Migrate switches

Install and maintain

NetApp
February 13, 2026

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Migrate from a switchless cluster with direct-attached storage

You can migrate from a switchless cluster with direct-attached storage by adding two new shared switches.

The procedure you use depends on whether you have two dedicated cluster-network ports on each controller or a single cluster port on each controller. The process documented works for all nodes using optical or Twinax ports, but is not supported on this switch if nodes are using onboard 10Gb BASE-T RJ45 ports for the cluster-network ports.

Most systems require two dedicated cluster-network ports on each controller. See Cisco Ethernet Switches for more information.

If you have an existing two-node switchless cluster environment, you can migrate to a two-node switched cluster environment using Cisco Nexus 9336C-FX2 switches to enable you to scale beyond two nodes in the cluster.

Review requirements

Ensure that:

- For the two-node switchless configuration:
  - The two-node switchless configuration is properly set up and functioning.
  - The nodes are running ONTAP 9.8 and later.
  - All cluster ports are in the **up** state.
  - All cluster logical interfaces (LIFs) are in the **up** state and on their **home** ports.
- For the Cisco Nexus 9336C-FX2 switch configuration:
  - Both switches have management network connectivity.
  - There is console access to the cluster switches.
  - Nexus 9336C-FX2 node-to-node switch and switch-to-switch connections use Twinax or fiber cables.
  - The NetApp Hardware Universe contains more information about cabling.
  - Inter-Switch Link (ISL) cables are connected to ports 1/35 and 1/36 on both 9336C-FX2 switches.
- Initial customization of the 9336C-FX2 switches are completed. So that the:
  - 9336C-FX2 switches are running the latest version of software
  - Reference Configuration Files (RCFs) have been applied to the switches
  - Any site customization, such as SMTP, SNMP, and SSH is configured on the new switches.

Migrate the switches

About the examples

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

- The names of the 9336C-FX2 switches are *cs1* and *cs2*.
- The names of the cluster SVMs are *node1* and *node2*.
- The names of the LIFs are *node1_clus1* and *node1_clus2* on node 1, and *node2_clus1* and *node2_clus2* on node 2 respectively.
- The cluster1::*> prompt indicates the name of the cluster.
- The cluster ports used in this procedure are *e3a* and *e3b*, as per the AFF A400 controller. The Hardware Universe contains the latest information about the actual cluster ports for your platforms.

Step 1: Migrate from a switchless cluster with direct-attached

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`.

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

   Show example

   The following example shows that node-facing ports 1 through 34 are disabled on switch cs1:

   ```
   cs1# config
   Enter configuration commands, one per line. End with CNTL/Z.
   cs1(config)# interface e1/1-34
   cs1(config-if-range)# shutdown
   ```

4. Verify that the ISL and the physical ports on the ISL between the two 9336C-FX2 switches cs1 and cs2 are up on ports 1/35 and 1/36:

   ```
   show port-channel summary
   ```

Show example

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

```
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      Eth1/35(P)   Eth1/36(P)
```

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

```
       cs2# 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      Eth1/35(P)   Eth1/36(P)
```

5. Display the list of neighboring devices:

```
show cdp neighbors
```

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

Show example

The following example lists the neighboring devices on switch cs1:

```
cs1# 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
cs2                Eth1/35        175    R S I s     N9K-C9336C
Eth1/35
cs2                Eth1/36        175    R S I s     N9K-C9336C
Eth1/36
Total entries displayed: 2
```

The following example lists the neighboring devices on switch cs2:

```
cs2# 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
cs1                Eth1/35        177    R S I s     N9K-C9336C
Eth1/35
cs1           )    Eth1/36        177    R S I s     N9K-C9336C
Eth1/36

Total entries displayed: 2
```

6. Verify that all cluster ports are up:

```
network port show - ipspace Cluster
```

Each port should display up for Link and healthy for Health Status.

Show example

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

Node: node1
                                                                  Speed(Mbps)
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper
Status
--------- ------------ ---------------- ---- ---- ------------
---------
e3a       Cluster      Cluster          up   9000  auto/100000
healthy
e3b       Cluster      Cluster          up   9000  auto/100000
healthy

Node: node2
                                                                  Speed(Mbps)
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper
Status
--------- ------------ ---------------- ---- ---- ------------
---------
e3a       Cluster      Cluster          up   9000  auto/100000
healthy
e3b       Cluster      Cluster          up   9000  auto/100000
healthy
4 entries were displayed.
```

7. Verify that all cluster LIFs are up and operational:

   `network interface show - vserver Cluster`

   Each cluster LIF should display true for `Is Home` and have a Status Admin/Oper of up/up.

Show example

```
cluster1::*> network interface show -vserver Cluster
            Logical     Status     Network            Current
Current Is
Vserver     Interface   Admin/Oper Address/Mask       Node
Port    Home
----------- ---------- ---------- ------------------ -------------
------- -----
Cluster
            node1_clus1  up/up    169.254.209.69/16  node1
e3a     true
            node1_clus2  up/up    169.254.49.125/16  node1
e3b     true
            node2_clus1  up/up    169.254.47.194/16  node2
e3a     true
            node2_clus2  up/up    169.254.19.183/16  node2
e3b     true
4 entries were displayed.
```

8. Verify that auto-revert is enabled on all cluster LIFs:

```
network interface show - vserver Cluster -fields auto-revert
```

Show example

```
cluster1::*> network interface show -vserver Cluster -fields auto-
revert
       Logical
Vserver   Interface     Auto-revert
--------- ------------- ------------
Cluster
          node1_clus1   true
          node1_clus2   true
          node2_clus1   true
          node2_clus2   true
4 entries were displayed.
```

9. Disconnect the cable from cluster port e3a on node1, and then connect e3a to port 1 on cluster switch cs1, using the appropriate cabling supported by the 9336C-FX2 switches.

   The NetApp Hardware Universe contains more information about cabling. See What additional information do I need to install my equipment that is not in HWU? for more information about switch installation

requirements.

10. Disconnect the cable from cluster port e3a on node2, and then connect e3a to port 2 on cluster switch cs1, using the appropriate cabling supported by the 9336C-FX2 switches.
11. Enable all node-facing ports on cluster switch cs1.

Show example

The following example shows that ports 1/1 through 1/34 are enabled on switch cs1:

```
cs1# config
Enter configuration commands, one per line. End with CNTL/Z.
cs1(config)# interface e1/1-34
cs1(config-if-range)# no shutdown
```

12. Verify that all cluster LIFs are **up**, operational, and display as true for `Is Home`:

`network interface show - vserver Cluster`

Show example

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

```
cluster1::*> network interface show -vserver Cluster
          Logical      Status     Network            Current
Current Is
Vserver   Interface    Admin/Oper Address/Mask       Node
Port    Home
--------- ------------ ---------- ------------------ -----------
------- ----
Cluster
          node1_clus1  up/up      169.254.209.69/16  node1       e3a
true
          node1_clus2  up/up      169.254.49.125/16  node1       e3b
true
          node2_clus1  up/up      169.254.47.194/16  node2       e3a
true
          node2_clus2  up/up      169.254.19.183/16  node2       e3b
true
4 entries were displayed.
```

13. Display information about the status of the nodes in the cluster:

```
cluster show
```

Show example

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

```
cluster1::*> cluster show
Node                 Health  Eligibility   Epsilon
-------------------- ------- ------------  ------------
node1                true    true          false
node2                true    true          false
2 entries were displayed.
```

14. Disconnect the cable from cluster port e3b on node1, and then connect e3b to port 1 on cluster switch cs2, using the appropriate cabling supported by the 9336C-FX2 switches.
15. Disconnect the cable from cluster port e3b on node2, and then connect e3b to port 2 on cluster switch cs2, using the appropriate cabling supported by the 9336C-FX2 switches.
16. Enable all node-facing ports on cluster switch cs2.

Show example

The following example shows that ports 1/1 through 1/34 are enabled on switch cs2:

```
cs2# config
Enter configuration commands, one per line. End with CNTL/Z.
cs2(config)# interface e1/1-34
cs2(config-if-range)# no shutdown
```

17. Verify that all cluster ports are up:

```
network port show - ipspace Cluster
```

Show example

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

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

Node: node1

Ignore
                                                  Speed(Mbps)
Health   Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper
Status   Status
--------- ------------ ---------------- ---- ---- ------------
-------- ------
e3a       Cluster      Cluster          up   9000  auto/100000
healthy  false
e3b       Cluster      Cluster          up   9000  auto/100000
healthy  false

Node: node2

Ignore
                                                  Speed(Mbps)
Health   Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper
Status   Status
--------- ------------ ---------------- ---- ---- ------------
-------- ------
e3a       Cluster      Cluster          up   9000  auto/100000
healthy  false
e3b       Cluster      Cluster          up   9000  auto/100000
healthy  false
4 entries were displayed.
```

18. Verify that all interfaces display true for `Is Home`:

`network interface show - vserver Cluster`

This might take several minutes to complete.

Show example

The following example shows that all LIFs are **up** on node1 and node2 and that `Is Home` results are true:

```
cluster1::*> network interface show -vserver Cluster
          Logical      Status     Network            Current
Current Is
Vserver   Interface    Admin/Oper Address/Mask       Node       Port
Home
--------- ------------ ---------- ------------------ ----------
------- ----
Cluster
          node1_clus1  up/up      169.254.209.69/16  node1      e3a
true
          node1_clus2  up/up      169.254.49.125/16  node1      e3b
true
          node2_clus1  up/up      169.254.47.194/16  node2      e3a
true
          node2_clus2  up/up      169.254.19.183/16  node2      e3b
true
4 entries were displayed.
```

19. Verify that both nodes each have one connection to each switch:

```
show cdp neighbors
```

Show example

The following example shows the appropriate results for both switches:

```
cs1# 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
node1              Eth1/1         133    H           AFFA400
e3a
node2              Eth1/2         133    H           AFFA400
e3a
cs2                Eth1/35        175    R S I s     N9K-C9336C
Eth1/35
cs2                Eth1/36        175    R S I s     N9K-C9336C
Eth1/36
Total entries displayed: 4
cs2# 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
node1              Eth1/1         133    H           AFFA400
e3b
node2              Eth1/2         133    H           AFFA400
e3b
cs1                Eth1/35        175    R S I s     N9K-C9336C
Eth1/35
cs1                Eth1/36        175    R S I s     N9K-C9336C
Eth1/36
Total entries displayed: 4
```

20. Display information about the discovered network devices in your cluster:

```
network device-discovery show -protocol cdp
```

Show example

```
cluster1::*> network device-discovery show -protocol cdp
Node/       Local  Discovered
Protocol    Port   Device (LLDP: ChassisID)  Interface
Platform
----------- ------ ------------------------- ----------------
----------------
node2       /cdp
            e3a    cs1                       0/2               N9K-
C9336C
            e3b    cs2                       0/2               N9K-
C9336C

node1       /cdp
            e3a    cs1                       0/1               N9K-
C9336C
            e3b    cs2                       0/1               N9K-
C9336C
4 entries were displayed.
```

21. Verify that the storage configuration of HA pair 1 (and HA pair 2) is correct and error free:

```
system switch ethernet show
```

Show example

```
storage::*> system switch ethernet show
Switch                    Type                  Address
Model
------------------------- --------------------- ---------------
----------
sh1
                          storage-network       172.17.227.5
C9336C

       Serial Number: FOC221206C2
        Is Monitored: true
              Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                      9.3(5)
      Version Source: CDP
sh2
                          storage-network       172.17.227.6
C9336C
       Serial Number: FOC220443LZ
        Is Monitored: true
              Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                      9.3(5)
      Version Source: CDP
2 entries were displayed.
storage::*>
```

22. Verify that the settings are disabled:

```
network options switchless-cluster show
```

> It might take several minutes for the command to complete. Wait for the '3-minute lifetime to expire' announcement.

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

Show example

```
cluster1::*> network options switchless-cluster show
Enable Switchless Cluster: false
```

23. Verify the status of the node members in the cluster:

```
cluster show
```

Show example

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

```
cluster1::*> cluster show
Node                 Health  Eligibility   Epsilon
-------------------- ------- ------------  --------
node1                true    true          false
node2                true    true          false
```

24. Verify the connectivity of the remote cluster interfaces:

ONTAP 9.9.1 and later

You can use the `network interface check cluster-connectivity` command to start an accessibility check for cluster connectivity and then display the details:

`network interface check cluster-connectivity start` and `network interface check cluster-connectivity show`

```
cluster1::*> network interface check cluster-connectivity start
```

NOTE: Wait for a number of seconds before running the `show` command to display the details.

```
cluster1::*> network interface check cluster-connectivity show
                                  Source           Destination
Packet
Node   Date                       LIF              LIF
Loss
------ -------------------------- ---------------- ----------------
-----------
node1
       3/5/2022 19:21:18 -06:00   node1_clus2      node2-clus1
none
       3/5/2022 19:21:20 -06:00   node1_clus2      node2_clus2
none
node2
       3/5/2022 19:21:18 -06:00   node2_clus2      node1_clus1
none
       3/5/2022 19:21:20 -06:00   node2_clus2      node1_clus2
none
```

All ONTAP releases

For all ONTAP releases, you can also use the `cluster ping-cluster -node <name>` command to check the connectivity:

```
cluster ping-cluster -node <name>
```

```
cluster1::*> cluster ping-cluster -node local
Host is node2
Getting addresses from network interface table...
Cluster node1_clus1 169.254.209.69 node1 e3a
Cluster node1_clus2 169.254.49.125 node1 e3b
Cluster node2_clus1 169.254.47.194 node2 e3a
Cluster node2_clus2 169.254.19.183 node2 e3b
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 169.254.47.194 to Remote 169.254.209.69
Local 169.254.47.194 to Remote 169.254.49.125
Local 169.254.19.183 to Remote 169.254.209.69
Local 169.254.19.183 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)
```

25. Change the privilege level back to admin:

```
set -privilege admin
```

Step 2: Set up the shared switch

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

- The names of the two shared switches are *sh1* and *sh2*.
- The nodes are *node1* and *node2*.

> The procedure requires the use of both ONTAP commands and Cisco Nexus 9000 Series Switches commands, ONTAP commands are used unless otherwise indicated.

1. Verify that the storage configuration of HA pair 1 (and HA pair 2) is correct and error free:

```
system switch ethernet show
```

Show example

```
storage::*> system switch ethernet show
Switch                    Type                  Address
Model
------------------------- --------------------  ---------------
-------
sh1
                          storage-network       172.17.227.5
C9336C

      Serial Number: FOC221206C2
       Is Monitored: true
             Reason: None
   Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                     9.3(5)
     Version Source: CDP
sh2
                          storage-network       172.17.227.6
C9336C
       Serial Number: FOC220443LZ
        Is Monitored: true
              Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                      9.3(5)
      Version Source: CDP
2 entries were displayed.
storage::*>
```

2. Verify that the storage node ports are healthy and operational:

```
storage port show -port-type ENET
```

Show example

```
storage::*> storage port show -port-type ENET
                                     Speed
VLAN
Node    Port    Type    Mode        (Gb/s)      State      Status
ID
------- ------- ------- ---------- ----------- ---------- ----------
-----
node1
        e0c     ENET   storage          100      enabled  online
30
        e0d     ENET   storage          100      enabled  online
30
        e5a     ENET   storage          100      enabled  online
30
        e5b     ENET   storage          100      enabled  online
30

node2
        e0c     ENET  storage           100      enabled  online
30
        e0d     ENET  storage           100      enabled  online
30
        e5a     ENET  storage           100      enabled  online
30
        e5b     ENET  storage           100      enabled  online
30
```

3. Move the HA pair 1, NSM224 path A ports to sh1 port range 11-22.
4. Install a cable from HA pair 1, node1, path A to sh1 port range 11-22. For example, the path A storage port on an AFF A400 is e0c.
5. Install a cable from HA pair 1, node2, path A to sh1 port range 11-22.
6. Verify that the node ports are healthy and operational:

   ```
   storage port show -port-type ENET
   ```

Show example

```
storage::*> storage port show -port-type ENET
                                    Speed
VLAN
Node    Port    Type    Mode        (Gb/s)      State      Status
ID
------- ------- ------- ---------- ----------- ---------- ----------
-----
node1
        e0c     ENET   storage          100      enabled  online
30
        e0d     ENET   storage            0      enabled  offline
30
        e5a     ENET   storage            0      enabled  offline
30
        e5b     ENET   storage          100      enabled  online
30

node2
        e0c     ENET  storage           100      enabled  online
30
        e0d     ENET  storage             0      enabled  offline
30
        e5a     ENET  storage             0      enabled  offline
30
        e5b     ENET  storage           100      enabled  online
30
```

7. Check that there are no storage switch or cabling issues with the cluster:

   `system health alert show -instance`

   Show example

   ```
   storage::*> system health alert show -instance
   There are no entries matching your query.
   ```

8. Move the HA pair 1, NSM224 path B ports to sh2 port range 11-22.
9. Install a cable from HA pair 1, node1, path B to sh2 port range 11-22. For example, the path B storage port on an AFF A400 is e5b.
10. Install a cable from HA pair 1, node2, path B to sh2 port range 11-22.

11. Verify that the node ports are healthy and operational:

    `storage port show -port-type ENET`

    Show example

```
storage::*> storage port show -port-type ENET
                                   Speed
VLAN
Node    Port    Type    Mode       (Gb/s)      State      Status
ID
------- ------- ------- ---------- ----------- ---------- ----------
-----
node1
        e0c     ENET   storage          100      enabled  online
30
        e0d     ENET   storage            0      enabled  offline
30
        e5a     ENET   storage            0      enabled  offline
30
        e5b     ENET   storage          100      enabled  online
30

node2
        e0c     ENET  storage           100      enabled  online
30
        e0d     ENET  storage             0      enabled  offline
30
        e5a     ENET  storage             0      enabled  offline
30
        e5b     ENET  storage           100      enabled  online
30
```

12. Verify that the storage configuration of HA pair 1 is correct and error free:

    `system switch ethernet show`

Show example

```
storage::*> system switch ethernet show
Switch                    Type                  Address
Model
------------------------- --------------------- ----------------
----------
sh1
                          storage-network       172.17.227.5
C9336C

      Serial Number: FOC221206C2
       Is Monitored: true
             Reason: None
   Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                     9.3(5)
     Version Source: CDP
sh2
                          storage-network       172.17.227.6
C9336C
      Serial Number: FOC220443LZ
       Is Monitored: true
             Reason: None
   Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                     9.3(5)
     Version Source: CDP
2 entries were displayed.
storage::*>
```

13. Reconfigure the unused (controller) secondary storage ports on HA pair 1 from storage to networking. If more than one NS224 was direct attached, there will be ports that should be reconfigured.

Show example

```
storage port modify –node [node name] –port [port name] –mode
network
```

To place storage ports into a broadcast domain:

- `network port broadcast-domain create` (to create a new domain, if needed)
- `network port broadcast-domain add-ports` (to add ports to an existing domain)

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

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

What's next?

After you've migrated your switches, you can configure switch health monitoring.

Migrate from a switched configuration with direct-attached storage

You can migrate from a switched configuration with direct-attached storage by adding two new shared switches.

Supported switches

The following switches are supported:

- Nexus 9336C-FX2
- Nexus 3232C

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

Connection Ports

The switches use the following ports to connect to nodes:

- Nexus 9336C-FX2:
  - Ports 1- 3: Breakout mode (4x10G) Intra-Cluster Ports, int e1/1/1-4, e1/2/1-4, e1/3/1-4
  - Ports 4- 6: Breakout mode (4x25G) Intra-Cluster/HA Ports, int e1/4/1-4, e1/5/1-4, e1/6/1-4
  - Ports 7-34: 40/100GbE Intra-Cluster/HA Ports, int e1/7-34
- Nexus 3232C:
  - Ports 1-30: 10/40/100 GbE
- The switches use the following Inter-Switch Link (ISL) ports:
  - Ports int e1/35-36: Nexus 9336C-FX2
  - Ports e1/31-32: Nexus 3232C

The Hardware Universe contains information about supported cabling for all cluster switches.

What you'll need

- Make sure you completed the following tasks:
  - Configured some of the ports on Nexus 9336C-FX2 switches to run at 100 GbE.
  - Planned, migrated, and documented 100 GbE connectivity from nodes to Nexus 9336C-FX2 switches.
  - Migrated nondisruptively other Cisco cluster switches from an ONTAP cluster to Cisco Nexus 9336C-FX2 network switches.
- The existing switch network is properly set up and functioning.
- All ports are in the **up** state to ensure nondisruptive operations.

- The Nexus 9336C-FX2 switches are configured and operating under the proper version of NX-OS installed and reference configuration file (RCF) applied.
- The existing network configuration has the following:
  - A redundant and fully functional NetApp cluster using both older Cisco switches.
  - Management connectivity and console access to both the older Cisco switches and the new switches.
  - All cluster LIFs in the **up** state with the cluster LIFs are on their home ports.
  - ISL ports enabled and cabled between the other Cisco switches and between the new switches.

About the examples

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

- The existing Cisco Nexus 3232C cluster switches are *c1* and *c2*.
- The new Nexus 9336C-FX2 switches are *sh1* and *sh2*.
- The nodes are *node1* and *node2*.
- The cluster LIFs are *node1_clus1* and *node1_clus2* on node 1, and *node2_clus1* and *node2_clus2* on node 2 respectively.
- Switch c2 is replaced by switch sh2 first and then switch c1 is replaced by switch sh1.

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.

2. Check the administrative and operational status of each cluster port.
3. Verify that all the cluster ports are up with a healthy status:

   ```
   network port show –role cluster
   ```

Show example

```
cluster1::*> network port show -role cluster
Node: node1

Ignore
                                                  Speed(Mbps)  Health
Health
Port    IPspace   Broadcast Domain Link MTU  Admin/Ope    Status
Status
------- --------- ---------------- ---- ---- ------------ --------
------
e3a     Cluster   Cluster          up   9000  auto/100000 healthy
false
e3b     Cluster   Cluster          up   9000  auto/100000 healthy
false

Node: node2

Ignore
                                                  Speed(Mbps) Health
Health
Port    IPspace   Broadcast Domain Link MTU  Admin/Oper  Status
Status
------- --------- ---------------- ---- ---- ----------- ---------
------
e3a     Cluster   Cluster          up   9000  auto/100000 healthy
false
e3b     Cluster   Cluster          up   9000  auto/100000 healthy
false
4 entries were displayed.
cluster1::*>
```

4. Verify that all the cluster interfaces (LIFs) are on the home port:

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

Show example

```
cluster1::*> network interface show -role cluster
         Logical     Status     Network           Current
Current Is
Vserver  Interface   Admin/Oper Address/Mask      Node        Port
Home
-------  ----------- ---------- ----------------- -----------
------- ----
Cluster
        node1_clus1  up/up      169.254.3.4/23    node1       e3a
true
        node1_clus2  up/up      169.254.3.5/23    node1       e3b
true
        node2_clus1  up/up      169.254.3.8/23    node2       e3a
true
        node2_clus2  up/up      169.254.3.9/23    node2       e3b
true
4 entries were displayed.
cluster1::*>
```

5. Verify that the cluster displays information for both cluster switches:

```
system cluster-switch show -is-monitoring-enabled-operational true
```

Show example

```
cluster1::*> system cluster-switch show -is-monitoring-enabled
-operational true
Switch                    Type               Address          Model
------------------------- ------------------ ---------------- ------
sh1                       cluster-network    10.233.205.90    N9K-
C9336C
     Serial Number: FOCXXXXXXGD
      Is Monitored: true
            Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(5)
    Version Source: CDP
sh2                       cluster-network    10.233.205.91    N9K-
C9336C
     Serial Number: FOCXXXXXXGS
      Is Monitored: true
            Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(5)
    Version Source: CDP
cluster1::*>
```

6. Disable auto-revert on the cluster LIFs.

Show example

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

7. Shut down the c2 switch.

Show example

```
c2# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
c2(config)# interface ethernet <int range>
c2(config)# shutdown
```

8. Verify that the cluster LIFs have migrated to the ports hosted on cluster switch sh1:

   `network interface show -role cluster`

   This might take a few seconds.

   Show example

```
cluster1::*> network interface show -role cluster
          Logical     Status     Network         Current
Current  Is
Vserver   Interface   Admin/Oper Address/Mask    Node          Port
Home
--------- ----------- ---------- --------------- ------------
-------- -----
Cluster
          node1_clus1 up/up      169.254.3.4/23  node1         e3a
true
          node1_clus2 up/up      169.254.3.5/23  node1         e3a
false
          node2_clus1 up/up      169.254.3.8/23  node2         e3a
true
          node2_clus2 up/up      169.254.3.9/23  node2         e3a
false
4 entries were displayed.
cluster1::*>
```

9. Replace switch c2 with the new switch sh2 and re-cable the new switch.
10. Verify that the ports are back up on sh2. **Note** that the LIFs are still on switch c1.
11. Shut down the c1 switch.

Show example

```
c1# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
c1(config)# interface ethernet <int range>
c1(config)# shutdown
```

12. Verify that the cluster LIFs have migrated to the ports hosted on cluster switch sh2. This might take a few seconds.

Show example

```
cluster1::*> network interface show -role cluster
         Logical        Status     Network         Current   Current
Is
Vserver  Interface      Admin/Oper Address/Mask    Node      Port
Home
-------- -------------- ---------- --------------- --------- -------
----
Cluster
         node1_clus1    up/up      169.254.3.4/23  node1     e3a
true
         node1_clus2    up/up      169.254.3.5/23  node1     e3a
false
         node2_clus1    up/up      169.254.3.8/23  node2     e3a
true
         node2_clus2    up/up      169.254.3.9/23  node2     e3a
false
4 entries were displayed.
cluster1::*>
```

13. Replace switch c1 with the new switch sh1 and re-cable the new switch.
14. Verify that the ports are back up on sh1. **Note** that the LIFs are still on switch c2.
15. Enable auto-revert on the cluster LIFs:

Show example

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

16. Verify that the cluster is healthy:

```
cluster show
```

Show example

```
cluster1::*> cluster show
Node                 Health  Eligibility   Epsilon
-------------------- ------- ------------- -------
node1                true    true          false
node2                true    true          false
2 entries were displayed.
cluster1::*>
```

What's next?

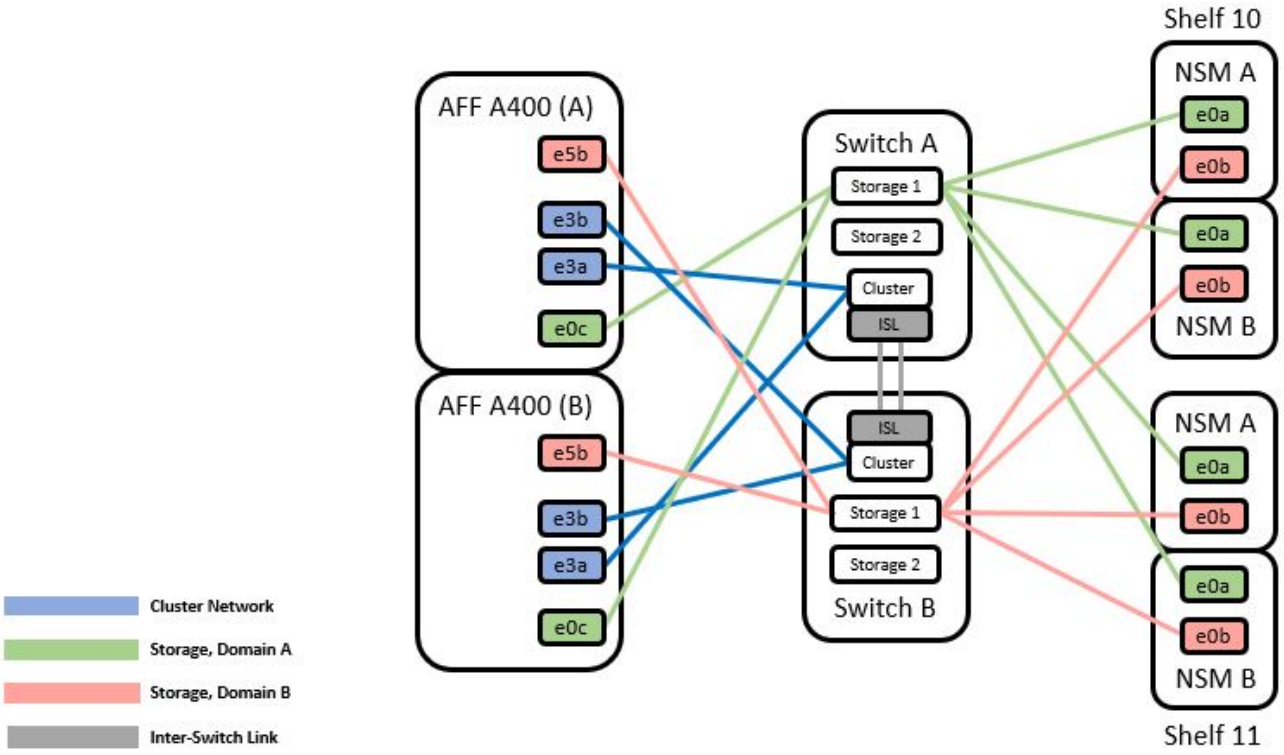
After you've migrated your switches, you can configure switch health monitoring.

Migrate from a switchless configuration with switch-attached storage by reusing the storage switches

You can migrate from a switchless configuration with switch-attached storage by reusing the storage switches.

By reusing the storage switches the storage switches of HA pair 1 become the shared switches as shown in the following figure.

Switch Attached



Steps

1. Verify that the storage configuration of HA pair 1 (and HA pair 2) is correct and error free:

   ```
   system switch ethernet show
   ```

Show example

```
storage::*> system switch ethernet show
Switch                    Type                  Address
Model
------------------------- --------------------- ----------------
----------
sh1
                          storage-network       172.17.227.5
C9336C

    Serial Number: FOC221206C2
     Is Monitored: true
           Reason: none
 Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                   9.3(5)
   Version Source: CDP
sh2
                        storage-network        172.17.227.6
C9336C
    Serial Number: FOC220443LZ
     Is Monitored: true
           Reason: None
 Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                   9.3(5)
   Version Source: CDP
2 entries were displayed.
storage::*>
```

2. Verify that the node ports are healthy and operational:

```
storage port show -port-type ENET
```

Show example

```
storage::*> storage port show -port-type ENET
                                     Speed
VLAN
Node    Port    Type    Mode        (Gb/s)    State     Status
ID
------- ------- ------- ---------- --------- --------- ---------
-----
node1
        e0c     ENET    storage           100 enabled   online
30
        e0d     ENET    storage           100 enabled   online
30
        e5a     ENET    storage           100 enabled   online
30
        e5b     ENET    storage           100 enabled   online
30

node2
        e0c     ENET    storage           100 enabled   online
30
        e0d     ENET    storage           100 enabled   online
30
        e5a     ENET    storage           100 enabled   online
30
        e5b     ENET    storage           100 enabled   online
30
```

3. Move the HA pair 1, NSM224 path A cables from storage switch A to the shared NS224 storage ports for HA pair 1, path A on storage switch A.
4. Move the cable from HA pair 1, node A, path A to the shared storage port for HA pair 1, node A on storage switch A.
5. Move the cable from HA pair 1, node B, path A to the shared storage port for HA pair 1, node B on storage switch A.
6. Verify the storage attached to HA pair 1, storage switch A is healthy:

   ```
   system health alert show -instance
   ```

Show example

```
storage::*> system health alert show -instance
There are no entries matching your query.
```

7. Replace the storage RCF on shared switch A with the shared RCF file. See Install the RCF on a Cisco Nexus 9336C-FX2 shared switch for further details.
8. Verify the storage attached to HA pair 1, storage switch B is healthy:

   `system health alert show -instance`

   Show example

   ```
   storage::*> system health alert show -instance
   There are no entries matching your query.
   ```

9. Move the HA pair 1, NSM224 path B cables from storage switch B to the shared NS224 storage ports for HA pair 1, path B to storage switch B.
10. Move the cable from HA pair 1, node A, path B to the shared storage port for HA pair 1, node A, path B on storage switch B.
11. Move the cable from HA pair 1, node B, path B to the shared storage port for HA pair 1, node B, path B on storage switch B.
12. Verify the storage attached to HA pair 1, storage switch B is healthy:

    `system health alert show -instance`

    Show example

    ```
    storage::*> system health alert show -instance
    There are no entries matching your query.
    ```

13. Replace the storage RCF file on shared switch B with the shared RCF file. See Install the RCF on a Cisco Nexus 9336C-FX2 shared switch for further details.
14. Verify the storage attached to HA pair 1, storage switch B is healthy:

    `system health alert show -instance`

Show example

```
storage::*> system health alert show -instance
There are no entries matching your query.
```

15. Install the ISLs between shared switch A and shared switch B:

Show example

```
sh1# configure
Enter configuration commands, one per line. End with CNTL/Z.
sh1 (config)# interface e1/35-36
sh1 (config-if-range)# no lldp transmit
sh1 (config-if-range)# no lldp receive
sh1 (config-if-range)# switchport mode trunk
sh1 (config-if-range)# no spanning-tree bpduguard enable
sh1 (config-if-range)# channel-group 101 mode active
sh1 (config-if-range)# exit
sh1 (config)# interface port-channel 101
sh1 (config-if)# switchport mode trunk
sh1 (config-if)# spanning-tree port type network
sh1 (config-if)# exit
sh1 (config)# exit
```

16. Convert HA pair 1 from a switchless cluster to a switched cluster. Use the cluster port assignments defined by the shared RCF. See Install NX-OS software and Reference Configuration Files (RCFs) for further details.
17. Verify that the switched networking configuration is valid:

```
network port show
```

What's next?

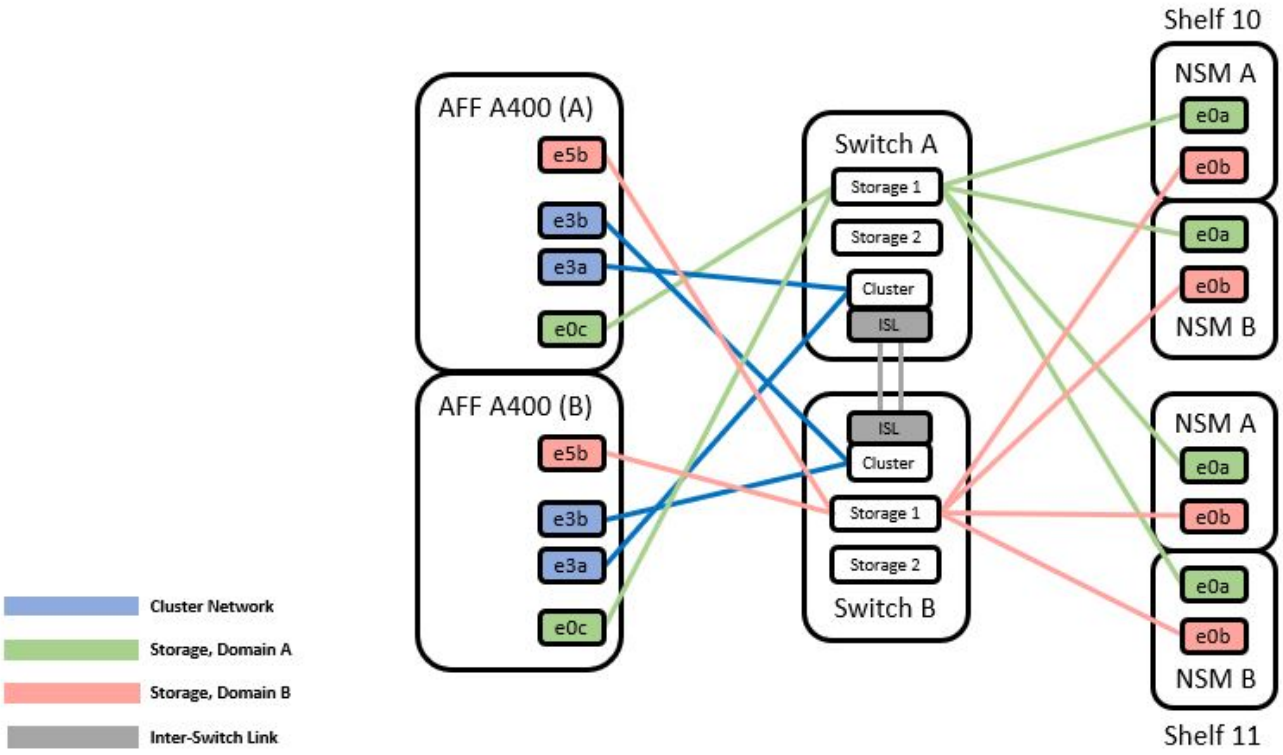
After you've migrated your switches, you can configure switch health monitoring.

Migrate from a switched cluster with switch-attached storage

You can migrate from a switched cluster with switch-attached storage by reusing the storage switches.

By reusing the storage switches the storage switches of HA pair 1 become the shared switches as shown in the following figure.

Switch Attached



Steps

1. Verify that the storage configuration of HA pair 1 (and HA pair 2) is correct and error free:

   ```
   system switch ethernet show
   ```

Show example

```
storage::*> system switch ethernet show
Switch                    Type               Address          Model
------------------------- ------------------ ----------------
----------
sh1
                          storage-network    172.17.227.5     C9336C

     Serial Number: FOC221206C2
      Is Monitored: true
            Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(5)
       Version Source: CDP
sh2
                          storage-network    172.17.227.6     C9336C
     Serial Number: FOC220443LZ
      Is Monitored: true
            Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(5)
    Version Source: CDP
2 entries were displayed.
storage::*>
```

2. Move the HA pair 1, NSM224 path A cables from storage switch A to the NSM224 storage ports for HA pair 1, path A on storage switch A.
3. Move the cable from HA pair 1, node A, path A to the NSM224 storage port for HA pair 1, node A on storage switch A.
4. Move the cable from HA pair 1, node B, path A to the NSM224 storage port for HA pair 1, node B on storage switch A.
5. Verify the storage attached to HA pair 1, storage switch A is healthy:

   ```
   storage port show -port-type ENET
   ```

Show example

```
storage::*> storage port show -port-type ENET
                                     Speed
VLAN
Node     Port     Type     Mode        (Gb/s)        State     Status
ID
------- ------- ------- ---------- ------------ --------- ---------
-----
node1
         e0c     ENET     storage            100  enabled   online
30
         e0d     ENET     storage            100  enabled   online
30
         e5a     ENET     storage            100  enabled   online
30
         e5b     ENET     storage            100  enabled   online
30

node2
         e0c     ENET     storage            100  enabled   online
30
         e0d     ENET     storage            100  enabled   online
30
         e5a     ENET     storage            100  enabled   online
30
         e5b     ENET     storage            100  enabled   online
30
```

6. Replace the storage RCF on shared switch A with the shared RCF file. See Install the RCF on a Cisco Nexus 9336C-FX2 shared switch for further details.
7. Verify the storage attached to HA pair 1, storage switch A is healthy:

   `system health alert show -instance`

   Show example

```
storage::*> system health alert show -instance
There are no entries matching your query.
```

8. Move the HA pair 1, NSM224 path B cables from storage switch B to the shared NS224 storage ports for HA pair 1, path B to storage switch B.

9. Move the cable from HA pair 1, node A, path B to the shared storage port for HA pair 1, node A, path B on storage switch B.
10. Move the cable from HA pair 1, node B, path B to the shared storage port for HA pair 1, node B, path B on storage switch B.
11. Verify the storage attached to HA pair 1, storage switch B is healthy:

    `system health alert show -instance`

    Show example

    ```
    storage::*> system health alert show -instance
    There are no entries matching your query.
    ```

12. Replace the storage RCF file on shared switch B with the shared RCF file. See Install the RCF on a Cisco Nexus 9336C-FX2 shared switch for further details.
13. Verify the storage attached to HA pair 1, storage switch B is healthy:

    `system health alert show -instance`

    Show example

    ```
    storage::*> system health alert show -instance
    There are no entries matching your query.
    ```

14. Verify the storage configuration of HA pair 1 is correct and error free:

    `system switch ethernet show`

Show example

```
storage::*> system switch ethernet show
Switch                    Type                  Address
Model
------------------------- ------------------- ----------------
----------
sh1
                          storage-network      172.17.227.5
C9336C

    Serial Number: FOC221206C2
     Is Monitored: true
           Reason: None
 Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                   9.3(5)
   Version Source: CDP
sh2
                          storage-network      172.17.227.6
C9336C
    Serial Number: FOC220443LZ
     Is Monitored: true
           Reason: None
 Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                   9.3(5)
   Version Source: CDP
2 entries were displayed.
storage::*>
```

15. Install the ISLs between shared switch A and shared switch B:

Show example

```
sh1# configure
Enter configuration commands, one per line. End with CNTL/Z.
sh1 (config)# interface e1/35-36*
sh1 (config-if-range)# no lldp transmit
sh1 (config-if-range)# no lldp receive
sh1 (config-if-range)# switchport mode trunk
sh1 (config-if-range)# no spanning-tree bpduguard enable
sh1 (config-if-range)# channel-group 101 mode active
sh1 (config-if-range)# exit
sh1 (config)# interface port-channel 101
sh1 (config-if)# switchport mode trunk
sh1 (config-if)# spanning-tree port type network
sh1 (config-if)# exit
sh1 (config)# exit
```

16. Migrate the cluster networking from the existing cluster switches to the shared switches using the switch replacement procedure and the shared RCF. The new shared switch A is "cs1". The new shared switch B is "cs2". See Replace a Cisco Nexus 9336C-FX2 shared switch and Install the RCF on a Cisco Nexus 9336C-FX2 shared switch for further details.
17. Verify that the switched networking config is valid:

    ```
    network port show
    ```

18. Remove the unused cluster switches.
19. Remove the unused storage switches.

What's next?

After you've migrated your switches, you can configure switch health monitoring.

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