



# **Cisco Nexus 9336C-FX2 shared switches**

## ONTAP Systems Switches

NetApp  
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# Cisco 9336C-FX2 shared switch overview

From ONTAP 9.9.1, you can use Cisco Nexus 9336C-FX2 switches to combine storage and cluster functionality into a shared switch scenario.

## Setup and configuration guide for Cisco shared switches

### Switches supported by ONTAP

From ONTAP 9.9.1, you can use Cisco Nexus 9336C-FX2 switches to combine storage and cluster functionality into a shared switch scenario. If you want to build ONTAP networks with more than two nodes, you need two supported network switches.

The following Cisco shared network switches are supported.

#### Nexus 9336C-FX2

You can install the Cisco Nexus 9336C-FX2 switch (X190200/X190210) in a NetApp system cabinet or third-party cabinet with the standard brackets that are included with the switch.

The following table lists the part number and description for the 9336C-FX2 switch, fans, and power supplies:

| Part number         | Description  |
|---------------------|--|
| X190200-CS-PE       | N9K-9336C-FX2, CS, PTSX, 36PT10/25/40/100GQSFP28   |
| X190200-CS-PI       | N9K-9336C-FX2, CS, PSIN, 36PT10/25/40/100GQSFP28   |
| X190210-FE-PE       | N9K-9336C, FTE, PTSX, 36PT10/25/40/100GQSFP28      |
| X190210-FE-PI       | N9K-9336C, FTE, PSIN, 36PT10/25/40/100GQSFP28      |
| X190002             | Accessory Kit X190001/X190003                      |
| X-NXA-PAC-1100W-PE2 | N9K-9336C AC 1100W PSU - Port side exhaust airflow |
| X-NXA-PAC-1100W-PI2 | N9K-9336C AC 1100W PSU - Port side Intake airflow  |
| X-NXA-FAN-65CFM-PE  | N9K-9336C 65CFM, Port side exhaust airflow         |
| X-NXA-FAN-65CFM-PI  | N9K-9336C 65CFM, Port side intake airflow          |

### Setup the switches

If you do not already have the required configuration information and documentation, you need to gather that information before setting up your shared switches.

#### Before you begin

- You must have access to an HTTP, FTP or TFTP server at the installation site to download the applicable NX-OS and reference configuration file (RCF) releases.

- You must have the required shared switch documentation.

See [Required documentation for shared switches](#) for more information.

- You must have the required controller documentation and ONTAP documentation.

See [NetApp ONTAP documentation](#).

- You must have the applicable licenses, network and configuration information, and cables.
- You must have the completed cabling worksheets.



In addition to cabling graphics, this guide does provide sample worksheets with recommended port assignments and blank worksheets that you can use to set up your network. For more information, refer to the [Hardware Universe](#).

### About this task

All Cisco shared switches arrive with the standard Cisco factory-default configuration. These switches also have the current version of the NX-OS software but do not have the RCFs loaded.



You must download the applicable NetApp RCFs from the [NetApp Support Site](#) for the switches that you receive.

### Procedure

1. Rack the switches and controllers. See the [Installing a Cisco Nexus 9336C-FX2 cluster switch and pass-through panel in a NetApp cabinet](#) guide for instructions to install the switch in a NetApp cabinet.
2. Power on the switches and controllers.
3. Perform an initial configuration of the switches based on information provided in [Required configuration information](#).
4. Verify the configuration choices you made in the display that appears at the end of the setup, and make sure that you save the configuration.
5. Check the software version on the switches, and if necessary, download the NetApp-supported version of the software to the switches.

If you download the NetApp-supported version of the software, then you must also download the NetApp Network Switch Reference Configuration File and merge it with the configuration you saved in [Step 3](#). You can download the file and the instructions from the [Cisco Ethernet Switches](#) page.

If you have your own switches, refer to the [Cisco](#) site.

### Required configuration information

For configuration, you need the appropriate number and type of cables and cable connectors for your switches. Depending on the type of switch you are initially configuring, you need to connect to the switch console port with the included console cable; you also need to provide specific network information.

### Required network information for all switches

- You need the following network information for all switch configurations:
  - IP subnet for management network traffic

- Host names and IP addresses for each of the storage system controllers and all applicable switches
- Most storage system controllers are managed through the e0M interface by connecting to the Ethernet service port (wrench icon). On AFF A800 and AFF A700 systems, the e0M interface uses a dedicated Ethernet port.
- Refer to the [Hardware Universe](#) for the latest information.

### Required network information for Cisco Nexus 9336C-FX2 switches

For the Cisco Nexus 9336C-FX2 switch, you need to provide applicable responses to the following initial setup questions when you first boot the switch. Your site's security policy defines the responses and services to enable:

1. Abort Auto Provisioning and continue with normal setup? (yes/no)

Respond with **yes**. The default is no.

2. Do you want to enforce secure password standard? (yes/no)

Respond with **yes**. The default is yes.

3. Enter the password for admin.

The default password is admin; you must create a new, strong password.

A weak password can be rejected.

4. Would you like to enter the basic configuration dialog? (yes/no)

Respond with **yes** at the initial configuration of the switch.

5. Create another login account? (yes/no)

Your answer depends on your site's policies on alternate administrators. The default is no.

6. Configure read-only SNMP community string? (yes/no)

Respond with **no**. The default is no.

7. Configure read-write SNMP community string? (yes/no)

Respond with **no**. The default is no.

8. Enter the switch name.

The switch name is limited to 63 alphanumeric characters.

9. Continue with out-of-band (mgmt0) management configuration? (yes/no)

Respond with **yes** (the default) at that prompt. At the mgmt0 IPv4 address: prompt, enter your IP address: ip\_address

10. Configure the default-gateway? (yes/no)

Respond with **yes**. At the IPv4 address of the default-gateway: prompt, enter your default\_gateway.

11. Configure advanced IP options? (yes/no)

Respond with **no**. The default is no.

12. Enable the telnet service? (yes/no)

Respond with **no**. The default is no.

13. Enable SSH service? (yes/no)

Respond with **yes**. The default is yes.



SSH is recommended when using Cluster Switch Health Monitor (CSHM) for its log collection features. SSHv2 is also recommended for enhanced security.

14. Enter the type of SSH key you want to generate (dsa/rsa/rsa1). The default is rsa.

15. Enter the number of key bits (1024- 2048).

16. Configure the NTP server? (yes/no)

Respond with **no**. The default is no.

17. Configure default interface layer (L3/L2):

Respond with **L2**. The default is L2.

18. Configure default switch port interface state (shut/noshut):

Respond with **noshut**. The default is noshut.

19. Configure CoPP system profile (strict/moderate/lenient/dense):

Respond with **strict**. The default is strict.

20. Would you like to edit the configuration? (yes/no)

You should see the new configuration at this point. Review and make any necessary changes to the configuration you just entered. Respond with no at the prompt if you are satisfied with the configuration. Respond with **yes** if you want to edit your configuration settings.

21. Use this configuration and save it? (yes/no)

Respond with **yes** to save the configuration. This automatically updates the kickstart and system images.



If you do not save the configuration at this stage, none of the changes will be in effect the next time you reboot the switch.

For more information about the initial configuration of your switch, see the following guide: [Cisco Nexus 9336C-FX2 Installation and Upgrade Guide](#).

### Required documentation for shared switches

You need specific switch and controller documentation to set up your ONTAP network.

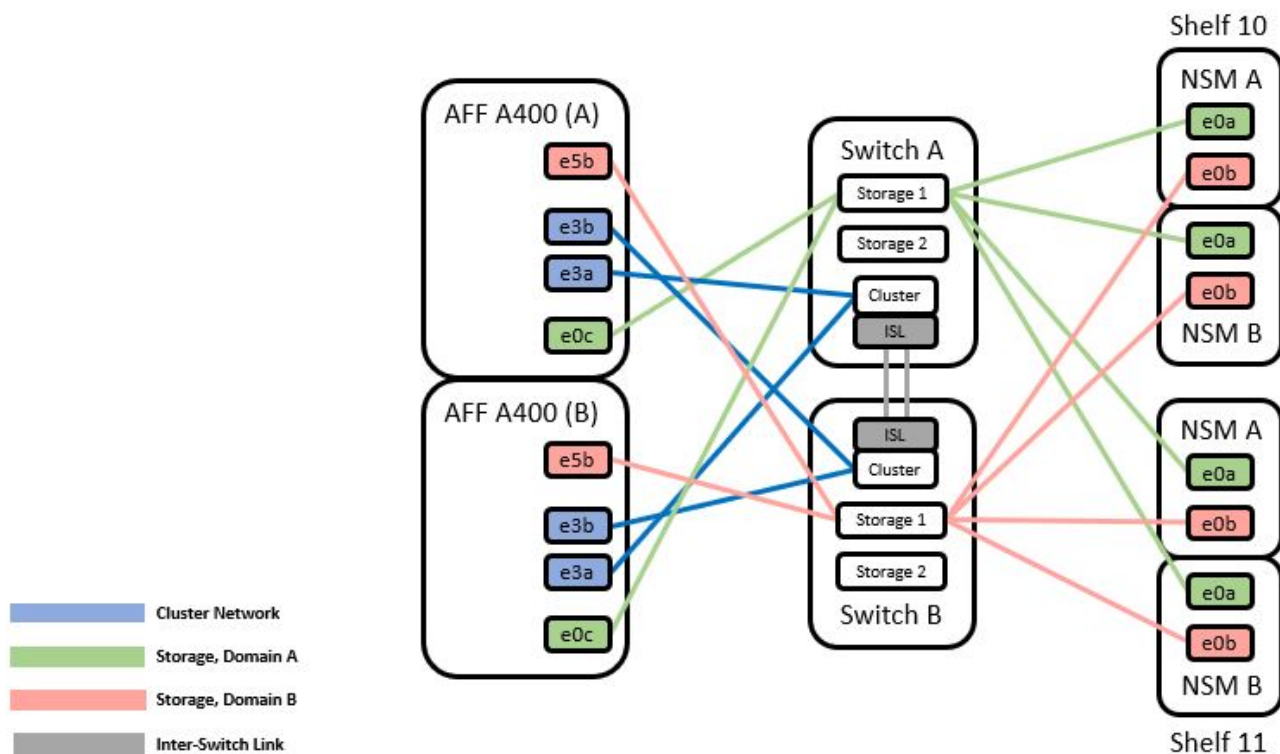
To set up the Cisco Nexus 9336C-FX2 shared switches, see the [Cisco Nexus 9000 Series Switches Support](#) page.

| Document title   | Description   |
|--|---|
| <a href="#">Nexus 9000 Series Hardware Installation Guide</a>  | Provides detailed information about site requirements, switch hardware details, and installation options.   |
| <a href="#">Cisco Nexus 9000 Series Switch Software Configuration Guides</a> (choose the guide for the NX-OS release installed on your switches)       | Provides initial switch configuration information that you need before you can configure the switch for ONTAP operation.  |
| <a href="#">Cisco Nexus 9000 Series NX-OS Software Upgrade and Downgrade Guide</a> (choose the guide for the NX-OS release installed on your switches) | Provides information on how to downgrade the switch to ONTAP supported switch software, if necessary.   |
| <a href="#">Cisco Nexus 9000 Series NX-OS Command Reference Master Index</a>   | Provides links to the various command references provided by Cisco.   |
| <a href="#">Cisco Nexus 9000 MIBs Reference</a>  | Describes the Management Information Base (MIB) files for the Nexus 9000 switches.  |
| <a href="#">Nexus 9000 Series NX-OS System Message Reference</a>   | Describes the system messages for Cisco Nexus 9000 series switches, those that are informational, and others that might help diagnose problems with links, internal hardware, or the system software. |
| <a href="#">Cisco Nexus 9000 Series NX-OS Release Notes</a> (choose the notes for the NX-OS release installed on your switches)                        | Describes the features, bugs, and limitations for the Cisco Nexus 9000 Series.  |
| <a href="#">Regulatory Compliance and Safety Information for Cisco Nexus 9000 Series</a>   | Provides international agency compliance, safety, and statutory information for the Nexus 9000 series switches.   |

## Cisco Nexus 9336C-FX2 cabling details

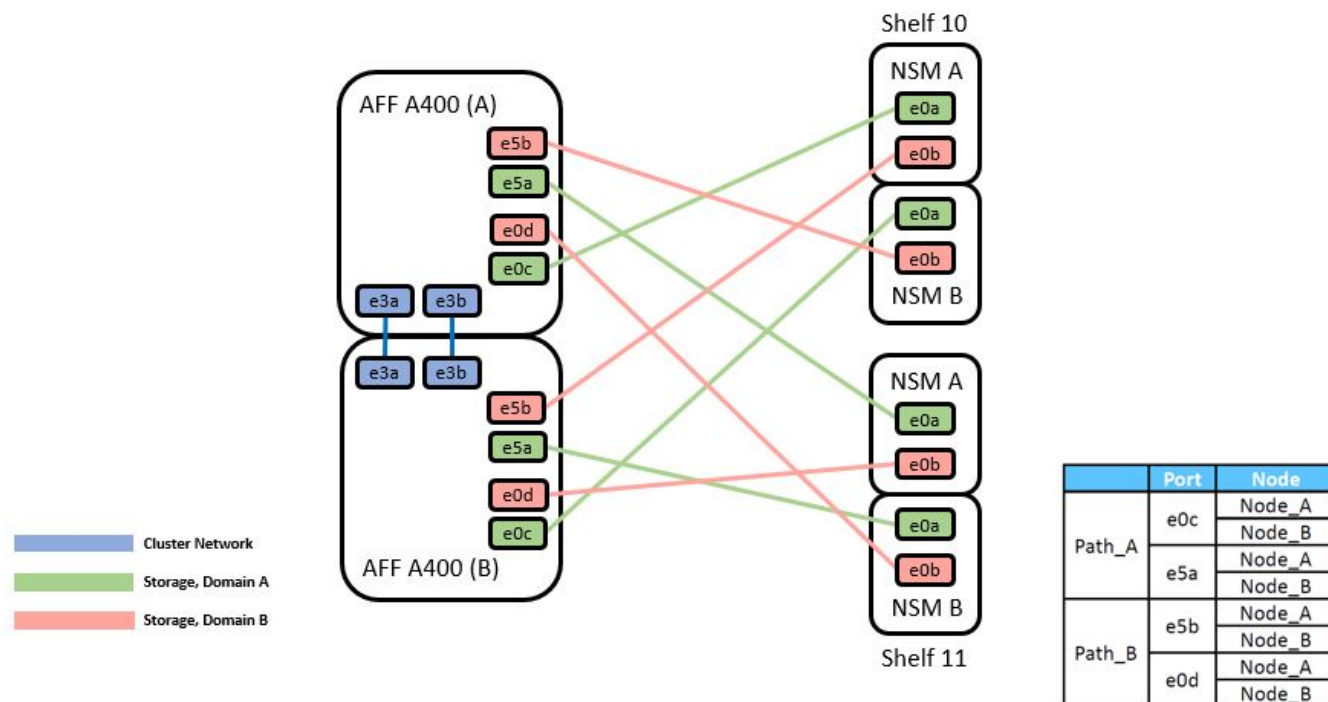
You can use the following cabling images to complete the cabling between the controllers and the switches.

## Switch Attached



If you want to cable storage as direct-attached instead of using the shared switch storage ports, follow the direct-attached diagram:

## Direct Attached





## Cisco Nexus 9336C-FX2 cabling worksheet

If you want to document the supported platforms, you must complete the blank cabling worksheet by using completed sample cabling worksheet as a guide.

The sample port definition on each pair of switches is as follows:

| Switch A    |           |                      | Switch B    |           |                      |
|-------------|-----------|----------------------|-------------|-----------|----------------------|
| Switch Port | Port Role | Port Usage           | Switch Port | Port Role | Port Usage           |
| 1           | Cluster   | 40/100GbE            | 1           | Cluster   | 40/100GbE            |
| 2           | Cluster   | 40/100GbE            | 2           | Cluster   | 40/100GbE            |
| 3           | Cluster   | 40/100GbE            | 3           | Cluster   | 40/100GbE            |
| 4           | Cluster   | 40/100GbE            | 4           | Cluster   | 40/100GbE            |
| 5           | Cluster   | 40/100GbE            | 5           | Cluster   | 40/100GbE            |
| 6           | Cluster   | 40/100GbE            | 6           | Cluster   | 40/100GbE            |
| 7           | Cluster   | 40/100GbE            | 7           | Cluster   | 40/100GbE            |
| 8           | Cluster   | 40/100GbE            | 8           | Cluster   | 40/100GbE            |
| 9           | Cluster   | 40GbE w/4x10GbE b/o  | 9           | Cluster   | 40GbE w/4x10GbE b/o  |
| 10          | Cluster   | 100GbE w/4x25GbE b/o | 10          | Cluster   | 100GbE w/4x25GbE b/o |
| 11          | Storage   | 100GbE               | 11          | Storage   | 100GbE               |
| 12          | Storage   | 100GbE               | 12          | Storage   | 100GbE               |
| 13          | Storage   | 100GbE               | 13          | Storage   | 100GbE               |
| 14          | Storage   | 100GbE               | 14          | Storage   | 100GbE               |
| 15          | Storage   | 100GbE               | 15          | Storage   | 100GbE               |
| 16          | Storage   | 100GbE               | 16          | Storage   | 100GbE               |
| 17          | Storage   | 100GbE               | 17          | Storage   | 100GbE               |
| 18          | Storage   | 100GbE               | 18          | Storage   | 100GbE               |
| 19          | Storage   | 100GbE               | 19          | Storage   | 100GbE               |
| 20          | Storage   | 100GbE               | 20          | Storage   | 100GbE               |
| 21          | Storage   | 100GbE               | 21          | Storage   | 100GbE               |
| 22          | Storage   | 100GbE               | 22          | Storage   | 100GbE               |
| 23          | Storage   | 100GbE               | 23          | Storage   | 100GbE               |
| 24          | Storage   | 100GbE               | 24          | Storage   | 100GbE               |
| 25          | Storage   | 100GbE               | 25          | Storage   | 100GbE               |
| 26          | Storage   | 100GbE               | 26          | Storage   | 100GbE               |
| 27          | Storage   | 100GbE               | 27          | Storage   | 100GbE               |
| 28          | Storage   | 100GbE               | 28          | Storage   | 100GbE               |
| 29          | Storage   | 100GbE               | 29          | Storage   | 100GbE               |
| 30          | Storage   | 100GbE               | 30          | Storage   | 100GbE               |
| 31          | Storage   | 100GbE               | 31          | Storage   | 100GbE               |
| 32          | Storage   | 100GbE               | 32          | Storage   | 100GbE               |
| 33          | Storage   | 100GbE               | 33          | Storage   | 100GbE               |
| 34          | Storage   | 100GbE               | 34          | Storage   | 100GbE               |
| 35          | ISL       | 100GbE               | 35          | ISL       | 100GbE               |
| 36          | ISL       | 100GbE               | 36          | ISL       | 100GbE               |

Where:

- 100G ISL to switch A port 35
- 100G ISL to switch A port 36
- 100G ISL to switch B port 35
- 100G ISL to switch B port 36

Blank cabling worksheet

You can use the blank cabling worksheet to document the platforms that are supported as nodes in a cluster. The Supported Cluster Connections table of the Hardware Universe defines the cluster ports used by the platform.

| Switch Port | Switch A<br>Port Role | Port Usage | Switch Port | Switch B<br>Port Role | Port Usage |
|-------------|-----------------------|------------|-------------|-----------------------|------------|
| 1           |                       |            | 1           |                       |            |
| 2           |                       |            | 2           |                       |            |
| 3           |                       |            | 3           |                       |            |
| 4           |                       |            | 4           |                       |            |
| 5           |                       |            | 5           |                       |            |
| 6           |                       |            | 6           |                       |            |
| 7           |                       |            | 7           |                       |            |
| 8           |                       |            | 8           |                       |            |
| 9           |                       |            | 9           |                       |            |
| 10          |                       |            | 10          |                       |            |
| 11          |                       |            | 11          |                       |            |
| 12          |                       |            | 12          |                       |            |
| 13          |                       |            | 13          |                       |            |
| 14          |                       |            | 14          |                       |            |
| 15          |                       |            | 15          |                       |            |
| 16          |                       |            | 16          |                       |            |
| 17          |                       |            | 17          |                       |            |
| 18          |                       |            | 18          |                       |            |
| 19          |                       |            | 19          |                       |            |
| 20          |                       |            | 20          |                       |            |
| 21          |                       |            | 21          |                       |            |
| 22          |                       |            | 22          |                       |            |
| 23          |                       |            | 23          |                       |            |
| 24          |                       |            | 24          |                       |            |
| 25          |                       |            | 25          |                       |            |
| 26          |                       |            | 26          |                       |            |
| 27          |                       |            | 27          |                       |            |
| 28          |                       |            | 28          |                       |            |
| 29          |                       |            | 29          |                       |            |
| 30          |                       |            | 30          |                       |            |
| 31          |                       |            | 31          |                       |            |
| 32          |                       |            | 32          |                       |            |
| 33          |                       |            | 33          |                       |            |
| 34          |                       |            | 34          |                       |            |
| 35          |                       |            | 35          |                       |            |
| 36          |                       |            | 36          |                       |            |

Where:

- 100G ISL to switch A port 35
- 100G ISL to switch A port 36
- 100G ISL to switch B port 35
- 100G ISL to switch B port 36

# Install NX-OS software and RCFs

## Install NX-OS software and RCFs on Cisco Nexus 9336C-FX2 switches

The Cisco NX-OS software and reference configuration file (RCF) must be installed on Cisco Nexus 9336C-FX2 cluster switches.

### Before you begin

The following conditions must exist before you install the NX-OS software and RCF on the cluster switch:

- The cluster must be fully functioning (there should be no errors in the logs or similar issues).
- 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.  
See [Cisco Ethernet Switches](#) for more information.
- 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 9000 Series Switches.  
See [Cisco Nexus 9000 Series Switches](#) for more information.
- You must have the current RCF.

### Initial setup

The examples in this procedure use two nodes. These nodes use two 100GbE cluster interconnect ports e3a and e3b, as per the A400 controller.

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 9000 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.

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
           e3a    cs1                      Eth1/2         N9K-C9336C
           e3b    cs2                      Eth1/2         N9K-C9336C
cluster1-01/cdp
           e3a    cs1                      Eth1/1         N9K-C9336C
           e3b    cs2                      Eth1/1         N9K-C9336C
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

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

Node: cluster1-01

Port      IPspace      Broadcast Domain  Link  MTU  Speed(Mbps)  Health
-----
e3a       Cluster     Cluster          up    9000  auto/100000  healthy
e3b       Cluster     Cluster          up    9000  auto/100000  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           |                   |            |                   |             |      |
| true              | cluster1-01_clus1 | up/up      | 169.254.209.69/16 | cluster1-01 | e3a  |
| true              | cluster1-01_clus2 | up/up      | 169.254.49.125/16 | cluster1-01 | e3b  |
| true              | cluster1-02_clus1 | up/up      | 169.254.47.194/16 | cluster1-02 | e3a  |
| true              | cluster1-02_clus2 | up/up      | 169.254.19.183/16 | cluster1-02 | e3b  |
| 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 e3a
Cluster cluster1-01_clus2 169.254.49.125 cluster1-01 e3b
Cluster cluster1-02_clus1 169.254.47.194 cluster1-02 e3a
Cluster cluster1-02_clus2 169.254.19.183 cluster1-02 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 169.254.19.183 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. Enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the following 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.

### Install the NX-OS software on a Cisco Nexus 9336C- FX2 cluster switch

You can use this procedure to install the NX-OS software on the Cisco Nexus 9336C-FX2 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 9336C-FX2 switch.

```
cs2# copy sftp: bootflash: vrf management
Enter source filename: /code/nxos.9.3.5.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.9.3.5.bin /bootflash/nxos.9.3.5.bin
/code/nxos.9.3.5.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.9.3.5.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.9.3.5.img /bootflash/n9000-epld.9.3.5.img
/code/n9000-epld.9.3.5.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:

```
show version
```



```
cs2# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
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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 Nexus9000 C9336C-FX2 Chassis
  Intel(R) Xeon(R) CPU E5-2403 v2 @ 1.80GHz with 8154432 kB of memory.
  Processor Board ID FOC20291J6K
  Device name: cs2
  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 Requested by CLI command reload
  System version: 9.3(4)
  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.9.3.5.bin
Installer will perform compatibility check first. Please wait.
Installer is forced disruptive
Verifying image bootflash:/nxos.9.3.5.bin for boot variable "nxos".
[#####] 100% -- SUCCESS
Verifying image type.
[#####] 100% -- SUCCESS
Preparing "nxos" version info using image bootflash:/nxos.9.3.5.bin.
[#####] 100% -- SUCCESS
Preparing "bios" version info using image bootflash:/nxos.9.3.5.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(4)                      9.3(5)
yes
1       bios      v08.37(01/28/2020):v08.23(09/23/2015)
v08.38(05/29/2020)  yes
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.

```

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
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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 05.33
  NXOS: version 9.3(5)
  BIOS compile time: 09/08/2018
  NXOS image file is: bootflash:///nxos.9.3.5.bin
  NXOS compile time: 11/4/2018 21:00:00 [11/05/2018 06:11:06]
Hardware
  cisco Nexus9000 C9336C-FX2 Chassis
  Intel(R) Xeon(R) CPU E5-2403 v2 @ 1.80GHz with 8154432 kB of memory.
  Processor Board ID FOC20291J6K
  Device name: cs2
  bootflash: 53298520 kB
Kernel uptime is 0 day(s), 0 hour(s), 3 minute(s), 42 second(s)
Last reset at 277524 usecs after Mon Nov 2 22:45:12 2020
  Reason: Reset due to upgrade
  System version: 9.3(4)
  Service:
plugin
  Core Plugin, Ethernet Plugin
Active Package(s):
```

## 7. Upgrade the EPLD image and reboot the switch.

```

cs2# show version module 1 epld
EPLD Device                               Version
-----
MI    FPGA                                0x7
IO    FPGA                                0x17
MI    FPGA2                               0x2
GEM   FPGA                                0x2
GEM   FPGA                                0x2
GEM   FPGA                                0x2
GEM   FPGA                                0x2

cs2# install epld bootflash:n9000-epld.9.3.5.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      0x07          0x07          No
1  SUP  IO FPGA      0x17          0x19          Yes
1  SUP  MI FPGA2     0x02          0x02          No

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

EPLDs upgraded.
Module 1 EPLD upgrade is successful.

```

8. After the switch reboot, log in again and verify that the new version of EPLD loaded successfully.

```
cs2# show version module 1 epld
EPLD Device                               Version
-----
MI    FPGA                               0x7
IO    FPGA                               0x19
MI    FPGA2                              0x2
GEM   FPGA                               0x2
GEM   FPGA                               0x2
GEM   FPGA                               0x2
GEM   FPGA                               0x2
```

## Install the RCF on a Cisco Nexus 9336C- FX2 cluster switch

You can install the RCF after setting up the Nexus 9336C-FX2 cluster switch for the first time. You can also use this procedure to upgrade your RCF version on your cluster switch.

### 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 use of both ONTAP commands and Cisco Nexus 9000 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
           e3a    cs1                      Ethernet1/7     N9K-C9336C
           e0d    cs2                      Ethernet1/7     N9K-C9336C
cluster1-02/cdp
           e3a    cs1                      Ethernet1/8     N9K-C9336C
           e0d    cs2                      Ethernet1/8     N9K-C9336C
cluster1-03/cdp
           e3a    cs1                      Ethernet1/1/1   N9K-C9336C
           e3b    cs2                      Ethernet1/1/1   N9K-C9336C
cluster1-04/cdp
           e3a    cs1                      Ethernet1/1/2   N9K-C9336C
           e3b    cs2                      Ethernet1/1/2   N9K-C9336C
cluster1::*>

```

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
```

```

cluster1::*> network port show -role cluster
Node: cluster1-01

Ignore
Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e3a       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
-----
-----

```



```

-----
e3a      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
-----
-----
e3a      Cluster      Cluster      up    9000  auto/100000 healthy
false
e3b      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
e0b      Cluster      Cluster      up    9000  auto/100000 healthy
false
cluster1::*>

```

#### 4. 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
true      cluster1-01_clus1  up/up      169.254.3.4/23  cluster1-01  e3a
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  e3a
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  e3a
true      cluster1-03_clus2  up/up      169.254.1.1/23  cluster1-03  e3b
true      cluster1-04_clus1  up/up      169.254.1.6/23  cluster1-04  e3a
true      cluster1-04_clus2  up/up      169.254.1.7/23  cluster1-04  e3b
true
8 entries were displayed.
cluster1::*>

```

5. 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                    10.233.205.90                        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
cs2                                   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.

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

7. 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
```

8. Verify that the cluster LIFs 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
true      cluster1-01_clus1 up/up      169.254.3.4/23      cluster1-01      e3a
false      cluster1-01_clus2 up/up      169.254.3.5/23      cluster1-01      e3a
true      cluster1-02_clus1 up/up      169.254.3.8/23      cluster1-02      e3a
false      cluster1-02_clus2 up/up      169.254.3.9/23      cluster1-02      e3a
true      cluster1-03_clus1 up/up      169.254.1.3/23      cluster1-03      e3a
false      cluster1-03_clus2 up/up      169.254.1.1/23      cluster1-03      e3a
true      cluster1-04_clus1 up/up      169.254.1.6/23      cluster1-04      e3a
false      cluster1-04_clus2 up/up      169.254.1.7/23      cluster1-04      e3a
8 entries were displayed.
cluster1::*>

```

9. 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::*>

```

10. 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.

11. Copy the RCF to the bootflash of switch cs2 using one of the following transfer protocols: FTP, TFTP, SFTP, or SCP. For more information about Cisco commands, see the appropriate guide in the [Cisco Nexus 9000 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_9336C_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)...
```

12. Apply the RCF previously downloaded to the bootflash.  
For more information about Cisco commands, see the appropriate guide in the [Cisco Nexus 9000 Series NX-OS Command Reference guides](#).

This example shows the RCF file `Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt` being installed on switch cs2.

```
cs2# copy Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt running-config
echo-commands
```

13. Examine the banner output from the `show banner motd` command. You must read and follow these instructions to ensure the proper configuration and operation of the switch.

```

cs2# show banner motd
*****
*
* NetApp Reference Configuration File (RCF)
*
* Switch      : Nexus N9K-C9336C-FX2
* Filename    : Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt
* Date       : 10-23-2020
* Version    : v1.6
*
* Port Usage:
* 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
* Ports 35-36: Intra-Cluster ISL Ports, int e1/35-36
*
* Dynamic breakout commands:
* 10G: interface breakout module 1 port <range> map 10g-4x
* 25G: interface breakout module 1 port <range> map 25g-4x
*
* Undo breakout commands and return interfaces to 40/100G configuration in
* config mode:
* no interface breakout module 1 port <range> map 10g-4x
* no interface breakout module 1 port <range> map 25g-4x
* interface Ethernet <interfaces taken out of breakout mode>
* inherit port-profile 40-100G
* priority-flow-control mode auto
* service-policy input HA
* exit
*
*****
*

```

14. 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.

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

For more information about Cisco commands, see the appropriate guide in the [Cisco Nexus 9000 Series NX-OS Command Reference guides](#).

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

16. 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
```

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

```
cs2# copy Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt running-config
echo-commands
cs2# copy running-config startup-config
[#####] 100% Copy complete
```

18. 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
```

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

```
Node: cluster1-02
```

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

```
Node: cluster1-03
```

| Port | IPspace | Broadcast Domain | Link | MTU  | Speed (Mbps)<br>Admin/Oper | Health<br>Status | Ignore<br>Health<br>Status |
|------|---------|------------------|------|------|----------------------------|------------------|----------------------------|
| e3a  | Cluster | Cluster          | up   | 9000 | auto/100000                | healthy          | false                      |
| e0d  | Cluster | Cluster          | up   | 9000 | auto/100000                | healthy          | false                      |

```
Node: cluster1-04
```

| Port | IPspace | Broadcast Domain | Link | MTU  | Speed (Mbps)<br>Admin/Oper | Health<br>Status | Ignore<br>Health<br>Status |
|------|---------|------------------|------|------|----------------------------|------------------|----------------------------|
| e3a  | 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
              e3a    cs1                      Ethernet1/7     N9K-C9336C
              e0d    cs2                      Ethernet1/7     N9K-C9336C
cluster01-2/cdp
              e3a    cs1                      Ethernet1/8     N9K-C9336C
              e0d    cs2                      Ethernet1/8     N9K-C9336C
cluster01-3/cdp
              e3a    cs1                      Ethernet1/1/1   N9K-C9336C
              e3b    cs2                      Ethernet1/1/1   N9K-C9336C
cluster1-04/cdp
              e3a    cs1                      Ethernet1/1/2   N9K-C9336C
              e3b    cs2                      Ethernet1/1/2   N9K-C9336C
cluster1::*> system cluster-switch show -is-monitoring-enabled-operational
true
Switch                                     Type                Address            Model
-----
cs1                                         cluster-network     10.233.205.90      NX9-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
cs2                                         cluster-network     10.233.205.91      NX9-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
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.

```

19. 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

```

20. 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           |                   |              |                |                 |
| false             | 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 |
| false             | 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 |
| false             | cluster1-03_clus1 | up/up        | 169.254.1.3/23 | cluster1-03 e3b |
| true              | cluster1-03_clus2 | up/up        | 169.254.1.1/23 | cluster1-03 e3b |
| false             | cluster1-04_clus1 | up/up        | 169.254.1.6/23 | cluster1-04 e3b |
| true              | cluster1-04_clus2 | up/up        | 169.254.1.7/23 | cluster1-04 e3b |

```

8 entries were displayed.
cluster1::*>

```

21. 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::*>
```

22. Repeat Steps 7 to 14 on switch cs1.

23. Enable auto-revert on the cluster LIFs.

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

24. 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
```

25. 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      100G (D)
--
Eth1/1/2      1      eth  access up      none      100G (D)
--
Eth1/7        1      eth  trunk  up      none      100G (D)
--
Eth1/8        1      eth  trunk  up      none      100G (D)
--
.
.
```

26. 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      Eth1/35 (P)      Eth1/36 (P)  
cs1#
```

27. Verify that the cluster LIFs have reverted to their home port:

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

```

cluster1::*> network interface show -role cluster

```

| Current Is | Logical           | Status     | Network        | Current     |      |
|------------|-------------------|------------|----------------|-------------|------|
| Vserver    | Interface         | Admin/Oper | Address/Mask   | Node        | Port |
| Home       |                   |            |                |             |      |
| -----      | -----             | -----      | -----          | -----       |      |
| Cluster    |                   |            |                |             |      |
| true       | 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 | e3b  |
| true       | cluster1-03_clus2 | up/up      | 169.254.1.1/23 | cluster1-03 | e3b  |
| true       | cluster1-04_clus1 | up/up      | 169.254.1.6/23 | cluster1-04 | e3b  |
| true       | cluster1-04_clus2 | up/up      | 169.254.1.7/23 | cluster1-04 | e3b  |

```

8 entries were displayed.
cluster1::*>

```

28. 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::*>

```

29. 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 e3a
Cluster cluster1-03_clus2 169.254.1.1 cluster1-03 e3b
Cluster cluster1-04_clus1 169.254.1.6 cluster1-04 e3a
Cluster cluster1-04_clus2 169.254.1.7 cluster1-04 e3b
Cluster cluster1-01_clus1 169.254.3.4 cluster1-01 e3a
Cluster cluster1-01_clus2 169.254.3.5 cluster1-01 e0d
Cluster cluster1-02_clus1 169.254.3.8 cluster1-02 e3a
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)

```

## Install the RCF on a Cisco Nexus 9336C-FX2 storage switch

The reference configuration files (RCFs) can be upgraded on Cisco Nexus 9336C-FX2 storage switches.

### Before you begin

The following conditions must exist before you upgrade the RCF 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 web site for complete documentation on the Cisco storage upgrade and downgrade procedures. See [Cisco Nexus 9000 Series Switches](#) for more information.
- The number of 100 GbE ports are defined in the reference configuration files (RCFs) available on the [Cisco Ethernet switches](#) page.

### Procedure summary

1. Check the health status of switches and ports (steps 1-4)
2. Download the NX-OS image to Cisco switch st2 and reboot (steps 5-8)
3. Copy the RCF to Cisco switch st2 (steps 9-12)
4. Recheck the health status of switches and ports (steps 13-15)
5. Repeat steps 1-15 for Cisco switch st1.



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 *st1* and *st2*.
- 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.

### 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`

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

2. Check that the storage switches are available:

```
system switch ethernet show
```

```

storage::*> system switch ethernet show
Switch                               Type                               Address                               Model
-----
st1
                                storage-network           172.17.227.5           NX9-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
st2
                                storage-network           172.17.227.6           NX9-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::*>

```

### 3. Verify that the node ports are healthy and operational:

storage port show -port-type ENET

```

storage::*> storage port show -port-type ENET
Node   Port   Type   Mode   Speed   State   Status   VLAN
-----
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. Download the NX-OS image to switch st2.
6. Install the system image so that the new version will be loaded the next time switch st2 is rebooted. The switch will be reboot in 10 seconds with the new image as shown in the following output:

```
st2# install all nxos bootflash:nxos.9.3. 5.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.
st2#
```

#### 7. Save the configuration.

You are prompted to reboot the system as shown in the following example:

```
st2# copy running-config startup-config
[#####] 100% Copy complete.
st2# reload
This command will reboot the system. (y/n)? [n] y
```

#### 8. Confirm that the new NX-OS version number is on the switch.

```
st2# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
Upgrading a Cisco Nexus 9336C Storage Switch 6
Upgrading a Cisco Nexus 9336C storage switch
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http://opensource.org/licenses/gpl-3.0.html and
http://www.opensource.org/licenses/lgpl-2.1.php and
.
Software
  BIOS: version 08.38
  NXOS: version 9.3(5)
  BIOS compile time: 05/29/2020
  NXOS image file is: bootflash:///nxos.9.3. 5.bin
  NXOS compile time: 4/28/2020 21:00:00 [04/29/2020 02:28:31]
Hardware
  cisco Nexus9000 C9336C 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(5)
      Service:
plugin
  Core Plugin, Ethernet Plugin
  Active Package(s):
st2#
```

- Copy the RCF on switch st2 to the switch bootflash using one of the following transfer protocols: FTP, HTTP, TFTP, SFTP, or SCP.

For more information about Cisco commands, see the appropriate guide in the [Cisco Nexus 9000 Series NX-OS Command Reference guides](#).

The following example shows HTTP being used to copy an RCF to the bootflash on switch st2:

```
st2# copy http://172.16.10.1//cfg/Nexus_9336C_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.
st2#
```

- Apply the RCF previously downloaded to the bootflash:  
copy bootflash.

The following example shows the RCF file Nexus\_9336C\_RCF\_v1.6-Storage.txt being installed on switch st2:

```
st2# copy Nexus_9336C_RCF_v1.6-Storage.txt running-config echo-commands
```

- 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.

**Important:** 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.

```

st2# show banner motd
*****
****
*NetApp Reference Configuration File (RCF)
*
*Switch : Nexus N9K-C9336C-FX2
*Filename : Nexus_9336C_RCF_v1.6-Storage.txt
* Date : 10-23-2020
*Version : v1.6
*
*Port Usage: Storage configuration
*Ports 1-36: 100GbE Controller and Shelf Storage Ports
*
*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
*****
****
st2#

```

12. After you verify that the software versions and switch settings are correct, copy the running-config file to the startup-config file on switch st2.

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 9000 Series NX-OS Command Reference guides](#).

The following example shows the running-config file successfully copied to the startup-config file:

```
st2# copy running-config startup-config
[#####] 100% Copy complete.
```

13. Recheck that the storage switches are available after the reboot:

system switch ethernet show

```
storage::~*> system switch ethernet show
Switch                                Type                                Address                                Model
-----                                -                                -
st1
                                storage-network                    172.17.227.5                        NX9-
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
st2
                                storage-network                    172.17.227.6                        NX9-
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::~*
```

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
```

| Node  | Port | Type | Mode    | Speed<br>(Gb/s) | State   | Status  | VLAN<br>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 is 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 this procedure for the RCF on switch st1.

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
```

## Install the RCF on a Cisco Nexus 9336C-FX2 shared switch

From ONTAP 9.9.1, you can use Cisco Nexus 9336C-FX2 switches to combine storage and cluster functionality into a shared switch scenario.

### Before you begin

- The cluster switches must be fully functioning (there should be no errors in the logs or similar issues).
- The storage switches must be fully functioning (there should be no errors in the logs or similar issues).
- The names of the two storage switches are *sh1* and *sh2*.
- The example used here loads the shared RCF on to the new switch.

### Steps

1. Copy the RCF on switch sh2 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 9000 Series NX-OS Command Reference guides](#).

The following example shows HTTP being used to copy an RCF to the bootflash on switch sh2:

```
sh2# copy http://172.16.10.1//cfg/Nexus_9336C_RCF_v1.7-Cluster-HA-
Storage.txt bootflash: vrf management
% Total % Received % Xferd  Average  Speed  Time    Time    Time
Current
      Dload      Upload  Total  Spent    Left
Speed
  100    5143      100    5143      0      0    11300      0 --:--:--
--:--:-- --:--:--
11300
Copy complete, now saving to disk (please wait)...
Copy complete.
sh2#
```

2. Apply the RCF previously downloaded to the bootflash:  
copy bootflash.

The following example shows the RCF file `Nexus\_9336C\_RCF\_v1.7-Cluster-HA-Storage.txt` being installed on switch sh2:

```
sh2# copy Nexus_9336C_RCF_v1.7-Cluster-HA-Storage.txt running-config echo-
commands
```

3. 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.

**Important:** 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.



```

sh2# show banner motd
*****
****
*NetApp Reference Configuration File (RCF)
*
*Switch : Nexus N9K-C9336C-FX2
*Filename : Nexus_9336C_RCF_v1.7-Cluster-HA-Storage.txt
* Date : Jan-08-2021
*Version : v1.7
*
*Port Usage:
*Ports 1-8: 40/100GbE Intra-Cluster/HA Ports, int e1/1-8
*Port 9: 10GbE breakout Intra-Cluster Ports, int e1/9/1-4
*Port 10: 25GbE breakout Intra-Cluster/HA Ports, int e1/10/1-4
*Ports 11-22: First HA-pair Controller and Shelf Storage Ports, int e1/11-
22
*Ports 23-34: Second HA-pair Controller and Shelf Storage Ports, int
e1/23-34
*Ports 35-36: Intra-Cluster ISL Ports, int e1/35-36
*
* Undo breakout commands and return interfaces to 40/100G configuration in
* config mode:
* no interface breakout module 1 port 9 map 10g-4x
* no interface breakout module 1 port 10 map 25g-4x
* interface Ethernet 1/9-10
* inherit port-profile CLUSTER_HA
* priority-flow-control mode auto
* service-policy type qos input HA_POLICY
* exit
*
*IMPORTANT NOTES*
* In certain conditions, N9K-C9336C-FX2 may not be able to auto-negotiate
port
* speed correctly, and port speed must be manually set, in config mode,
e.g.
* int e1/1
* speed 40000
* int e1/3
* speed 100000
*
*****
****
sh2#

```

4. After you verify that the software versions and switch settings are correct, copy the running-config

file to the startup-config file on switch sh2.

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 9000 Series NX-OS Command Reference guides](#).

The following example shows the `running-config` file successfully copied to the `startup-config` file:

```
sh2# copy running-config startup-config
[#####] 100% Copy complete.
```

5. Repeat this procedure for the RCF on switch sh1.

## Migrate from a switchless cluster with direct-attached storage by adding two new shared switches

### Migrate from a switchless cluster with direct-attached storage

You must be aware of certain configuration information, port connections, and cabling requirements when you migrate a two-node switchless cluster, non-disruptively, to a cluster with Cisco Nexus 9336C-FX2 cluster 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.

#### Before you begin

- Two-node switchless configuration:
  - The two-node switchless configuration must be properly set up and functioning.
  - The nodes must be running ONTAP 9.8 and later.
  - All cluster ports must be in the **up** state.
  - All cluster logical interfaces (LIFs) must be in the **up** state and on their **home** ports.
- Cisco Nexus 9336C-FX2 switch configuration:
  - Both switches must have management network connectivity.
  - There must be console access to the cluster switches.
  - Nexus 9336C-FX2 node-to-node switch and switch-to-switch connections must use Twinax or fiber cables.
  - The NetApp [Hardware Universe](#) contains more information about cabling.
  - Inter-Switch Link (ISL) cables must be connected to ports 1/35 and 1/36 on both 9336C-FX2 switches.
- Initial customization of the 9336C-FX2 switches must be 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 must be configured on the new switches.

### About this task

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.

### 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.`

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.

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 e/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
```

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. 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:

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

Node: node1

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

Node: node2

| Port | IPspace | Broadcast Domain | Link | MTU  | Speed(Mbps) | Health  |
|------|---------|------------------|------|------|-------------|---------|
|      |         |                  |      |      | 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.

```
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
```

```
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.

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.

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 - vservers Cluster

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
```

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.

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
```

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.

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
```

| Vserver | Logical Interface | Status Admin/Oper | Network Address/Mask | Current Node | Current Is 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
```

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
```

```
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
```

```

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:

```

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

```

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

```
cluster show
```

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

```
cluster1::*> cluster show
```

| Node  | Health | Eligibility | Epsilon |
|-------|--------|-------------|---------|
| node1 | true   | true        | false   |
| node2 | true   | true        | false   |

24. Ensure that the cluster network has full connectivity:

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

```
cluster1::*> cluster ping-cluster -node node2
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
```

26. 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::*>

```

### Setup 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.

### Steps

1. Verify that the storage configuration of HA pair 1 (and HA pair 2) is correct and error free:  
`system switch ethernet show`

```

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

```

storage::*> storage port show -port-type ENET
Node  Port  Type  Mode  Speed  State  Status  VLAN
-----  -
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`

```
storage::*> storage port show -port-type ENET
```

| Node  | Port | Type | Mode    | Speed<br>(Gb/s) | State   | Status  | VLAN<br>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`

```
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`



```
storage::*> storage port show -port-type ENET
```

| Node  | Port | Type | Mode    | Speed<br>(Gb/s) | State   | Status  | VLAN<br>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
```

```
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.

```
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`

## Migrate from a switched configuration with direct-attached storage by adding two new shared switches

### Migrate from a switched configuration with direct-attached storage

You must be aware of certain configuration information, port connections, and cabling requirements when you are replacing some older Cisco Nexus cluster switches with Cisco Nexus 9336C-FX2 shared switches.

- The following switches are supported:
  - Nexus 9336C-FX2
  - Nexus 3232C
- The switches use the following ports for connections 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.

See [Hardware Universe](#) for more information.

- You have configured some of the ports on Nexus 9336C-FX2 switches to run at 100 GbE.
- You have planned, migrated, and documented 100 GbE connectivity from nodes to Nexus 9336C-FX2 switches.
- The ONTAP and NX-OS versions supported in this procedure are on the Cisco Ethernet Switches page. See [Cisco Ethernet switches](#).

- You can migrate nondisruptively other Cisco cluster switches from an ONTAP cluster to Cisco Nexus 9336C-FX2 network switches.

### Before you begin

- The existing switch network must be properly set up and functioning.
- All ports must be in the **up** state to ensure nondisruptive operations.
- The Nexus 9336C-FX2 switches must be configured and operating under the proper version of NX-OS installed and reference configuration file (RCF) applied.
- The existing network configuration must have 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 this task

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
```

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

```
Node: node1
```

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

```
Node: node2
```

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

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

| Vserver | Logical<br>Interface | Status<br>Admin/Oper | Network<br>Address/Mask | Current<br>Node | Current<br>Port | Is<br>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
```

```
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.

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

7. Shutdown the c2 switch:

```
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.
```

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

| Vserver | Logical Interface | Status Admin/Oper | Network Address/Mask | Current Node | Current Port | Is 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. Shutdown the c1 switch:

```
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.

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

| Vserver | Logical Interface | Status Admin/Oper | Network Address/Mask | Current Node | Current Port | Is 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:

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

16. Verify that the cluster is healthy:

```
cluster show
```

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

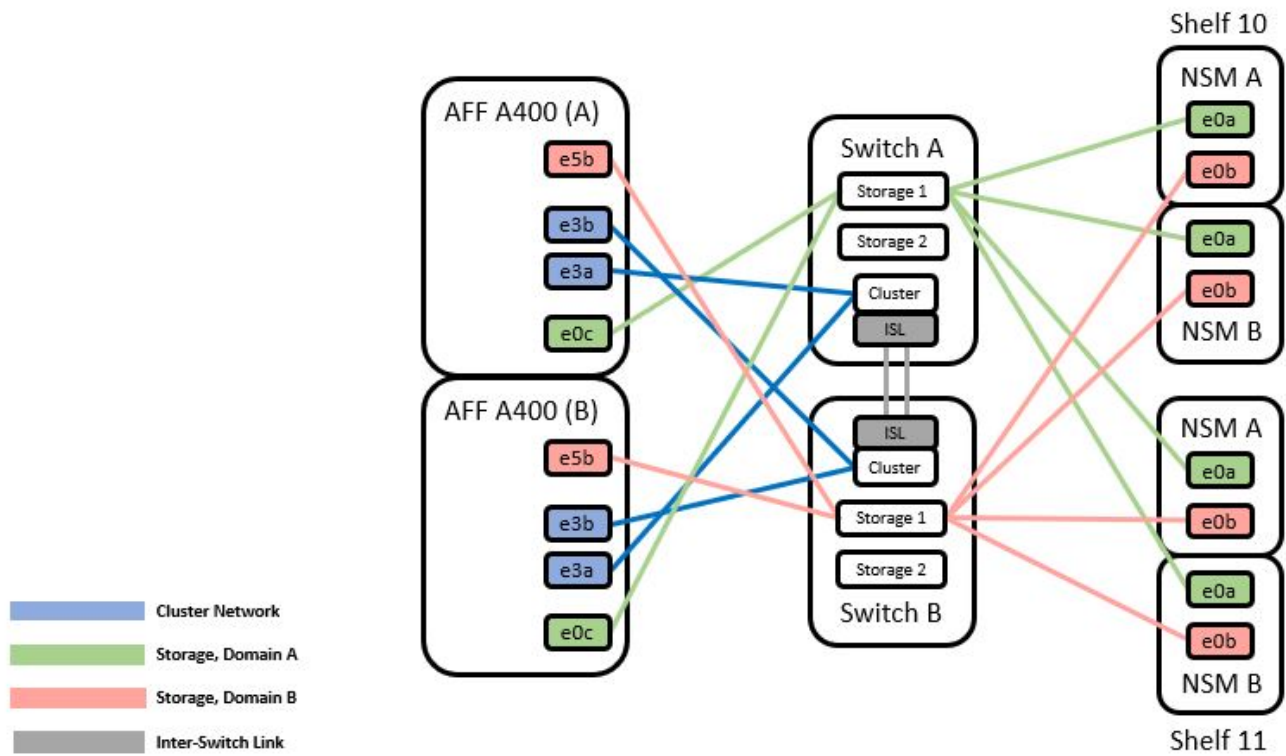
## Migrate from a switchless configuration with switch-attached storage by reusing the storage switches

### Migrate the storage switches

By reusing the storage switches the storage switches of HA pair 1 become the shared switches.

### Cabling diagram for switch-attached

## 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`



```
storage::*> system switch ethernet show
```

| Switch   | Type            | Address      | Model  |
|--|-----------------|--------------|--------|
| sh1  | storage-network | 172.17.227.5 | C9336C |
| Serial Number: FOC221206C2<br>Is Monitored: true<br>Reason: none<br>Software Version: Cisco Nexus Operating System (NX-OS) Software, Version 9.3(5)<br>Version Source: CDP |                 |              |        |
| sh2  | storage-network | 172.17.227.6 | C9336C |
| Serial Number: FOC220443LZ<br>Is Monitored: true<br>Reason: None<br>Software Version: Cisco Nexus Operating System (NX-OS) Software, Version 9.3(5)<br>Version Source: CDP |                 |              |        |

2 entries were displayed.

```
storage::*>
```

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

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

```
storage::*> storage port show -port-type ENET
```

| Node  | Port | Type | Mode    | Speed<br>(Gb/s) | State   | Status | VLAN<br>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`

```
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`

```
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`

```
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`

```
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:

```
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

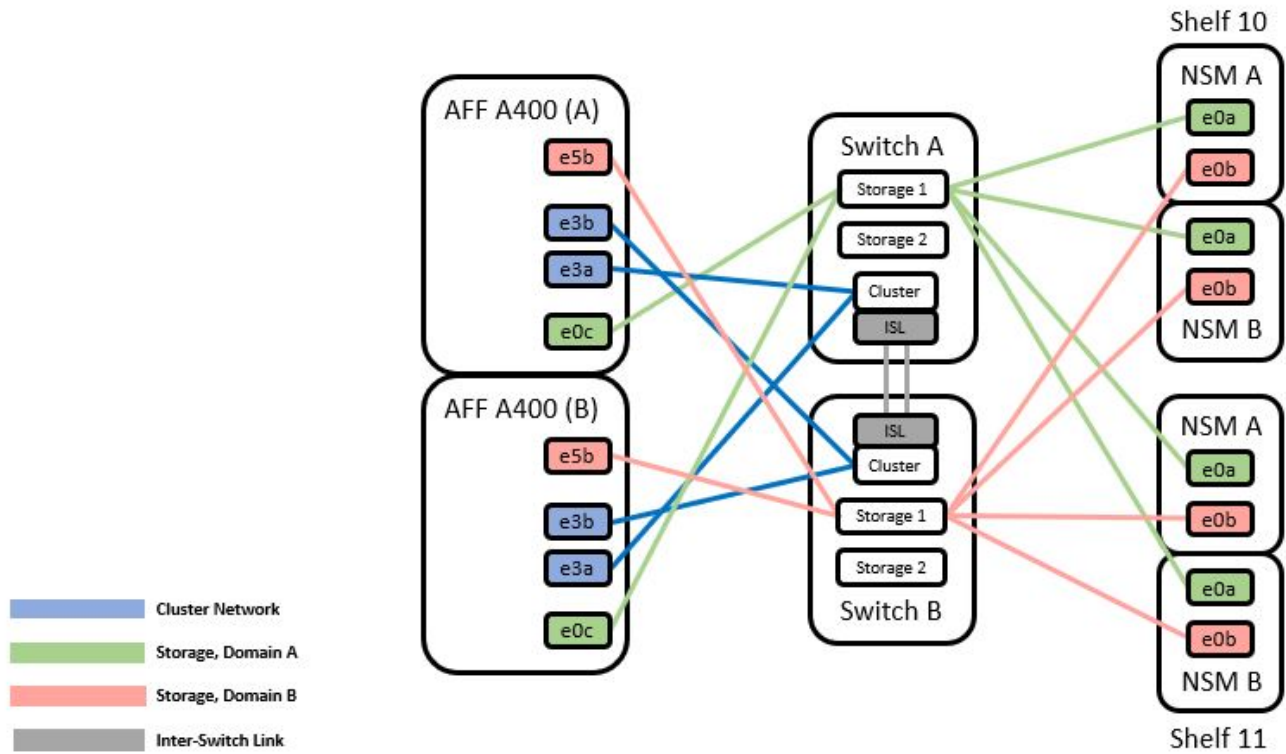
## Migrate from a switched cluster with switch-attached storage by reusing the storage switches

### Migrate the storage switches

By reusing the storage switches the storage switches of HA pair 1 become the shared switches.

#### Cabling diagram for switch-attached

## 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`

```

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
```

```
storage::*> storage port show -port-type ENET
```

| Node  | Port | Type | Mode    | Speed<br>(Gb/s) | State   | Status | VLAN<br>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
```

```
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
```

```
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
```

```
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
```

```
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:

```

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.

## Replace a Cisco Nexus 9336C-FX2 shared switch

### Replace a Cisco Nexus 9336C-FX2 shared switch

Replacing a defective Nexus 9336C-FX2 shared switch is a nondisruptive procedure (NDU).

#### Before you begin

The following conditions must exist before performing the switch replacement in the current environment and on the replacement switch.

- Existing cluster and network infrastructure:
  - The existing cluster must be verified as completely functional, with at least one fully connected cluster switch.
  - All cluster ports must be **up**.
  - All cluster logical interfaces (LIFs) must be **up** and on their home ports.
  - The ONTAP cluster ping-cluster -node node1 command must indicate that basic connectivity and larger than PMTU communication are successful on all paths.
- Nexus 9336C-FX2 replacement switch:
  - Management network connectivity on the replacement switch must be functional.
  - Console access to the replacement switch must be in place.



- The node connections are ports 1/1 through 1/34:
- All Inter-Switch Link (ISL) ports must be disabled on ports 1/35 and 1/36.
- The desired reference configuration file (RCF) and NX-OS operating system image switch must be loaded onto the switch.
- Any previous site customizations, such as STP, SNMP, and SSH, should be copied to the new switch.

### About this task

You must execute the command for migrating a cluster LIF from the node where the cluster LIF is hosted.

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

- The names of the existing Nexus 9336C-FX2 switches are *sh1* and *sh2*.
- The name of the new Nexus 9336C-FX2 switches are *newsh1* and *newsh2*.
- The node names are *node1* and *node2*.
- The cluster ports on each node are named *e3a* and *e3b*.
- The cluster LIF names are *node1\_clus1* and *node1\_clus2* for *node1*, and *node2\_clus1* and *node2\_clus2* for *node2*.
- The prompt for changes to all cluster nodes is *cluster1::\*>*.



The following procedure is based on the following network topology:

```
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.

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.

cluster1::*> network device-discovery show -protocol cdp
Node/      Local  Discovered
Protocol    Port   Device (LLDP: ChassisID)  Interface      Platform
-----
-----
node2      /cdp
      e3a    sh1              Eth1/2          N9K-C9336C
      e3b    sh2              Eth1/2          N9K-C9336C

node1      /cdp
      e3a    sh1              Eth1/1          N9K-C9336C
      e3b    sh2              Eth1/1          N9K-C9336C
4 entries were displayed.

sh1# 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          144      H          FAS2980      e3a
node2          Eth1/2          145      H          FAS2980      e3a
sh2            Eth1/35         176      R S I s    N9K-C9336C   Eth1/35
sh2 (FDO220329V5) Eth1/36         176      R S I s    N9K-C9336C   Eth1/36
Total entries displayed: 4

sh2# 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         139     H           FAS2980       eb
node2          Eth1/2         124     H           FAS2980       eb
sh1            Eth1/35        178     R S I s    N9K-C9336C    Eth1/35
sh1            Eth1/36        178     R S I s    N9K-C9336C    Eth1/36
Total entries displayed: 4

```

## 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`  
 Where x is the duration of the maintenance window in hours.
2. Optional: Install the appropriate RCF and image on the switch, newsh2, and make any necessary site preparations.
  - a. If necessary, verify, download, and install the appropriate versions of the RCF and NX-OS software for the new switch. If you have verified that the new switch is correctly set up and does not need updates to the RCF and NX-OS software, continue to [Step 3](#).
  - b. Go to the [NetApp Cluster and Management Network Switches Reference Configuration File Description Page](#) on the NetApp Support Site.
  - c. Click the link for the [Cluster Network and Management Network Compatibility Matrix](#), and then note the required switch software version.
  - d. Click your browser's back arrow to return to the Description page, click CONTINUE, accept the license agreement, and then go to the Download page.
  - e. Follow the steps on the Download page to download the correct RCF and NX-OS files for the version of ONTAP software you are installing.
3. On the new switch, log in as admin and shut down all the ports that will be connected to the node cluster interfaces (ports 1/1 to 1/34).  
 If the switch that you are replacing is not functional and is powered down, go to [Step 4](#). The LIFs on the cluster nodes should have already failed over to the other cluster port for each node.

```
newsh2# config
Enter configuration commands, one per line. End with CNTL/Z.
newsh2(config)# interface e1/1-34
newsh2(config-if-range)# shutdown
```

4. Verify that all cluster LIFs have auto-revert enabled.

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

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

5. Verify that all the cluster LIFs can communicate:

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

```

cluster1::*> cluster ping-cluster node1
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)

```

6. Shut down the ISL ports 1/35 and 1/36 on the Nexus 9336C-FX2 switch sh1.

```

sh1# configure
Enter configuration commands, one per line. End with CNTL/Z.
sh1(config)# interface e1/35-36
sh1(config-if-range)# shutdown
sh1(config-if-range)#

```

7. Remove all the cables from the Nexus 9336C-FX2 sh2 switch, and then connect them to the same ports on the Nexus C9336C-FX2 newsh2 switch.
8. Bring up the ISLs ports 1/35 and 1/36 between the sh1 and newsh2 switches, and then verify the port channel operation status.

Port-Channel should indicate Po1(SU) and Member Ports should indicate Eth1/35(P) and Eth1/36(P).

This example enables ISL ports 1/35 and 1/36 and displays the port channel summary on switch sh1.

```

sh1# configure
Enter configuration commands, one per line. End with CNTL/Z.
sh1 (config)# int e1/35-36
sh1 (config-if-range)# no shutdown
sh1 (config-if-range)# 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)

sh1 (config-if-range)#

```

9. Verify that port e3b is up on all nodes:  
network port show ipspace Cluster

The output should be like the following:

```
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/auto    | -       |
| false  |         |           |        |       |       |              |         |

```
4 entries were displayed.
```

10. On the same node you used in the previous step, revert the cluster LIF associated with the port in the previous step by using the network interface revert command.

In this example, LIF node1\_clus2 on node1 is successfully reverted if the Home value is true and the port is e3b.

The following commands return LIF node1\_clus2 on node1 to home port e3a and displays information about the LIFs on both nodes. Bringing up the first node is successful if the Is Home column is **true** for both cluster interfaces and they show the correct port assignments, in this example e3a and e3b on node1.

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

| Is Vserver Home | Logical Interface | Status Admin/Oper | Network Address/Mask | Current Node | Current Port |
|-----------------|-------------------|-------------------|----------------------|--------------|--------------|
| 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        | e3a          |
| false           |                   |                   |                      |              |              |

4 entries were displayed.

11. Display information about the nodes in a cluster:

```
cluster show
```

This example shows that the node health for node1 and node2 in this cluster is true:

```
cluster1::*> cluster show
```

| Node  | Health | Eligibility |
|-------|--------|-------------|
| node1 | false  | true        |
| node2 | true   | true        |

12. Verify that all physical cluster ports are up:

```
network port show ipspace Cluster
```



```
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.

13. Verify that all the cluster LIFs can communicate:

```
cluster ping-cluster
```

```

cluster1::*> cluster ping-cluster -node node2
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)

```

#### 14. Confirm the following cluster network configuration:

network port show

```

cluster1::*> network port show -ipspace Cluster

Node: node1

Ignore
Speed (Mbps)
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.

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.

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

| Node/    | Local | Discovered               |            |            |
|----------|-------|--------------------------|------------|------------|
| Protocol | Port  | Device (LLDP: ChassisID) | Interface  | Platform   |
| -----    | ----- | -----                    | -----      |            |
| -----    |       |                          |            |            |
| node2    | /cdp  |                          |            |            |
|          | e3a   | sh1 0/2                  | N9K-C9336C |            |
|          | e3b   | newsh2                   | 0/2        | N9K-C9336C |
| node1    | /cdp  |                          |            |            |
|          | e3a   | sh1                      | 0/1        | N9K-C9336C |
|          | e3b   | newsh2                   | 0/1        | N9K-C9336C |

4 entries were displayed.

sh1# 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 |
|-----------|---------------|--------|------------|------------|------|
| node1     | Eth1/1        | 144    | H          | FAS2980    | e3a  |
| node2     | Eth1/2        | 145    | H          | FAS2980    | e3a  |
| newsh2    | Eth1/35       | 176    | R S I s    | N9K-C9336C |      |
| Eth1/35   |               |        |            |            |      |
| newsh2    | Eth1/36       | 176    | R S I s    | N9K-C9336C |      |
| Eth1/36   |               |        |            |            |      |

Total entries displayed: 4

sh2# 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        | 139    | H          | FAS2980    | e3b     |
| node2     | Eth1/2        | 124    | H          | FAS2980    | eb      |
| sh1       | Eth1/35       | 178    | R S I s    | N9K-C9336C | Eth1/35 |
| sh1       | Eth1/36       | 178    | R S I s    | N9K-C9336C | Eth1/36 |

Total entries displayed: 4

15. Enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the following 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:
sh1
sh2
cluster1::*> system switch ethernet log setup-password
Enter the switch name: sh1
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: sh2
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.

16. Move the storage ports from the old switch sh2 to the new switch newsh2.
17. Verify the storage attached to HA pair 1, shared switch newsh2 is healthy.
18. Verify the storage attached to HA pair 2, shared switch newsh2 is healthy:  

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

```
storage::*> storage port show -port-type ENET
```

| Node  | Port | Type | Mode    | Speed<br>(Gb/s) | State   | Status  | VLAN<br>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         |

19. Verify that the shelves are correctly cabled:

```
storage shelf port show -fields remote- device,remote-port
```

```
cluster1::*> storage shelf port show -fields remote-device,remote-port
```

| shelf | id | remote-port  | remote-device |
|-------|----|--------------|---------------|
| 3.20  | 0  | Ethernet1/13 | sh1           |
| 3.20  | 1  | Ethernet1/13 | newsh2        |
| 3.20  | 2  | Ethernet1/14 | sh1           |
| 3.20  | 3  | Ethernet1/14 | newsh2        |
| 3.30  | 0  | Ethernet1/15 | sh1           |
| 3.30  | 1  | Ethernet1/15 | newsh2        |
| 3.30  | 2  | Ethernet1/16 | sh1           |
| 3.30  | 3  | Ethernet1/16 | newsh2        |

8 entries were displayed.

20. Remove the old switch sh2.

21. Repeat these steps for the switch sh1 and new switch newsh1.

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

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

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