)
Version Source: CDP
2 entries were displayed.
```

22. Enable the cluster switch health monitor log collection feature for collecting switch-related log files:

    ```
    system cluster-switch log setup-password

    system cluster-switch log enable-collection
    ```

```
cluster::*> system cluster-switch log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
CL1
C2

cluster::*> system cluster-switch log setup-password

Enter the switch name: CL1
**RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster::*> system cluster-switch log setup-password

Enter the switch name: C2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster::*> system cluster-switch log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster::*>
```

If any of these commands return an error, contact NetApp support.

23. If you suppressed automatic case creation, re-enable it by invoking an AutoSupport message:

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

Related information

Cisco Ethernet Switch description page

Hardware Universe

Replace a Cisco Nexus 3232C storage switch

You must be aware of certain configuration information, port connections and cabling requirements when you replace Cisco Nexus 3232C storage switches.

You must verify the following conditions exist before installing the NX-OS software and RCFs on a Cisco Nexus storage switch:

- Your system can support Cisco Nexus 3232C storage switches.
- You must have consulted the switch compatibility table on the Cisco Ethernet Switch page for the supported ONTAP, NX-OS, and RCF versions.

> You should be aware there can be dependencies between command syntax in the RCF and NX-OS versions.

- You must have referred to the appropriate software and upgrade guides available on the Cisco web site for complete documentation on the Cisco switch upgrade and downgrade procedures at Cisco Nexus 3000 Series Switches.
- You must have downloaded the applicable RCFs.

Steps to replace a Cisco Nexus 3232C storage switch

You can nondisruptively replace a defective Cisco Nexus 3232C storage switch by performing a specific sequence of tasks.

Before you begin

The existing network configuration must have the following characteristics:

- The Cisco Ethernet Switches page has the latest RCF and NX-OS versions on your switches.
- Management connectivity must exist on both switches.

> Make sure that all troubleshooting steps have been completed to confirm that your switch needs replacing.

The replacement Cisco Nexus 3232C switch must have the following characteristics:

- Management network connectivity must be functional.
- Console access to the replacement switch must be in place.
- The appropriate RCF and NX-OS operating system image must be loaded onto the switch.
- Initial customization of the switch must be complete.

Procedure summary:

- **Confirm the switch to be replaced is S2 (Steps 1-5)**
- **Disconnect the cables from switch S2 (Step 6)**
- **Reconnect the cables to switch NS2 (Step 7)**
- **Verify all device configurations on switch NS2 (Steps 8-10)**

- This procedure replaces the second Nexus 3232C storage switch S2 with the new 3232C switch NS2.
- The two nodes are node1 and node2.

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. Check on the health status of the storage node ports to make sure that there is connection to storage switch S1: `storage port show -port-type ENET`

```
storage::*> storage port show -port-type ENET
                                     Speed                      VLAN
Node                Port Type  Mode    (Gb/s) State    Status      ID
------------------- ---- ----- ------- ------ -------- --------- ----
node1
                    e3a  ENET  storage    100 enabled  online      30
                    e3b  ENET  storage      0 enabled  offline     30
                    e7a  ENET  storage      0 enabled  offline     30
                    e7b  ENET  storage      0 enabled  offline     30
node2
                    e3a  ENET  storage    100 enabled  online      30
                    e3b  ENET  storage      0 enabled  offline     30
                    e7a  ENET  storage      0 enabled  offline     30
                    e7b  ENET  storage      0 enabled  offline     30
```

3. Verify that storage switch S1 is available: `network device-discovery show`

```
storage::*> network device-discovery show
Node/       Local  Discovered
Protocol    Port   Device (LLDP: ChassisID)  Interface         Platform
----------- ------ ------------------------- -----------------
----------------
node1/cdp
            e3a    S1                        Ethernet1/1       NX3232C
            e4a    node2                     e4a               AFF-A700
            e4e    node2                     e4e               AFF-A700
node1/lldp
            e3a    S1                        Ethernet1/1       -
            e4a    node2                     e4a               -
            e4e    node2                     e4e               -
node2/cdp
            e3a    S1                        Ethernet1/2       NX3232C
            e4a    node1                     e4a               AFF-A700
            e4e    node1                     e4e               AFF-A700
node2/lldp
            e3a    S1                        Ethernet1/2       -
            e4a    node1                     e4a               -
            e4e    node1                     e4e               -
```

4. Run the `show lldp neighbors` command on the working switch to confirm that you can see both nodes and all shelves: `show lldp neighbors`

```
S1# show lldp neighbors
Capability codes:
  (R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device
  (W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other
Device ID               Local Intf      Hold-time  Capability  Port ID
node1                   Eth1/1          121        S           e3a
node2                   Eth1/2          121        S           e3a
SHFGD2008000011         Eth1/5          121        S           e0a
SHFGD2008000011         Eth1/6          120        S           e0a
SHFGD2008000022         Eth1/7          120        S           e0a
SHFGD2008000022         Eth1/8          120        S           e0a
```

5. Verify the shelf ports in the storage system: `storage shelf port show -fields remote-device,remote-port`

```
storage::*> storage shelf port show -fields remote-device,remote-port

shelf  id  remote-port  remote-device
-----  --  -----------  -------------
3.20   0   Ethernet1/5  S1
3.20   1   -            -
3.20   2   Ethernet1/6  S1
3.20   3   -            -
3.30   0   Ethernet1/7  S1
3.20   1   -            -
3.30   2   Ethernet1/8  S1
3.20   3   -            -
```

6. Remove all cables attached to storage switch S2.
7. Reconnect all cables to the replacement switch NS2.
8. Recheck the health status of the storage node ports: `storage port show -port-type ENET`

```
storage::*> storage port show -port-type ENET
                                    Speed                       VLAN
Node                Port Type  Mode    (Gb/s) State    Status      ID
------------------- ---- ----- ------- ------ -------- ---------- ---
node1
                    e3a  ENET  storage    100 enabled  online      30
                    e3b  ENET  storage      0 enabled  offline     30
                    e7a  ENET  storage      0 enabled  offline     30
                    e7b  ENET  storage    100 enabled  online      30
node2
                    e3a  ENET  storage    100 enabled  online      30
                    e3b  ENET  storage      0 enabled  offline     30
                    e7a  ENET  storage      0 enabled  offline     30
                    e7b  ENET  storage    100 enabled  online      30
```

9. Verify that both switches are available: `network device-discovery show`

```
storage::*> network device-discovery show
Node/       Local  Discovered
Protocol    Port   Device (LLDP: ChassisID)  Interface         Platform
----------- ------ ------------------------- ----------------  --------
node1/cdp
            e3a    S1                        Ethernet1/1       NX3232C
            e4a    node2                     e4a               AFF-A700
            e4e    node2                     e4e               AFF-A700
            e7b    NS2                       Ethernet1/1       NX3232C
node1/lldp
            e3a    S1                        Ethernet1/1       -
            e4a    node2                     e4a               -
            e4e    node2                     e4e               -
            e7b    NS2                       Ethernet1/1       -
node2/cdp
            e3a    S1                        Ethernet1/2       NX3232C
            e4a    node1                     e4a               AFF-A700
            e4e    node1                     e4e               AFF-A700
            e7b    NS2                       Ethernet1/2       NX3232C
node2/lldp
            e3a    S1                        Ethernet1/2       -
            e4a    node1                     e4a               -
            e4e    node1                     e4e               -
            e7b    NS2                       Ethernet1/2       -
```

10. Verify the shelf ports in the storage system: `storage shelf port show -fields remote-device,remote-port`

```
storage::*> storage shelf port show -fields remote-device,remote-port
shelf id remote-port remote-device
----- -- ----------- -------------
3.20  0  Ethernet1/5 S1
3.20  1  Ethernet1/5 NS2
3.20  2  Ethernet1/6 S1
3.20  3  Ethernet1/6 NS2
3.30  0  Ethernet1/7 S1
3.20  1  Ethernet1/7 NS2
3.30  2  Ethernet1/8 S1
3.20  3  Ethernet1/8 NS2
```

11. If you suppressed automatic case creation, re-enable it by invoking an AutoSupport message: `system node autosupport invoke -node * -type all -message MAINT=END`

Upgrade a Cisco Nexus 3232C storage switch

The Cisco NX-OS software and reference configuration files (RCFs) can be upgraded on Cisco Nexus 3232C storage switches.

Before you begin

The following conditions must exist before you upgrade the NX-OS software and RCFs on the storage switch:

- The switch must be fully functioning (there should be no errors in the logs or similar issues).
- You must have checked or set your desired boot variables in the RCF to reflect the desired boot images if you are installing only NX-OS and keeping your current RCF version.

  If you need to change the boot variables to reflect the current boot images, you must do so before reapplying the RCF so that the correct version is instantiated on future reboots.
- You must have referred to the appropriate software and upgrade guides available on the Cisco Nexus 3000 Series Switches page for complete documentation on the Cisco storage upgrade and downgrade procedures.
- The number of 10 GbE and 40/100 GbE ports are defined in the reference configuration files (RCFs) available on the Cisco® Ethernet Switches page.

Procedure summary:

- **I. Check the health status of switches and ports (Steps 1- 4)**
- **II. Copy the RCF to Cisco switch S2 (Steps 5 - 8)**
- **III. Download the NX-OS image to Cisco switch S2 and reboot (Steps 9 - 12)**
- **IV. Recheck the health status of switches and ports (Steps 13 - 15)**
- **V. Repeat Steps 1- 17 for Cisco switch S1.**

The examples in this procedure use two nodes; node1 with two storage ports and node2 with two storage ports. See the Hardware Universe to verify the correct storage ports on your platforms.

The command outputs might vary depending on different releases of ONTAP.

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

- The names of the two storage switches are S1 and S2.
- The nodes are node1 and node2.

The procedure requires the use of both ONTAP commands and Cisco Nexus 3000 Series Switches commands; ONTAP commands are used unless otherwise indicated.

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. Check that the storage switches are available: `system switch ethernet show`

```
storage::*> system switch ethernet show
Switch                       Type               Address          Model
---------------------------- ------------------ ----------------
---------------
S1
                             storage-network    172.17.227.5     NX3232C
     Serial Number: FOC221206C2
      Is Monitored: true
            Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(3)
    Version Source: CDP

S2
                             storage-network    172.17.227.6     NX3232C
     Serial Number: FOC220443LZ
      Is Monitored: true
            Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(3)
    Version Source: CDP

2 entries were displayed.
storage::*>
```

3. Verify that the node ports are healthy and operational: `storage port show -port-type ENET`

```
storage::*> storage port show -port-type ENET
                                     Speed                       VLAN
Node                Port Type  Mode    (Gb/s) State    Status        ID
------------------ ---- ----- ------- ------ -------- ----------- ----
node1
                    e3a  ENET  storage    100 enabled  online        30
                    e3b  ENET  storage      0 enabled  offline       30
                    e7a  ENET  storage      0 enabled  offline       30
                    e7b  ENET  storage    100 enabled  online        30
node2
                    e3a  ENET  storage    100 enabled  online        30
                    e3b  ENET  storage      0 enabled  offline       30
                    e7a  ENET  storage      0 enabled  offline       30
                    e7b  ENET  storage    100 enabled  online        30
```

4. Check that there are no storage switch or cabling issues with the cluster: `system health alert show -instance`

```
storage::*> system health alert show -instance
There are no entries matching your query.
```

5. Copy the RCF on switch S2 to the switch bootflash using one of the following transfer protocols: FTP, HTTP, TFTP, SFTP, or SCP.

   For more information on Cisco commands, see the appropriate guide in the Cisco Nexus 3000 Series NX-OS Command References.

   The following example shows HTTP being used to copy an RCF to the bootflash on switch S2:

```
S2# copy http://172.16.10.1//cfg/Nexus_3232C_RCF_v1.6-Storage.txt
bootflash: vrf management
% Total    % Received % Xferd  Average  Speed   Time    Time     Time
Current
                               Dload    Upload  Total   Spent    Left
Speed
  100        3254       100    3254     0       0       8175     0 --:
--:-- --:--:-- --:--:-   8301
Copy complete, now saving to disk (please wait)...
Copy complete.
S2#
```

6. Apply the RCF previously downloaded to the bootflash: `copy bootflash:`

   The following example shows the RCF file `Nexus_3232C_RCF_v1.6-Storage.txt` being installed on switch S2:

```
S2# copy Nexus_3232C_RCF_v1.6-Storage.txt running-config echo-commands
```

7. Verify that the RCF file is the correct newer version: `show running-config`

   When you check the output to verify you have the correct RCF, make sure that the following information is correct:

   - The RCF banner
   - The node and port settings
   - Customizations The output varies according to your site configuration. Check the port settings and refer to the release notes for any changes specific to the RCF that you have installed.

   > In the banner output from the `show banner motd` command, you must read and follow the instructions in the **IMPORTANT NOTES** section to ensure the proper configuration and operation of the switch.

```
S2# show banner motd

**********************************************************************
******
* NetApp Reference Configuration File (RCF)
*
* Switch   : Cisco Nexus 3232C
* Filename : Nexus_3232C_RCF_v1.6-Storage.txt
* Date     : Oct-20-2020
* Version  : v1.6
*
* Port Usage : Storage configuration
* Ports  1-32: Controller and Shelf Storage Ports
* Ports 33-34: Disabled
*
* IMPORTANT NOTES*
* - This RCF utilizes QoS and requires TCAM re-configuration, requiring
RCF
*   to be loaded twice with the Storage Switch rebooted in between.
*
* - Perform the following 4 steps to ensure proper RCF installation:
*
*   (1) Apply RCF first time, expect following messages:
*       - Please save config and reload the system...
*       - Edge port type (portfast) should only be enabled on ports...
*       - TCAM region is not configured for feature QoS class IPv4
ingress...
*
*   (2) Save running-configuration and reboot Cluster Switch
*
*   (3) After reboot, apply same RCF second time and expect following
messages:
*       - % Invalid command at '^' marker
*       - Syntax error while parsing...
*
*   (4) Save running-configuration again
**********************************************************************
******
S2#
```

8. After you verify that the software versions and switch settings are correct, copy the `running-config` file to the `startup-config` file on switch S2.

   For more information on Cisco commands, see the appropriate guide in the Cisco Nexus 3000 Series NX-OS Command References.

The following example shows the `running-config` file successfully copied to the `startup-config` file:

```
S2# copy running-config startup-config
[########################################] 100% Copy complete.
```

9. Download the NX-OS image to switch S2.
10. Install the system image so that the new version will be loaded the next time switch S2 is rebooted.

The switch will be reboot in 10 seconds with the new image as shown in the following output:

```
S2# install all nxos bootflash:nxos.9.3.4.bin
Installer will perform compatibility check first. Please wait.
Installer is forced disruptive

Verifying image bootflash:/nxos.9.3.4.bin for boot variable "nxos".
[####################] 100% -- SUCCESS

Verifying image type.
[[####################] 100% -- SUCCESS

Preparing "nxos" version info using image bootflash:/nxos.9.3.4.bin.
[####################] 100% -- SUCCESS

Preparing "bios" version info using image bootflash:/nxos.9.3.4.bin.
[####################] 100% -- SUCCESS

Performing module support checks.
[####################] 100% -- SUCCESS

Notifying services about system upgrade.
[####################] 100% -- SUCCESS


Compatibility check is done:
Module  bootable          Impact  Install-type  Reason
------  --------  --------------  ------------  ------
     1       yes      disruptive         reset  default upgrade is not
hitless


Images will be upgraded according to following table:
Module       Image                  Running-Version(pri:alt)
New-Version  Upg-Required
------  ----------  ----------------------------------------
-------------------  ------------
```

```
     1        nxos                                      9.3(3)
9.3(4)           yes
     1        bios     v08.37(01/28/2020):v08.23(09/23/2015)
v08.38(05/29/2020)             no


Switch will be reloaded for disruptive upgrade.
Do you want to continue with the installation (y/n)?  [n]  y
input string too long
Do you want to continue with the installation (y/n)?  [n] y

Install is in progress, please wait.

Performing runtime checks.
[####################] 100% -- SUCCESS

Setting boot variables.
[####################] 100% -- SUCCESS

Performing configuration copy.
[####################] 100% -- SUCCESS

Module 1: Refreshing compact flash and upgrading bios/loader/bootrom.
Warning: please do not remove or power off the module at this time.
[####################] 100% -- SUCCESS


Finishing the upgrade, switch will reboot in 10 seconds.
S2#
```

11. Save the configuration.

    For more information on Cisco commands, see the appropriate guide in the Cisco Nexus 3000 Series NX-OS Command References.

    You are prompted to reboot the system as shown in the following example:

```
S2# copy running-config startup-config
[########################################] 100% Copy complete.
S2# reload
This command will reboot the system. (y/n)?  [n] y
```

12. Confirm that the new NX-OS version number is on the switch:

```
S2# show version
Cisco Nexus Operating System (NX-OS) Software
```

```
TAC support: http://www.cisco.com/tac
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The copyrights to certain works contained in this software are
owned by other third parties and used and distributed under their own
licenses, such as open source.  This software is provided "as is," and
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Lesser General Public License (LGPL) Version 2.1 or
Lesser General Public License (LGPL) Version 2.0.
A copy of each such license is available at
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http://opensource.org/licenses/gpl-3.0.html and
http://www.opensource.org/licenses/lgpl-2.1.php and
http://www.gnu.org/licenses/old-licenses/library.txt.

Software
  BIOS: version 08.38
 NXOS: version 9.3(4)
  BIOS compile time:  05/29/2020
  NXOS image file is: bootflash:///nxos.9.3.4.bin
  NXOS compile time:  4/28/2020 21:00:00 [04/29/2020 02:28:31]


Hardware
  cisco Nexus3000 C3232C Chassis (Nexus 9000 Series)
  Intel(R) Xeon(R) CPU E5-2403 v2 @ 1.80GHz with 8154432 kB of memory.
  Processor Board ID FOC20291J6K

  Device name: S2
  bootflash:   53298520 kB
Kernel uptime is 0 day(s), 0 hour(s), 3 minute(s), 42 second(s)

Last reset at 157524 usecs after Mon Nov  2 18:32:06 2020
  Reason: Reset due to upgrade
  System version: 9.3(3)
  Service:

plugin
  Core Plugin, Ethernet Plugin
```

```
Active Package(s):

S2#
```

13. Recheck that the storage switches are available after the reboot: `system switch ethernet show`

```
storage::*> system switch ethernet show
Switch                      Type               Address          Model
--------------------------- ------------------ ----------------
---------------
S1
                            storage-network    172.17.227.5     NX3232C
     Serial Number: FOC221206C2
      Is Monitored: true
            Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(4)
    Version Source: CDP

S2
                            storage-network    172.17.227.6     NX3232C
     Serial Number: FOC220443LZ
      Is Monitored: true
            Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(4)
    Version Source: CDP

2 entries were displayed.
storage::*>
```

14. Verify that the switch ports are healthy and operational after the reboot: `storage port show -port -type ENET`

```
storage::*> storage port show -port-type ENET
                                     Speed                       VLAN
Node                Port Type  Mode    (Gb/s) State    Status        ID
------------------- ---- ----- ------- ------ -------- ----------- ----
node1
                    e3a  ENET  storage    100 enabled  online        30
                    e3b  ENET  storage      0 enabled  offline       30
                    e7a  ENET  storage      0 enabled  offline       30
                    e7b  ENET  storage    100 enabled  online        30
node2
                    e3a  ENET  storage    100 enabled  online        30
                    e3b  ENET  storage      0 enabled  offline       30
                    e7a  ENET  storage      0 enabled  offline       30
                    e7b  ENET  storage    100 enabled  online        30
```

15. Recheck that there are no storage switch or cabling issues with the cluster: `system health alert show -instance`

```
storage::*> system health alert show -instance
There are no entries matching your query.
```

16. Repeat the procedure to upgrade the NX-OS software and RCF on switch S1.

17. If you suppressed automatic case creation, re-enable it by invoking an AutoSupport message: `system node autosupport invoke -node * -type all -message MAINT=END`