



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

### **Install and maintain**

NetApp  
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# Cisco Nexus 9336C-FX2

## Get started

### Installation and setup workflow for Cisco Nexus 9336C-FX2 shared switches

The Cisco Nexus 9336C-FX2 shared switch is part of the Cisco Nexus 9000 platform and can be installed in a NetApp system cabinet. Shared switches allow you to combine cluster and storage functionality into a shared switch configuration, by supporting the use of shared cluster and storage Reference Configuration Files.

Follow these workflow steps to install and setup your Cisco 9336C-FX2 switches.

1

#### Review the configuration requirements

Review the configuration requirements for the 9336C-FX2 shared switch.

2

#### Review the components and part numbers

Review the components and part numbers for the 9336C-FX2 shared switch.

3

#### Review the required documentation

Review specific switch and controller documentation to set up your 9336C-FX2 switches and the ONTAP cluster.

### Configuration requirements for Cisco Nexus 9336C-FX2 shared switches

For Cisco Nexus 9336C-FX2 switch installation and maintenance, be sure to review configuration and network requirements.

#### ONTAP support

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

If you want to build ONTAP clusters with more than two nodes, you need two supported network switches.

#### Configuration requirements

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.

#### Network requirements

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 A700s systems, the e0M interface uses a dedicated Ethernet port.
- Refer to the [Hardware Universe](#) for the latest information. See [What additional information do I need to install my equipment that is not in HWU?](#) for more information about switch installation requirements.

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

### What's next

After you've reviewed the configuration requirements, you can confirm your [components and part numbers](#).

## Components and part numbers for Cisco Nexus 9336C-FX2 shared switches

For Cisco Nexus 9336C-FX2 switch installation and maintenance, be sure to review the list of components and part numbers.

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
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

### What's next

After you've confirmed your components and part numbers, you can review the [required documentation](#).

## Documentation requirements for Cisco Nexus 9336C-FX2 shared switches

For Cisco Nexus 9336C-FX2 switch installation and maintenance, be sure to review specific switch and controller documentation to set up your Cisco 9336-FX2 switches and ONTAP cluster.

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.

## Install the hardware

### Hardware install workflow for Cisco Nexus 9336C-FX2 shared switches

To install and configure the hardware for a 9336C-FX2 shared switch, follow these steps:

1

#### Complete the cabling worksheet

The sample cabling worksheet provides examples of recommended port assignments from the switches to the controllers. The blank worksheet provides a template that you can use in setting up your cluster.

2

#### Install the switch

Install the 9336C-FX2 switch.

3

#### Install the switch in a NetApp cabinet

Install the 9336C-FX2 switch and pass-through panel in a NetApp cabinet as required.

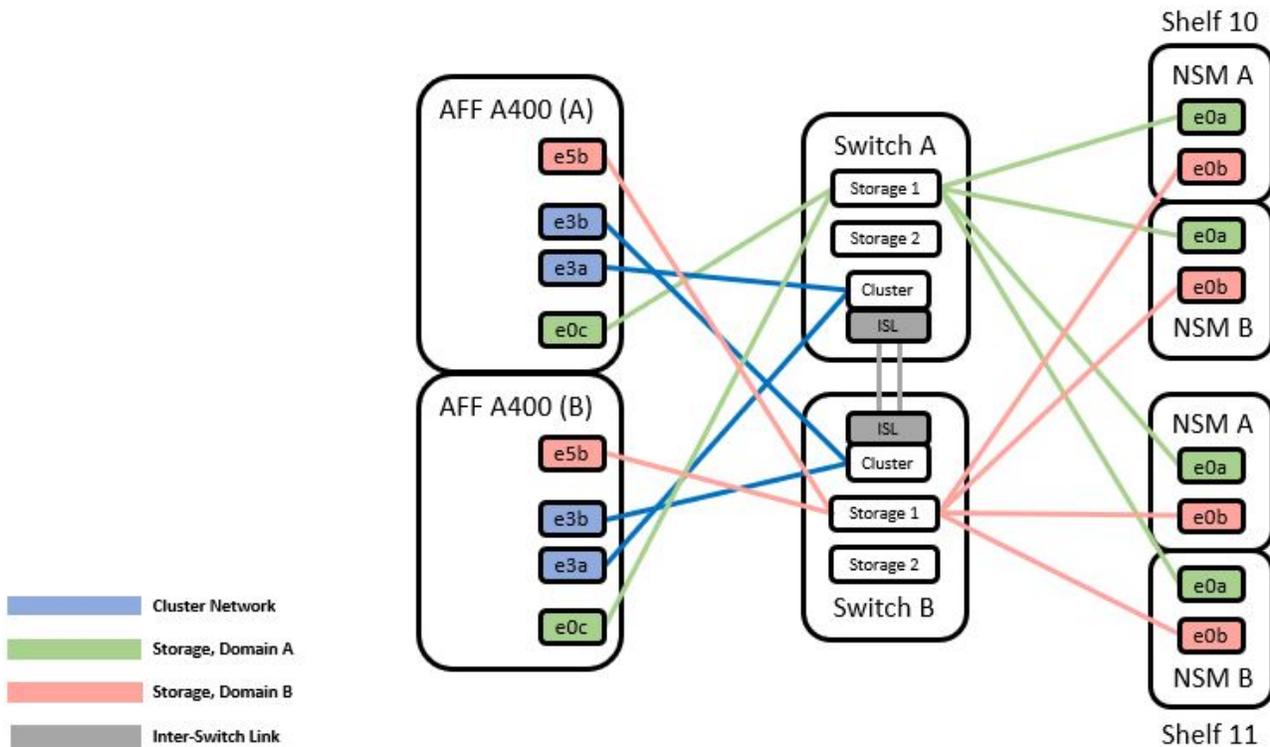
## Complete the Cisco Nexus 9336C-FX2 cabling worksheet

Use the following cabling images to complete the cabling between the controllers and the switches.

### Cable NS224 storage as switch-attached

If you want to cable NS224 storage as switch-attached, follow the switch-attached diagram:

Switch Attached

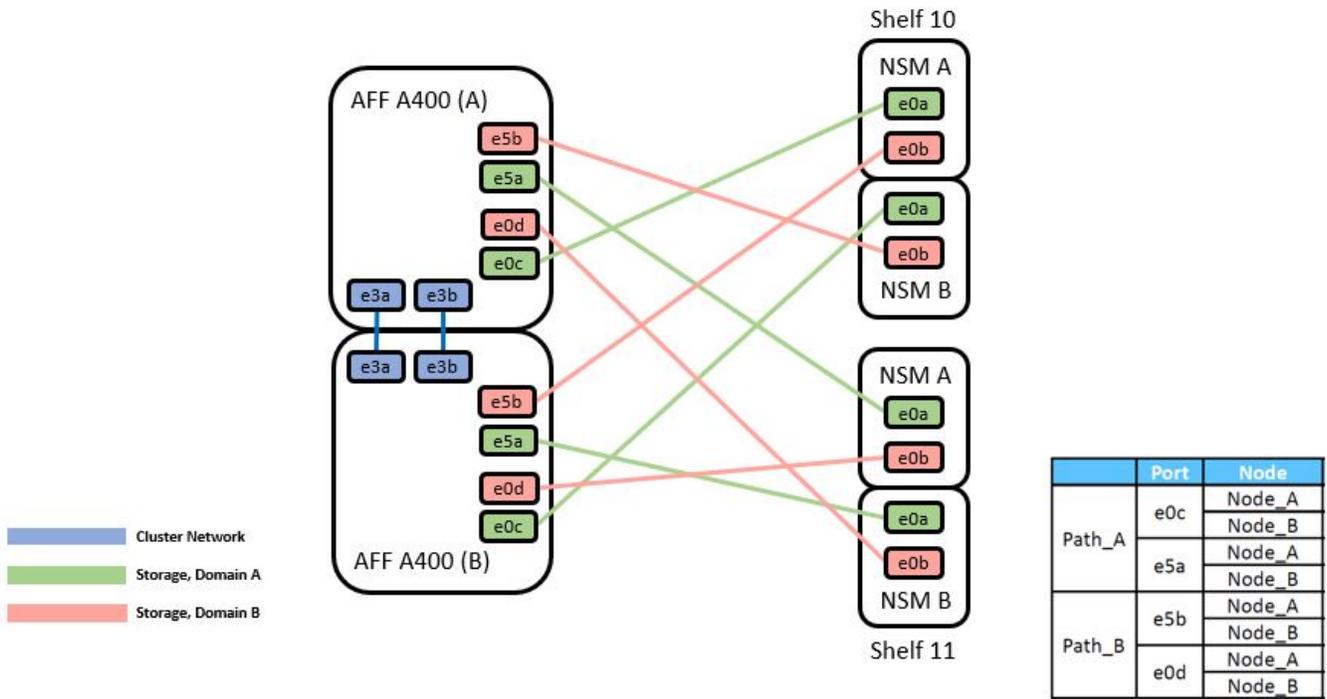


See the [Hardware Universe](#) for more information on switch ports. See [What additional information do I need to install my equipment that is not in HWU?](#) for more information about switch installation requirements.

### Cable NS224 storage as direct-attached

If you want to cable NS224 storage as direct-attached instead of using the shared switch storage ports, follow the direct-attached diagram:

Direct Attached



See the [Hardware Universe](#) for more information on switch ports.

**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	40/10GbE	1	Cluster	40/10GbE
2	Cluster	40/10GbE	2	Cluster	40/10GbE
3	Cluster	40/10GbE	3	Cluster	40/10GbE
4	Cluster	40/10GbE	4	Cluster	40/10GbE
5	Cluster	40/10GbE	5	Cluster	40/10GbE
6	Cluster	40/10GbE	6	Cluster	40/10GbE
7	Cluster	40/10GbE	7	Cluster	40/10GbE
8	Cluster	40/10GbE	8	Cluster	40/10GbE
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-1	100GbE	11	Storage-1	100GbE
12	Storage-1	100GbE	12	Storage-1	100GbE
13	Storage-1	100GbE	13	Storage-1	100GbE
14	Storage-1	100GbE	14	Storage-1	100GbE
15	Storage-1	100GbE	15	Storage-1	100GbE
16	Storage-1	100GbE	16	Storage-1	100GbE
17	Storage-1	100GbE	17	Storage-1	100GbE
18	Storage-1	100GbE	18	Storage-1	100GbE
19	Storage-1	100GbE	19	Storage-1	100GbE
20	Storage-1	100GbE	20	Storage-1	100GbE
21	Storage-1	100GbE	21	Storage-1	100GbE
22	Storage-1	100GbE	22	Storage-1	100GbE
23	Storage-2	100GbE	23	Storage-2	100GbE
24	Storage-2	100GbE	24	Storage-2	100GbE
25	Storage-2	100GbE	25	Storage-2	100GbE
26	Storage-2	100GbE	26	Storage-2	100GbE
27	Storage-2	100GbE	27	Storage-2	100GbE
28	Storage-2	100GbE	28	Storage-2	100GbE
29	Storage-2	100GbE	29	Storage-2	100GbE
30	Storage-2	100GbE	30	Storage-2	100GbE
31	Storage-2	100GbE	31	Storage-2	100GbE
32	Storage-2	100GbE	32	Storage-2	100GbE
33	Storage-2	100GbE	33	Storage-2	100GbE
34	Storage-2	100GbE	34	Storage-2	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 A			Switch B		
Switch port	Port role	Port usage	Switch port	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		
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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

### What's next

After you've completed your cabling worksheets, you can [install the switch](#).

## Install Cisco Nexus 9336C-FX2 shared switches

Follow these instructions to configure Cisco Nexus 9336C-FX2 shared switches.

### Before you begin

Make sure you have the following:

- Required shared switch documentation, controller documentation and ONTAP documentation. See [Documentation requirements for Cisco Nexus 9336C-FX2 shared switches](#) and [NetApp ONTAP documentation](#).
- Applicable licenses, network and configuration information, and cables.
- Completed cabling worksheets. See [Complete the Cisco Nexus 9336C-FX2 cabling worksheet](#). For more information on cabling, refer to the [Hardware Universe](#).

### Steps

1. Rack the switches, controllers and NS224 NVMe storage shelves.

See the [Racking instructions](#) to learn how to rack the switch in a NetApp cabinet.

2. Power on the switches, controllers and NS224 NVMe storage shelves.

### What's next?

Optionally, you can [install a Cisco Nexus 9336C-FX2 switch in a NetApp cabinet](#). Otherwise, go to [Configure the switch](#).

## Install a Cisco Nexus 9336C-FX2 switch in a NetApp cabinet

Depending on your configuration, you might need to install the Cisco Nexus 9336C-FX2 switch and pass-through panel in a NetApp cabinet. Standard brackets are included with the switch.

### Before you begin

Make sure you have the following:

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



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

### Required documentation

Review the initial preparation requirements, kit contents, and safety precautions in the [Cisco Nexus 9000 Series Hardware Installation Guide](#).

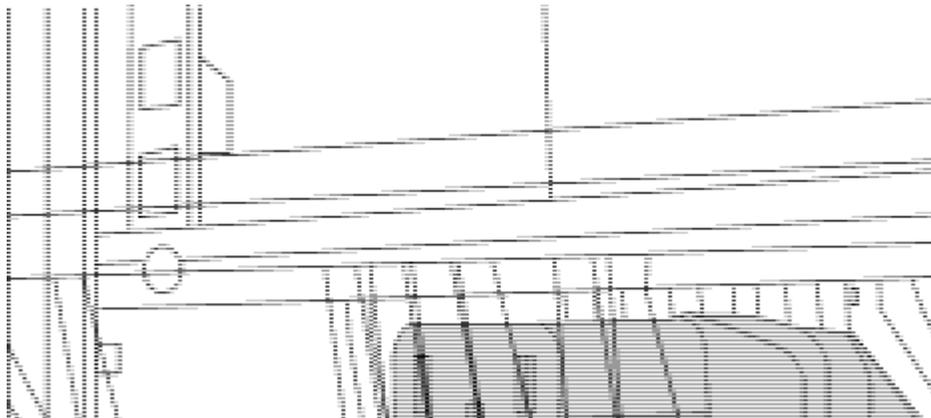
## Steps

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

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

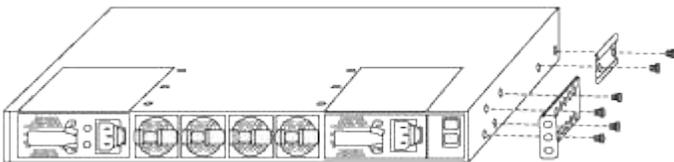
The NetApp pass-through panel kit contains the following hardware:

- One pass-through blanking panel
- Four 10-32 x .75 screws
- Four 10-32 clip nuts
  - a. Determine the vertical location of the switches and blanking panel in the cabinet.  
  
In this procedure, the blanking panel will be installed in U40.
  - b. Install two clip nuts on each side in the appropriate square holes for front cabinet rails.
  - c. Center the panel vertically to prevent intrusion into adjacent rack space, and then tighten the screws.
  - d. Insert the female connectors of both 48-inch jumper cords from the rear of the panel and through the brush assembly.



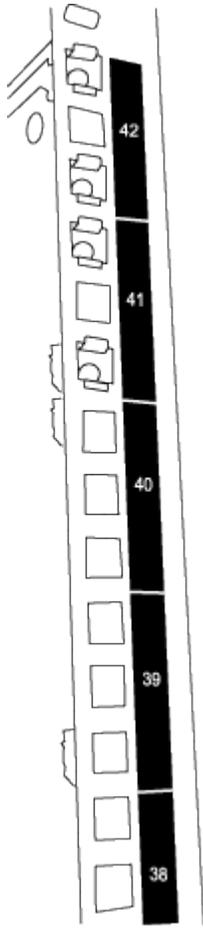
(1) Female connector of the jumper cord.

2. Install the rack-mount brackets on the Nexus 9336C-FX2 switch chassis.
  - a. Position a front rack-mount bracket on one side of the switch chassis so that the mounting ear is aligned with the chassis faceplate (on the PSU or fan side), and then use four M4 screws to attach the bracket to the chassis.



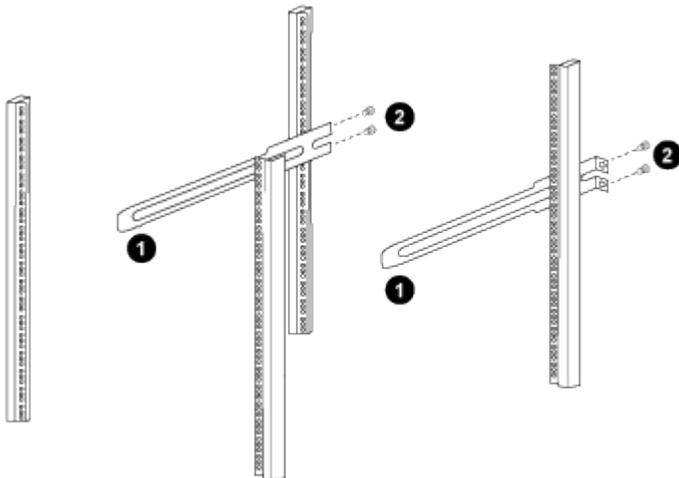
- b. Repeat step 2a with the other front rack-mount bracket on the other side of the switch.
- c. Install the rear rack-mount bracket on the switch chassis.

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



The two 9336C-FX2 switches will always be mounted in the top 2U of the cabinet RU41 and 42.

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



(1) As you gently slide the slider rail, align it to the screw holes in the rack.

(2) Tighten the screws of the slider rails to the cabinet posts.

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

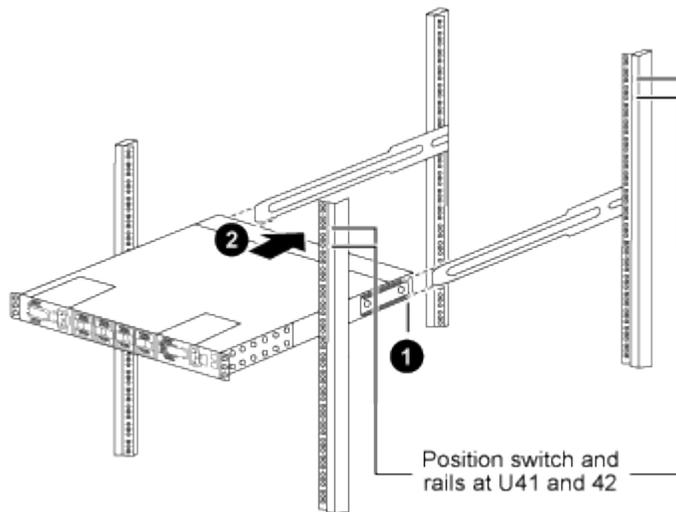
c. Repeat steps 4a and 4b at the RU41 locations on the cabinet.

5. Install the switch in the cabinet.



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

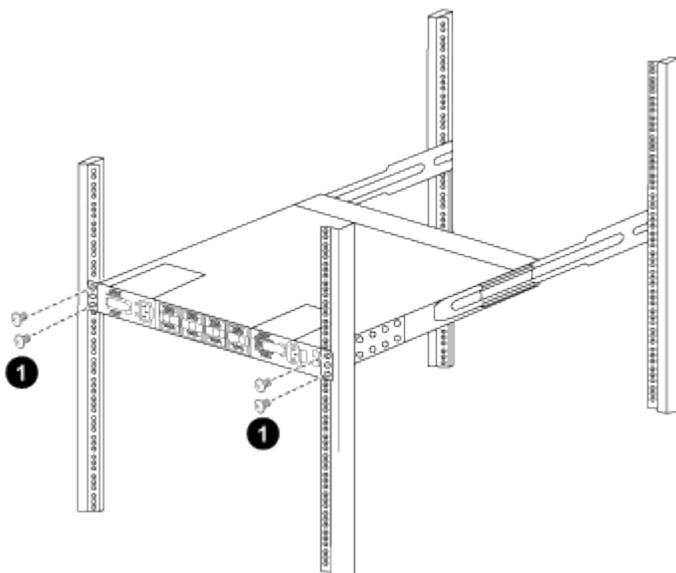
a. Position the back of the switch at RU41.



(1) As the chassis is pushed toward the rear posts, align the two rear rack-mount guides with the slider rails.

(2) Gently slide the switch until the front rack-mount brackets are flush with the front posts.

b. Attach the switch to the cabinet.



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

- c. With the chassis now supported without assistance, fully tighten the front screws to the posts.
- d. Repeat steps 5a through 5c for the second switch at the RU42 location.



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

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



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

8. Connect the management port on each 9336C-FX2 switch to either of the management switches (if ordered) or connect them directly to your management network.

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

## Review cabling and configuration considerations

Before configuring your 9336C-FX2 and 9336C-FX2-T switches, review the cabling and configuration requirements.

### Support for NVIDIA CX6, CX6-DX, and CX7 Ethernet ports

If you are connecting a switch port to an ONTAP controller using NVIDIA ConnectX-6 (CX6), ConnectX-6 Dx (CX6-DX), or ConnectX-7 (CX7) NIC ports, you must hard-code the switch port speed.

```
(cs1)(config)# interface Ethernet1/19
For 100GbE speed:
(cs1)(config-if)# speed 100000
For 40GbE speed:
(cs1)(config-if)# speed 40000
(cs1)(config-if)# no negotiate auto
(cs1)(config-if)# exit
(cs1)(config)# exit
Save the changes:
(cs1)# copy running-config startup-config
```

### 25GbE FEC requirements

#### FAS2820 e0a/e0b ports

FAS2820 e0a and e0b ports require FEC configuration changes to link up with 9336C-FX2 and 9336C-FX2-T switch ports.

For switch ports e0a and e0b, the `fec` setting is set to `rs-cons16`.

```
(cs1)(config)# interface Ethernet1/8-9
(cs1)(config-if-range)# fec rs-cons16
(cs1)(config-if-range)# exit
(cs1)(config)# exit
Save the changes:
(cs1)# copy running-config startup-config
```

## Ports do not link up due to TCAM resources

On the 9336C-FX2 and 9336C-FX2-T switches, the Ternary Content Addressable Memory (TCAM) resources configured in the configuration utilized by the switch are exhausted.

### Related information

- Refer to [Hardware Universe](#) for more information on switch ports.
- See [What additional information do I need to install my equipment that is not in HWU?](#) for more information about switch installation requirements.
- See the Knowledge Base article [Ports do not link up on Cisco Nexus 9336C-FX2 due to TCAM resources](#) for details on how to resolve TCAM issues.

# Configure the software

## Software install workflow for Cisco Nexus 9336C-FX2 shared switches

To install and configure software for a Cisco Nexus 9336C-FX2 shared switch, follow these steps:

1

### Configure the switch

Configure the 9336C-FX2 shared switch.

2

### Prepare to install the NX-OS software and RCF

The Cisco NX-OS software and reference configuration files (RCFs) must be installed on Cisco 9336C-FX2 shared switches.

3

### Install or upgrade the NX-OS software

Download and install or upgrade the NX-OS software on the Cisco 9336C-FX2 shared switch.

4

### Install the RCF

Install the RCF after setting up the Cisco 9336C-FX2 shared switch for the first time.

## 5

### Upgrade your RCF

Upgrade your RCF version when you have an existing version of the RCF file installed on your operational switches.

## 6

### Reset the switch to factory defaults

Erase the 9336C-FX2 shared switch settings.

## Configure Cisco Nexus 9336C-FX2 shared switches

Follow these instructions to configure Cisco Nexus 9336C-FX2 shared switches.

### Before you begin

Make sure you have the following:

- Required shared switch documentation, controller documentation and ONTAP documentation. See [Documentation requirements for Cisco Nexus 9336C-FX2 shared switches](#) and [NetApp ONTAP documentation](#).
- Applicable licenses, network and configuration information, and cables.
- Completed cabling worksheets. See [Complete the Cisco Nexus 9336C-FX2 cabling worksheet](#). For more information on cabling, refer to the [Hardware Universe](#).

### Steps

1. Perform an initial configuration of the switches.

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.

2. Boot the switch.

Provide the 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.

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

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

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

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

- c. Enter the password for admin.

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

A weak password can be rejected.

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

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

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

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

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

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

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

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

h. Enter the switch name.

The switch name is limited to 63 alphanumeric characters.

i. 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

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

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

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

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

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

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

m. Enable SSH service? (yes/no)

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



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

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

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

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

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

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

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

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

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

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

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

t. 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.

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

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

3. 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.



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.

4. Check the version on the cluster network switches, and if necessary, download the NetApp-supported version of the software to the switches from the [Cisco software download](#) page.

### What's next?

After you've configured your switches, you can [prepare to install NX-OS and RCF](#).

## Prepare to install NX-OS software and RCF

Before you install the NX-OS software and the Reference Configuration File (RCF), follow this procedure.

### Suggested documentation

- [Cisco Ethernet switch page](#)

Consult the switch compatibility table for the supported ONTAP and NX-OS versions.

- [Software Upgrade and downgrade guides](#)

Refer to the appropriate software and upgrade guides available on the Cisco website for complete documentation on the Cisco switch upgrade and downgrade procedures.

- [Cisco Nexus 9000 and 3000 Upgrade and ISSU Matrix](#)

Provides information on Disruptive Upgrade/Downgrade for Cisco NX-OS software on Nexus 9000 Series Switches based on your current and target releases.

On the page, select **Disruptive Upgrade** and select your current release and target release from the dropdown list.

## About the examples

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.

## About this task

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.



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

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

```
set -privilege advanced
```

The advanced prompt (`*>`) appears.

3. Display how many cluster interconnect interfaces are configured in each node for each cluster interconnect switch:

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

## Show example

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

Node/ Protocol Platform	Local Port	Discovered Device (LLDP: ChassisID)	Interface	
cluster1-02/cdp	e0a	cs1	Eth1/2	N9K-
C9336C	e0b	cs2	Eth1/2	N9K-
C9336C				
cluster1-01/cdp	e0a	cs1	Eth1/1	N9K-
C9336C	e0b	cs2	Eth1/1	N9K-
C9336C				
.				
.				

4. Check the administrative or operational status of each cluster interface and each node storage port and storage shelf port.

- a. Display the network port attributes:

```
network port show -ipSpace Cluster
```

## Show example

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

Node: cluster1-02

Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper
Status
-----
-----
e0a       Cluster      Cluster      up   9000  auto/10000
healthy
e0b       Cluster      Cluster      up   9000  auto/10000
healthy

Node: cluster1-01

Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper
Status
-----
-----
e0a       Cluster      Cluster      up   9000  auto/10000
healthy
e0b       Cluster      Cluster      up   9000  auto/10000
healthy
.
.
```

### b. Display information about the LIFs:

```
network interface show -vserver Cluster
```

### Show example

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

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

c. Verify that all the node storage ports are up with a healthy status:

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

### Show example

```
cluster1::*> storage port show -port-type ENET
```

Node	Port	Type	Mode	Speed (Gb/s)	State	Status
-----						
cluster1-01	e5a	ENET	-	100	enabled	online
	e3b	ENET	-	100	enabled	online
cluster1-02	e5a	ENET	-	100	enabled	online
	e3b	ENET	-	100	enabled	online
.						
.						

- d. Verify that all the storage shelf ports are up with a healthy status:

```
storage shelf port show
```

### Show example

```
cluster1::> storage shelf port show
```

Shelf ID	Module	State	Internal?
-----			
1.4			
0	A	connected	false
1	A	connected	false
2	B	connected	false
3	B	connected	false
.			
.			

- e. Verify that the switches are being monitored.

```
system switch ethernet show
```

## Show example

```
cluster1::*> system switch ethernet show
Switch                               Type                               Address
Model
-----
s1
                                     storage-network                    10.228.143.216
N9K-C9336C-FX2
  Serial Number: FDOXXXXXXB
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                                     10.4(6)
  Version Source: CDP/ISDP

s2
                                     storage-network                    10.228.143.219
N9K-C9336C-FX2
  Serial Number: FDOXXXXXXC
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                                     10.6(2)
  Version Source: CDP/ISDP

cs1
                                     cluster-network                    10.228.184.39
N9K-C9336C-FX2
  Serial Number: FLMXXXXXXXXJ
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                                     10.4(6)
  Version Source: CDP/ISDP

cs2
                                     cluster-network                    10.228.184.40
N9K-C9336C-FX2
```

```
Serial Number: FLMXXXXXXXXG
  Is Monitored: true
    Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                  10.6(2)
Version Source: CDP/ISDP
```

5. Verify the connectivity of the remote cluster interfaces:

## ONTAP 9.9.1 and later

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

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

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

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

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

Packet	Source	Destination
Node	Date	LIF
Loss		
-----	-----	-----
node1		
3/5/2022 19:21:18 -06:00	cluster1-01_clus2	cluster1-02-
clus1 none		
3/5/2022 19:21:20 -06:00	cluster1-01_clus2	cluster1-
02_clus2 none		
node2		
3/5/2022 19:21:18 -06:00	cluster1-02_clus2	cluster1-
01_clus1 none		
3/5/2022 19:21:20 -06:00	cluster1-02_clus2	cluster1-
01_clus2 none		

## All ONTAP releases

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

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

```

cluster1::*> cluster ping-cluster -node local
Host is cluster1-02
Getting addresses from network interface table...
Cluster cluster1-01_clus1 169.254.209.69 cluster1-01 e0a
Cluster cluster1-01_clus2 169.254.49.125 cluster1-01 e0b
Cluster cluster1-02_clus1 169.254.47.194 cluster1-02 e0a
Cluster cluster1-02_clus2 169.254.19.183 cluster1-02 e0b
Local = 169.254.47.194 169.254.19.183
Remote = 169.254.209.69 169.254.49.125
Cluster Vserver Id = 4294967293
Ping status:

Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s)

Detected 9000 byte MTU on 4 path(s):
    Local 169.254.19.183 to Remote 169.254.209.69
    Local 169.254.19.183 to Remote 169.254.49.125
    Local 169.254.47.194 to Remote 169.254.209.69
    Local 169.254.47.194 to Remote 169.254.49.125
Larger than PMTU communication succeeds on 4 path(s)
RPC status:
2 paths up, 0 paths down (tcp check)
2 paths up, 0 paths down (udp check)

```

6. Verify that the auto-revert command is enabled on all cluster LIFs:

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

## Show example

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

Vserver	Logical Interface	Auto-revert
Cluster	cluster1-01_clus1	true
	cluster1-01_clus2	true
	cluster1-02_clus1	true
	cluster1-02_clus2	true

## What's next?

After you've prepared to install the NX-OS software and RCF, you can [install the NX-OS software](#).

## Install the NX-OS software

Follow this procedure to install the NX-OS software on the Nexus 9336C-FX2 shared switch.

Before you begin, complete the procedure in [Prepare to install NX-OS and RCF](#).

## Review requirements

### Before you begin

Make sure you have the following:

- A current backup of the switch configuration.
- A fully functioning cluster (no errors in the logs or similar issues).

## Suggested documentation

- [Cisco Ethernet switch page](#)

Consult the switch compatibility table for the supported ONTAP and NX-OS versions.

- [Software Upgrade and downgrade guides](#)

Refer to the appropriate software and upgrade guides available on the Cisco website for complete documentation on the Cisco switch upgrade and downgrade procedures.

- [Cisco Nexus 9000 and 3000 Upgrade and ISSU Matrix](#)

Provides information on Disruptive Upgrade/Downgrade for Cisco NX-OS software on Nexus 9000 Series Switches based on your current and target releases.

On the page, select **Disruptive Upgrade** and select your current release and target release from the dropdown list.

### About the examples

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.

### Install the software

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. 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.

### Show example

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

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

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

3. Display the cluster ports on each node that are connected to the cluster switches:

```
network device-discovery show
```

## Show example

```
cluster1::*> network device-discovery show
Node/          Local  Discovered
Protocol      Port   Device (LLDP: ChassisID)  Interface
Platform
-----
-----
cluster1-01/cdp
              e0a    cs1                      Ethernet1/7      N9K-
C9336C-FX2
              e0d    cs2                      Ethernet1/7      N9K-
C9336C-FX2
cluster1-02/cdp
              e0a    cs1                      Ethernet1/8      N9K-
C9336C-FX2
              e0d    cs2                      Ethernet1/8      N9K-
C9336C-FX2
cluster1-03/cdp
              e0a    cs1                      Ethernet1/1/1    N9K-
C9336C-FX2
              e0b    cs2                      Ethernet1/1/1    N9K-
C9336C-FX2
cluster1-04/cdp
              e0a    cs1                      Ethernet1/1/2    N9K-
C9336C-FX2
              e0b    cs2                      Ethernet1/1/2    N9K-
C9336C-FX2
```

4. Check the administrative and operational status of each cluster port, node storage port, and storage shelf port.
  - a. Verify that all the cluster ports are **up** with a healthy status:

```
network port show -ipospace Cluster
```

## Show example

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

Node: cluster1-01

Ignore

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

Node: cluster1-02

Ignore

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

Node: cluster1-03

Ignore

Health      Health
Port        IPspace    Broadcast Domain Link MTU  Admin/Oper
Status      Status
-----
e0a         Cluster    Cluster    up    9000  auto/10000
healthy    false
e0b         Cluster    Cluster    up    9000  auto/10000
healthy    false
```

Node: cluster1-04

Ignore

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

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

```
network interface show -vserver Cluster
```

### Show example

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

Current Vserver Port	Logical Current Home	Is Interface	Status Admin/Oper	Network Address/Mask	Node
Cluster					
cluster1-01	cluster1-01	clus1	up/up	169.254.3.4/23	
	e0a	true			
cluster1-01	cluster1-01	clus2	up/up	169.254.3.5/23	
	e0d	true			
cluster1-02	cluster1-02	clus1	up/up	169.254.3.8/23	
	e0a	true			
cluster1-02	cluster1-02	clus2	up/up	169.254.3.9/23	
	e0d	true			
cluster1-03	cluster1-03	clus1	up/up	169.254.1.3/23	
	e0a	true			
cluster1-03	cluster1-03	clus2	up/up	169.254.1.1/23	
	e0b	true			
cluster1-04	cluster1-04	clus1	up/up	169.254.1.6/23	
	e0a	true			
cluster1-04	cluster1-04	clus2	up/up	169.254.1.7/23	
	e0b	true			

c. Verify that all the node storage ports are up with a healthy status:

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

### Show example

```
cluster1::*> storage port show -port-type ENET
```

Node	Port	Type	Mode	Speed (Gb/s)	State	Status
-----						
cluster1-01	e5a	ENET	-	100	enabled	online
	e3b	ENET	-	100	enabled	online
cluster1-02	e5a	ENET	-	100	enabled	online
	e3b	ENET	-	100	enabled	online
.						
.						

- d. Verify that all the storage shelf ports are up with a healthy status:

```
storage shelf port show
```

### Show example

```
cluster1::> storage shelf port show
```

Shelf	ID	Module	State	Internal?
-----				
1.4				
	0	A	connected	false
	1	A	connected	false
	2	B	connected	false
	3	B	connected	false
.				
.				

- e. Verify that the switches are being monitored.

```
system switch ethernet show
```

## Show example

```
cluster1::*> system switch ethernet show
Switch                               Type                               Address
Model
-----
s1
                                     storage-network                    10.228.143.216
N9K-C9336C-FX2
  Serial Number: FDOXXXXXXXXB
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                                     10.4(6)
  Version Source: CDP/ISDP

s2
                                     storage-network                    10.228.143.219
N9K-C9336C-FX2
  Serial Number: FDOXXXXXXXXC
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                                     10.6(2)
  Version Source: CDP/ISDP

cs1
                                     cluster-network                    10.228.184.39
N9K-C9336C-FX2
  Serial Number: FLMXXXXXXXXJ
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                                     10.4(6)
  Version Source: CDP/ISDP

cs2
                                     cluster-network                    10.228.184.40
N9K-C9336C-FX2
```

```
Serial Number: FLMXXXXXXXXG
Is Monitored: true
Reason: None
Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                10.6(2)
Version Source: CDP/ISDP
```

5. Disable auto-revert on the cluster LIFs. The cluster LIFs fail over to the partner cluster switch and remain there as you perform the upgrade procedure on the targeted switch:

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

6. Copy the NX-OS software and EPLD images to the Nexus 9336C-FX2 switch.

## Show example

```
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.
```

### 7. Verify the running version of the NX-OS software:

```
show version
```

## Show example

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

Software
  BIOS: version 08.38
  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#
```

#### 8. Install the NX-OS image.

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

## Show example

```
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.
```

9. Verify the new version of NX-OS software after the switch has rebooted:

```
show version
```

## Show example

```
cs2# show version
```

```
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (C) 2002-2020, Cisco and/or its affiliates.
All rights reserved.
The copyrights to certain works contained in this software are
owned by other third parties and used and distributed under their
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and unless
otherwise stated, there is no warranty, express or implied,
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GNU General Public License (GPL) version 3.0 or the GNU
Lesser General Public License (LGPL) Version 2.1 or
Lesser General Public License (LGPL) Version 2.0.
A copy of each such license is available at
http://www.opensource.org/licenses/gpl-2.0.php and
http://opensource.org/licenses/gpl-3.0.html and
http://www.opensource.org/licenses/lgpl-2.1.php and
http://www.gnu.org/licenses/old-licenses/library.txt.
```

### Software

```
BIOS: version 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):
```

10. Upgrade the EPLD image and reboot the switch.

Show example



```
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 all
```

```
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.
```

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

**Show example**

```
cs2# show version module 1 epld
```

EPLD	Device	Version
MI	FPGA	0x7
IO	FPGA	0x19
MI	FPGA2	0x2
GEM	FPGA	0x2

12. Verify the health of all ports on the cluster.

a. Verify that cluster ports are up and healthy across all nodes in the cluster:

```
network port show -ipSpace Cluster
```

## Show example

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

```
Node: cluster1-01
```

```
Ignore
```

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

```
Node: cluster1-02
```

```
Ignore
```

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

```
Node: cluster1-03
```

```
Ignore
```

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

```
Node: cluster1-04

Ignore

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

b. Verify the switch health from the cluster.

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

## Show example

```
cluster1::*> network device-discovery show -protocol cdp
Node/          Local  Discovered
Protocol      Port   Device (LLDP: ChassisID)  Interface
Platform
-----
-----
cluster1-01/cdp
              e0a    cs1                        Ethernet1/7
N9K-C9336C-FX2
              e0d    cs2                        Ethernet1/7
N9K-C9336C-FX2
cluster01-2/cdp
              e0a    cs1                        Ethernet1/8
N9K-C9336C-FX2
              e0d    cs2                        Ethernet1/8
N9K-C9336C-FX2
cluster01-3/cdp
              e0a    cs1                        Ethernet1/1/1
N9K-C9336C-FX2
              e0b    cs2                        Ethernet1/1/1
N9K-C9336C-FX2
cluster1-04/cdp
              e0a    cs1                        Ethernet1/1/2
N9K-C9336C-FX2
              e0b    cs2                        Ethernet1/1/2
N9K-C9336C-FX2
```

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

- c. Verify that all the node storage ports are up with a healthy status:

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

### Show example

```
cluster1::*> storage port show -port-type ENET
```

Node	Port	Type	Mode	Speed (Gb/s)	State	Status
-----						
cluster1-01	e5a	ENET	-	100	enabled	online
	e3b	ENET	-	100	enabled	online
cluster1-02	e5a	ENET	-	100	enabled	online
	e3b	ENET	-	100	enabled	online
.						
.						

- d. Verify that all the storage shelf ports are up with a healthy status:

```
storage shelf port show
```

### Show example

```
cluster1::> storage shelf port show
```

Shelf	ID	Module	State	Internal?
-----				
1.4				
	0	A	connected	false
	1	A	connected	false
	2	B	connected	false
	3	B	connected	false
.				
.				

- e. Verify that the switches are being monitored.

```
system switch ethernet show
```

## Show example

```
cluster1::*> system switch ethernet show
Switch                               Type                               Address
Model
-----
s1
                                     storage-network                    10.228.143.216
N9K-C9336C-FX2
  Serial Number: FDOXXXXXXXXB
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                                     10.4(6)
  Version Source: CDP/ISDP

s2
                                     storage-network                    10.228.143.219
N9K-C9336C-FX2
  Serial Number: FDOXXXXXXXXC
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                                     10.6(2)
  Version Source: CDP/ISDP

cs1
                                     cluster-network                    10.228.184.39
N9K-C9336C-FX2
  Serial Number: FLMXXXXXXXXJ
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                                     10.4(6)
  Version Source: CDP/ISDP

cs2
                                     cluster-network                    10.228.184.40
N9K-C9336C-FX2
```

```
Serial Number: FLMXXXXXXXXG
  Is Monitored: true
    Reason: None
Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                  10.6(2)
Version Source: CDP/ISDP
```

13. Verify that the cluster is healthy:

```
cluster show
```

#### Show example

```
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::*>
```

14. Repeat steps 6 to 13 to install the NX-OS software on switch cs1.

15. Verify the connectivity of the remote cluster interfaces before enabling auto-revert on the cluster LIFs:

## ONTAP 9.9.1 and later

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

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

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

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

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

Packet	Source	Destination
Node	Date	LIF
Loss		
-----	-----	-----
-----	-----	-----
node1		
3/5/2022 19:21:18 -06:00	cluster1-01_clus2	cluster1-02-
clus1 none		
3/5/2022 19:21:20 -06:00	cluster1-01_clus2	cluster1-
02_clus2 none		
node2		
3/5/2022 19:21:18 -06:00	cluster1-02_clus2	cluster1-
01_clus1 none		
3/5/2022 19:21:20 -06:00	cluster1-02_clus2	cluster1-
01_clus2 none		

## All ONTAP releases

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

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

```

cluster1::*> cluster ping-cluster -node local
Host is cluster1-02
Getting addresses from network interface table...
Cluster cluster1-01_clus1 169.254.209.69 cluster1-01 e0a
Cluster cluster1-01_clus2 169.254.49.125 cluster1-01 e0b
Cluster cluster1-02_clus1 169.254.47.194 cluster1-02 e0a
Cluster cluster1-02_clus2 169.254.19.183 cluster1-02 e0b
Local = 169.254.47.194 169.254.19.183
Remote = 169.254.209.69 169.254.49.125
Cluster Vserver Id = 4294967293
Ping status:

Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s)

Detected 9000 byte MTU on 4 path(s):
    Local 169.254.19.183 to Remote 169.254.209.69
    Local 169.254.19.183 to Remote 169.254.49.125
    Local 169.254.47.194 to Remote 169.254.209.69
    Local 169.254.47.194 to Remote 169.254.49.125
Larger than PMTU communication succeeds on 4 path(s)
RPC status:
2 paths up, 0 paths down (tcp check)
2 paths up, 0 paths down (udp check)

```

16. Enable auto-revert on the cluster LIFs.

```
network interface modify -vserver Cluster -lif * -auto-revert true
```

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

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

## Show example

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

Current Is	Logical	Status	Network	Current
Vserver	Interface	Admin/Oper	Address/Mask	Node
Port	Home			
-----				
Cluster				
	cluster1-01_clus1	up/up	169.254.3.4/23	
cluster1-01	e0d	true		
	cluster1-01_clus2	up/up	169.254.3.5/23	
cluster1-01	e0d	true		
	cluster1-02_clus1	up/up	169.254.3.8/23	
cluster1-02	e0d	true		
	cluster1-02_clus2	up/up	169.254.3.9/23	
cluster1-02	e0d	true		
	cluster1-03_clus1	up/up	169.254.1.3/23	
cluster1-03	e0b	true		
	cluster1-03_clus2	up/up	169.254.1.1/23	
cluster1-03	e0b	true		
	cluster1-04_clus1	up/up	169.254.1.6/23	
cluster1-04	e0b	true		
	cluster1-04_clus2	up/up	169.254.1.7/23	
cluster1-04	e0b	true		

If any cluster LIFs have not returned to their home ports, revert them manually from the local node:

```
network interface revert -vserver Cluster -lif <lif_name>
```

### What's next?

After you've installed the NX-OS software, you can [install the RCF](#).

## Install the Reference Configuration File (RCF)

You can install the reference configuration file (RCF) after setting up the Nexus 9336C-FX2 switch for the first time.

Before you begin, complete the procedure in [Prepare to install NX-OS and RCF](#).

### Before you begin

Verify the following installations and connections:

- A console connection to the switch. The console connection is optional if you have remote access to the switch.

- Switch cs1 and switch cs2 are powered up and the initial switch setup is complete (the Management IP address and SSH is set up).
- The desired NX-OS version has been installed.
- Inter-switch link (ISL) connections between switches are connected.
- ONTAP node cluster ports are not connected.

### Available RCF configuration

- **ClusterStorageRCF** - Supports a partitioned cluster plus two storage zones on the switches (Cluster-Storage RCF 1.xx).

### Step 1: Install the RCF on the switches

1. Login to switch cs1 using SSH or by using a serial console.
2. Copy the RCF to the bootflash of switch cs1 using one of the following transfer protocols: FTP, TFTP, SFTP, or SCP.

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

#### Show example

This example shows TFTP being used to copy an RCF to the bootflash on switch cs1:

```
cs1# 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)...
```

3. Apply the RCF previously downloaded to the bootflash.

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

#### Show example

This example shows the RCF file `Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt` being installed on switch cs1:

```
cs1# copy Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt running-
config echo-commands
```

4. 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.

### Show example

```
cs1# 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 confi
g 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
*
*****
*****
```

5. 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.

6. Record any custom additions between the current `running-config` file and the RCF file in use.
7. After you verify that the RCF versions and switch settings are correct, copy the `running-config` file to the `startup-config` file.

```
cs1# copy running-config startup-config
[#####] 100% Copy complete
```

8. Reboot switch cs1.

```
cs1# reload
```

This command will reboot the system. (y/n)? [n] **y**

9. Repeat steps 1 through 8 on switch cs2.
10. Connect the cluster ports of all nodes in the ONTAP cluster to switches cs1 and cs2.

## Step 2: Verify the switch connections

1. Verify that the switch ports connected to the cluster ports are **up**.

```
show interface brief
```

## Show example

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

2. Verify that the cluster nodes are in their correct cluster VLANs using the following commands:

```
show vlan brief
```

```
show interface trunk
```

## Show example

```
cs1# show vlan brief
```

VLAN Name	Status	Ports
1 default	active	Pol, Eth1/1, Eth1/2, Eth1/3 Eth1/4, Eth1/5, Eth1/6, Eth1/7 Eth1/8, Eth1/35, Eth1/36 Eth1/9/1, Eth1/9/2, Eth1/9/3 Eth1/9/4, Eth1/10/1, Eth1/10/2 Eth1/10/3, Eth1/10/4
17 VLAN0017	active	Eth1/1, Eth1/2, Eth1/3, Eth1/4 Eth1/5, Eth1/6, Eth1/7, Eth1/8 Eth1/9/1, Eth1/9/2, Eth1/9/3 Eth1/9/4, Eth1/10/1, Eth1/10/2 Eth1/10/3, Eth1/10/4
18 VLAN0018	active	Eth1/1, Eth1/2, Eth1/3, Eth1/4 Eth1/5, Eth1/6, Eth1/7, Eth1/8 Eth1/9/1, Eth1/9/2, Eth1/9/3 Eth1/9/4, Eth1/10/1, Eth1/10/2 Eth1/10/3, Eth1/10/4
31 VLAN0031	active	Eth1/11, Eth1/12, Eth1/13 Eth1/14, Eth1/15, Eth1/16 Eth1/17, Eth1/18, Eth1/19 Eth1/20, Eth1/21, Eth1/22
32 VLAN0032	active	Eth1/23, Eth1/24, Eth1/25

```

Eth1/28                               Eth1/26, Eth1/27,
Eth1/31                               Eth1/29, Eth1/30,
Eth1/34                               Eth1/32, Eth1/33,
33   VLAN0033                         active   Eth1/11, Eth1/12,
Eth1/13                               Eth1/14, Eth1/15,
Eth1/16                               Eth1/17, Eth1/18,
Eth1/19                               Eth1/20, Eth1/21,
Eth1/22                               Eth1/23, Eth1/24,
34   VLAN0034                         active   Eth1/26, Eth1/27,
Eth1/25                               Eth1/29, Eth1/30,
Eth1/28                               Eth1/32, Eth1/33,
Eth1/31
Eth1/34

```

```
cs1# show interface trunk
```

```

-----
Port          Native  Status      Port
              Vlan               Channel
-----
Eth1/1        1       trunking    --
Eth1/2        1       trunking    --
Eth1/3        1       trunking    --
Eth1/4        1       trunking    --
Eth1/5        1       trunking    --
Eth1/6        1       trunking    --
Eth1/7        1       trunking    --
Eth1/8        1       trunking    --
Eth1/9/1      1       trunking    --
Eth1/9/2      1       trunking    --
Eth1/9/3      1       trunking    --
Eth1/9/4      1       trunking    --
Eth1/10/1     1       trunking    --
Eth1/10/2     1       trunking    --
Eth1/10/3     1       trunking    --
Eth1/10/4     1       trunking    --
Eth1/11       33      trunking    --

```

Eth1/12	33	trunking	--
Eth1/13	33	trunking	--
Eth1/14	33	trunking	--
Eth1/15	33	trunking	--
Eth1/16	33	trunking	--
Eth1/17	33	trunking	--
Eth1/18	33	trunking	--
Eth1/19	33	trunking	--
Eth1/20	33	trunking	--
Eth1/21	33	trunking	--
Eth1/22	33	trunking	--
Eth1/23	34	trunking	--
Eth1/24	34	trunking	--
Eth1/25	34	trunking	--
Eth1/26	34	trunking	--
Eth1/27	34	trunking	--
Eth1/28	34	trunking	--
Eth1/29	34	trunking	--
Eth1/30	34	trunking	--
Eth1/31	34	trunking	--
Eth1/32	34	trunking	--
Eth1/33	34	trunking	--
Eth1/34	34	trunking	--
Eth1/35	1	trnk-bndl	Pol
Eth1/36	1	trnk-bndl	Pol
Pol	1	trunking	--

-----  
Port                    Vlans Allowed on Trunk  
-----

Eth1/1	1,17-18
Eth1/2	1,17-18
Eth1/3	1,17-18
Eth1/4	1,17-18
Eth1/5	1,17-18
Eth1/6	1,17-18
Eth1/7	1,17-18
Eth1/8	1,17-18
Eth1/9/1	1,17-18
Eth1/9/2	1,17-18
Eth1/9/3	1,17-18
Eth1/9/4	1,17-18
Eth1/10/1	1,17-18
Eth1/10/2	1,17-18
Eth1/10/3	1,17-18
Eth1/10/4	1,17-18

```
Eth1/11      31, 33
Eth1/12      31, 33
Eth1/13      31, 33
Eth1/14      31, 33
Eth1/15      31, 33
Eth1/16      31, 33
Eth1/17      31, 33
Eth1/18      31, 33
Eth1/19      31, 33
Eth1/20      31, 33
Eth1/21      31, 33
Eth1/22      31, 33
Eth1/23      32, 34
Eth1/24      32, 34
Eth1/25      32, 34
Eth1/26      32, 34
Eth1/27      32, 34
Eth1/28      32, 34
Eth1/29      32, 34
Eth1/30      32, 34
Eth1/31      32, 34
Eth1/32      32, 34
Eth1/33      32, 34
Eth1/34      32, 34
Eth1/35      1
Eth1/36      1
Po1          1
..
..
..
..
..
```



For specific port and VLAN usage details, refer to the banner and important notes section in your RCF.

3. Verify that the ISL between cs1 and cs2 is functional:

```
show port-channel summary
```

## Show example

```
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#
```

### Step 3: Set up your ONTAP cluster

NetApp recommends that you use System Manager to set up new clusters.

System Manager provides a simple and easy workflow for cluster set up and configuration including assigning a node management IP address, initializing the cluster, creating a local tier, configuring protocols and provisioning initial storage.

Go to [Configure ONTAP on a new cluster with System Manager](#) for setup instructions.

#### What's next?

After you've installed the RCF, you can [configure switch health monitoring](#).

### Upgrade your reference configuration file (RCF)

You upgrade your RCF version when you have an existing version of the RCF file installed on your operational switches.

#### Before you begin

Make sure you have the following:

- A current backup of the switch configuration.
- A fully functioning cluster (no errors in the logs or similar issues).
- The current RCF.
- If you are updating your RCF version, you need a boot configuration in the RCF that reflects the desired boot images.

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.



No operational inter-switch link (ISL) is needed during this procedure. This is by design because RCF version changes can affect ISL connectivity temporarily. To ensure non-disruptive cluster operations, the following procedure migrates all of the cluster LIFs to the operational partner switch while performing the steps on the target switch.



Before installing a new switch software version and RCFs, you must erase the switch settings and perform basic configuration. You must be connected to the switch using the serial console or have preserved basic configuration information before erasing the switch settings.

### Step 1: Prepare for the upgrade

1. Display the cluster ports on each node that are connected to the cluster switches:

```
network device-discovery show
```

## Show example

```
cluster1::*> network device-discovery show
Node/          Local  Discovered
Protocol      Port   Device (LLDP: ChassisID)  Interface
Platform
-----
-----
cluster1-01/cdp
              e0a    cs1                      Ethernet1/7      N9K-
C9336C
              e0d    cs2                      Ethernet1/7      N9K-
C9336C
cluster1-02/cdp
              e0a    cs1                      Ethernet1/8      N9K-
C9336C
              e0d    cs2                      Ethernet1/8      N9K-
C9336C
cluster1-03/cdp
              e0a    cs1                      Ethernet1/1/1    N9K-
C9336C
              e0b    cs2                      Ethernet1/1/1    N9K-
C9336C
cluster1-04/cdp
              e0a    cs1                      Ethernet1/1/2    N9K-
C9336C
              e0b    cs2                      Ethernet1/1/2    N9K-
C9336C
```

2. Check the administrative and operational status of each cluster port, node storage port, and storage shelf port.
  - a. Verify that all the cluster ports are **up** with a healthy status:

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

## Show example

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

Node: cluster1-01

Ignore

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

Node: cluster1-02

Ignore

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

Node: cluster1-03

Ignore

Health      Health
Port        IPspace    Broadcast Domain Link MTU  Admin/Oper
Status      Status
-----
e0a         Cluster    Cluster          up   9000  auto/10000
healthy    false
e0b         Cluster    Cluster          up   9000  auto/10000
healthy    false
```

Node: cluster1-04

Ignore

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

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

```
network interface show -vserver Cluster
```

### Show example

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

Current Vserver Port	Logical Current Home	Is Interface	Status Admin/Oper	Network Address/Mask	Node
Cluster					
cluster1-01	e0a	true	up/up	169.254.3.4/23	
cluster1-01	e0d	true			
cluster1-01			up/up	169.254.3.5/23	
cluster1-02	e0a	true	up/up	169.254.3.8/23	
cluster1-02	e0d	true			
cluster1-02			up/up	169.254.3.9/23	
cluster1-03	e0a	true	up/up	169.254.1.3/23	
cluster1-03	e0b	true			
cluster1-03			up/up	169.254.1.1/23	
cluster1-04	e0a	true	up/up	169.254.1.6/23	
cluster1-04	e0b	true			
cluster1-04			up/up	169.254.1.7/23	

c. Verify that all the node storage ports are up with a healthy status:

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

### Show example

```
cluster1::*> storage port show -port-type ENET
```

Node	Port	Type	Mode	Speed (Gb/s)	State	Status
-----						
cluster1-01	e5a	ENET	-	100	enabled	online
	e3b	ENET	-	100	enabled	online
cluster1-02	e5a	ENET	-	100	enabled	online
	e3b	ENET	-	100	enabled	online
.						
.						

- d. Verify that all the storage shelf ports are up with a healthy status:

```
storage shelf port show
```

### Show example

```
cluster1::> storage shelf port show
```

Shelf	ID	Module	State	Internal?
-----				
1.4				
	0	A	connected	false
	1	A	connected	false
	2	B	connected	false
	3	B	connected	false
.				
.				

- e. Verify that the switches are being monitored.

```
system switch ethernet show
```

## Show example

```
cluster1::*> system switch ethernet show
Switch                               Type                               Address
Model
-----
s1
                                     storage-network                    10.228.143.216
N9K-C9336C-FX2
  Serial Number: FDOXXXXXXXXB
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                                     10.4(6)
  Version Source: CDP/ISDP

s2
                                     storage-network                    10.228.143.219
N9K-C9336C-FX2
  Serial Number: FDOXXXXXXXXC
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                                     10.6(2)
  Version Source: CDP/ISDP

cs1
                                     cluster-network                    10.228.184.39
N9K-C9336C-FX2
  Serial Number: FLMXXXXXXXXJ
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                                     10.4(6)
  Version Source: CDP/ISDP

cs2
                                     cluster-network                    10.228.184.40
N9K-C9336C-FX2
```

```
Serial Number: FLMXXXXXXXXG
Is Monitored: true
Reason: None
Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                10.6(2)
Version Source: CDP/ISDP
```

3. Disable auto-revert on the cluster LIFs.

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

## Step 2: Configure ports

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

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

```
cs1(config-if-range)# shutdown
```



Make sure to shutdown **all** connected cluster ports to avoid any network connection issues. See the Knowledge Base article [Node out of quorum when migrating cluster LIF during switch OS upgrade](#) for further details.

2. Verify that the cluster LIFs have failed over to the ports hosted on cluster switch cs1. This might take a few seconds.

```
network interface show -vserver Cluster
```

### Show example

```
cluster1::*> network interface show -vserver Cluster
          Logical          Status      Network          Current
Current Is
Vserver   Interface              Admin/Oper  Address/Mask     Node
Port      Home
-----
Cluster
cluster1-01  cluster1-01_clus1 up/up      169.254.3.4/23
            e0a             true
cluster1-01  cluster1-01_clus2 up/up      169.254.3.5/23
            e0a             false
cluster1-02  cluster1-02_clus1 up/up      169.254.3.8/23
            e0a             true
cluster1-02  cluster1-02_clus2 up/up      169.254.3.9/23
            e0a             false
cluster1-03  cluster1-03_clus1 up/up      169.254.1.3/23
            e0a             true
cluster1-03  cluster1-03_clus2 up/up      169.254.1.1/23
            e0a             false
cluster1-04  cluster1-04_clus1 up/up      169.254.1.6/23
            e0a             true
cluster1-04  cluster1-04_clus2 up/up      169.254.1.7/23
            e0a             false
```

### 3. Verify that the cluster is healthy:

```
cluster show
```

### Show example

```
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. If you have not already done so, save a copy of the current switch configuration by copying the output of the following command to a text file:

```
show running-config
```

- a. Record any custom additions between the current running-config and the RCF file in use (such as an SNMP configuration for your organization).
  - b. For NX-OS 10.2 and later, use the `show diff running-config` command to compare with the saved RCF file in the bootflash. Otherwise, use a third party diff or compare tool.
5. Save basic configuration details to the `write_erase.cfg` file on the bootflash.

```
cs1# show run | i "username admin password" > bootflash:write_erase.cfg
```

```
cs1# show run | section "vrf context management" >> bootflash:write_erase.cfg
```

```
cs1# show run | section "interface mgmt0" >> bootflash:write_erase.cfg
```

```
cs1# show run | section "switchname" >> bootflash:write_erase.cfg
```

6. For RCF version 1.12 and later, run the following commands:

```
cs1# echo "hardware access-list tcam region ing-racl 1024" >>  
bootflash:write_erase.cfg
```

```
cs1# echo "hardware access-list tcam region egr-racl 1024" >>  
bootflash:write_erase.cfg
```

```
cs1# echo "hardware access-list tcam region ing-l2-qos 1280" >>  
bootflash:write_erase.cfg
```

See the Knowledge Base article [How to clear configuration on a Cisco interconnect switch while retaining remote connectivity](#) for further details.

7. Verify that the `write_erase.cfg` file is populated as expected:

```
show file bootflash:write_erase.cfg
```

8. Issue the write erase command to erase the current saved configuration:

```
cs1# write erase
```

```
Warning: This command will erase the startup-configuration.
```

```
Do you wish to proceed anyway? (y/n) [n] y
```

9. Copy the previously saved basic configuration into the startup configuration.

```
cs1# copy bootflash:write_erase.cfg startup-config
```

10. Perform a reboot of the switch:

```
switch# reload
```

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

11. After the management IP address is reachable again, log in to the switch through SSH.

You might need to update host file entries related to the SSH keys.

12. Copy the RCF to the bootflash of switch cs1 using one of the following transfer protocols: FTP, TFTP, SFTP, or SCP.

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

#### Show example

This example shows TFTP being used to copy an RCF to the bootflash on switch cs1:

```
cs1# 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)...
```

13. Apply the RCF previously downloaded to the bootflash.

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

#### Show example

This example shows the RCF file `Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt` being installed on switch cs1:

```
cs1# copy Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt running-
config echo-commands
```

14. 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.

## Show example

```
cs1# 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 confi
g 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
*
*****
*****
```

15. 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.

16. Reapply any previous customizations to the switch configuration.
17. Refer to [Review cabling and configuration considerations](#) for details of any further changes required.
18. After you verify the RCF versions, custom additions, and switch settings are correct, copy the running-config file to the startup-config file.

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

```
cs1# copy running-config startup-config
```

```
[ ] 100% Copy complete
```

19. Reboot switch cs1. You can ignore the “cluster switch health monitor” alerts and “cluster ports down” events reported on the nodes while the switch reboots.

```
cs1# reload
```

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

20. Verify the health of all ports on the cluster.
  - a. Verify that cluster ports are up and healthy across all nodes in the cluster:

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

## Show example

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

```
Node: cluster1-01
```

```
Ignore
```

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

```
Node: cluster1-02
```

```
Ignore
```

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

```
Node: cluster1-03
```

```
Ignore
```

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

```
Node: cluster1-04

Ignore

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

b. Verify the switch health from the cluster.

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

## Show example

```
cluster1::*> network device-discovery show -protocol cdp
Node/          Local  Discovered
Protocol       Port   Device (LLDP: ChassisID)  Interface
Platform
-----
-----
cluster1-01/cdp
                e0a    cs1                        Ethernet1/7
N9K-C9336C
                e0d    cs2                        Ethernet1/7
N9K-C9336C
cluster01-2/cdp
                e0a    cs1                        Ethernet1/8
N9K-C9336C
                e0d    cs2                        Ethernet1/8
N9K-C9336C
cluster01-3/cdp
                e0a    cs1                        Ethernet1/1/1
N9K-C9336C
                e0b    cs2                        Ethernet1/1/1
N9K-C9336C
cluster1-04/cdp
                e0a    cs1                        Ethernet1/1/2
N9K-C9336C
                e0b    cs2                        Ethernet1/1/2
N9K-C9336C
```

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

- c. Verify that all the node storage ports are up with a healthy status:

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

### Show example

```
cluster1::*> storage port show -port-type ENET
```

Node	Port	Type	Mode	Speed (Gb/s)	State	Status
-----						
cluster1-01	e5a	ENET	-	100	enabled	online
	e3b	ENET	-	100	enabled	online
cluster1-02	e5a	ENET	-	100	enabled	online
	e3b	ENET	-	100	enabled	online
.						
.						

- d. Verify that all the storage shelf ports are up with a healthy status:

```
storage shelf port show
```

### Show example

```
cluster1::> storage shelf port show
```

Shelf	ID	Module	State	Internal?
-----				
1.4				
	0	A	connected	false
	1	A	connected	false
	2	B	connected	false
	3	B	connected	false
.				
.				

- e. Verify that the switches are being monitored.

```
system switch ethernet show
```

## Show example

```
cluster1::*> system switch ethernet show
Switch                               Type                               Address
Model
-----
s1
                                     storage-network                    10.228.143.216
N9K-C9336C-FX2
  Serial Number: FDOXXXXXXXXB
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                                     10.4(6)
  Version Source: CDP/ISDP

s2
                                     storage-network                    10.228.143.219
N9K-C9336C-FX2
  Serial Number: FDOXXXXXXXXC
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                                     10.6(2)
  Version Source: CDP/ISDP

cs1
                                     cluster-network                    10.228.184.39
N9K-C9336C-FX2
  Serial Number: FLMXXXXXXXXJ
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                                     10.4(6)
  Version Source: CDP/ISDP

cs2
                                     cluster-network                    10.228.184.40
N9K-C9336C-FX2
```

```
Serial Number: FLMXXXXXXXXG
  Is Monitored: true
    Reason: None
Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                  10.6(2)
Version Source: CDP/ISDP
```

21. Verify that the cluster is healthy:

```
cluster show
```

#### Show example

```
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 1 to 21 on switch cs2.

23. Enable auto-revert on the cluster LIFs.

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

### Step 3: Verify the cluster network configuration and cluster health

1. Verify that the switch ports connected to the cluster ports are **up**.

```
show interface brief
```

### Show example

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

### 2. Verify that the expected nodes are still connected:

```
show cdp neighbors
```

### Show example

```
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           FAS2980
e0a
node2              Eth1/2        133     H           FAS2980
e0a
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
```

3. Verify that the cluster nodes are in their correct cluster VLANs using the following commands:

```
show vlan brief
```

```
show interface trunk
```

## Show example

```
cs1# show vlan brief
```

VLAN Name	Status	Ports
1 default	active	Pol, Eth1/1, Eth1/2, Eth1/3 Eth1/4, Eth1/5, Eth1/6, Eth1/7 Eth1/8, Eth1/35, Eth1/36 Eth1/9/1, Eth1/9/2, Eth1/9/3 Eth1/9/4, Eth1/10/1, Eth1/10/2 Eth1/10/3, Eth1/10/4
17 VLAN0017	active	Eth1/1, Eth1/2, Eth1/3, Eth1/4 Eth1/5, Eth1/6, Eth1/7, Eth1/8 Eth1/9/1, Eth1/9/2, Eth1/9/3 Eth1/9/4, Eth1/10/1, Eth1/10/2 Eth1/10/3, Eth1/10/4
18 VLAN0018	active	Eth1/1, Eth1/2, Eth1/3, Eth1/4 Eth1/5, Eth1/6, Eth1/7, Eth1/8 Eth1/9/1, Eth1/9/2, Eth1/9/3 Eth1/9/4, Eth1/10/1, Eth1/10/2 Eth1/10/3, Eth1/10/4
31 VLAN0031	active	Eth1/11, Eth1/12, Eth1/13 Eth1/14, Eth1/15, Eth1/16 Eth1/17, Eth1/18, Eth1/19 Eth1/20, Eth1/21, Eth1/22
32 VLAN0032	active	Eth1/23, Eth1/24, Eth1/25

```

Eth1/28                               Eth1/26, Eth1/27,
Eth1/31                               Eth1/29, Eth1/30,
Eth1/34                               Eth1/32, Eth1/33,
33  VLAN0033                          active  Eth1/11, Eth1/12,
Eth1/13                               Eth1/14, Eth1/15,
Eth1/16                               Eth1/17, Eth1/18,
Eth1/19                               Eth1/20, Eth1/21,
Eth1/22                               Eth1/23, Eth1/24,
34  VLAN0034                          active  Eth1/26, Eth1/27,
Eth1/25                               Eth1/29, Eth1/30,
Eth1/28                               Eth1/32, Eth1/33,
Eth1/31
Eth1/34

```

```
cs1# show interface trunk
```

```

-----
Port          Native  Status      Port
              Vlan               Channel
-----
Eth1/1        1       trunking    --
Eth1/2        1       trunking    --
Eth1/3        1       trunking    --
Eth1/4        1       trunking    --
Eth1/5        1       trunking    --
Eth1/6        1       trunking    --
Eth1/7        1       trunking    --
Eth1/8        1       trunking    --
Eth1/9/1      1       trunking    --
Eth1/9/2      1       trunking    --
Eth1/9/3      1       trunking    --
Eth1/9/4      1       trunking    --
Eth1/10/1     1       trunking    --
Eth1/10/2     1       trunking    --
Eth1/10/3     1       trunking    --
Eth1/10/4     1       trunking    --
Eth1/11       33      trunking    --

```

Eth1/12	33	trunking	--
Eth1/13	33	trunking	--
Eth1/14	33	trunking	--
Eth1/15	33	trunking	--
Eth1/16	33	trunking	--
Eth1/17	33	trunking	--
Eth1/18	33	trunking	--
Eth1/19	33	trunking	--
Eth1/20	33	trunking	--
Eth1/21	33	trunking	--
Eth1/22	33	trunking	--
Eth1/23	34	trunking	--
Eth1/24	34	trunking	--
Eth1/25	34	trunking	--
Eth1/26	34	trunking	--
Eth1/27	34	trunking	--
Eth1/28	34	trunking	--
Eth1/29	34	trunking	--
Eth1/30	34	trunking	--
Eth1/31	34	trunking	--
Eth1/32	34	trunking	--
Eth1/33	34	trunking	--
Eth1/34	34	trunking	--
Eth1/35	1	trnk-bndl	Pol
Eth1/36	1	trnk-bndl	Pol
Pol	1	trunking	--

-----

Port	Vlans Allowed on Trunk
------	------------------------

-----

Eth1/1	1,17-18
Eth1/2	1,17-18
Eth1/3	1,17-18
Eth1/4	1,17-18
Eth1/5	1,17-18
Eth1/6	1,17-18
Eth1/7	1,17-18
Eth1/8	1,17-18
Eth1/9/1	1,17-18
Eth1/9/2	1,17-18
Eth1/9/3	1,17-18
Eth1/9/4	1,17-18
Eth1/10/1	1,17-18
Eth1/10/2	1,17-18
Eth1/10/3	1,17-18
Eth1/10/4	1,17-18

```
Eth1/11      31, 33
Eth1/12      31, 33
Eth1/13      31, 33
Eth1/14      31, 33
Eth1/15      31, 33
Eth1/16      31, 33
Eth1/17      31, 33
Eth1/18      31, 33
Eth1/19      31, 33
Eth1/20      31, 33
Eth1/21      31, 33
Eth1/22      31, 33
Eth1/23      32, 34
Eth1/24      32, 34
Eth1/25      32, 34
Eth1/26      32, 34
Eth1/27      32, 34
Eth1/28      32, 34
Eth1/29      32, 34
Eth1/30      32, 34
Eth1/31      32, 34
Eth1/32      32, 34
Eth1/33      32, 34
Eth1/34      32, 34
Eth1/35      1
Eth1/36      1
Po1          1
..
..
..
..
..
```



For specific port and VLAN usage details, refer to the banner and important notes section in your RCF.

4. Verify that the ISL between cs1 and cs2 is functional:

```
show port-channel summary
```

## Show example

```
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#
```

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

```
network interface show -vserver Cluster
```

## Show example

```
cluster1::*> network interface show -vserver Cluster
          Logical          Status      Network          Current
Current Is
Vserver   Interface             Admin/Oper  Address/Mask     Node
Port      Home
-----
Cluster
          cluster1-01_clus1 up/up      169.254.3.4/23
cluster1-01 e0d             true
          cluster1-01_clus2 up/up      169.254.3.5/23
cluster1-01 e0d             true
          cluster1-02_clus1 up/up      169.254.3.8/23
cluster1-02 e0d             true
          cluster1-02_clus2 up/up      169.254.3.9/23
cluster1-02 e0d             true
          cluster1-03_clus1 up/up      169.254.1.3/23
cluster1-03 e0b             true
          cluster1-03_clus2 up/up      169.254.1.1/23
cluster1-03 e0b             true
          cluster1-04_clus1 up/up      169.254.1.6/23
cluster1-04 e0b             true
          cluster1-04_clus2 up/up      169.254.1.7/23
cluster1-04 e0b             true
```

If any cluster LIFs have not returned to their home ports, revert them manually from the local node:

```
network interface revert -vserver vsver_name -lif lif_name
```

### 6. Verify that the cluster is healthy:

```
cluster show
```

### Show example

```
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
```

7. Verify the connectivity of the remote cluster interfaces:

## ONTAP 9.9.1 and later

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

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

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

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

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

Packet	Source	Destination
Node	Date	LIF
Loss		
-----	-----	-----
node1		
3/5/2022 19:21:18 -06:00	cluster1-01_clus2	cluster1-02-
clus1 none		
3/5/2022 19:21:20 -06:00	cluster1-01_clus2	cluster1-
02_clus2 none		
node2		
3/5/2022 19:21:18 -06:00	cluster1-02_clus2	cluster1-
01_clus1 none		
3/5/2022 19:21:20 -06:00	cluster1-02_clus2	cluster1-
01_clus2 none		

## All ONTAP releases

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

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

```

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

```

### What's next?

After you've upgraded the RCF, you can [configure switch health monitoring](#).

### Reset the 9336C-FX2 shared switch to factory defaults

To reset the 9336C-FX2 shared switch to factory defaults, you must erase the 9336C-FX2

switch settings.

### About this task

- You must be connected to the switch using the serial console.
- This task resets the configuration of the management network.

### Steps

1. Erase the existing configuration:

```
write erase
```

```
(cs2)# write erase
```

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

2. Reload the switch software:

```
reload
```

```
(cs2)# reload
```

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

The system reboots and enters the configuration wizard. During the boot, if you receive the prompt “Abort Auto Provisioning and continue with normal setup? (yes/no)[n]”, you should respond **yes** to proceed.

### What's next

After you've reset your switches, you can [reconfigure](#) them as needed.

## Migrate switches

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

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

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

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

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

cluster.

## Review requirements

Ensure that:

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

## Migrate the switches

### About the examples

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

- The names of the 9336C-FX2 switches are *cs1* and *cs2*.
- The names of the cluster SVMs are *node1* and *node2*.
- The names of the LIFs are *node1\_clus1* and *node1\_clus2* on node 1, and *node2\_clus1* and *node2\_clus2* on node 2 respectively.
- The `cluster1::*>` prompt indicates the name of the cluster.
- The cluster ports used in this procedure are *e3a* and *e3b*, as per the AFF A400 controller. The [Hardware Universe](#) contains the latest information about the actual cluster ports for your platforms.

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

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

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

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



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

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

```
set -privilege advanced
```

The advanced prompt (\*>) appears.

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

#### Show example

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

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

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

```
show port-channel summary
```

## Show example

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

```
cs1# show port-channel summary
Flags:  D - Down          P - Up in port-channel (members)
        I - Individual    H - Hot-standby (LACP only)
        s - Suspended     r - Module-removed
        b - BFD Session Wait
        S - Switched     R - Routed
        U - Up (port-channel)
        p - Up in delay-lacp mode (member)
        M - Not in use. Min-links not met

-----
-----
Group Port-          Type      Protocol  Member Ports
Channel
-----
-----
1      Po1(SU)       Eth       LACP      Eth1/35(P)  Eth1/36(P)
```

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

```
cs2# show port-channel summary
Flags:  D - Down          P - Up in port-channel (members)
        I - Individual    H - Hot-standby (LACP only)
        s - Suspended     r - Module-removed
        b - BFD Session Wait
        S - Switched     R - Routed
        U - Up (port-channel)
        p - Up in delay-lacp mode (member)
        M - Not in use. Min-links not met

-----
-----
Group Port-          Type      Protocol  Member Ports
Channel
-----
-----
1      Po1(SU)       Eth       LACP      Eth1/35(P)  Eth1/36(P)
```

## 5. Display the list of neighboring devices:

```
show cdp neighbors
```

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

### Show example

The following example lists the neighboring devices on switch cs1:

```
cs1# show cdp neighbors
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-
Bridge
                S - Switch, H - Host, I - IGMP, r - Repeater,
                V - VoIP-Phone, D - Remotely-Managed-Device,
                s - Supports-STP-Dispute
Device-ID      Local Intrfce  Hldtme Capability  Platform
Port ID
cs2            Eth1/35       175    R S I s      N9K-C9336C
Eth1/35
cs2            Eth1/36       175    R S I s      N9K-C9336C
Eth1/36
Total entries displayed: 2
```

The following example lists the neighboring devices on switch cs2:

```
cs2# show cdp neighbors
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-
Bridge
                S - Switch, H - Host, I - IGMP, r - Repeater,
                V - VoIP-Phone, D - Remotely-Managed-Device,
                s - Supports-STP-Dispute
Device-ID      Local Intrfce  Hldtme Capability  Platform
Port ID
cs1            Eth1/35       177    R S I s      N9K-C9336C
Eth1/35
cs1            ) Eth1/36       177    R S I s      N9K-C9336C
Eth1/36
Total entries displayed: 2
```

6. Verify that all cluster ports are up:

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

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

## Show example

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

Node: node1

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

Node: node2

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

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

```
network interface show - vserver Cluster
```

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

### Show example

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

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

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

### Show example

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

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

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

requirements.

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

#### Show example

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

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

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

```
network interface show - vserver Cluster
```

#### Show example

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

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

	Logical	Status	Network	Current	
Current Is					
Vserver	Interface	Admin/Oper	Address/Mask	Node	
Port	Home				
Cluster					
true	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

4 entries were displayed.

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

```
cluster show
```

### Show example

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

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

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

### Show example

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

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

17. Verify that all cluster ports are up:

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

## Show example

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

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

Node: node1

Ignore

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

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

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

```
network interface show - vserver Cluster
```



This might take several minutes to complete.

## Show example

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

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

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

```
show cdp neighbors
```

## Show example

The following example shows the appropriate results for both switches:

```
cs1# show cdp neighbors
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-
Bridge
                S - Switch, H - Host, I - IGMP, r - Repeater,
                V - VoIP-Phone, D - Remotely-Managed-Device,
                s - Supports-STP-Dispute
Device-ID      Local Intrfce  Hldtme  Capability  Platform
Port ID
node1          Eth1/1         133     H           AFFA400
e3a
node2          Eth1/2         133     H           AFFA400
e3a
cs2            Eth1/35        175     R S I s     N9K-C9336C
Eth1/35
cs2            Eth1/36        175     R S I s     N9K-C9336C
Eth1/36
Total entries displayed: 4
cs2# show cdp neighbors
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-
Bridge
                S - Switch, H - Host, I - IGMP, r - Repeater,
                V - VoIP-Phone, D - Remotely-Managed-Device,
                s - Supports-STP-Dispute
Device-ID      Local Intrfce  Hldtme  Capability  Platform
Port ID
node1          Eth1/1         133     H           AFFA400
e3b
node2          Eth1/2         133     H           AFFA400
e3b
cs1            Eth1/35        175     R S I s     N9K-C9336C
Eth1/35
cs1            Eth1/36        175     R S I s     N9K-C9336C
Eth1/36
Total entries displayed: 4
```

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

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

## Show example

```
cluster1::*> network device-discovery show -protocol cdp
Node/          Local  Discovered
Protocol      Port  Device (LLDP: ChassisID)  Interface
Platform
-----
node2          /cdp
              e3a   cs1                       0/2          N9K-
C9336C
              e3b   cs2                       0/2          N9K-
C9336C
node1          /cdp
              e3a   cs1                       0/1          N9K-
C9336C
              e3b   cs2                       0/1          N9K-
C9336C
4 entries were displayed.
```

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

```
system switch ethernet show
```

## Show example

```
storage::*> system switch ethernet show
Switch                Type                Address
Model
-----
sh1
                    storage-network    172.17.227.5
C9336C
    Serial Number: FOC221206C2
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(5)
    Version Source: CDP
sh2
                    storage-network    172.17.227.6
C9336C
    Serial Number: FOC220443LZ
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(5)
    Version Source: CDP
2 entries were displayed.
storage::*>
```

## 22. Verify that the settings are disabled:

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



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

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

### Show example

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

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

```
cluster show
```

### Show example

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

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

24. Verify the connectivity of the remote cluster interfaces:

### ONTAP 9.9.1 and later

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

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

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

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

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

Packet	Source	Destination
Node	LIF	LIF
Date		
Loss		
node1		
3/5/2022 19:21:18 -06:00	node1_clus2	node2-clus1
node		
3/5/2022 19:21:20 -06:00	node1_clus2	node2_clus2
node2		
3/5/2022 19:21:18 -06:00	node2_clus2	node1_clus1
node		
3/5/2022 19:21:20 -06:00	node2_clus2	node1_clus2
node		

### All ONTAP releases

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

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

```

cluster1::*> cluster ping-cluster -node local
Host is node2
Getting addresses from network interface table...
Cluster node1_clus1 169.254.209.69 node1 e3a
Cluster node1_clus2 169.254.49.125 node1 e3b
Cluster node2_clus1 169.254.47.194 node2 e3a
Cluster node2_clus2 169.254.19.183 node2 e3b
Local = 169.254.47.194 169.254.19.183
Remote = 169.254.209.69 169.254.49.125
Cluster Vserver Id = 4294967293
Ping status:.....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 9000 byte MTU on 4 path(s):
Local 169.254.47.194 to Remote 169.254.209.69
Local 169.254.47.194 to Remote 169.254.49.125
Local 169.254.19.183 to Remote 169.254.209.69
Local 169.254.19.183 to Remote 169.254.49.125
Larger than PMTU communication succeeds on 4 path(s)
RPC status:
2 paths up, 0 paths down (tcp check)
2 paths up, 0 paths down (udp check)

```

25. Change the privilege level back to admin:

```
set -privilege admin
```

### Step 2: Set up the shared switch

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

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



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

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

```
system switch ethernet show
```

## Show example

```
storage::*> system switch ethernet show
Switch                Type                Address
Model
-----
sh1
                    storage-network    172.17.227.5
C9336C
    Serial Number: FOC221206C2
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(5)
    Version Source: CDP
sh2
                    storage-network    172.17.227.6
C9336C
    Serial Number: FOC220443LZ
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(5)
    Version Source: CDP
2 entries were displayed.
storage::*>
```

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

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

### Show example

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

```
Speed
VLAN
Node   Port   Type   Mode   Speed   State   Status
ID
-----
node1
30     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
node2
30     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
```

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

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

### Show example

```
storage::*> storage port show -port-type ENET
                               Speed
VLAN
Node   Port   Type   Mode   (Gb/s)   State   Status
ID
-----
node1
30     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
node2
30     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
```

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

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

### Show example

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

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

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

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

**Show example**

```
storage::*> storage port show -port-type ENET
                               Speed
VLAN
Node   Port   Type   Mode   (Gb/s)   State   Status
ID
-----
node1
 30    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
node2
 30    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
```

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

```
system switch ethernet show
```

### Show example

```
storage::*> system switch ethernet show
Switch                               Type                               Address
Model
-----
sh1
                                     storage-network                    172.17.227.5
C9336C
    Serial Number: FOC221206C2
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                                     9.3(5)
    Version Source: CDP
sh2
                                     storage-network                    172.17.227.6
C9336C
    Serial Number: FOC220443LZ
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                                     9.3(5)
    Version Source: CDP
2 entries were displayed.
storage::*>
```

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

### Show example

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

To place storage ports into a broadcast domain:

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

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

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

### What's next?

After you've migrated your switches, you can [configure switch health monitoring](#).

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

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

### Supported switches

The following switches are supported:

- Nexus 9336C-FX2
- Nexus 3232C

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

### Connection Ports

The switches use the following ports to connect to nodes:

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

The [Hardware Universe](#) contains information about supported cabling for all cluster switches.

### What you'll need

- Make sure you completed the following tasks:
  - Configured some of the ports on Nexus 9336C-FX2 switches to run at 100 GbE.
  - Planned, migrated, and documented 100 GbE connectivity from nodes to Nexus 9336C-FX2 switches.
  - Migrated nondisruptively other Cisco cluster switches from an ONTAP cluster to Cisco Nexus 9336C-FX2 network switches.
- The existing switch network is properly set up and functioning.
- All ports are in the **up** state to ensure nondisruptive operations.
- The Nexus 9336C-FX2 switches are configured and operating under the proper version of NX-OS installed and reference configuration file (RCF) applied.

- The existing network configuration has the following:
  - A redundant and fully functional NetApp cluster using both older Cisco switches.
  - Management connectivity and console access to both the older Cisco switches and the new switches.
  - All cluster LIFs in the **up** state with the cluster LIFs are on their home ports.
  - ISL ports enabled and cabled between the other Cisco switches and between the new switches.

### About the examples

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

- The existing Cisco Nexus 3232C cluster switches are *c1* and *c2*.
- The new Nexus 9336C-FX2 switches are *sh1* and *sh2*.
- The nodes are *node1* and *node2*.
- The cluster LIFs are *node1\_clus1* and *node1\_clus2* on node 1, and *node2\_clus1* and *node2\_clus2* on node 2 respectively.
- Switch *c2* is replaced by switch *sh2* first and then switch *c1* is replaced by switch *sh1*.

### Steps

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

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

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

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

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

## Show example

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

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

Node: node2

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

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

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

## Show example

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

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

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

### Show example

```
cluster1::*> system cluster-switch show -is-monitoring-enabled  
-operational true
```

Switch	Type	Address	Model
sh1 C9336C	cluster-network	10.233.205.90	N9K-
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 C9336C	cluster-network	10.233.205.91	N9K-
Serial Number: FOCXXXXXXGS Is Monitored: true Reason: None Software Version: Cisco Nexus Operating System (NX-OS) Software, Version 9.3(5) Version Source: CDP			

```
cluster1::*>
```

6. Disable auto-revert on the cluster LIFs.

### Show example

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

7. Shut down the c2 switch.

### Show example

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

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

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

This might take a few seconds.

### Show example

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

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

### Show example

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

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

### Show example

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

Logical	Status	Network	Current	Current
Is	Admin/Oper	Address/Mask	Node	Port
Vserver	Interface			
Home				
-----	-----	-----	-----	-----
----				
Cluster				
true	node1_clus1	up/up	169.254.3.4/23	node1 e3a
false	node1_clus2	up/up	169.254.3.5/23	node1 e3a
true	node2_clus1	up/up	169.254.3.8/23	node2 e3a
false	node2_clus2	up/up	169.254.3.9/23	node2 e3a

```
4 entries were displayed.  
cluster1::*>
```

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

### Show example

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

16. Verify that the cluster is healthy:

```
cluster show
```

#### Show example

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

#### What's next?

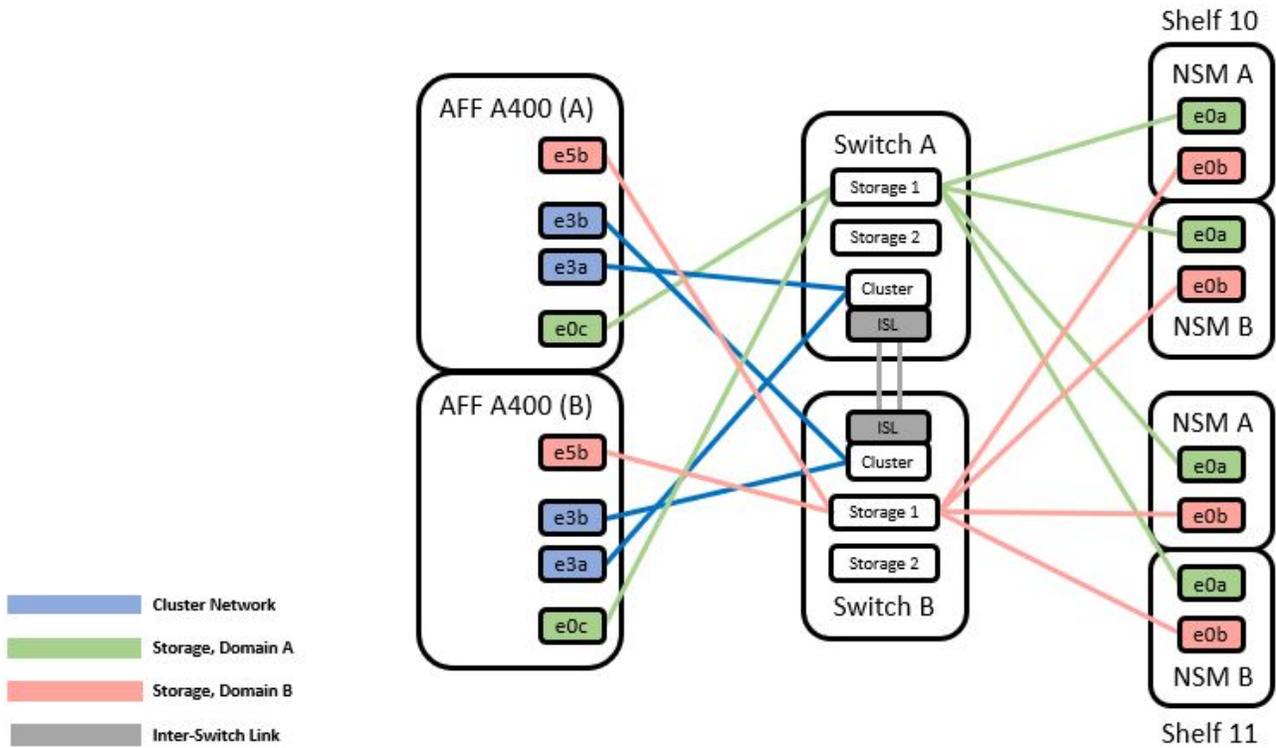
After you've migrated your switches, you can [configure switch health monitoring](#).

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

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

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

## Switch Attached



### Steps

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

```
system switch ethernet show
```

## Show example

```
storage::*> system switch ethernet show
Switch                Type                Address
Model
-----
sh1
C9336C                storage-network    172.17.227.5
    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
C9336C                storage-network    172.17.227.6
    Serial Number: FOC220443LZ
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                        9.3(5)
    Version Source: CDP
2 entries were displayed.
storage::*>
```

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

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

## Show example

```
storage::*> storage port show -port-type ENET
                               Speed
VLAN Node   Port   Type   Mode   (Gb/s)  State  Status
ID
-----
node1
30    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
node2
30    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
```

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

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

### Show example

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

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

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

### Show example

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

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

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

### Show example

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

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

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

### Show example

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

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

### Show example

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

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

```
network port show
```

### What's next?

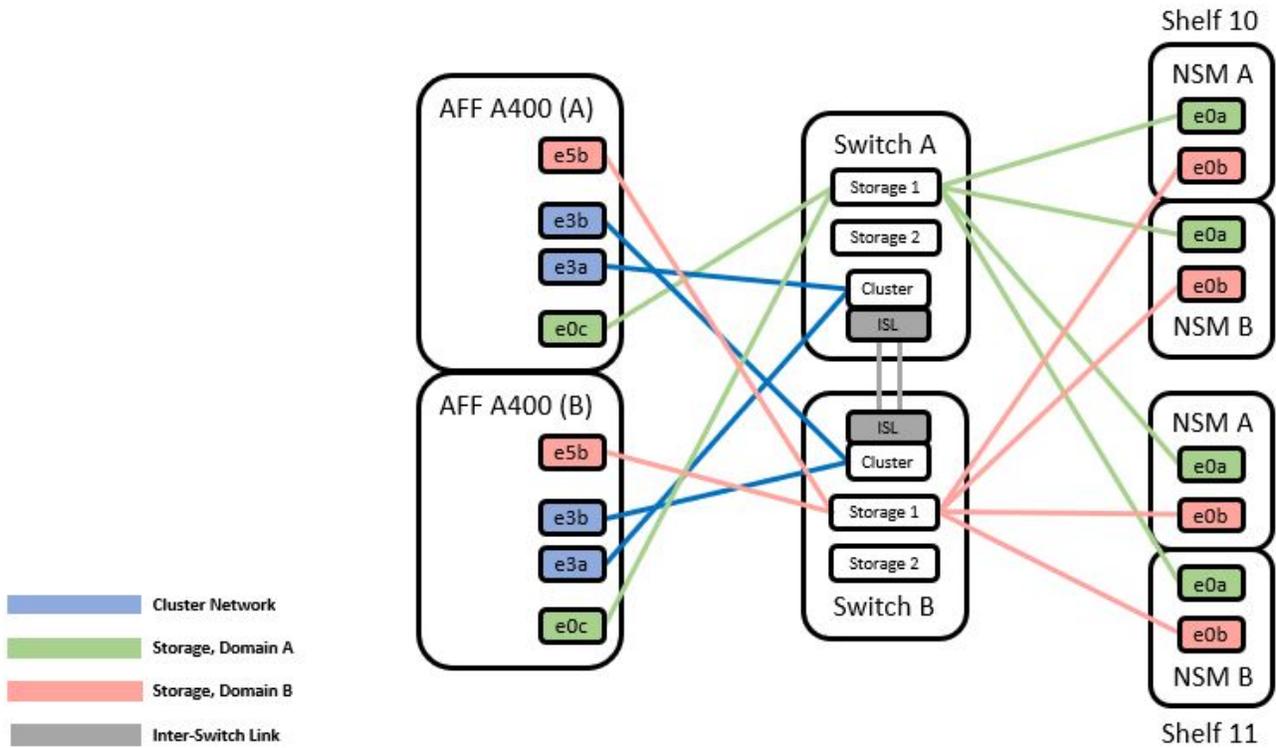
After you've migrated your switches, you can [configure switch health monitoring](#).

## Migrate from a switched cluster with switch-attached storage

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

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

## Switch Attached



## Steps

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

```
system switch ethernet show
```

## Show example

```
storage::*> system switch ethernet show
Switch                Type                Address            Model
-----
sh1
                    storage-network    172.17.227.5      C9336C
    Serial Number: FOC221206C2
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(5)
    Version Source: CDP
sh2
                    storage-network    172.17.227.6      C9336C
    Serial Number: FOC220443LZ
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(5)
    Version Source: CDP
2 entries were displayed.
storage::*>
```

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

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

### Show example

```
storage::*> storage port show -port-type ENET
                               Speed
VLAN                               (Gb/s)                               State                               Status
Node                               (Gb/s)                               State                               Status
ID
-----
node1
30      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
node2
30      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
```

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

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

### Show example

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

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

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

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

#### Show example

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

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

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

#### Show example

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

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

```
system switch ethernet show
```

## Show example

```
storage::*> system switch ethernet show
Switch                Type                Address
Model
-----
sh1
                    storage-network    172.17.227.5
C9336C
    Serial Number: FOC221206C2
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(5)
    Version Source: CDP
sh2
                    storage-network    172.17.227.6
C9336C
    Serial Number: FOC220443LZ
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(5)
    Version Source: CDP
2 entries were displayed.
storage::*>
```

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

## Show example

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

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

```
network port show
```

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

### What's next?

After you've migrated your switches, you can [configure switch health monitoring](#).

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

You can replace a defective Nexus 9336C-FX2 shared switch. This is a nondisruptive procedure (NDU).

### Before you begin

Before performing the switch replacement, make sure that:

- In the existing cluster and network infrastructure:
  - The existing cluster is verified as completely functional, with at least one fully connected cluster switch.
  - All cluster ports are **up**.
  - All cluster logical interfaces (LIFs) are **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.

- For the Nexus 9336C-FX2 replacement switch:
  - Management network connectivity on the replacement switch is functional.
  - Console access to the replacement switch is in place.
  - The node connections are ports 1/1 through 1/34:
  - All Inter-Switch Link (ISL) ports are disabled on ports 1/35 and 1/36.
  - The desired reference configuration file (RCF) and NX-OS operating system image switch is loaded onto the switch.
  - Any previous site customizations, such as STP, SNMP, and SSH, should be copied to the new switch.

### About the examples

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:

## Show example 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				
true	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
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.

## Show example

```

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
```

### Show example

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

Vserver	Logical 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 the connectivity of the remote cluster interfaces:

### ONTAP 9.9.1 and later

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

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

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

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

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

Packet	Source	Destination
Node	LIF	LIF
Date		
Loss		
node1		
3/5/2022 19:21:18 -06:00	node1_clus2	node2-clus1
node		
3/5/2022 19:21:20 -06:00	node1_clus2	node2_clus2
node2		
3/5/2022 19:21:18 -06:00	node2_clus2	node1_clus1
node		
3/5/2022 19:21:20 -06:00	node2_clus2	node1_clus2
node		

### All ONTAP releases

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

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

```

cluster1::*> cluster ping-cluster -node local
Host is node2
Getting addresses from network interface table...
Cluster node1_clus1 169.254.209.69 node1 e3a
Cluster node1_clus2 169.254.49.125 node1 e3b
Cluster node2_clus1 169.254.47.194 node2 e3a
Cluster node2_clus2 169.254.19.183 node2 e3b
Local = 169.254.47.194 169.254.19.183
Remote = 169.254.209.69 169.254.49.125
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 9000 byte MTU on 4 path(s):
Local 169.254.47.194 to Remote 169.254.209.69
Local 169.254.47.194 to Remote 169.254.49.125
Local 169.254.19.183 to Remote 169.254.209.69
Local 169.254.19.183 to Remote 169.254.49.125
Larger than PMTU communication succeeds on 4 path(s)
RPC status:
2 paths up, 0 paths down (tcp check)
2 paths up, 0 paths down (udp check)

```

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

#### Show example

```

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

```

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).

## Show example

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
```

## Show example

The output should be like the following:

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

Node: node1

Ignore

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

Node: node2

Ignore

Health      Health
Port        IPspace    Broadcast Domain Link MTU  Admin/Oper  Speed (Mbps)
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.

### Show example

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

Current Is	Logical	Status	Network	Current
Vserver	Interface	Admin/Oper	Address/Mask	Node
Port	Home			
-----				
Cluster				
e3a	node1_clus1	up/up	169.254.209.69/16	node1
	true			
e3b	node1_clus2	up/up	169.254.49.125/16	node1
	true			
e3a	node2_clus1	up/up	169.254.47.194/16	node2
	true			
e3a	node2_clus2	up/up	169.254.19.183/16	node2
	false			

4 entries were displayed.

11. Display information about the nodes in a cluster:

```
cluster show
```

### Show example

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
```

## Show example

```
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 the connectivity of the remote cluster interfaces:

### ONTAP 9.9.1 and later

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

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

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

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

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

Packet	Source	Destination
Node	LIF	LIF
Date		
Loss		
node1		
3/5/2022 19:21:18 -06:00	node1_clus2	node2-clus1
node		
3/5/2022 19:21:20 -06:00	node1_clus2	node2_clus2
node2		
3/5/2022 19:21:18 -06:00	node2_clus2	node1_clus1
node		
3/5/2022 19:21:20 -06:00	node2_clus2	node1_clus2
node		

### All ONTAP releases

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

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

```
cluster1::*> cluster ping-cluster -node local
Host is node2
Getting addresses from network interface table...
Cluster node1_clus1 169.254.209.69 node1 e3a
Cluster node1_clus2 169.254.49.125 node1 e3b
Cluster node2_clus1 169.254.47.194 node2 e3a
Cluster node2_clus2 169.254.19.183 node2 e3b
Local = 169.254.47.194 169.254.19.183
Remote = 169.254.209.69 169.254.49.125
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 9000 byte MTU on 4 path(s):
Local 169.254.47.194 to Remote 169.254.209.69
Local 169.254.47.194 to Remote 169.254.49.125
Local 169.254.19.183 to Remote 169.254.209.69
Local 169.254.19.183 to Remote 169.254.49.125
Larger than PMTU communication succeeds on 4 path(s)
RPC status:
2 paths up, 0 paths down (tcp check)
2 paths up, 0 paths down (udp check)
```

14. Confirm the following cluster network configuration:

```
network port show
```

## Show example

```
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    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 ID
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 Port ID	Local Intrfce	Hldtme	Capability	Platform
node1 e3b	Eth1/1	139	H	FAS2980
node2 eb	Eth1/2	124	H	FAS2980
sh1 Eth1/35	Eth1/35	178	R S I s	N9K-C9336C
sh1 Eth1/36	Eth1/36	178	R S I s	N9K-C9336C

Total entries displayed: 4

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

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

## Show example

```
storage::*> storage port show -port-type ENET
                               Speed
VLAN
Node   Port   Type   Mode   (Gb/s)   State   Status
ID
-----
node1
30     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
node2
30     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
```

18. Verify that the shelves are correctly cabled:

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

## Show example

```
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.
```

19. Remove the old switch sh2.
20. Repeat these steps for the switch sh1 and new switch newsh1.
21. If you suppressed automatic case creation, reenable it by invoking an AutoSupport message:

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

## What's next?

After you've replaced your switches, you can [configure switch health monitoring](#).

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