



End-of-availability switches

Install and maintain

NetApp
February 20, 2026

Table of Contents

- End-of-availability switches 1
 - End-of-availability 1
 - End-of-sale and End-of-life announcements 1
- Cisco Nexus 3232C 1
 - Get started 1
 - Install hardware 4
 - Configure software 13
 - Migrate switches 74
 - Replace switches 95
 - Cisco 3232C storage switches 136
- Cisco Nexus 3132Q-V 143
 - Get started 143
 - Install hardware 146
 - Configure software 155
 - Migrate switches 218
 - Replace switches 242
- Cisco Nexus 92300YC 286
 - Get started 286
 - Install hardware 290
 - Configure the software 302
 - Migrate switches 343
 - Replace switches 361
- NetApp CN1610 392
 - Overview of installation and configuration for NetApp CN1610 switches 392
 - Install and configure workflow for NetApp CN1610 switches 393
 - Documentation requirements for NetApp CN1610 switches 393
 - Install and configure 394
 - Migrate switches 430
 - Replace switches 456

End-of-availability switches

End-of-availability

The following switches are no longer available for purchase, but are still supported.

- [Cisco Nexus 3232C](#)
- [Cisco Nexus 3132Q-V](#)
- [Cisco Nexus 92300YC](#)
- [NetApp CN1610](#)

End-of-sale and End-of-life announcements

- [End-of-Sale and End-of-Life Announcement for the Cisco Nexus 3232C](#)
- [End-of-Sale and End-of-Life Announcement for the Cisco Nexus 31108PC-V, 31108TC-V and Nexus 3132Q-V](#)
- [End-of-Sale and End-of-Life Announcement for the Cisco N9K-C93120TX, N9K-C92300YC](#)
- [End-of-Sale and End-of-Life Announcement for the Cisco Nexus 5500 Series Switches](#)
- [End of Availability: NetApp CN1610 Cluster Interconnect SKUs](#)

Cisco Nexus 3232C

Get started

Installation and setup workflow for Cisco Nexus 3232C switches

Cisco Nexus 3232C switches can be used as cluster switches in your AFF or FAS cluster. Cluster switches allow you to build ONTAP clusters with more than two nodes.

Follow these workflow steps to install and setup your to Cisco Nexus 3232C switch.

1

Configuration requirements

Review the configuration requirements for the 3232C cluster switch.

2

Required documentation

Review specific switch and controller documentation to set up your 3232C switches and the ONTAP cluster.

3

Smart Call Home requirements

Review the requirements for the Cisco Smart Call Home feature, used to monitor the hardware and software components on your network.



Install the hardware

Install the switch hardware.



Configure the software

Configure the switch software.

Configuration requirements for Cisco Nexus 3232C switches

For Cisco Nexus 3232C switch installation and maintenance, be sure to review configuration and network requirements.

Configuration requirements

To configure your cluster, 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 A700 systems, the e0M interface uses a dedicated Ethernet port.

Refer to the [Hardware Universe](#) for 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.

What's next

After you've confirmed your configuration requirements, you can review the [required documentation](#).

Documentation requirements for Cisco Nexus 3232C switches

For Cisco Nexus 3232C switch installation and maintenance, be sure to review all recommended documentation.

Switch documentation

To set up the Cisco Nexus 3232C switches, you need the following documentation from the [Cisco Nexus 3000 Series Switches Support](#) page.

Document title	Description
<i>Nexus 3000 Series Hardware Installation Guide</i>	Provides detailed information about site requirements, switch hardware details, and installation options.

Document title	Description
<i>Cisco Nexus 3000 Series Switch Software Configuration Guides</i> (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.
<i>Cisco Nexus 3000 Series NX-OS Software Upgrade and Downgrade Guide</i> (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.
<i>Cisco Nexus 3000 Series NX-OS Command Reference Master Index</i>	Provides links to the various command references provided by Cisco.
<i>Cisco Nexus 3000 MIBs Reference</i>	Describes the Management Information Base (MIB) files for the Nexus 3000 switches.
<i>Nexus 3000 Series NX-OS System Message Reference</i>	Describes the system messages for Cisco Nexus 3000 series switches, those that are informational, and others that might help diagnose problems with links, internal hardware, or the system software.
<i>Cisco Nexus 3000 Series NX-OS Release Notes</i> (choose the notes for the NX-OS release installed on your switches)	Describes the features, bugs, and limitations for the Cisco Nexus 3000 Series.
Regulatory, Compliance, and Safety Information for the Cisco Nexus 6000, Cisco Nexus 5000 Series, Cisco Nexus 3000 Series, and Cisco Nexus 2000 Series	Provides international agency compliance, safety, and statutory information for the Nexus 3000 series switches.

ONTAP systems documentation

To set up an ONTAP system, you need the following documents for your version of the operating system from [ONTAP 9](#).

Name	Description
Controller-specific <i>Installation and Setup Instructions</i>	Describes how to install NetApp hardware.
ONTAP documentation	Provides detailed information about all aspects of the ONTAP releases.
Hardware Universe	Provides NetApp hardware configuration and compatibility information.

Rail kit and cabinet documentation

To install a 3232C Cisco switch in a NetApp cabinet, see the following hardware documentation.

Name	Description
42U System Cabinet, Deep Guide	Describes the FRUs associated with the 42U system cabinet, and provides maintenance and FRU replacement instructions.
Install a Cisco Nexus 3232C switch in a NetApp Cabinet	Describes how to install a Cisco Nexus 3232C switch in a four-post NetApp cabinet.

Smart Call Home requirements

To use Smart Call Home, you must configure a cluster network switch to communicate using email with the Smart Call Home system. In addition, you can optionally set up your cluster network switch to take advantage of Cisco's embedded Smart Call Home support feature.

Smart Call Home monitors the hardware and software components on your network. When a critical system configuration occurs, it generates an email-based notification and raises an alert to all the recipients that are configured in your destination profile.

Smart Call Home monitors the hardware and software components on your network. When a critical system configuration occurs, it generates an email-based notification and raises an alert to all the recipients that are configured in your destination profile.

Before you can use Smart Call Home, be aware of the following requirements:

- An email server must be in place.
- The switch must have IP connectivity to the email server.
- The contact name (SNMP server contact), phone number, and street address information must be configured. This is required to determine the origin of messages received.
- A CCO ID must be associated with an appropriate Cisco SMARTnet Service contract for your company.
- Cisco SMARTnet Service must be in place for the device to be registered.

The [Cisco support site](#) contains information about the commands to configure Smart Call Home.

Install hardware

Hardware install workflow for Cisco Nexus 3232C switches

To install and configure the hardware for a 3232C cluster 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 3232C switch.

3

Install the switch in a NetApp cabinet

Install the 3232C switch and pass-through panel in a NetApp cabinet as required.

4

Review cabling and configuration

Review support for NVIDIA Ethernet ports.

Complete Cisco Nexus 3232C cabling worksheet

If you want to document the supported platforms, download a PDF of this page and 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.

Each switch can be configured as a single 100GbE, 40GbE port or 4 x 10GbE ports.

Sample cabling worksheet

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

Cluster switch A		Cluster switch B	
Switch port	Node and port usage	Switch port	Node and port usage
1	4x10GbE/4x25GbE or 40/100GbE node	1	4x10GbE/4x25GbE or 40/100GbE node
2	4x10GbE/4x25GbE or 40/100GbE node	2	4x10GbE/4x25GbE or 40/100GbE node
3	4x10GbE/4x25GbE or 40/100GbE node	3	4x10GbE/4x25GbE or 40/100GbE node
4	4x10GbE/4x25GbE or 40/100GbE node	4	4x10GbE/4x25GbE or 40/100GbE node
5	4x10GbE/4x25GbE or 40/100GbE node	5	4x10GbE/4x25GbE or 40/100GbE node
6	4x10GbE/4x25GbE or 40/100GbE node	6	4x10GbE/4x25GbE or 40/100GbE node

Cluster switch A		Cluster switch B	
7	4x10GbE/4x25GbE or 40/100GbE node	7	4x10GbE/4x25GbE or 40/100GbE node
8	4x10GbE/4x25GbE or 40/100GbE node	8	4x10GbE/4x25GbE or 40/100GbE node
9	4x10GbE/4x25GbE or 40/100GbE node	9	4x10GbE/4x25GbE or 40/100GbE node
10	4x10GbE/4x25GbE or 40/100GbE node	10	4x10GbE/4x25GbE or 40/100GbE node
11	4x10GbE/4x25GbE or 40/100GbE node	11	4x10GbE/4x25GbE or 40/100GbE node
12	4x10GbE/4x25GbE or 40/100GbE node	12	4x10GbE/4x25GbE or 40/100GbE node
13	4x10GbE/4x25GbE or 40/100GbE node	13	4x10GbE/4x25GbE or 40/100GbE node
14	4x10GbE/4x25GbE or 40/100GbE node	14	4x10GbE/4x25GbE or 40/100GbE node
15	4x10GbE/4x25GbE or 40/100GbE node	15	4x10GbE/4x25GbE or 40/100GbE node
16	4x10GbE/4x25GbE or 40/100GbE node	16	4x10GbE/4x25GbE or 40/100GbE node
17	4x10GbE/4x25GbE or 40/100GbE node	17	4x10GbE/4x25GbE or 40/100GbE node
18	4x10GbE/4x25GbE or 40/100GbE node	18	4x10GbE/4x25GbE or 40/100GbE node
19	40G/100GbE node 19	19	40G/100GbE node 19
20	40G/100GbE node 20	20	40G/100GbE node 20
21	40G/100GbE node 21	21	40G/100GbE node 21
22	40G/100GbE node 22	22	40G/100GbE node 22
23	40G/100GbE node 23	23	40G/100GbE node 23

Cluster switch A		Cluster switch B	
24	40G/100GbE node 24	24	40G/100GbE node 24
25 through 30	Reserved	25 through 30	Reserved
31	100GbE ISL to switch B port 31	31	100GbE ISL to switch A port 31
32	100GbE ISL to switch B port 32	32	100GbE ISL to switch A port 32

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* section of the [Hardware Universe](#) defines the cluster ports used by the platform.

Cluster switch A		Cluster switch B	
Switch port	Node/port usage	Switch port	Node/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	

Cluster switch A		Cluster switch B	
14		14	
15		15	
16		16	
17		17	
18		18	
19		19	
20		20	
21		21	
22		22	
23		23	
24		24	
25 through 30	Reserved	25 through 30	Reserved
31	100GbE ISL to switch B port 31	31	100GbE ISL to switch A port 31
32	100GbE ISL to switch B port 32	32	100GbE ISL to switch A port 32

What's next

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

Install the 3232C cluster switch

Follow this procedure to set up and configure the Cisco Nexus 3232C switch.

Before you begin

Make sure you have the following:

- Access to an HTTP, FTP, or TFTP server at the installation site to download the applicable NX-OS and Reference Configuration File (RCF) releases.
- Applicable NX-OS version, downloaded from the [Cisco Software Download](#) page.
- Applicable licenses, network and configuration information, and cables.

- Completed [cabling worksheets](#).
- Applicable NetApp cluster network and management network RCFs downloaded from the NetApp Support Site at mysupport.netapp.com. All Cisco cluster network and management network switches arrive with the standard Cisco factory-default configuration. These switches also have the current version of the NX-OS software but do not have the RCFs loaded.
- [Required switch and ONTAP documentation](#).

Steps

1. Rack the cluster network and management network switches and controllers.

If you are installing the...	Then...
Cisco Nexus 3232C in a NetApp system cabinet	See the <i>Installing a Cisco Nexus 3232C cluster switch and pass-through panel in a NetApp cabinet</i> guide for instructions to install the switch in a NetApp cabinet.
Equipment in a Telco rack	See the procedures provided in the switch hardware installation guides and the NetApp installation and setup instructions.

2. Cable the cluster network and management network switches to the controllers using the completed cabling worksheets.
3. Power on the cluster network and management network switches and controllers.

What's next?

Optionally, you can [install a Cisco Nexus 3223C switch in a NetApp cabinet](#). Otherwise, go to [review cabling and configuration](#).

Install a Cisco Nexus 3232C cluster switch in a NetApp cabinet

Depending on your configuration, you might need to install the Cisco Nexus 3232C cluster switch and pass-through panel in a NetApp cabinet with the standard brackets that are included with the switch.

Before you begin

- The initial preparation requirements, kit contents, and safety precautions in the [Cisco Nexus 3000 Series Hardware Installation Guide](#).
- For each switch, 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.
- Cisco standard rail kit to install the switch in a NetApp cabinet.



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

Steps

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

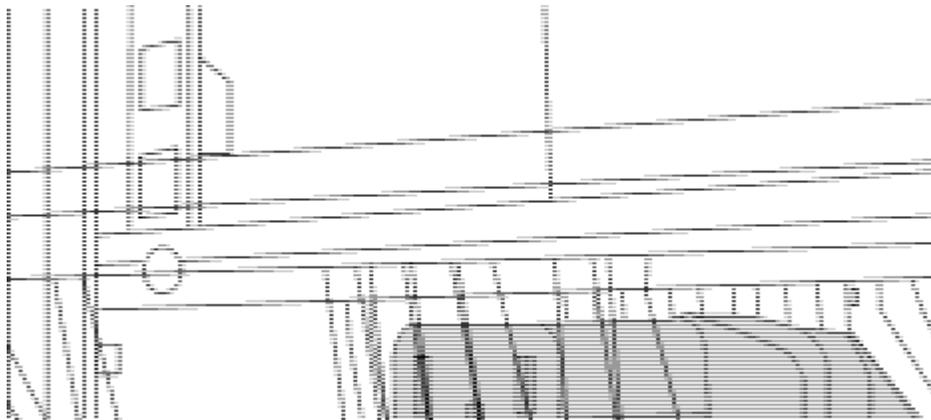
The pass-through panel kit is available from NetApp (part number X8784-R6).

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

- One pass-through blanking panel
- Four 10-32 x .75 screws
- Four 10-32 clip nuts
 - a. Determine the vertical location of the switches and blanking panel in the cabinet.

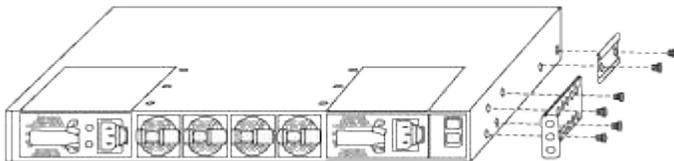
In this procedure, the blanking panel will be installed in U40.

- b. Install two clip nuts on each side in the appropriate square holes for front cabinet rails.
- c. Center the panel vertically to prevent intrusion into adjacent rack space, and then tighten the screws.
- d. Insert the female connectors of both 48-inch jumper cords from the rear of the panel and through the brush assembly.

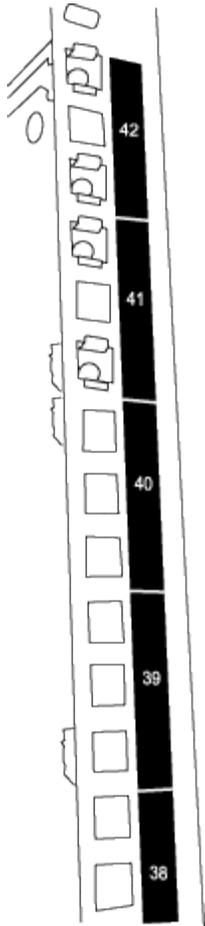


(1) Female connector of the jumper cord.

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



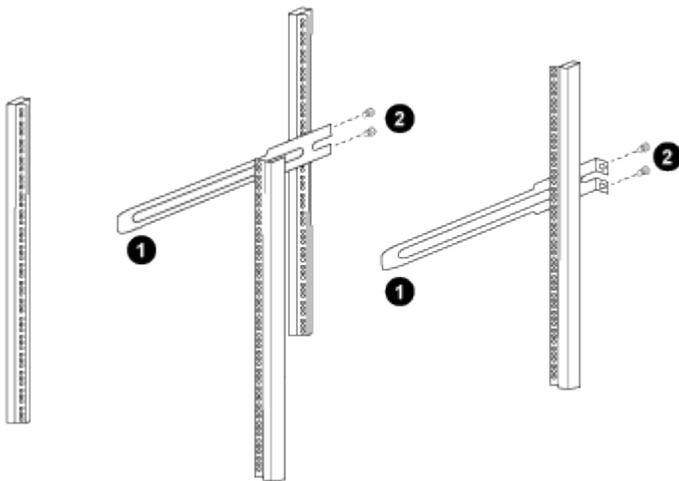
- b. Repeat step 2a with the other front rack-mount bracket on the other side of the switch.
 - c. Install the rear rack-mount bracket on the switch chassis.
 - d. Repeat step 2c with the other rear rack-mount bracket on the other side of the switch.
2. Install the clip nuts in the square hole locations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



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

3. 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.

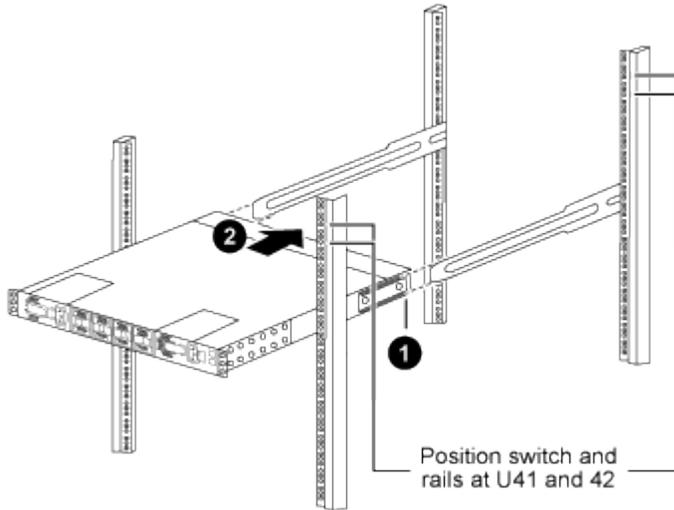
c. Repeat steps 4a and 4b at the RU41 locations on the cabinet.

4. 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.

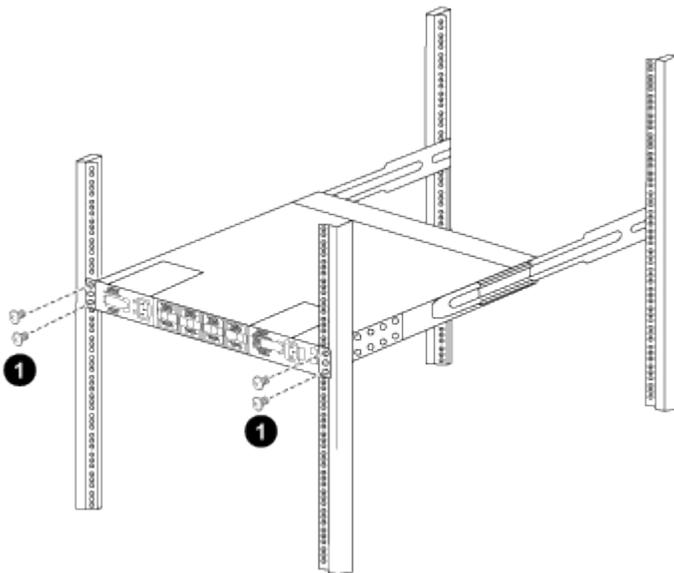
a. Position the back of the switch at RU41.



(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.

5. When the switches are installed, connect the jumper cords to the switch power inlets.

6. 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.

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

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

Review cabling and configuration considerations

Before configuring your Cisco 3232C switch, review the following considerations.

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

If 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
```

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.

Configure software

Software install workflow for Cisco Nexus 3232C cluster switches

To install and configure the software for a Cisco Nexus 3232C switch and install or upgrade the Reference Configuration File (RCF), follow these steps:

1**Configure the switch**

Configure the 3232C cluster 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 3232C cluster switches.

3**Install or upgrade the NX-OS software**

Download and install or upgrade the NX-OS software on the Cisco 3232C cluster switch.

4**Install the RCF**

Install the RCF after setting up the Cisco 3232C switch for the first time.

5**Verify SSH configuration**

Verify that SSH is enabled on the switches to use the Ethernet Switch Health Monitor (CSHM) and log collection features.

6**Reset the switch to factory defaults**

Erase the 3232C cluster switch settings.

Configure the 3232C cluster switch

Follow this procedure to set up and configure the Cisco Nexus 3232C switch.

Before you begin

- Access to an HTTP, FTP or TFTP server at the installation site to download the applicable NX-OS and reference configuration file (RCF) releases.
- Applicable NX-OS version, downloaded from the [Cisco software download](#) page.
- Required cluster network and management network switch documentation.

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

- Required controller documentation and ONTAP documentation.

[NetApp documentation](#)

- Applicable licenses, network and configuration information, and cables.
- Completed cabling worksheets.
- Applicable NetApp cluster network and management network RCFs, downloaded from the NetApp Support Site at mysupport.netapp.com for the switches that you receive. All Cisco cluster network and management network switches arrive with the standard Cisco factory-default configuration. These switches also have the

current version of the NX-OS software, but do not have the RCFs loaded.

Steps

1. Rack the cluster network and management network switches and controllers.

If you are installing your...	Then...
Cisco Nexus 3232C in a NetApp system cabinet	See the <i>Installing a Cisco Nexus 3232C cluster switch and pass-through panel in a NetApp cabinet</i> guide for instructions to install the switch in a NetApp cabinet.
Equipment in a Telco rack	See the procedures provided in the switch hardware installation guides and the NetApp installation and setup instructions.

2. Cable the cluster network and management network switches to the controllers using the completed cabling worksheets.
3. Power on the cluster network and management network switches and controllers.
4. Perform an initial configuration of the cluster network switches.

Provide applicable responses to the following initial setup questions when you first boot the switch. Your site's security policy defines the responses and services to enable.

Prompt	Response
Abort Auto Provisioning and continue with normal setup? (yes/no)	Respond with yes . The default is no.
Do you want to enforce secure password standard? (yes/no)	Respond with yes . The default is yes.
Enter the password for admin.	The default password is "admin"; you must create a new, strong password. A weak password can be rejected.
Would you like to enter the basic configuration dialog? (yes/no)	Respond with yes at the initial configuration of the switch.
Create another login account? (yes/no)	Your answer depends on your site's policies on alternate administrators. The default is no .
Configure read-only SNMP community string? (yes/no)	Respond with no . The default is no.
Configure read-write SNMP community string? (yes/no)	Respond with no . The default is no.
Enter the switch name.	The switch name is limited to 63 alphanumeric characters.

Prompt	Response
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.
Configure the default-gateway? (yes/no)	Respond with yes . At the IPv4 address of the default-gateway: prompt, enter your default_gateway.
Configure advanced IP options? (yes/no)	Respond with no . The default is no.
Enable the telnet service? (yes/no)	Respond with no . The default is no.
Enabled SSH service? (yes/no)	Respond with yes . The default is yes. <div style="border-left: 1px solid #ccc; padding-left: 10px; margin-left: 20px;">  SSH is recommended when using Ethernet Switch Health Monitor (CSHM) for its log collection features. SSHv2 is also recommended for enhanced security. </div>
Enter the type of SSH key you want to generate (dsa/rsa/rsa1).	The default is rsa .
Enter the number of key bits (1024-2048).	Enter the number of key bits from 1024-2048.
Configure the NTP server? (yes/no)	Respond with no . The default is no.
Configure default interface layer (L3/L2):	Respond with L2 . The default is L2.
Configure default switch port interface state (shut/noshut):	Respond with noshut . The default is noshut.
Configure CoPP system profile (strict/moderate/lenient/dense):	Respond with strict . The default is strict.
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.

Prompt	Response
Use this configuration and save it? (yes/no)	<p>Respond with yes to save the configuration. This automatically updates the kickstart and system images.</p> <p> 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.</p>

5. 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.
6. 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 the NX-OS and RCF](#).

Prepare to install NX-OS software and Reference Configuration File (RCF)

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

About the examples

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

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



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

Switch and node nomenclature

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 3000 Series Switches commands; ONTAP commands are used unless otherwise indicated.

Steps

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

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



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

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

```
set -privilege advanced
```

The advanced prompt (***>**) appears.

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

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

Show example

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

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

4 entries were displayed.
```

4. Check the administrative or operational status of each cluster interface.
 - a. Display the network port attributes:

```
network port show -ip-space 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

4 entries were displayed.
```

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

Show example

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

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

Cluster						
cluster1-01		cluster1-01_clus1	true	up/up	169.254.209.69/16	
cluster1-01		cluster1-01_clus2	true	up/up	169.254.49.125/16	
cluster1-02		cluster1-02_clus1	true	up/up	169.254.47.194/16	
cluster1-02		cluster1-02_clus2	true	up/up	169.254.19.183/16	
cluster1-02		cluster1-02_clus2	true	up/up	169.254.19.183/16	
cluster1-02		cluster1-02_clus2	true	up/up	169.254.19.183/16	

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	Date	LIF
Loss		
-----	-----	-----
-----	-----	-----
cluster1-01		
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		
.		
.		
cluster1-02		
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)

```

- 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

4 entries were displayed.

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

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

Review requirements

Before you begin

- A current backup of the switch configuration.
- A fully functioning cluster (no errors in the logs or similar issues).
- [Cisco Ethernet switch page](#). Consult the switch compatibility table for the supported ONTAP and NX-OS versions.
- [Cisco Nexus 3000 Series Switches](#). Refer to the appropriate software and upgrade guides available on the Cisco web site for complete documentation on the Cisco switch upgrade and downgrade procedures.

Install the software

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

Be sure to complete the procedure in [Prepare to install NX-OS and RCF](#), and then follow the steps below.

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
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      N3K-
C3232C
              e0d    cs2                      Ethernet1/7      N3K-
C3232C
cluster1-02/cdp
              e0a    cs1                      Ethernet1/8      N3K-
C3232C
              e0d    cs2                      Ethernet1/8      N3K-
C3232C
cluster1-03/cdp
              e0a    cs1                      Ethernet1/1/1    N3K-
C3232C
              e0b    cs2                      Ethernet1/1/1    N3K-
C3232C
cluster1-04/cdp
              e0a    cs1                      Ethernet1/1/2    N3K-
C3232C
              e0b    cs2                      Ethernet1/1/2    N3K-
C3232C
cluster1::*>
```

4. Check the administrative and operational status of each cluster port.

- a. Verify that all the cluster ports are **up** with a healthy status:

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

Show example

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

```
Node: cluster1-01
```

```
Ignore
```

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

e0a	Cluster	Cluster		up	9000	auto/100000
healthy	false					
e0d	Cluster	Cluster		up	9000	auto/100000
healthy	false					

```
Node: cluster1-02
```

```
Ignore
```

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

e0a	Cluster	Cluster		up	9000	auto/100000
healthy	false					
e0d	Cluster	Cluster		up	9000	auto/100000
healthy	false					

8 entries were displayed.

```
Node: cluster1-03
```

```
Ignore
```

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

e0a	Cluster	Cluster		up	9000	auto/10000
healthy	false					
e0b	Cluster	Cluster		up	9000	auto/10000
healthy	false					

```
Node: cluster1-04
```

```
Ignore
```

```
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
cluster1::*>
```

b. 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
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
8 entries were displayed.
cluster1::*>
```

- c. Verify that the cluster displays information for both cluster switches:

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

Show example

```
cluster1::*> system cluster-switch show -is-monitoring-enabled
-operational true
Switch                                     Type                                     Address
Model
-----
cs1                                         cluster-network                         10.233.205.90
N3K-C3232C
  Serial Number: FOCXXXXXXGD
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                                     9.3(5)
  Version Source: CDP

cs2                                         cluster-network                         10.233.205.91
N3K-C3232C
  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::*>
```

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 3232C switch.

Show example

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

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

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

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

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
Copyright (C) 2002-2019, 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
own
licenses, such as open source. This software is provided "as is,"
and unless
otherwise stated, there is no warranty, express or implied,
including but not
limited to warranties of merchantability and fitness for a
particular purpose.
Certain components of this software are licensed under
the GNU General Public License (GPL) version 2.0 or
GNU General Public License (GPL) version 3.0 or the GNU
Lesser General Public License (LGPL) Version 2.1 or
Lesser General Public License (LGPL) Version 2.0.
A copy of each such license is available at
http://www.opensource.org/licenses/gpl-2.0.php and
http://opensource.org/licenses/gpl-3.0.html and
http://www.opensource.org/licenses/lgpl-2.1.php and
http://www.gnu.org/licenses/old-licenses/library.txt.

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

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

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

  Last reset at 74117 usecs after Tue Nov 24 06:24:23 2020
  Reason: Reset Requested by CLI command reload
```

```
System version: 9.3(3)
```

```
Service:
```

```
plugin
```

```
Core Plugin, Ethernet Plugin
```

```
Active Package(s):
```

```
cs2#
```

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.9.3.4.bin
Installer will perform compatibility check first. Please wait.
Installer is forced disruptive

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

Verifying image type.
[] 100% -- SUCCESS

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

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

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

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

Compatibility check is done:
Module  bootable          Impact                Install-type  Reason
-----  -
1       Yes                   Disruptive          Reset         Default
upgrade is not hitless

Images will be upgraded according to following table:
Module      Image      Running-Version(pri:alt)
New-Version      Upg-Required
-----  -
1           nxos      9.3(3)
9.3(4)         yes
1           bios      v08.37(01/28/2020):v08.32(10/18/2016)
v08.37(01/28/2020)  no

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

```
Install is in progress, please wait.
```

```
Performing runtime checks.
```

```
[ ] 100% -- SUCCESS
```

```
Setting boot variables.
```

```
[ ] 100% -- SUCCESS
```

```
Performing configuration copy.
```

```
[ ] 100% -- SUCCESS
```

```
Module 1: Refreshing compact flash and upgrading  
bios/loader/bootrom.
```

```
Warning: please do not remove or power off the module at this time.
```

```
[ ] 100% -- SUCCESS
```

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

```
cs2#
```

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
own
licenses, such as open source. This software is provided "as is,"
and unless
otherwise stated, there is no warranty, express or implied,
including but not
limited to warranties of merchantability and fitness for a
particular purpose.
Certain components of this software are licensed under
the GNU General Public License (GPL) version 2.0 or
GNU General Public License (GPL) version 3.0 or the GNU
Lesser General Public License (LGPL) Version 2.1 or
Lesser General Public License (LGPL) Version 2.0.
A copy of each such license is available at
http://www.opensource.org/licenses/gpl-2.0.php and
http://opensource.org/licenses/gpl-3.0.html and
http://www.opensource.org/licenses/lgpl-2.1.php and
http://www.gnu.org/licenses/old-licenses/library.txt.

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

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

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

Last reset at 196755 usecs after Tue Nov 24 06:37:36 2020
Reason: Reset due to upgrade
```

```
System version: 9.3(3)
```

```
Service:
```

```
plugin
```

```
Core Plugin, Ethernet Plugin
```

```
Active Package(s):
```

```
cs2#
```

10. Upgrade the EPLD image and reboot the switch.

Show example

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

EPLD Device	Version
MI FPGA	0x12
IO FPGA	0x11

```
cs2# install epld bootflash:n9000-epld.9.3.4.img module 1
```

Compatibility check:

Module	Type	Upgradable	Impact	Reason
1	SUP	Yes	Disruptive	Module Upgradable

Retrieving EPLD versions.... Please wait.

Images will be upgraded according to following table:

Module	Type	EPLD	Running-Version	New-Version	Upg-Required
1	SUP	MI FPGA	0x12	0x12	No
1	SUP	IO FPGA	0x11	0x12	Yes

The above modules require upgrade.

The switch will be reloaded at the end of the upgrade

Do you want to continue (y/n) ? [n] **y**

Proceeding to upgrade Modules.

Starting Module 1 EPLD Upgrade

Module 1 : IO FPGA [Programming] : 100.00% (64 of 64 sectors)

Module 1 EPLD upgrade is successful.

Module	Type	Upgrade-Result
1	SUP	Success

Module 1 EPLD upgrade is successful.

```
cs2#
```

11. If you are upgrading to NX-OS version 9.3(11), you must upgrade the EPLD golden image and reboot the switch once again. Otherwise, skip to step 12.

See [EPLD Upgrade Release Notes, Release 9.3\(11\)](#) for further details.

Show example

```
cs2# install epld bootflash:n9000-epld.9.3.11.img module 1 golden
Digital signature verification is successful
Compatibility check:
Module          Type          Upgradable    Impact        Reason
-----
-----
          1          SUP          Yes          Disruptive    Module
Upgradable

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

Proceeding to upgrade Modules.

Starting Module 1 EPLD Upgrade

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

EPLDs upgraded.

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

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

Show example

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

EPLD Device	Version
MI FPGA	0x12
IO FPGA	0x12

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

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

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

Show example

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

```
Node: cluster1-01
```

```
Ignore
```

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

e0a	Cluster	Cluster		up	9000	auto/10000
healthy	false					
e0b	Cluster	Cluster		up	9000	auto/10000
healthy	false					

```
Node: cluster1-02
```

```
Ignore
```

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

e0a	Cluster	Cluster		up	9000	auto/10000
healthy	false					
e0b	Cluster	Cluster		up	9000	auto/10000
healthy	false					

```
Node: cluster1-03
```

```
Ignore
```

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

e0a	Cluster	Cluster		up	9000	auto/100000
healthy	false					
e0d	Cluster	Cluster		up	9000	auto/100000
healthy	false					

```
Node: cluster1-04
```

```
Ignore
```

```
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
N3K-C3232C
              e0d    cs2                        Ethernet1/7
N3K-C3232C
cluster01-2/cdp
              e0a    cs1                        Ethernet1/8
N3K-C3232C
              e0d    cs2                        Ethernet1/8
N3K-C3232C
cluster01-3/cdp
              e0a    cs1                        Ethernet1/1/1
N3K-C3232C
              e0b    cs2                        Ethernet1/1/1
N3K-C3232C
cluster1-04/cdp
              e0a    cs1                        Ethernet1/1/2
N3K-C3232C
              e0b    cs2                        Ethernet1/1/2
N3K-C3232C

cluster1::*> system cluster-switch show -is-monitoring-enabled
-operational true
Switch          Type          Address
Model
-----
-----
cs1              cluster-network  10.233.205.90
N3K-C3232C
  Serial Number: FOCXXXXXXGD
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                  9.3(5)
  Version Source: CDP

cs2              cluster-network  10.233.205.91
```

```

N3K-C3232C
  Serial Number: FOCXXXXXXGS
    Is Monitored: true
      Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                9.3(5)
  Version Source: CDP

2 entries were displayed.

```

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

```

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

```

14. 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::*>

```

15. Repeat steps 6 to 14 on switch cs1.

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

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 or upgrade the Reference Configuration File \(RCF\)](#).

Install or upgrade the RCF

Install or upgrade the Reference Configuration File (RCF) overview

You install the Reference Configuration File (RCF) after setting up the Nexus 3232C switches for the first time. You upgrade your RCF version when you have an existing

version of the RCF file installed on your switch.

See the Knowledge Base article [How to clear configuration on a Cisco interconnect switch while retaining remote connectivity](#) for further information when installing or upgrading your RCF.

Available RCF configurations

The following table describes the RCFs available for different configurations. Choose the RCF applicable to your configuration.

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

RCF name	Description
2-Cluster-HA-Breakout	Supports two ONTAP clusters with at least eight nodes, including nodes that use shared Cluster+HA ports.
4-Cluster-HA-Breakout	Supports four ONTAP clusters with at least four nodes, including nodes that use shared Cluster+HA ports.
1-Cluster-HA	All ports are configured for 40/100GbE. Supports shared cluster/HA traffic on ports. Required for AFF A320, AFF A250, and FAS500f systems. Additionally, all ports can be used as dedicated cluster ports.
1-Cluster-HA-Breakout	Ports are configured for 4x10GbE breakout, 4x25GbE breakout (RCF 1.6+ on 100GbE switches), and 40/100GbE. Supports shared cluster/HA traffic on ports for nodes that use shared cluster/HA ports: AFF A320, AFF A250, and FAS500f systems. Additionally, all ports can be used as dedicated cluster ports.
Cluster-HA-Storage	Ports are configured for 40/100GbE for Cluster+HA, 4x10GbE breakout for Cluster and 4x25GbE breakout for Cluster+HA, and 100GbE for each Storage HA Pair.
Cluster	Two flavors of RCF with different allocations of 4x10GbE ports (breakout) and 40/100GbE ports. All FAS/AFF nodes are supported, except for AFF A320, AFF A250, and FAS500f systems.
Storage	All ports are configured for 100GbE NVMe storage connections.

Available RCFs

The following table lists the available RCFs for 3232C switches. Choose the applicable RCF version for your configuration. See [Cisco Ethernet Switches](#) for more information.

RCF name
Cluster-HA-Breakout RCF v1.xx
Cluster-HA RCF v1.xx

RCF name
Storage RCF v1.xx
Cluster RCF 1.xx

Suggested documentation

- [Cisco Ethernet Switches \(NSS\)](#)

Consult the switch compatibility table for the supported ONTAP and RCF versions on the NetApp Support Site. Note that there can be command dependencies between the command syntax in the RCF and the syntax found in specific versions of NX-OS.

- [Cisco Nexus 3000 Series Switches](#)

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

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.

The examples in this procedure use four nodes. These nodes use two 10GbE cluster interconnect ports **e0a** and **e0b**. See the [Hardware Universe](#) to verify the correct cluster ports on your platforms.



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

For details of the available RCF configurations, see [Software install workflow](#).

Commands used

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

What's next?

After you've reviewed the install RCF or upgrade RCF procedure overview, you can [install the RCF](#) or [upgrade your RCF](#) as required.

Install the Reference Configuration File (RCF)

You install the Reference Configuration File (RCF) after setting up the Nexus 3232C switches for the first time.

Before you begin

Verify the following installations and connections:

- A current backup of the switch configuration.
- A fully functioning cluster (no errors in the logs or similar issues).
- The current RCF.
- A console connection to the switch, required when installing the RCF.

About this task

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

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 enable 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.

Be sure to complete the procedure in [Prepare to install NX-OS and RCF](#), and then follow the steps below.

Step 1: Install the RCF on the switches

1. Login to switch cs2 using SSH or by using a serial console.
2. Copy the RCF to the bootflash of switch cs2 using one of the following transfer protocols: FTP, TFTP, SFTP, or SCP. For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 3000 Series NX-OS Command Reference](#).

Show example

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

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

3. Apply the RCF previously downloaded to the bootflash.

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 3000 Series NX-OS Command Reference](#).

Show example

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

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



Make sure to read thoroughly the **Installation notes**, **Important Notes**, and **banner** sections of your RCF. You must read and follow these instructions to ensure the proper configuration and operation of the switch.

4. Examine the banner output from the `show banner motd` command. You must read and follow the instructions under **Important Notes** to make sure the proper configuration and operation of the switch.
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. Reapply any previous customizations to the switch configuration. Refer to [Review cabling and configuration considerations](#) for details of any further changes required.
7. Save basic configuration details to the `write_erase.cfg` file on the bootflash.



Make sure to configure the following: * Username and password * Management IP address * Default gateway * Switch name

```
cs2# show run | section "switchname" > bootflash:write_erase.cfg
```

```
cs2# show run | section "hostname" >> bootflash:write_erase.cfg
```

```
cs2# show run | i "username admin password" >> bootflash:write_erase.cfg
```

```
cs2# show run | section "vrf context management" >> bootflash:write_erase.cfg
```

```
cs2# show run | section "interface mgmt0" >> bootflash:write_erase.cfg
```

8. When installing RCF version 1.12 and later, run the following commands:

```
cs2# echo "hardware access-list tcam region racl-lite 512" >>
```

```
bootflash:write_erase.cfg
```

```
cs2# echo "hardware access-list tcam region qos 256" >>  
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.

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

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

10. Issue the `write erase` command to erase the current saved configuration:

```
cs2# write erase
```

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

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

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

```
cs2# copy bootflash:write_erase.cfg startup-config
```

12. Reboot switch cs2:

```
cs2# reload
```

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

13. Repeat Steps 1 to 12 on switch cs1.

14. 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 | grep up
```

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 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      Eth1/31(P)  Eth1/32(P)
cs1#
```

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

If any cluster LIFS have not returned to their home ports, revert them manually: `network interface revert -vserver <vserver_name> -lif <lif_name>`

4. 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::*>
```

Step 3: Setup 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.

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

What's next?

After you've installed the RCF, you can [verify the SSH configuration](#).

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 prior to 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      N3K-
C3232C
              e0d    cs2                      Ethernet1/7      N3K-
C3232C
cluster1-02/cdp
              e0a    cs1                      Ethernet1/8      N3K-
C3232C
              e0d    cs2                      Ethernet1/8      N3K-
C3232C
cluster1-03/cdp
              e0a    cs1                      Ethernet1/1/1    N3K-
C3232C
              e0b    cs2                      Ethernet1/1/1    N3K-
C3232C
cluster1-04/cdp
              e0a    cs1                      Ethernet1/1/2    N3K-
C3232C
              e0b    cs2                      Ethernet1/1/2    N3K-
C3232C
cluster1::*>
```

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

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

Show example

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

Ignore

Health Health
Port IPspace Broadcast Domain Link MTU Admin/Oper
Status Status
Speed (Mbps)
-----
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
Speed (Mbps)
-----
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
Speed (Mbps)
-----
e0a Cluster Cluster up 9000 auto/10000
healthy false
e0b Cluster Cluster up 9000 auto/10000
healthy false
Node: cluster1-04

Ignore

Speed (Mbps)
```

```

Health   Health
Port     IPspace   Broadcast Domain Link MTU   Admin/Oper
Status   Status
-----
-----
e0a      Cluster   Cluster           up   9000   auto/10000
healthy  false
e0b      Cluster   Cluster           up   9000   auto/10000
healthy  false
cluster1::*>

```

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

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

Show example

```

cluster1::*> network interface show -role cluster
          Logical           Status      Network
Current   Current Is
Vserver   Interface           Admin/Oper Address/Mask      Node
Port      Home
-----
-----
Cluster
          cluster1-01_clus1  up/up      169.254.3.4/23
cluster1-01  e0a      true
          cluster1-01_clus2  up/up      169.254.3.5/23
cluster1-01  e0d      true
          cluster1-02_clus1  up/up      169.254.3.8/23
cluster1-02  e0a      true
          cluster1-02_clus2  up/up      169.254.3.9/23
cluster1-02  e0d      true
          cluster1-03_clus1  up/up      169.254.1.3/23
cluster1-03  e0a      true
          cluster1-03_clus2  up/up      169.254.1.1/23
cluster1-03  e0b      true
          cluster1-04_clus1  up/up      169.254.1.6/23
cluster1-04  e0a      true
          cluster1-04_clus2  up/up      169.254.1.7/23
cluster1-04  e0b      true
8 entries were displayed.
cluster1::*>

```

- c. Verify that the cluster displays information for both cluster switches:

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

Show example

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

Switch	Type	Address

cs1	cluster-network	10.233.205.92
NX3232C		
Serial Number: FOXXXXXXXXGS		
Is Monitored: true		
Reason: None		
Software Version: Cisco Nexus Operating System (NX-OS)		
Software, Version		
9.3(4)		
Version Source: CDP		
cs2	cluster-network	10.233.205.93
NX3232C		
Serial Number: FOXXXXXXXXGD		
Is Monitored: true		
Reason: None		
Software Version: Cisco Nexus Operating System (NX-OS)		
Software, Version		
9.3(4)		
Version Source: CDP		

2 entries were displayed.

3. Disable auto-revert on the cluster LIFs.

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

Step 2: Configure ports

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

```

cs2> enable
cs2# configure
cs2(config)# interface eth1/1/1-2,eth1/7-8
cs2(config-if-range)# shutdown
cs2(config-if-range)# exit
cs2# exit

```



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

```
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	e0a true			
	cluster1-01_clus2	up/up	169.254.3.5/23	
cluster1-01	e0a false			
	cluster1-02_clus1	up/up	169.254.3.8/23	
cluster1-02	e0a true			
	cluster1-02_clus2	up/up	169.254.3.9/23	
cluster1-02	e0a false			
	cluster1-03_clus1	up/up	169.254.1.3/23	
cluster1-03	e0a true			
	cluster1-03_clus2	up/up	169.254.1.1/23	
cluster1-03	e0a false			
	cluster1-04_clus1	up/up	169.254.1.6/23	
cluster1-04	e0a true			
	cluster1-04_clus2	up/up	169.254.1.7/23	
cluster1-04	e0a false			

```

8 entries were displayed.
cluster1::*>

```

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

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
```

5. Record any custom additions between the current `running-config` and the RCF file in use (such as an SNMP configuration for your organization).

6. Save basic configuration details to the `write_erase.cfg` file on the bootflash.



Make sure to configure the following: * Username and password * Management IP address * Default gateway * Switch name

```
cs2# show run | section "switchname" > bootflash:write_erase.cfg
```

```
cs2# show run | section "hostname" >> bootflash:write_erase.cfg
```

```
cs2# show run | i "username admin password" >> bootflash:write_erase.cfg
```

```
cs2# show run | section "vrf context management" >> bootflash:write_erase.cfg
```

```
cs2# show run | section "interface mgmt0" >> bootflash:write_erase.cfg
```

7. When upgrading to RCF version 1.12 and later, run the following commands:

```
cs2# echo "hardware access-list tcam region racl-lite 512" >>
bootflash:write_erase.cfg
```

```
cs2# echo "hardware access-list tcam region qos 256" >>
bootflash:write_erase.cfg
```

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

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

- Issue the `write erase` command to erase the current saved configuration:

```
cs2# write erase
```

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

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

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

```
cs2# copy bootflash:write_erase.cfg startup-config
```

- Reboot the switch `cs2`:

```
cs2# reload
```

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

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

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

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

Show example

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

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

- Apply the RCF previously downloaded to the bootflash.

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

Show example

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

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



Make sure to read thoroughly the **Installation notes**, **Important Notes**, and **banner** sections of your RCF. You must read and follow these instructions to ensure the proper configuration and operation of the switch.

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

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

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

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

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

19. Verify the health of cluster ports on the cluster.
 - a. Verify that `e0d` ports are up and healthy across all nodes in the cluster:

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



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

b. Verify the switch health from the cluster (this might not show switch cs2, since LIFs are not homed on e0d).

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
N3K-C3232C
          e0d    cs2                        Ethernet1/7
N3K-C3232C
cluster01-2/cdp
          e0a    cs1                        Ethernet1/8
N3K-C3232C
          e0d    cs2                        Ethernet1/8
N3K-C3232C
cluster01-3/cdp
          e0a    cs1                        Ethernet1/1/1
N3K-C3232C
          e0b    cs2                        Ethernet1/1/1
N3K-C3232C
cluster1-04/cdp
          e0a    cs1                        Ethernet1/1/2
N3K-C3232C
          e0b    cs2                        Ethernet1/1/2
N3K-C3232C
cluster1::*> system cluster-switch show -is-monitoring-enabled
-operational true
Switch                Type                Address
Model
-----
-----
cs1                    cluster-network    10.233.205.90
N3K-C3232C
  Serial Number: FOXXXXXXXXGD
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                    9.3(4)
  Version Source: CDP
cs2                    cluster-network    10.233.205.91
N3K-C3232C
  Serial Number: FOXXXXXXXXGS
```

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



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

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



It can take up to 5 minutes for the cluster nodes to report as healthy.

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

Show example

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

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

21. Verify that the cluster LIFs have migrated to the ports hosted on switch cs2. This might take a few seconds.

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

Show example

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

22. 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::*>
```

23. Repeat Steps 4 to 19 on switch cs1.

24. 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 | grep up
```

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 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      Eth1/31 (P)  Eth1/32 (P)
cs1#
```

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

If any cluster LIFS have not returned to their home ports, revert them manually: `network interface revert -vserver vsver_name -lif lif_name`

4. 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::*>
```

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		
-----	-----	-----
-----	-----	-----
cluster1-01		
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		
.		
.		
cluster1-02		
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		
.		
.		
cluster1-03		
.		
.		
.		
.		
cluster1-04		
.		
.		
.		
.		

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 your RCF, you can [verify the SSH configuration](#).

Verify your SSH configuration

If you are using the Ethernet Switch Health Monitor (CSHM) and log collection features, verify that SSH and SSH keys are enabled on the cluster switches.

Steps

1. Verify that SSH is enabled:

```
(switch) show ssh server  
ssh version 2 is enabled
```

2. Verify that the SSH keys are enabled:

```
show ssh key
```

Show example

```
(switch)# show ssh key

rsa Keys generated:Fri Jun 28 02:16:00 2024

ssh-rsa
AAAAB3NzaC1yc2EAAAADAQABAAQGDINrD52Q586wTGJjFABjBlFaA23EpDrZ2sDCew
l7nwlIoC6HBejxluIObAH8hrW8kR+gj0ZAFpPNeLGTg3APj/yIPTBoIZZxbWRShywAM5
PqyxWwRb7kp9Zt1YHzVuHYpSO82KUDowKrL6lox/YtpKoZUDZjrZjAp8hTv3JZsPgQ==

bitcount:1024
fingerprint:
SHA256:aHwhpzo7+YCDSrp3isJv2uVGz+mjMMokqdMeXVVXfdo

could not retrieve dsa key information

ecdsa Keys generated:Fri Jun 28 02:30:56 2024

ecdsa-sha2-nistp521
AAAAE2VjZHNhLXNoYTItbmlzdHA1MjEAAAABmlzdHA1MjEAAACFBABJ+ZX5SFKhS57e
vkE273e0VoqZi4/32dt+f14fBuKv80MjMsmLfjKtCWylwgVt1Zi+C5TIBbugpzez529z
kFSF0ADb8JaGCoaAYe2HvWR/f6QLbKbqVIewCdqWgxzrIY5BPP5GBdxQJMBiOwEdnHg1
u/9Pzh/Vz9cHDcCW9qGE780QHA==

bitcount:521
fingerprint:
SHA256:TFGe2hXn6QIpcs/vyHzftHJ7Dceg0vQaULYRALZeHwQ

(switch)# show feature | include scpServer
scpServer          1          enabled
(switch)# show feature | include ssh
sshServer          1          enabled
(switch)#
```



When enabling FIPS, you must change the bitcount to 256 on the switch using the command `ssh key ecdsa 256 force`. See [Configure network security using FIPS](#) for more details.

What's next?

After you've verified your SSH configuration, you can [configure switch health monitoring](#).

Reset the 3232C cluster switch to factory defaults

To reset the 3232C cluster switch to factory defaults, you must erase the 3232C 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 resetting the switch, you can [reconfigure](#) it according to your requirements.

Migrate switches

Migrate from two-node switchless clusters

Migrate from a two-node switchless cluster workflow

Follow these workflow steps to migrate from a two-node switchless cluster to a cluster with Cisco Nexus 3232C cluster switches.

1

Migration requirements

Review the example switch information for the migration process.

2

Prepare for migration

Prepare your two-node switchless cluster for migration to a two-node switched cluster.

3

Configure your ports

Configure your two-node switchless cluster for migration to a two-node switched cluster.

4

Complete your migration

Complete your migration to a two-node switched cluster.

Migration requirements

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

Before you begin

Verify the following installations and connections:

- Ports are available for node connections. The cluster switches use the Inter-Switch Link (ISL) ports e1/31-32.
- You have appropriate cables for cluster connections:
 - The nodes with 10 GbE cluster connections require QSFP optical modules with breakout fiber cables or QSFP to SFP+ copper breakout cables.
 - The nodes with 40/100 GbE cluster connections require supported QSFP/QSFP28 optical modules with fiber cables or QSFP/QSFP28 copper direct-attach cables.
 - The cluster switches require the appropriate ISL cabling:
 - 2x QSFP28 fiber or copper direct-attach cables.
- The configurations are properly set up and functioning.

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

- All cluster ports are in the **up** state.
- The Cisco Nexus 3232C cluster switch are supported.
- The existing cluster network configuration has the following:
 - A redundant and fully functional Nexus 3232C cluster infrastructure on both switches
 - The latest RCF and NX-OS versions on your switches
 - Management connectivity on both switches
 - Console access to both switches
 - All cluster logical interfaces (LIFs) in the **up** state without having been migrated
 - Initial customization of the switch
 - All ISL ports enabled and cabled

About the examples used

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

- Nexus 3232C cluster switches, **C1** and **C2**.

- The nodes are **n1** and **n2**.

The examples in this procedure use two nodes, each using two 40 GbE cluster interconnect ports **e4a** and **e4e**. The [Hardware Universe](#) has details about the cluster ports on your platforms.

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



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

What's next?

After you've reviewed the migration requirements, you can [prepare to migrate your switches](#).

Prepare for migration from two-node switchless clusters to two-node switched clusters

Follow these steps to prepare your two-node switchless cluster to migrate to a two-node switched cluster that includes Cisco Nexus 3232C cluster network switches.

Steps

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

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

x is the duration of the maintenance window in hours.



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

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

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

Show example

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

Ignore

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

Ignore

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

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

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

Show example

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

4 entries were displayed.
```

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

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

Show example

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

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

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

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

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

[Cisco Ethernet Switches](#)

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

- c. Download the appropriate version of RCF.

- d. Select **CONTINUE** on the **Description** page, accept the license agreement, and then follow the instructions on the **Download** page to download the RCF.
- e. Download the appropriate version of the image software.

[Cisco Cluster and Management Network Switch Reference Configuration File Download](#)

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

For more information on Cisco commands, see the following list in the [Cisco Nexus 3000 Series NX-OS Command References](#).

Show example

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

```
C1# copy running-config startup-config
[] 100% Copy complete.
C1# configure
C1(config)# int e1/1/1-4,e1/2/1-4,e1/3/1-4,e1/4/1-4,e1/5/1-4,e1/6/1-4,e1/7-30
C1(config-if-range)# shutdown
C1(config-if-range)# exit
C1(config)# exit
C2# copy running-config startup-config
[] 100% Copy complete.
C2# configure
C2(config)# int e1/1/1-4,e1/2/1-4,e1/3/1-4,e1/4/1-4,e1/5/1-4,e1/6/1-4,e1/7-30
C2(config-if-range)# shutdown
C2(config-if-range)# exit
C2(config)# exit
```

6. Connect ports 1/31 and 1/32 on C1 to the same ports on C2 using supported cabling.
7. Verify that the ISL ports are operational on C1 and C2:

```
show port-channel summary
```

For more information on Cisco commands, see the following list in the [Cisco Nexus 3000 Series NX-OS Command References](#).

Show example

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

```
C1# show port-channel summary
Flags: D - Down          P - Up in port-channel (members)
      I - Individual    H - Hot-standby (LACP only)          s -
Suspended      r - Module-removed
      S - Switched      R - Routed
      U - Up (port-channel)
      M - Not in use. Min-links not met

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

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

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

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

For more information on Cisco commands, see the following list in the [Cisco Nexus 3000 Series NX-OS Command References](#).

Show example

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

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

9. Display the cluster port connectivity on each node:

```
network device-discovery show
```

Show example

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

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

Node	Local Port	Discovered Device	Interface	Platform
n1	/cdp			
	e4a	n2	e4a	FAS9000
	e4e	n2	e4e	FAS9000
n2	/cdp			
	e4a	n1	e4a	FAS9000
	e4e	n1	e4e	FAS9000

What's next?

After you've prepared to migrate your switches, you can [configure your ports](#).

Configure your ports for migration from a two-node switchless cluster to a two-node switched cluster

Follow these steps to configure your ports for migration from a two-node switchless cluster to a two-node switched cluster on Nexus 3232C switches.

Steps

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

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

Show example

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

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

2. Verify the cluster interfaces have successfully migrated:

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

Show example

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

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

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

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

Show example

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

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

4. 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		
n1		
3/5/2022 19:21:18 -06:00	n1_clus2	n2-clus1
none		
3/5/2022 19:21:20 -06:00	n1_clus2	n2_clus2
none		
n2		
3/5/2022 19:21:18 -06:00	n2_clus2	n1_clus1
none		
3/5/2022 19:21:20 -06:00	n2_clus2	n1_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 n1
Getting addresses from network interface table...
Cluster n1_clus1 n1          e4a    10.10.0.1
Cluster n1_clus2 n1          e4e    10.10.0.2
Cluster n2_clus1 n2          e4a    10.10.0.3
Cluster n2_clus2 n2          e4e    10.10.0.4
Local = 10.10.0.1 10.10.0.2
Remote = 10.10.0.3 10.10.0.4
Cluster Vserver Id = 4294967293
Ping status:.....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s) .....
Detected 9000 byte MTU on 32 path(s):
    Local 10.10.0.1 to Remote 10.10.0.3
    Local 10.10.0.1 to Remote 10.10.0.4
    Local 10.10.0.2 to Remote 10.10.0.3
    Local 10.10.0.2 to Remote 10.10.0.4
Larger than PMTU communication succeeds on 4 path(s) RPC status:
1 paths up, 0 paths down (tcp check)
1 paths up, 0 paths down (ucp check)

```

5. Disconnect the cable from e4a on node n1.

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

6. Disconnect the cable from e4a on node n2.

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

7. Enable all node-facing ports on C1.

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

Show example

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

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

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

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

Show example

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

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

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

Show example

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

Ignore

Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e4a       Cluster      Cluster      up    9000 auto/40000  -
e4e       Cluster      Cluster      up    9000 auto/40000  -
-

Node: n2

Ignore

Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e4a       Cluster      Cluster      up    9000 auto/40000  -
e4e       Cluster      Cluster      up    9000 auto/40000  -

4 entries were displayed.
```

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

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

Show example

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

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

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

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

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

Show example

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

12. Display the cluster port connectivity on each node:

```
network device-discovery show
```

Show example

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

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

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

Show example

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

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

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

```
network port modify
```

Show example

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

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

15. Verify the cluster LIF status:

```
network interface show
```

Show example

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

16. Disconnect the cable from e4e on node n1.

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

17. Disconnect the cable from e4e on node n2.

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

18. Enable all node-facing ports on C2.

Show example

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

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

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

```
network port modify
```

Show example

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

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

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

```
network interface revert
```

Show example

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

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

What's next?

After you've configured your ports, you can [complete your migration](#).

Complete your migration from a two-node switchless cluster to a two-node switched cluster

Complete the following steps to finalize the two-node switchless cluster migration to a two-node switched cluster on Nexus 3232C switches.

Steps

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

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

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

Show example

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

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

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

3. Display the cluster switch port numbers through which each cluster port is connected to each node:

```
network device-discovery show
```

Show example

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

4. Display discovered and monitored cluster switches:

```
system cluster-switch show
```

Show example

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

Switch Model	Type	Address
C1 NX3232CV Serial Number: FOX000001 Is Monitored: true Reason: Software Version: Cisco Nexus Operating System (NX-OS) Software, Version 7.0(3)I6(1) Version Source: CDP	cluster-network	10.10.1.101
C2 NX3232CV Serial Number: FOX000002 Is Monitored: true Reason: Software Version: Cisco Nexus Operating System (NX-OS) Software, Version 7.0(3)I6(1) Version Source: CDP	cluster-network	10.10.1.102

2 entries were displayed.

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

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

6. 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		
n1		
3/5/2022 19:21:18 -06:00	n1_clus2	n2-clus1
none		
3/5/2022 19:21:20 -06:00	n1_clus2	n2_clus2
none		
n2		
3/5/2022 19:21:18 -06:00	n2_clus2	n1_clus1
none		
3/5/2022 19:21:20 -06:00	n2_clus2	n1_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 n1
Getting addresses from network interface table...
Cluster n1_clus1 n1          e4a    10.10.0.1
Cluster n1_clus2 n1          e4e    10.10.0.2
Cluster n2_clus1 n2          e4a    10.10.0.3
Cluster n2_clus2 n2          e4e    10.10.0.4
Local = 10.10.0.1 10.10.0.2
Remote = 10.10.0.3 10.10.0.4
Cluster Vserver Id = 4294967293
Ping status:.....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s) .....
Detected 9000 byte MTU on 32 path(s):
    Local 10.10.0.1 to Remote 10.10.0.3
    Local 10.10.0.1 to Remote 10.10.0.4
    Local 10.10.0.2 to Remote 10.10.0.3
    Local 10.10.0.2 to Remote 10.10.0.4
Larger than PMTU communication succeeds on 4 path(s) RPC status:
1 paths up, 0 paths down (tcp check)
1 paths up, 0 paths down (ucp check)

```

7. 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 completed your switch migration, you can [configure switch health monitoring](#).

Replace switches

Replace a Cisco Nexus 3232C cluster switch

Follow these steps to replace a defective Cisco Nexus 3232C switch in a cluster. This is a non-disruptive procedure.

Review requirements

What you'll need

Make sure that the existing cluster and network configuration has the following characteristics:

- The Nexus 3232C cluster infrastructure are redundant and fully functional on both switches.
The Cisco Ethernet Switches page has the latest RCF and NX-OS versions on your switches.
- All cluster ports must be in the **up** state.

- Management connectivity must exist on both switches.
- All cluster logical interfaces (LIFs) are in the **up** state and are not migrated.

The replacement Cisco Nexus 3232C switch has the following characteristics:

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

For more information

See the following:

- [Cisco Ethernet Switches](#)
- [Hardware Universe](#)
- [What additional information do I need to install my equipment that is not in HWU?](#)

Enable console logging

NetApp strongly recommends that you enable console logging on the devices that you are using and take the following actions when replacing your switch:

- Leave AutoSupport enabled during maintenance.
- Trigger a maintenance AutoSupport before and after maintenance to disable case creation for the duration of the maintenance. See this Knowledge Base article [SU92: How to suppress automatic case creation during scheduled maintenance windows](#) for further details.
- Enable session logging for any CLI sessions. For instructions on how to enable session logging, review the "Logging Session Output" section in this Knowledge Base article [How to configure PuTTY for optimal connectivity to ONTAP systems](#).

Replace the switch

About this task

This replacement procedure describes the following scenario:

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

About the examples

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

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

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

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

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

Step 1: Display and migrate the cluster ports to switch

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

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

x is the duration of the maintenance window in hours.



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

2. Display information about the devices in your configuration:

```
network device-discovery show
```

Show example

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

Node	Local Port	Discovered Device	Interface	Platform
n1	/cdp			
	e0a	CL1	Ethernet1/1/1	N3K-C3232C
	e0b	CL2	Ethernet1/1/1	N3K-C3232C
	e0c	CL2	Ethernet1/1/2	N3K-C3232C
	e0d	CL1	Ethernet1/1/2	N3K-C3232C
n2	/cdp			
	e0a	CL1	Ethernet1/1/3	N3K-C3232C
	e0b	CL2	Ethernet1/1/3	N3K-C3232C
	e0c	CL2	Ethernet1/1/4	N3K-C3232C
	e0d	CL1	Ethernet1/1/4	N3K-C3232C
n3	/cdp			
	e4a	CL1	Ethernet1/7	N3K-C3232C
	e4e	CL2	Ethernet1/7	N3K-C3232C
n4	/cdp			
	e4a	CL1	Ethernet1/8	N3K-C3232C
	e4e	CL2	Ethernet1/8	N3K-C3232C

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

a. Display the network port attributes:

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

Show example

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

Ignore

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

Node: n2

Ignore

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

Node: n3

Ignore

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

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

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

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

Show example

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

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

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

c. Display the discovered cluster switches:

```
system cluster-switch show
```

Show example

The following output example displays the cluster switches:

```
cluster::> system cluster-switch show
Switch                               Type                               Address
Model
-----
CL1                                   cluster-network                    10.10.1.101
NX3232C
    Serial Number: FOX000001
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS)
    Software, Version 7.0(3)I6(1)
    Version Source: CDP

CL2                                   cluster-network                    10.10.1.102
NX3232C
    Serial Number: FOX000002
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS)
    Software, Version 7.0(3)I6(1)
    Version Source: CDP
```

4. Verify that the appropriate RCF and image are installed on the new Nexus 3232C switch and make any necessary site customizations.

a. Go to the NetApp Support Site.

mysupport.netapp.com

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

[Cisco Ethernet Switches](#)

c. Download the appropriate version of the RCF.

d. Click **CONTINUE** on the **Description** page, accept the license agreement, and then navigate to the **Download** page.

e. Download the correct version of the image software from the **Cisco® Cluster and Management Network Switch Reference Configuration File Download** page.

[Cisco® Cluster and Management Network Switch Reference Configuration File Download](#)

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

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

Show example

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

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

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

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

Show example

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

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

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

Show example

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

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

8. 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		
-----	-----	-----
n1		
3/5/2022 19:21:18 -06:00	n1_clus2	n2-clus1
none		
3/5/2022 19:21:20 -06:00	n1_clus2	n2_clus2
none		
.		
.		
n2		
3/5/2022 19:21:18 -06:00	n2_clus2	n1_clus1
none		
3/5/2022 19:21:20 -06:00	n2_clus2	n1_clus2
none		
.		
.		
n3		
.		
.		
.n4		
.		
.		

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

```

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

Step 2: Migrate ISLs to switch CL1 and C2

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

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

Show example

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

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

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

Show example

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

5. Verify that the ISLs are up on CL1.

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

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

Show example

```
CL1# show port-channel summary
Flags: D - Down          P - Up in port-channel (members)
      I - Individual    H - Hot-standby (LACP only)
      s - Suspended     r - Module-removed
      S - Switched      R - Routed
      U - Up (port-channel)
      M - Not in use. Min-links not met

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

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

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

Show example

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

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

7. On all nodes, bring up all the cluster interconnect ports connected to the replacement switch C2:

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

Show example

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

Step 3: Revert all LIFs to originally assigned ports

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

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

Show example

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

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

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

```
network interface show
```

Show example

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

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

```

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

Cluster					
e0a	true	n1_clus1	up/up	10.10.0.1/24	n1
e0b	true	n1_clus2	up/up	10.10.0.2/24	n1
e0c	true	n1_clus3	up/up	10.10.0.3/24	n1
e0d	true	n1_clus4	up/up	10.10.0.4/24	n1
e0a	true	n2_clus1	up/up	10.10.0.5/24	n2
e0b	true	n2_clus2	up/up	10.10.0.6/24	n2
e0c	true	n2_clus3	up/up	10.10.0.7/24	n2
e0d	true	n2_clus4	up/up	10.10.0.8/24	n2
e4a	true	n3_clus1	up/up	10.10.0.9/24	n3
e4e	true	n3_clus2	up/up	10.10.0.10/24	n3
e4a	true	n4_clus1	up/up	10.10.0.11/24	n4
e4e	true	n4_clus2	up/up	10.10.0.12/24	n4

3. Verify that the cluster ports are connected:

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

Show example

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

Ignore

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

e0a      Cluster      Cluster      up    9000  auto/10000  -
e0b      Cluster      Cluster      up    9000  auto/10000  -
e0c      Cluster      Cluster      up    9000  auto/10000  -
e0d      Cluster      Cluster      up    9000  auto/10000  -
-

Node: n2

Ignore

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

e0a      Cluster      Cluster      up    9000  auto/10000  -
e0b      Cluster      Cluster      up    9000  auto/10000  -
e0c      Cluster      Cluster      up    9000  auto/10000  -
e0d      Cluster      Cluster      up    9000  auto/10000  -
-

Node: n3

Ignore

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

e4a      Cluster      Cluster      up    9000  auto/40000  -
e4e      Cluster      Cluster      up    9000  auto/40000  -
-

Node: n4
```

Ignore

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

4. 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		
-----	-----	-----
n1		
3/5/2022 19:21:18 -06:00	n1_clus2	n2-clus1
none		
3/5/2022 19:21:20 -06:00	n1_clus2	n2_clus2
none		
.		
.		
n2		
3/5/2022 19:21:18 -06:00	n2_clus2	n1_clus1
none		
3/5/2022 19:21:20 -06:00	n2_clus2	n1_clus2
none		
.		
.		
n3		
.		
.		
.n4		
.		
.		

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

```

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

Step 4: Verify all ports and LIF are correctly migrated

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

You can execute the following commands in any order:

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

Show example

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

Node	Local Port	Discovered Device	Interface	Platform
n1	/cdp			
	e0a	C1	Ethernet1/1/1	N3K-C3232C
	e0b	C2	Ethernet1/1/1	N3K-C3232C
	e0c	C2	Ethernet1/1/2	N3K-C3232C
n2	/cdp			
	e0d	C1	Ethernet1/1/2	N3K-C3232C
	e0a	C1	Ethernet1/1/3	N3K-C3232C
	e0b	C2	Ethernet1/1/3	N3K-C3232C
n3	/cdp			
	e0c	C2	Ethernet1/1/4	N3K-C3232C
	e0d	C1	Ethernet1/1/4	N3K-C3232C
	e4a	C1	Ethernet1/7	N3K-C3232C
n4	/cdp			
	e4e	C2	Ethernet1/7	N3K-C3232C
	e4a	C1	Ethernet1/8	N3K-C3232C
	e4e	C2	Ethernet1/8	N3K-C3232C

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

```
(network port show)
```

```
Node: n1
```

```
Ignore
```

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

```
Node: n2
```

```
Ignore
```

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

```

Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e0a       Cluster      Cluster      up    9000  auto/10000  -
e0b       Cluster      Cluster      up    9000  auto/10000  -
e0c       Cluster      Cluster      up    9000  auto/10000  -
e0d       Cluster      Cluster      up    9000  auto/10000  -

```

Node: n3

Ignore

```

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

```

```

e4a       Cluster      Cluster      up    9000  auto/40000  -
e4e       Cluster      Cluster      up    9000  auto/40000  -

```

Node: n4

Ignore

```

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

```

```

e4a       Cluster      Cluster      up    9000  auto/40000  -
e4e       Cluster      Cluster      up    9000  auto/40000  -

```

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

```

Logical      Status      Network      Current
Current Is
Vserver      Interface  Admin/Oper  Address/Mask  Node
Port      Home
-----
-----
Cluster
      nm1_clus1  up/up      10.10.0.1/24  n1
e0a      true
      n1_clus2  up/up      10.10.0.2/24  n1
e0b      true

```

```

n1_clus3 up/up 10.10.0.3/24 n1
e0c true
n1_clus4 up/up 10.10.0.4/24 n1
e0d true
n2_clus1 up/up 10.10.0.5/24 n2
e0a true
n2_clus2 up/up 10.10.0.6/24 n2
e0b true
n2_clus3 up/up 10.10.0.7/24 n2
e0c true
n2_clus4 up/up 10.10.0.8/24 n2
e0d true
n3_clus1 up/up 10.10.0.9/24 n3
e4a true
n3_clus2 up/up 10.10.0.10/24 n3
e4e true
n4_clus1 up/up 10.10.0.11/24 n4
e4a true
n4_clus2 up/up 10.10.0.12/24 n4
e4e true

```

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

```

Switch                               Type                Address
Model
-----
CL1                                   cluster-network    10.10.1.101
NX3232C
    Serial Number: FOX000001
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version 7.0(3)I6(1)
    Version Source: CDP
CL2                                   cluster-network    10.10.1.102
NX3232C
    Serial Number: FOX000002
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version 7.0(3)I6(1)
    Version Source: CDP
C2                                   cluster-network    10.10.1.103
NX3232C
    Serial Number: FOX000003

```

```
Is Monitored: true
```

```
Reason: None
```

```
Software Version: Cisco Nexus Operating System (NX-OS)
```

```
Software, Version 7.0(3)I6(1)
```

```
Version Source: CDP 3 entries were displayed.
```

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

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

3. Verify that the proper cluster switches are monitored:

```
system cluster-switch show
```

Show example

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

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

Switch Model	Type	Address
CL1 NX3232C	cluster-network	10.10.1.101
Serial Number: FOX000001		
Is Monitored: true		
Reason: None		
Software Version: Cisco Nexus Operating System (NX-OS)		
Software, Version 7.0(3)I6(1)		
Version Source: CDP		
C2 NX3232C	cluster-network	10.10.1.103
Serial Number: FOX000002		
Is Monitored: true		
Reason: None		
Software Version: Cisco Nexus Operating System (NX-OS)		
Software, Version 7.0(3)I6(1)		
Version Source: CDP		

4. 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 replaced your switch, you can [configure switch health monitoring](#).

Replace Cisco Nexus 3232C cluster switches with switchless connections

You can migrate from a cluster with a switched cluster network to one where two nodes are directly connected for ONTAP 9.3 and later.

Review requirements

Guidelines

Review the following guidelines:

- Migrating to a two-node switchless cluster configuration is a nondisruptive operation. Most systems have two dedicated cluster interconnect ports on each node, but you can also use this procedure for systems with a larger number of dedicated cluster interconnect ports on each node, such as four, six or eight.
- You cannot use the switchless cluster interconnect feature with more than two nodes.
- If you have an existing two-node cluster that uses cluster interconnect switches and is running ONTAP 9.3 or later, you can replace the switches with direct, back-to-back connections between the nodes.

Before you begin

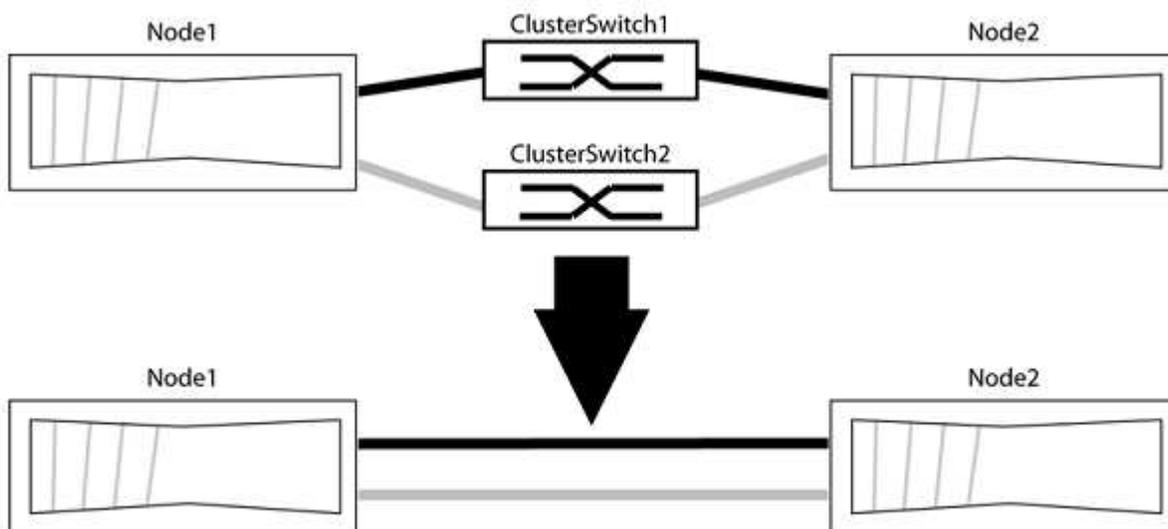
Make sure you have the following:

- A healthy cluster that consists of two nodes connected by cluster switches. The nodes must be running the same ONTAP release.
- Each node with the required number of dedicated cluster ports, which provide redundant cluster interconnect connections to support your system configuration. For example, there are two redundant ports for a system with two dedicated cluster interconnect ports on each node.

Migrate the switches

About this task

The following procedure removes the cluster switches in a two-node cluster and replaces each connection to the switch with a direct connection to the partner node.



About the examples

The examples in the following procedure show nodes that are using "e0a" and "e0b" as cluster ports. Your nodes might be using different cluster ports as they vary by system.

Step 1: Prepare for migration

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

```
set -privilege advanced
```

The advanced prompt **>* appears.

2. ONTAP 9.3 and later supports automatic detection of switchless clusters, which is enabled by default.

You can verify that detection of switchless clusters is enabled by running the advanced privilege command:

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

Show example

The following example output shows if the option is enabled.

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

If "Enable Switchless Cluster Detection" is *false*, contact NetApp support.

3. 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=<number_of_hours>h
```

where *h* is the duration of the maintenance window in hours. The message notifies technical support of this maintenance task so that they can suppress automatic case creation during the maintenance window.

In the following example, the command suppresses automatic case creation for two hours:

Show example

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

Step 2: Configure ports and cabling

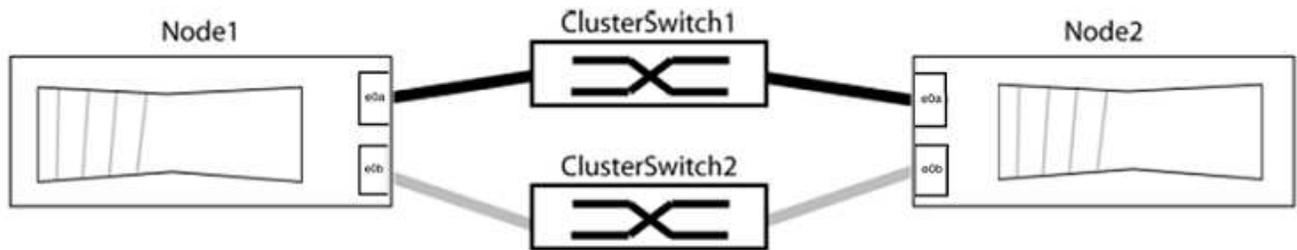
1. Organize the cluster ports on each switch into groups so that the cluster ports in group1 go to cluster

switch1 and the cluster ports in group2 go to cluster switch2. These groups are required later in the procedure.

2. Identify the cluster ports and verify link status and health:

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

In the following example for nodes with cluster ports "e0a" and "e0b", one group is identified as "node1:e0a" and "node2:e0a" and the other group as "node1:e0b" and "node2:e0b". Your nodes might be using different cluster ports because they vary by system.



Verify that the ports have a value of `up` for the "Link" column and a value of `healthy` for the "Health Status" column.

Show example

```
cluster::> network port show -ipSPACE Cluster
Node: node1

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

Node: node2

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

3. Confirm that all the cluster LIFs are on their home ports.

Verify that the “is-home” column is `true` for each of the cluster LIFs:

```
network interface show -vserver Cluster -fields is-home
```

Show example

```
cluster::*> net int show -vserver Cluster -fields is-home
(network interface show)
vserver  lif           is-home
-----  -
Cluster  node1_clus1  true
Cluster  node1_clus2  true
Cluster  node2_clus1  true
Cluster  node2_clus2  true
4 entries were displayed.
```

If there are cluster LIFs that are not on their home ports, revert those LIFs to their home ports:

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

4. Disable auto-revert for the cluster LIFs:

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

5. Verify that all ports listed in the previous step are connected to a network switch:

```
network device-discovery show -port cluster_port
```

The “Discovered Device” column should be the name of the cluster switch that the port is connected to.

Show example

The following example shows that cluster ports "e0a" and "e0b" are correctly connected to cluster switches "cs1" and "cs2".

```
cluster:::> network device-discovery show -port e0a|e0b
(network device-discovery show)
Node/      Local  Discovered
Protocol  Port   Device (LLDP: ChassisID)  Interface  Platform
-----  -
node1/cdp
          e0a    cs1                       0/11      BES-53248
          e0b    cs2                       0/12      BES-53248
node2/cdp
          e0a    cs1                       0/9       BES-53248
          e0b    cs2                       0/9       BES-53248
4 entries were displayed.
```

6. 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
node2		
3/5/2022 19:21:20 -06:00	node1_clus2	node2_clus2
node1		
3/5/2022 19:21:18 -06:00	node2_clus2	node1_clus1
node2		
3/5/2022 19:21:20 -06:00	node2_clus2	node1_clus2

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 e0a
Cluster node1_clus2 169.254.49.125 node1 e0b
Cluster node2_clus1 169.254.47.194 node2 e0a
Cluster node2_clus2 169.254.19.183 node2 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 169.254.47.194 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)

```

7. Verify that the cluster is healthy:

```
cluster ring show
```

All units must be either master or secondary.

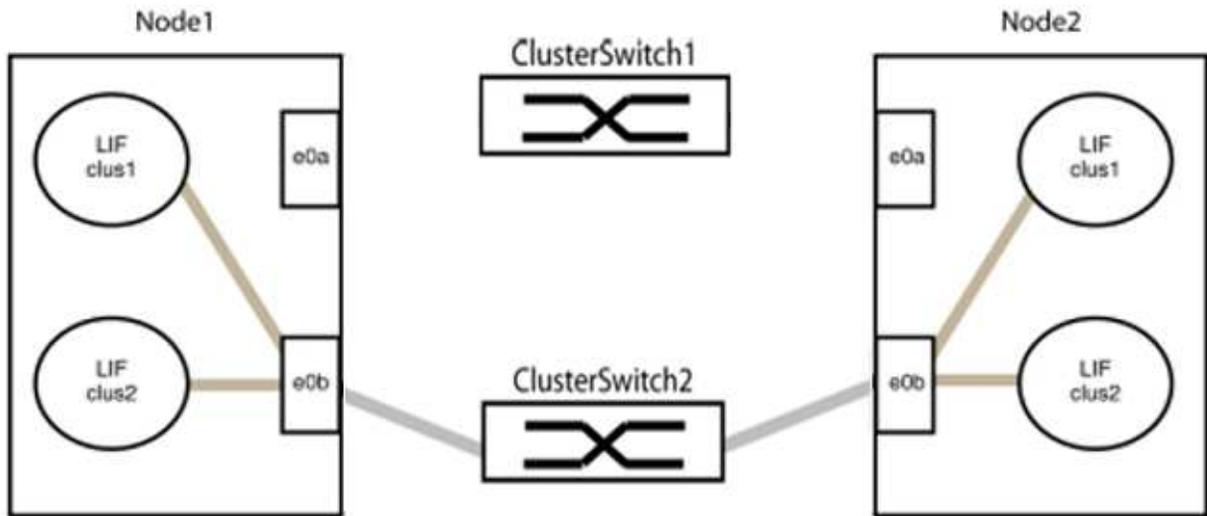
8. Set up the switchless configuration for the ports in group 1.



To avoid potential networking issues, you must disconnect the ports from group1 and reconnect them back-to-back as quickly as possible, for example, **in less than 20 seconds**.

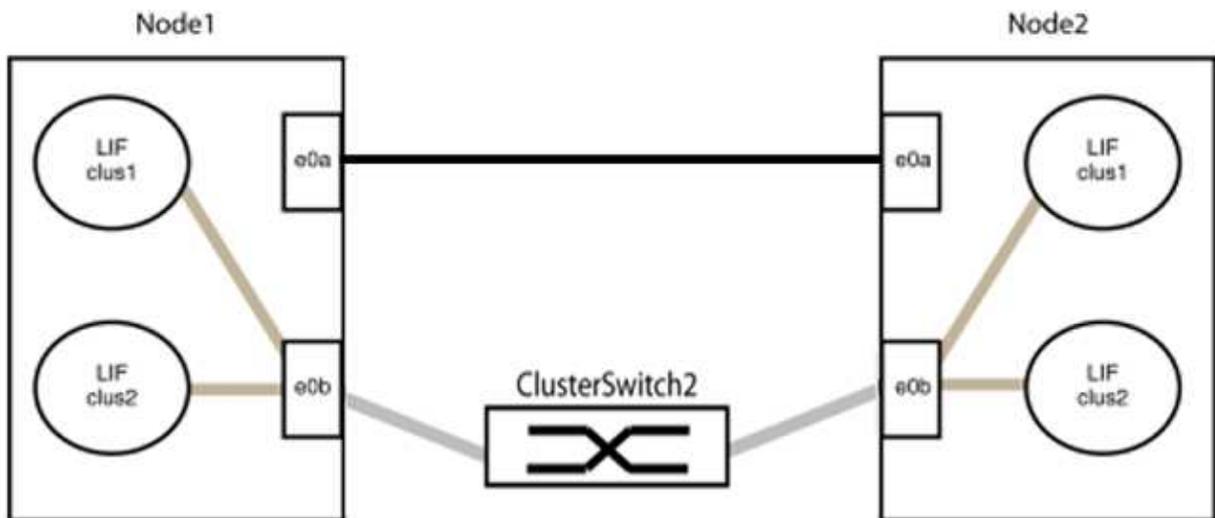
a. Disconnect all the cables from the ports in group1 at the same time.

In the following example, the cables are disconnected from port "e0a" on each node, and cluster traffic continues through the switch and port "e0b" on each node:



b. Cable the ports in group1 back-to-back.

In the following example, "e0a" on node1 is connected to "e0a" on node2:



9. The switchless cluster network option transitions from *false* to *true*. This might take up to 45 seconds. Confirm that the switchless option is set to *true*:

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

The following example shows that the switchless cluster is enabled:

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

10. 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 e0a
Cluster node1_clus2 169.254.49.125 node1 e0b
Cluster node2_clus1 169.254.47.194 node2 e0a
Cluster node2_clus2 169.254.19.183 node2 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 169.254.47.194 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)

```



Before proceeding to the next step, you must wait at least two minutes to confirm a working back-to-back connection on group 1.

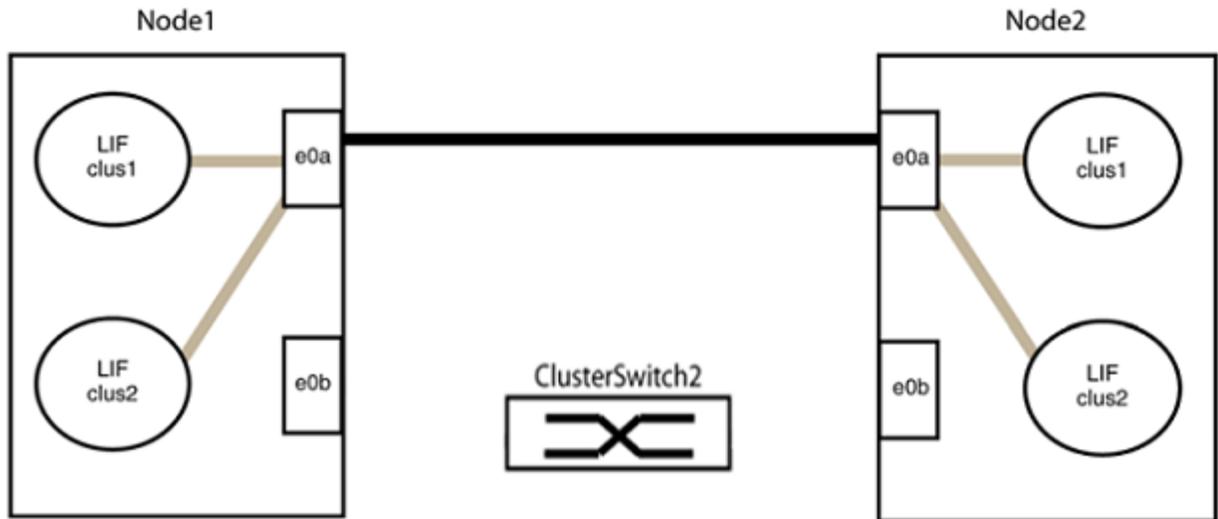
11. Set up the switchless configuration for the ports in group 2.



To avoid potential networking issues, you must disconnect the ports from group2 and reconnect them back-to-back as quickly as possible, for example, **in less than 20 seconds**.

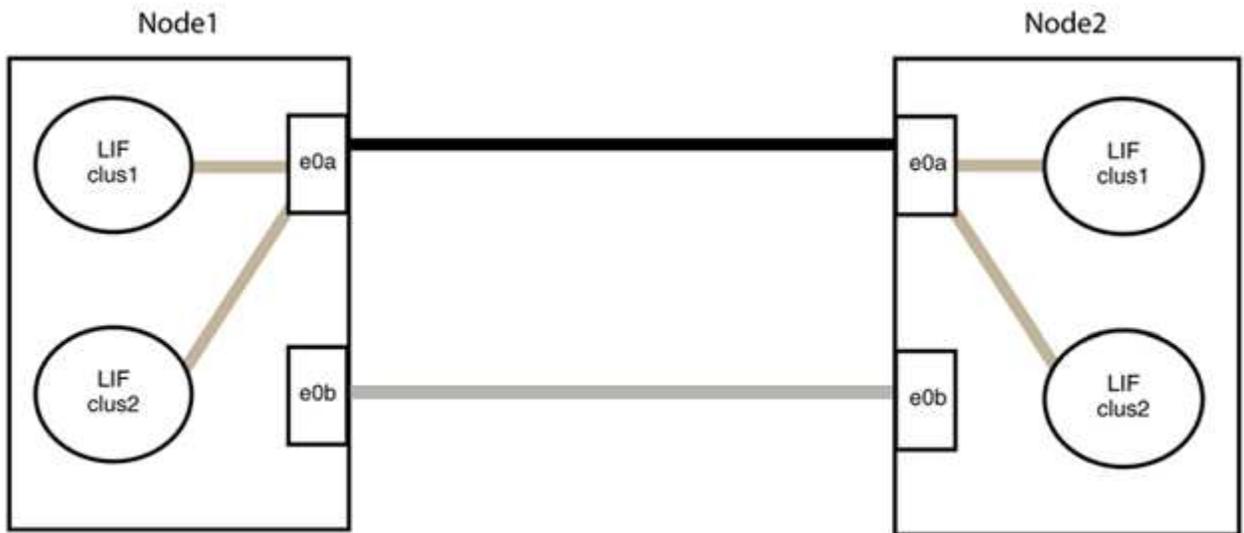
- a. Disconnect all the cables from the ports in group2 at the same time.

In the following example, the cables are disconnected from port "e0b" on each node, and cluster traffic continues through the direct connection between the "e0a" ports:



b. Cable the ports in group2 back-to-back.

In the following example, "e0a" on node1 is connected to "e0a" on node2 and "e0b" on node1 is connected to "e0b" on node2:



Step 3: Verify the configuration

1. Verify that the ports on both nodes are correctly connected:

```
network device-discovery show -port cluster_port
```

Show example

The following example shows that cluster ports "e0a" and "e0b" are correctly connected to the corresponding port on the cluster partner:

```
cluster::> net device-discovery show -port e0a|e0b
(network device-discovery show)
Node/      Local  Discovered
Protocol   Port   Device (LLDP: ChassisID)  Interface  Platform
-----
node1/cdp
          e0a    node2                      e0a        AFF-A300
          e0b    node2                      e0b        AFF-A300
node1/lldp
          e0a    node2 (00:a0:98:da:16:44)  e0a        -
          e0b    node2 (00:a0:98:da:16:44)  e0b        -
node2/cdp
          e0a    node1                      e0a        AFF-A300
          e0b    node1                      e0b        AFF-A300
node2/lldp
          e0a    node1 (00:a0:98:da:87:49)  e0a        -
          e0b    node1 (00:a0:98:da:87:49)  e0b        -
8 entries were displayed.
```

2. Re-enable auto-revert for the cluster LIFs:

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

3. Verify that all LIFs are home. This might take a few seconds.

```
network interface show -vserver Cluster -lif lif_name
```

Show example

The LIFs have been reverted if the “Is Home” column is `true`, as shown for `node1_clus2` and `node2_clus2` in the following example:

```
cluster::> network interface show -vserver Cluster -fields curr-  
port,is-home  
vserver  lif                curr-port  is-home  
-----  -  
Cluster  node1_clus1  e0a       true  
Cluster  node1_clus2  e0b       true  
Cluster  node2_clus1  e0a       true  
Cluster  node2_clus2  e0b       true  
4 entries were displayed.
```

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
```

4. Check the cluster status of the nodes from the system console of either node:

```
cluster show
```

Show example

The following example shows `epsilon` on both nodes to be `false`:

```
Node  Health  Eligibility  Epsilon  
-----  
node1 true     true        false  
node2 true     true        false  
2 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
node2		
3/5/2022 19:21:20 -06:00	node1_clus2	node2_clus2
node1		
3/5/2022 19:21:18 -06:00	node2_clus2	node1_clus1
node2		
3/5/2022 19:21:20 -06:00	node2_clus2	node1_clus2

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 e0a
Cluster node1_clus2 169.254.49.125 node1 e0b
Cluster node2_clus1 169.254.47.194 node2 e0a
Cluster node2_clus2 169.254.19.183 node2 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 169.254.47.194 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. If you suppressed automatic case creation, reenable it by invoking an AutoSupport message:

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

For more information, see [NetApp KB Article 1010449: How to suppress automatic case creation during scheduled maintenance windows](#).

7. Change the privilege level back to admin:

```
set -privilege admin
```

Cisco 3232C storage switches

Replace a Cisco Nexus 3232C storage switch

Follow these steps to replace a defective Cisco Nexus 3232C storage switch. This is a non-disruptive procedure.

Review requirements

The existing network configuration must have the following characteristics:

- The Cisco Ethernet Switches page has the latest RCF and NX-OS versions on your switches.
- Management connectivity must exist on both switches.



Make sure that all troubleshooting steps have been completed to confirm that your switch needs replacing.

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

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

Replace the switch

This procedure replaces the second Nexus 3232C storage switch S2 with the new 3232C switch NS2. The two nodes are node1 and node2.

Step 1: Confirm the switch to be replaced is S2

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

x is the duration of the maintenance window in hours.



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

2. Check on the health status of the storage node ports to make sure that there is connection to storage switch S1:

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

Show example

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

Node	Port	Type	Mode	Speed (Gb/s)	State	Status	VLAN ID

node1	e3a	ENET	storage	100	enabled	online	30
	e3b	ENET	storage	0	enabled	offline	30
	e7a	ENET	storage	0	enabled	offline	30
	e7b	ENET	storage	0	enabled	offline	30
node2	e3a	ENET	storage	100	enabled	online	30
	e3b	ENET	storage	0	enabled	offline	30
	e7a	ENET	storage	0	enabled	offline	30
	e7b	ENET	storage	0	enabled	offline	30

3. Verify that storage switch S1 is available:

```
network device-discovery show
```

Show example

```
storage::*> network device-discovery show
Node/      Local  Discovered
Protocol   Port   Device (LLDP: ChassisID)  Interface
Platform
-----
-----
node1/cdp
           e3a    S1                        Ethernet1/1
NX3232C
           e4a    node2                     e4a          AFF-
A700
           e4e    node2                     e4e          AFF-
A700
node1/lldp
           e3a    S1                        Ethernet1/1   -
           e4a    node2                     e4a          -
           e4e    node2                     e4e          -
node2/cdp
           e3a    S1                        Ethernet1/2
NX3232C
           e4a    node1                     e4a          AFF-
A700
           e4e    node1                     e4e          AFF-
A700
node2/lldp
           e3a    S1                        Ethernet1/2   -
           e4a    node1                     e4a          -
           e4e    node1                     e4e          -
```

4. Run the `show lldp neighbors` command on the working switch to confirm that you can see both nodes and all shelves:

```
show lldp neighbors
```

Show example

```
S1# show lldp neighbors
Capability codes:
  (R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device
  (W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other
Device ID                Local Intf          Hold-time  Capability  Port
ID
node1                    Eth1/1             121        S           e3a
node2                    Eth1/2             121        S           e3a
SHFGD2008000011         Eth1/5             121        S           e0a
SHFGD2008000011         Eth1/6             120        S           e0a
SHFGD2008000022         Eth1/7             120        S           e0a
SHFGD2008000022         Eth1/8             120        S           e0a
```

Step 2: Configure cabling

1. Verify the shelf ports in the storage system:

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

Show example

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

shelf  id  remote-port  remote-device
----- --  -
3.20   0  Ethernet1/5  S1
3.20   1  -            -
3.20   2  Ethernet1/6  S1
3.20   3  -            -
3.30   0  Ethernet1/7  S1
3.20   1  -            -
3.30   2  Ethernet1/8  S1
3.20   3  -            -
```

2. Remove all cables attached to storage switch S2.
3. Reconnect all cables to the replacement switch NS2.

Step 3: Verify all device configurations on switch NS2

1. Verify the health status of the storage node ports:

```
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
```

2. Verify that both switches are available:

```
network device-discovery show
```

Show example

```
storage::*> network device-discovery show
Node/      Local  Discovered
Protocol   Port   Device (LLDP: ChassisID)  Interface
Platform
-----
node1/cdp
NX3232C    e3a    S1                          Ethernet1/1
A700       e4a    node2                       e4a             AFF-
A700       e4e    node2                       e4e             AFF-
NX3232C    e7b    NS2                          Ethernet1/1
node1/lldp
           e3a    S1                          Ethernet1/1     -
           e4a    node2                       e4a             -
           e4e    node2                       e4e             -
           e7b    NS2                          Ethernet1/1     -
node2/cdp
NX3232C    e3a    S1                          Ethernet1/2
A700       e4a    node1                       e4a             AFF-
A700       e4e    node1                       e4e             AFF-
NX3232C    e7b    NS2                          Ethernet1/2
node2/lldp
           e3a    S1                          Ethernet1/2     -
           e4a    node1                       e4a             -
           e4e    node1                       e4e             -
           e7b    NS2                          Ethernet1/2     -
```

3. Verify the shelf ports in the storage system:

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

Show example

```
storage::*> storage shelf port show -fields remote-device,remote-  
port  
shelf id remote-port remote-device  
-----  
3.20 0 Ethernet1/5 S1  
3.20 1 Ethernet1/5 NS2  
3.20 2 Ethernet1/6 S1  
3.20 3 Ethernet1/6 NS2  
3.30 0 Ethernet1/7 S1  
3.20 1 Ethernet1/7 NS2  
3.30 2 Ethernet1/8 S1  
3.20 3 Ethernet1/8 NS2
```

4. 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?

[Configure switch health monitoring](#)

Cisco Nexus 3132Q-V

Get started

Installation and setup workflow for Cisco Nexus 3132Q-V switches

Cisco Nexus 3132Q-V switches can be used as cluster switches in your AFF or FAS cluster. Cluster switches allow you to build ONTAP clusters with more than two nodes.

Follow these workflow steps to install and setup your to Cisco Nexus 3132Q-V switch.

1

Configuration requirements

Review the configuration requirements for the 3132Q-V cluster switch.

2

Required documentation

Review specific switch and controller documentation to set up your 3132Q-V switches and the ONTAP cluster.

3

Smart Call Home requirements

Review the requirements for the Cisco Smart Call Home feature, used to monitor the hardware and software components on your network.

4

Install the hardware

Install the switch hardware.

5

Configure the software

Configure the switch software.

Configuration requirements for Cisco Nexus 3132Q-V switches

For Cisco Nexus 3132Q-V switch installation and maintenance, be sure to review network and configuration requirements.

Configuration requirements

To configure your cluster, 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 A700 systems, the e0M interface uses a dedicated Ethernet port.

Refer to the [Hardware Universe](#) for 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.

What's next

After you've reviewed the configuration requirements, you can review the [required documentation](#).

Documentation requirements for Cisco Nexus 3132Q-V switches

For Cisco Nexus 3132Q-V switch installation and maintenance, be sure to review all the recommended documentation.

Switch documentation

To set up the Cisco Nexus 3132Q-V switches, you need the following documentation from the [Cisco Nexus 3000 Series Switches Support](#) page.

Document title	Description
<i>Nexus 3000 Series Hardware Installation Guide</i>	Provides detailed information about site requirements, switch hardware details, and installation options.

Document title	Description
<i>Cisco Nexus 3000 Series Switch Software Configuration Guides</i> (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.
<i>Cisco Nexus 3000 Series NX-OS Software Upgrade and Downgrade Guide</i> (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.
<i>Cisco Nexus 3000 Series NX-OS Command Reference Master Index</i>	Provides links to the various command references provided by Cisco.
<i>Cisco Nexus 3000 MIBs Reference</i>	Describes the Management Information Base (MIB) files for the Nexus 3000 switches.
<i>Nexus 3000 Series NX-OS System Message Reference</i>	Describes the system messages for Cisco Nexus 3000 series switches, those that are informational, and others that might help diagnose problems with links, internal hardware, or the system software.
<i>Cisco Nexus 3000 Series NX-OS Release Notes</i> (choose the notes for the NX-OS release installed on your switches)	Describes the features, bugs, and limitations for the Cisco Nexus 3000 Series.
Regulatory, Compliance, and Safety Information for the Cisco Nexus 6000, Cisco Nexus 5000 Series, Cisco Nexus 3000 Series, and Cisco Nexus 2000 Series	Provides international agency compliance, safety, and statutory information for the Nexus 3000 series switches.

ONTAP systems documentation

To set up an ONTAP system, you need the following documents for your version of the operating system from [ONTAP 9](#).

Name	Description
Controller-specific <i>Installation and Setup Instructions</i>	Describes how to install NetApp hardware.
ONTAP documentation	Provides detailed information about all aspects of the ONTAP releases.
Hardware Universe	Provides NetApp hardware configuration and compatibility information.

To install a 3132Q-V Cisco switch in a NetApp cabinet, see the following hardware documentation.

Name	Description
42U System Cabinet, Deep Guide	Describes the FRUs associated with the 42U system cabinet, and provides maintenance and FRU replacement instructions.
Install Cisco Nexus 3132Q-V switch in a NetApp Cabinet	Describes how to install a Cisco Nexus 3132Q-V switch in a four-post NetApp cabinet.

Smart Call Home requirements

To use Smart Call Home, you must configure a cluster network switch to communicate using email with the Smart Call Home system. In addition, you can optionally set up your cluster network switch to take advantage of Cisco's embedded Smart Call Home support feature.

Smart Call Home monitors the hardware and software components on your network. When a critical system configuration occurs, it generates an email-based notification and raises an alert to all the recipients that are configured in your destination profile.

Smart Call Home monitors the hardware and software components on your network. When a critical system configuration occurs, it generates an email-based notification and raises an alert to all the recipients that are configured in your destination profile.

Before you can use Smart Call Home, be aware of the following requirements:

- An email server must be in place.
- The switch must have IP connectivity to the email server.
- The contact name (SNMP server contact), phone number, and street address information must be configured. This is required to determine the origin of messages received.
- A CCO ID must be associated with an appropriate Cisco SMARTnet Service contract for your company.
- Cisco SMARTnet Service must be in place for the device to be registered.

The [Cisco support site](#) contains information about the commands to configure Smart Call Home.

Install hardware

Hardware install workflow for Cisco Nexus 3132Q-V switches

To install and configure the hardware for a 3132Q-V cluster switch, follow these steps:



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 3132Q-V switch.

3**Install the switch in a NetApp cabinet**

Install the 3132Q-V switch and pass-through panel in a NetApp cabinet as required.

4**Review cabling and configuration**

Review support for NVIDIA Ethernet ports.

Complete Cisco Nexus 3132Q-V cabling worksheet

If you want to document the supported platforms, download a PDF of this page and 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.

Each switch can be configured as a single 40GbE port or 4 x 10GbE ports.

Sample cabling worksheet

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

Cluster switch A		Cluster switch B	
Switch port	Node and port usage	Switch port	Node and port usage
1	4x10G/40G node	1	4x10G/40G node
2	4x10G/40G node	2	4x10G/40G node
3	4x10G/40G node	3	4x10G/40G node
4	4x10G/40G node	4	4x10G/40G node
5	4x10G/40G node	5	4x10G/40G node
6	4x10G/40G node	6	4x10G/40G node
7	4x10G/40G node	7	4x10G/40G node
8	4x10G/40G node	8	4x10G/40G node
9	4x10G/40G node	9	4x10G/40G node

Cluster switch A		Cluster switch B	
10	4x10G/40G node	10	4x10G/40G node
11	4x10G/40G node	11	4x10G/40G node
12	4x10G/40G node	12	4x10G/40G node
13	4x10G/40G node	13	4x10G/40G node
14	4x10G/40G node	14	4x10G/40G node
15	4x10G/40G node	15	4x10G/40G node
16	4x10G/40G node	16	4x10G/40G node
17	4x10G/40G node	17	4x10G/40G node
18	4x10G/40G node	18	4x10G/40G node
19	40G node 19	19	40G node 19
20	40G node 20	20	40G node 20
21	40G node 21	21	40G node 21
22	40G node 22	22	40G node 22
23	40G node 23	23	40G node 23
24	40G node 24	24	40G node 24
25 through 30	Reserved	25 through 30	Reserved
31	40G ISL to switch B port 31	31	40G ISL to switch A port 31
32	40G ISL to switch B port 32	32	40G ISL to switch A port 32

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* section of the [Hardware Universe](#) defines the cluster ports used by the platform.

Cluster switch A		Cluster switch B	
Switch port	Node/port usage	Switch port	Node/port usage
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
16		16	
17		17	
18		18	
19		19	
20		20	
21		21	

Cluster switch A		Cluster switch B	
22		22	
23		23	
24		24	
25 through 30	Reserved	25 through 30	Reserved
31	40G ISL to switch B port 31	31	40G ISL to switch A port 31
32	40G ISL to switch B port 32	32	40G ISL to switch A port 32

What's next

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

Install the 3132Q-V cluster switch

Follow this procedure to set up and configure the Cisco Nexus 3132Q-V switch.

Before you begin

Make sure you have the following:

- Access to an HTTP, FTP, or TFTP server at the installation site to download the applicable NX-OS and Reference Configuration File (RCF) releases.
- Applicable NX-OS version, downloaded from the [Cisco Software Download](#) page.
- Applicable licenses, network and configuration information, and cables.
- Completed [cabling worksheets](#).
- Applicable NetApp cluster network and management network RCFs downloaded from the NetApp Support Site at mysupport.netapp.com. All Cisco cluster network and management network switches arrive with the standard Cisco factory-default configuration. These switches also have the current version of the NX-OS software but do not have the RCFs loaded.
- [Required switch and ONTAP documentation](#).

Steps

1. Rack the cluster network and management network switches and controllers.

If you are installing the...	Then...
Cisco Nexus 9336C-FX2 in a NetApp system cabinet	See the <i>Installing a Cisco Nexus 3132Q-V cluster switch and pass-through panel in a NetApp cabinet</i> guide for instructions to install the switch in a NetApp cabinet.

If you are installing the...	Then...
Equipment in a Telco rack	See the procedures provided in the switch hardware installation guides and the NetApp installation and setup instructions.

2. Cable the cluster network and management network switches to the controllers using the completed cabling worksheets.
3. Power on the cluster network and management network switches and controllers.

What's next?

Optionally, you can [install a Cisco Nexus 3132Q-V switch in a NetApp cabinet](#). Otherwise, you can [review the cabling and configuration requirements](#).

Install a Cisco Nexus 3132Q-V cluster switch in a NetApp cabinet

Depending on your configuration, you might need to install the Cisco Nexus 3132Q-V switch and pass-through panel in a NetApp cabinet with the standard brackets that are included with the switch.

Before you begin

- The initial preparation requirements, kit contents, and safety precautions in the [Cisco Nexus 3000 Series Hardware Installation Guide](#). Review these documents before you begin the procedure.
- The pass-through panel kit, 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
- Eight 10-32 or 12-24 screws and clip nuts to mount the brackets and slider rails to the front and rear cabinet posts.
- Cisco standard rail kit to install the switch in a NetApp cabinet.

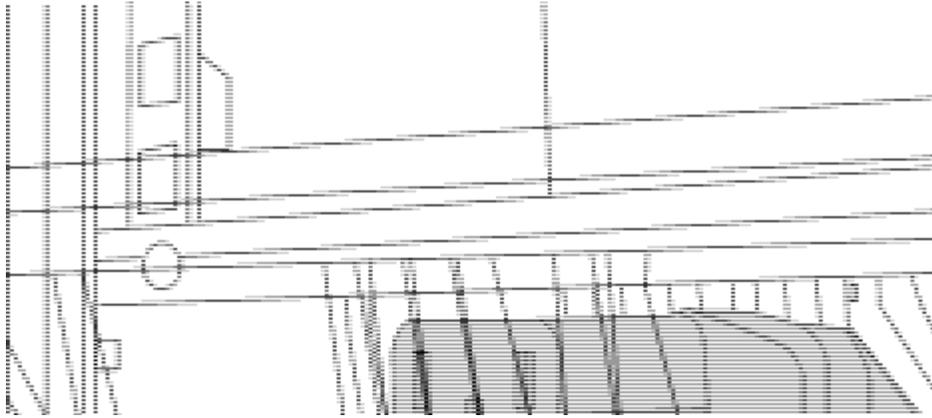


The jumper cords are not included with the pass-through kit and should be included with your switches. If they were not shipped with the switches, you can order them from NetApp (part number X1558A-R6).

Steps

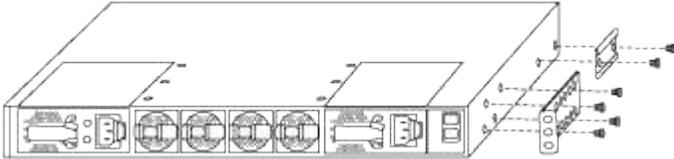
1. Install the pass-through blanking panel in the NetApp cabinet.
 - a. Determine the vertical location of the switches and blanking panel in the cabinet.

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.

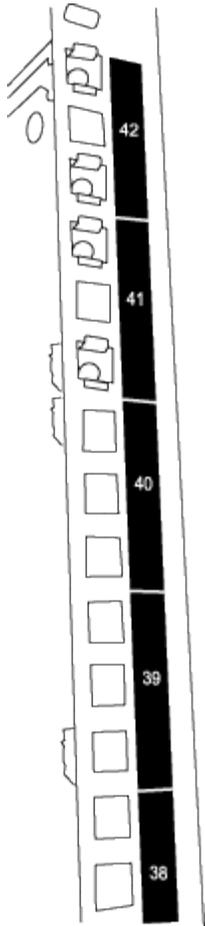


(1) Female connector of the jumper cord.

2. Install the rack-mount brackets on the Nexus 3132Q-V 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.



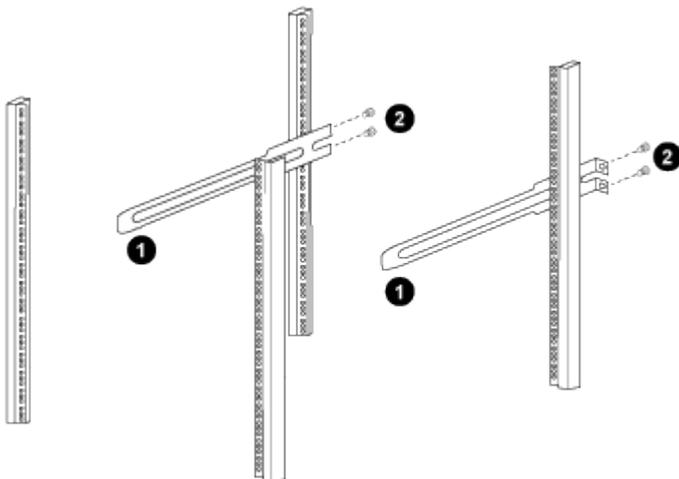
- b. Repeat step 2a with the other front rack-mount bracket on the other side of the switch.
 - c. Install the rear rack-mount bracket on the switch chassis.
 - d. Repeat step 2c with the other rear rack-mount bracket on the other side of the switch.
3. Install the clip nuts in the square hole locations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



The two 3132Q-V 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.

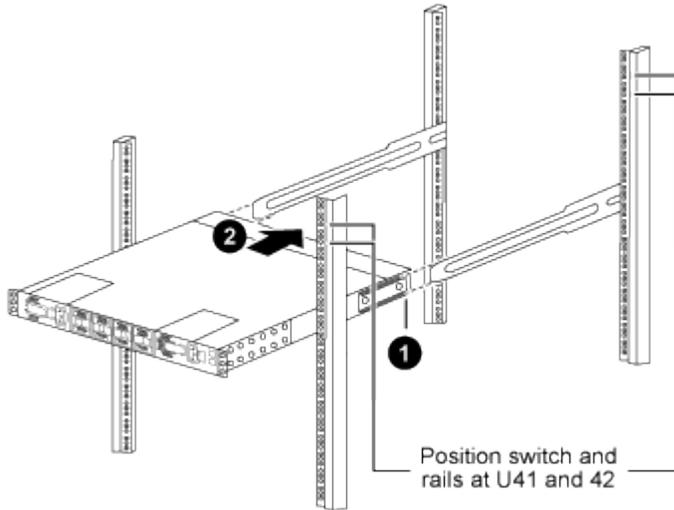
c. Repeat steps 4a and 4b at the RU41 locations on the cabinet.

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.

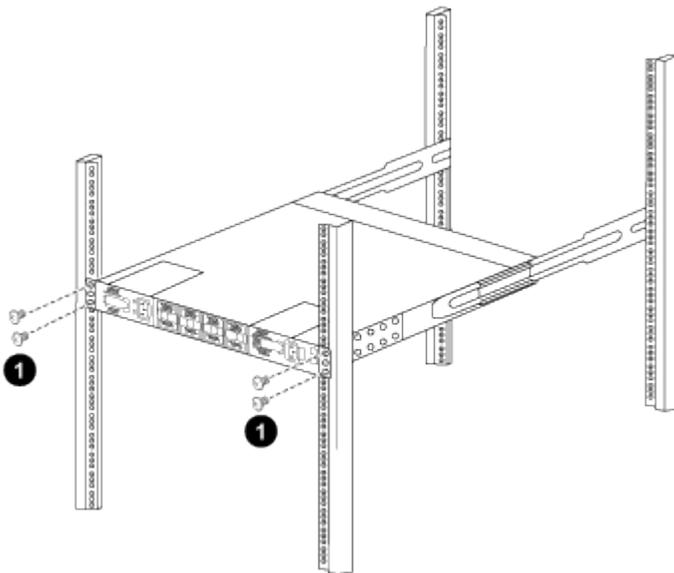
a. Position the back of the switch at RU41.



(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, you do not need 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 3132Q-V 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 Cisco 3132Q-V switch, review the following considerations.

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

If 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
(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
```

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.

Configure software

Software install workflow for Cisco Nexus 3132Q-V cluster switches

To install and configure the software for a Cisco Nexus 3132Q-V switch and install or upgrade the Reference Configuration File (RCF), follow these steps:



Configure the switch

Configure the 3132Q-V cluster switch.

2

Prepare to install the NX-OS software and RCF

The Cisco NX-OS software and RCF must be installed on Cisco 3132Q-V cluster switches.

3

Install or upgrade the NX-OS software

Download and install or upgrade the NX-OS software on the Cisco 3132Q-V cluster switch.

4

Install or upgrade the RCF

Install or upgrade the RCF after setting up the Cisco 3132Q-V switch.

5

Verify SSH configuration

Verify that SSH is enabled on the switches to use the Ethernet Switch Health Monitor (CSHM) and log collection features.

6

Reset the switch to factory defaults

Erase the 3132Q-V cluster switch settings.

Configure the Cisco Nexus 3132Q-V switch

Follow this procedure to configure the Cisco Nexus 3132Q-V switch.

Before you begin

- Access to an HTTP, FTP or TFTP server at the installation site to download the applicable NX-OS and reference configuration file (RCF) releases.
- Applicable NX-OS version, downloaded from the [Cisco software download](#) page.
- Required network switch documentation, controller documentation, and ONTAP documentation. For more information, see [Required documentation](#).
- Applicable licenses, network and configuration information, and cables.
- Completed cabling worksheets. See [Complete Cisco Nexus 3132Q-V cabling worksheet](#).
- Applicable NetApp cluster network and management network RCFs, downloaded from the NetApp Support Site at mysupport.netapp.com for the switches that you receive. All Cisco cluster network and management network switches arrive with the standard Cisco factory-default configuration. These switches also have the current version of the NX-OS software, but do not have the RCFs loaded.

Steps

1. Rack the cluster network and management network switches and controllers.

If you are installing your...	Then...
Cisco Nexus 3132Q-V in a NetApp system cabinet	See the <i>Installing a Cisco Nexus 3132Q-V cluster switch and pass-through panel in a NetApp cabinet</i> guide for instructions to install the switch in a NetApp cabinet.

If you are installing your...	Then...
Equipment in a Telco rack	See the procedures provided in the switch hardware installation guides and the NetApp installation and setup instructions.

2. Cable the cluster network and management network switches to the controllers using the completed cabling worksheet, as described in [Complete Cisco Nexus 3132Q-V cabling worksheet](#).
3. Power on the cluster network and management network switches and controllers.
4. Perform an initial configuration of the cluster network switches.

Provide applicable responses to the following initial setup questions when you first boot the switch. Your site's security policy defines the responses and services to enable.

Prompt	Response
Abort Auto Provisioning and continue with normal setup? (yes/no)	Respond with yes . The default is no.
Do you want to enforce secure password standard? (yes/no)	Respond with yes . The default is yes.
Enter the password for admin:	The default password is "admin"; you must create a new, strong password. A weak password can be rejected.
Would you like to enter the basic configuration dialog? (yes/no)	Respond with yes at the initial configuration of the switch.
Create another login account? (yes/no)	Your answer depends on your site's policies on alternate administrators. The default is no .
Configure read-only SNMP community string? (yes/no)	Respond with no . The default is no.
Configure read-write SNMP community string? (yes/no)	Respond with no . The default is no.
Enter the switch name.	The switch name is limited to 63 alphanumeric characters.
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.
Configure the default-gateway? (yes/no)	Respond with yes . At the IPv4 address of the default-gateway: prompt, enter your default_gateway.
Configure advanced IP options? (yes/no)	Respond with no . The default is no.

Prompt	Response
Enable the telnet service? (yes/no)	Respond with no . The default is no.
Enabled 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.
Enter the type of SSH key you want to generate (dsa/rsa/rsa1).	The default is rsa .
Enter the number of key bits (1024-2048).	Enter the key bits from 1024-2048.
Configure the NTP server? (yes/no)	Respond with no . The default is no.
Configure default interface layer (L3/L2):	Respond with L2 . The default is L2.
Configure default switch port interface state (shut/noshut):	Respond with noshut . The default is noshut.
Configure CoPP system profile (strict/moderate/lenient/dense):	Respond with strict . The default is strict.
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.
Use this configuration and save it? (yes/no)	Respond with yes to save the configuration. This automatically updates the kickstart and system images.  If you do not save the configuration at this stage, none of the changes will be in effect the next time you reboot the switch.

- 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.
- 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 [prepare to install the NX-OS and RCF](#).

Prepare to install NX-OS software and Reference Configuration File

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

About the examples

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

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



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

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

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

About this task

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

Steps

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

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

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	N3K-
C3132Q-V	e0b	cs2	Eth1/2	N3K-
C3132Q-V				
cluster1-01/cdp	e0a	cs1	Eth1/1	N3K-
C3132Q-V	e0b	cs2	Eth1/1	N3K-
C3132Q-V				

4. Check the administrative or operational status of each cluster interface.

a. Display the network port attributes:

```
network port show -ip-space Cluster
```

Show example

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

```
Node: cluster1-02
```

Health						Speed (Mbps)
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						Speed (Mbps)
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			

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		
-----	-----	
-----	-----	
cluster1-01		
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		
cluster1-02		
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 [install the NX-OS software](#).

Install the NX-OS software

Follow this procedure to install the NX-OS software on the Nexus 3132Q-V cluster switch.

Review requirements

Before you begin

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

Suggested documentation

- [Cisco Ethernet switch](#). Consult the switch compatibility table for the supported ONTAP and NX-OS versions.
- [Cisco Nexus 3000 Series Switches](#). Consult the appropriate software and upgrade guides available on the Cisco web site for complete documentation on the Cisco switch upgrade and downgrade procedures.

Install the software

About this task

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

Be sure to complete the procedure in [Prepare to install NX-OS software and Reference Configuration File](#), and then follow the steps below.

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

```
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      N3K-
C3132Q-V
              e0d    cs2                      Ethernet1/7      N3K-
C3132Q-V
cluster1-02/cdp
              e0a    cs1                      Ethernet1/8      N3K-
C3132Q-V
              e0d    cs2                      Ethernet1/8      N3K-
C3132Q-V
cluster1-03/cdp
              e0a    cs1                      Ethernet1/1/1    N3K-
C3132Q-V
              e0b    cs2                      Ethernet1/1/1    N3K-
C3132Q-V
cluster1-04/cdp
              e0a    cs1                      Ethernet1/1/2    N3K-
C3132Q-V
              e0b    cs2                      Ethernet1/1/2    N3K-
C3132Q-V
cluster1::*>
```

4. Check the administrative and operational status of each cluster port.

- a. Verify that all the cluster ports are **up** with a healthy status:

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

Show example

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

```
Node: cluster1-01
```

```
Ignore
```

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

e0a	Cluster	Cluster		up	9000	auto/100000
healthy	false					
e0d	Cluster	Cluster		up	9000	auto/100000
healthy	false					

```
Node: cluster1-02
```

```
Ignore
```

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

e0a	Cluster	Cluster		up	9000	auto/100000
healthy	false					
e0d	Cluster	Cluster		up	9000	auto/100000
healthy	false					

8 entries were displayed.

```
Node: cluster1-03
```

```
Ignore
```

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

e0a	Cluster	Cluster		up	9000	auto/10000
healthy	false					
e0b	Cluster	Cluster		up	9000	auto/10000
healthy	false					

```
Node: cluster1-04

Ignore

Health Health
Port IPspace Broadcast Domain Link MTU Admin/Oper
Status Status
-----
-----
e0a Cluster Cluster up 9000 auto/10000
healthy false
e0b Cluster Cluster up 9000 auto/10000
healthy false
cluster1::*>
```

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

```
network interface show -role Cluster
```

Show example

```
cluster1::*> network interface show -role 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
            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
8 entries were displayed.
cluster1::*>
```

- c. Verify that the cluster displays information for both cluster switches:

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

Show example

```
cluster1::*> system cluster-switch show -is-monitoring-enabled
-operational true
Switch                                     Type                               Address
Model
-----
cs1                                         cluster-network                   10.233.205.90
N3K-C3132Q-V
  Serial Number: FOCXXXXXXGD
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                                     9.3(5)
  Version Source: CDP

cs2                                         cluster-network                   10.233.205.91
N3K-C3132Q-V
  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::*>
```

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 to the Nexus 3132Q-V switch using one of the following transfer protocols: FTP, TFTP, SFTP, or SCP. For more information on Cisco commands, see the appropriate guide in [Cisco Nexus 3000 Series NX-OS Command Reference guides](#).

Show example

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

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

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
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
own
licenses, such as open source. This software is provided "as is,"
and unless
otherwise stated, there is no warranty, express or implied,
including but not
limited to warranties of merchantability and fitness for a
particular purpose.
Certain components of this software are licensed under
the GNU General Public License (GPL) version 2.0 or
GNU General Public License (GPL) version 3.0 or the GNU
Lesser General Public License (LGPL) Version 2.1 or
Lesser General Public License (LGPL) Version 2.0.
A copy of each such license is available at
http://www.opensource.org/licenses/gpl-2.0.php and
http://opensource.org/licenses/gpl-3.0.html and
http://www.opensource.org/licenses/lgpl-2.1.php and
http://www.gnu.org/licenses/old-licenses/library.txt.

Software
  BIOS: version 04.25
  NXOS: version 9.3(3)
  BIOS compile time: 01/28/2020
  NXOS image file is: bootflash:///nxos.9.3.3.bin
  NXOS compile time: 12/22/2019 2:00:00 [12/22/2019
14:00:37]

Hardware
  cisco Nexus 3132QV Chassis (Nexus 9000 Series)
  Intel(R) Core(TM) i3- CPU @ 2.50GHz with 16399900 kB of memory.
  Processor Board ID FOxxxxxxxx23

  Device name: cs2
  bootflash: 15137792 kB
  usb1: 0 kB (expansion flash)

Kernel uptime is 79 day(s), 10 hour(s), 23 minute(s), 53 second(s)
```

```
Last reset at 663500 usecs after Mon Nov  2 10:50:33 2020
Reason: Reset Requested by CLI command reload
System version: 9.3(3)
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.9.3.4.bin
Installer will perform compatibility check first. Please wait.
Installer is forced disruptive

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

Verifying image type.
[] 100% -- SUCCESS

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

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

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

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

Compatibility check is done:
Module  bootable          Impact                Install-type  Reason
-----  -
1      yes                   Disruptive          Reset         Default
upgrade is not hitless

Images will be upgraded according to following table:
Module      Image      Running-Version(pri:alt)
New-Version      Upg-Required
-----  -
1      nxos      9.3(3)
9.3(4)      yes
1      bios      v04.25(01/28/2020):v04.25(10/18/2016)
v04.25(01/28/2020)  no

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

```
Install is in progress, please wait.
```

```
Performing runtime checks.
```

```
[ ] 100% -- SUCCESS
```

```
Setting boot variables.
```

```
[ ] 100% -- SUCCESS
```

```
Performing configuration copy.
```

```
[ ] 100% -- SUCCESS
```

```
Module 1: Refreshing compact flash and upgrading  
bios/loader/bootrom.
```

```
Warning: please do not remove or power off the module at this time.
```

```
[ ] 100% -- SUCCESS
```

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

```
cs2#
```

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
own
licenses, such as open source. This software is provided "as is,"
and unless
otherwise stated, there is no warranty, express or implied,
including but not
limited to warranties of merchantability and fitness for a
particular purpose.
Certain components of this software are licensed under
the GNU General Public License (GPL) version 2.0 or
GNU General Public License (GPL) version 3.0 or the GNU
Lesser General Public License (LGPL) Version 2.1 or
Lesser General Public License (LGPL) Version 2.0.
A copy of each such license is available at
http://www.opensource.org/licenses/gpl-2.0.php and
http://opensource.org/licenses/gpl-3.0.html and
http://www.opensource.org/licenses/lgpl-2.1.php and
http://www.gnu.org/licenses/old-licenses/library.txt.

Software
  BIOS: version 04.25
  NXOS: version 9.3(4)
  BIOS compile time: 05/22/2019
  NXOS image file is: bootflash:///nxos.9.3.4.bin
  NXOS compile time: 4/28/2020 21:00:00 [04/29/2020 06:28:31]

Hardware
  cisco Nexus 3132QV Chassis (Nexus 9000 Series)
  Intel(R) Core(TM) i3- CPU @ 2.50GHz with 16399900 kB of memory.
  Processor Board ID FOxxxxxxxx23

  Device name: cs2
  bootflash: 15137792 kB
  usb1: 0 kB (expansion flash)

Kernel uptime is 79 day(s), 10 hour(s), 23 minute(s), 53 second(s)
```

```
Last reset at 663500 usecs after Mon Nov  2 10:50:33 2020
Reason: Reset Requested by CLI command reload
System version: 9.3(4)
Service:

plugin
  Core Plugin, Ethernet Plugin

Active Package(s) :

cs2#
```

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

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

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

Show example

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

```
Node: cluster1-01
```

```
Ignore
```

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

e0a	Cluster	Cluster		up	9000	auto/10000
healthy	false					
e0b	Cluster	Cluster		up	9000	auto/10000
healthy	false					

```
Node: cluster1-02
```

```
Ignore
```

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

e0a	Cluster	Cluster		up	9000	auto/10000
healthy	false					
e0b	Cluster	Cluster		up	9000	auto/10000
healthy	false					

```
Node: cluster1-03
```

```
Ignore
```

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

e0a	Cluster	Cluster		up	9000	auto/100000
healthy	false					
e0d	Cluster	Cluster		up	9000	auto/100000
healthy	false					

```
Node: cluster1-04

Ignore

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
N3K-C3132Q-V
          e0d    cs2                      Ethernet1/7
N3K-C3132Q-V
cluster01-2/cdp
          e0a    cs1                      Ethernet1/8
N3K-C3132Q-V
          e0d    cs2                      Ethernet1/8
N3K-C3132Q-V
cluster01-3/cdp
          e0a    cs1                      Ethernet1/1/1
N3K-C3132Q-V
          e0b    cs2                      Ethernet1/1/1
N3K-C3132Q-V
cluster1-04/cdp
          e0a    cs1                      Ethernet1/1/2
N3K-C3132Q-V
          e0b    cs2                      Ethernet1/1/2
N3K-C3132Q-V

cluster1::*> system cluster-switch show -is-monitoring-enabled
-operational true
Switch                Type                Address
Model
-----
-----
cs1                    cluster-network    10.233.205.90
N3K-C3132Q-V
  Serial Number: FOCXXXXXXGD
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                      9.3(5)
  Version Source: CDP

cs2                    cluster-network    10.233.205.91
```

```

N3K-C3132Q-V
  Serial Number: FOCXXXXXXGS
    Is Monitored: true
      Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                    9.3(5)
  Version Source: CDP

2 entries were displayed.

```

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

```

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

```

11. 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::*>

```

12. Repeat steps 6 to 11 on switch cs1.

13. Enable auto-revert on the cluster LIFs.

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

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

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 or upgrade the Reference Configuration File \(RCF\)](#).

Install or upgrade the RCF

Install or upgrade the Reference Configuration File (RCF) overview

You install the Reference Configuration File (RCF) after setting up the Nexus 3132Q-V switches for the first time. You upgrade your RCF version when you have an existing

version of the RCF file installed on your switch.

See the Knowledge Base article [How to clear configuration on a Cisco interconnect switch while retaining remote connectivity](#) for further information when installing or upgrading your RCF.

Available RCF configurations

The following table describes the RCFs available for different configurations. Choose the RCF applicable to your configuration.

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

RCF name	Description
2-Cluster-HA-Breakout	Supports two ONTAP clusters with at least eight nodes, including nodes that use shared Cluster+HA ports.
4-Cluster-HA-Breakout	Supports four ONTAP clusters with at least four nodes, including nodes that use shared Cluster+HA ports.
1-Cluster-HA	All ports are configured for 40/100GbE. Supports shared cluster/HA traffic on ports. Required for AFF A320, AFF A250, and FAS500f systems. Additionally, all ports can be used as dedicated cluster ports.
1-Cluster-HA-Breakout	Ports are configured for 4x10GbE breakout, 4x25GbE breakout (RCF 1.6+ on 100GbE switches), and 40/100GbE. Supports shared cluster/HA traffic on ports for nodes that use shared cluster/HA ports: AFF A320, AFF A250, and FAS500f systems. Additionally, all ports can be used as dedicated cluster ports.
Cluster-HA-Storage	Ports are configured for 40/100GbE for Cluster+HA, 4x10GbE breakout for Cluster and 4x25GbE breakout for Cluster+HA, and 100GbE for each Storage HA Pair.
Cluster	Two flavors of RCF with different allocations of 4x10GbE ports (breakout) and 40/100GbE ports. All FAS/AFF nodes are supported, except for AFF A320, AFF A250, and FAS500f systems.
Storage	All ports are configured for 100GbE NVMe storage connections.

Available RCFs

The following table lists the available RCFs for 3132Q-V switches. Choose the applicable RCF version for your configuration. See [Cisco Ethernet Switches](#) for more information.

RCF name
Cluster-HA-Breakout RCF v1.xx
Cluster-HA RCF v1.xx

RCF name
Cluster RCF 1.xx

Suggested documentation

- [Cisco Ethernet Switches \(NSS\)](#)

Consult the switch compatibility table for the supported ONTAP and RCF versions on the NetApp Support Site. Note that there can be command dependencies between the command syntax in the RCF and the syntax found in specific versions of NX-OS.

- [Cisco Nexus 3000 Series Switches](#)

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

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.

The examples in this procedure use four nodes. These nodes use two 10GbE cluster interconnect ports **e0a** and **e0b**. See the [Hardware Universe](#) to verify the correct cluster ports on your platforms.



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

For details of the available RCF configurations, see [Software install workflow](#).

Commands used

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

What's next?

After you've reviewed the install RCF or upgrade RCF procedure, you [install the RCF](#) or [upgrade your RCF](#) as required.

Install the Reference Configuration File (RCF)

You install the Reference Configuration File (RCF) after setting up the Nexus 3132Q-V switches for the first time.

Before you begin

Verify the following installations and connections:

- A current backup of the switch configuration.

- A fully functioning cluster (no errors in the logs or similar issues).
- The current RCF.
- A console connection to the switch, required when installing the RCF.

About this task

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

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 enable 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.

Step 1: Install the RCF on the switches

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      N3K-
C3132Q-V
              e0d    cs2                      Ethernet1/7      N3K-
C3132Q-V
cluster1-02/cdp
              e0a    cs1                      Ethernet1/8      N3K-
C3132Q-V
              e0d    cs2                      Ethernet1/8      N3K-
C3132Q-V
cluster1-03/cdp
              e0a    cs1                      Ethernet1/1/1    N3K-
C3132Q-V
              e0b    cs2                      Ethernet1/1/1    N3K-
C3132Q-V
cluster1-04/cdp
              e0a    cs1                      Ethernet1/1/2    N3K-
C3132Q-V
              e0b    cs2                      Ethernet1/1/2    N3K-
C3132Q-V
cluster1::*>
```

2. Check the administrative and operational status of each cluster port.

a. Verify that all the cluster ports are up with a healthy status:

```
network port show -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 Speed (Mbps)
-----
-----
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 Speed (Mbps)
-----
-----
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 Speed (Mbps)
-----
-----
e0a Cluster Cluster up 9000 auto/10000
healthy false
e0b Cluster Cluster up 9000 auto/10000
healthy false
Node: cluster1-04

Ignore

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

```

Health   Health
Port     IPspace   Broadcast Domain Link MTU   Admin/Oper
Status   Status
-----
e0a      Cluster   Cluster           up   9000   auto/10000
healthy  false
e0b      Cluster   Cluster           up   9000   auto/10000
healthy  false
cluster1::*>

```

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

```
network interface show -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  e0a      true
          cluster1-01_clus2  up/up      169.254.3.5/23
cluster1-01  e0d      true
          cluster1-02_clus1  up/up      169.254.3.8/23
cluster1-02  e0a      true
          cluster1-02_clus2  up/up      169.254.3.9/23
cluster1-02  e0d      true
          cluster1-03_clus1  up/up      169.254.1.3/23
cluster1-03  e0a      true
          cluster1-03_clus2  up/up      169.254.1.1/23
cluster1-03  e0b      true
          cluster1-04_clus1  up/up      169.254.1.6/23
cluster1-04  e0a      true
          cluster1-04_clus2  up/up      169.254.1.7/23
cluster1-04  e0b      true
cluster1::*>

```

- c. 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  
-----  
-----  
cs1                                    cluster-network                    10.0.0.1  
NX3132QV  
    Serial Number: FOXXXXXXXXGS  
    Is Monitored: true  
    Reason: None  
    Software Version: Cisco Nexus Operating System (NX-OS)  
Software, Version  
                                9.3(4)  
    Version Source: CDP  
cs2                                    cluster-network                    10.0.0.2  
NX3132QV  
    Serial Number: FOXXXXXXXXGD  
    Is Monitored: true  
    Reason: None  
    Software Version: Cisco Nexus Operating System (NX-OS)  
Software, Version  
                                9.3(4)  
    Version Source: CDP  
2 entries were displayed.
```



For ONTAP 9.8 and later, use the command `system switch ethernet show -is-monitoring-enabled-operational true`.

3. Disable auto-revert on the cluster LIFs.

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

Make sure that auto-revert is disabled after running this command.

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

```

cs2> enable
cs2# configure
cs2(config)# interface eth1/1/1-2,eth1/7-8
cs2(config-if-range)# shutdown
cs2(config-if-range)# exit
cs2# exit

```



The number of ports displayed varies based on the number of nodes in the cluster.

- Verify that the cluster ports 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

```

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	e0a	true		
	cluster1-01_clus2	up/up	169.254.3.5/23	
cluster1-01	e0a	false		
	cluster1-02_clus1	up/up	169.254.3.8/23	
cluster1-02	e0a	true		
	cluster1-02_clus2	up/up	169.254.3.9/23	
cluster1-02	e0a	false		
	cluster1-03_clus1	up/up	169.254.1.3/23	
cluster1-03	e0a	true		
	cluster1-03_clus2	up/up	169.254.1.1/23	
cluster1-03	e0a	false		
	cluster1-04_clus1	up/up	169.254.1.6/23	
cluster1-04	e0a	true		
	cluster1-04_clus2	up/up	169.254.1.7/23	
cluster1-04	e0a	false		

```

cluster1::*>

```

- 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
cluster1::*>
```

7. 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
```

8. Record any custom additions between the current running-config and the RCF file in use.



Make sure to configure the following: * Username and password * Management IP address * Default gateway * Switch name

9. Save basic configuration details to the `write_erase.cfg` file on the bootflash.



When upgrading or applying a new RCF, you must erase the switch settings and perform basic configuration. You must be connected to the switch serial console port to set up the switch again.

```
cs2# show run | section "switchname" > bootflash:write_erase.cfg
```

```
cs2# show run | section "hostname" >> bootflash:write_erase.cfg
```

```
cs2# show run | i "username admin password" >> bootflash:write_erase.cfg
```

```
cs2# show run | section "vrf context management" >> bootflash:write_erase.cfg
```

```
cs2# show run | section "interface mgmt0" >> bootflash:write_erase.cfg
```

10. When installing RCF version 1.12 and later, run the following commands:

```
cs2# echo "hardware access-list tcam region vpc-convergence 256" >>
bootflash:write_erase.cfg
```

```
cs2# echo "hardware access-list tcam region racl 256" >>
bootflash:write_erase.cfg
```

```
cs2# echo "hardware access-list tcam region e-racl 256" >>
```

```
bootflash:write_erase.cfg
```

```
cs2# echo "hardware access-list tcam region qos 256" >>  
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.

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

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

12. Issue the `write erase` command to erase the current saved configuration:

```
cs2# write erase
```

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

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

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

```
cs2# copy bootflash:write_erase.cfg startup-config
```

14. Reboot the switch:

```
cs2# reload
```

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

15. Repeat Steps 7 to 14 on switch cs1.
16. 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 | grep up
```

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 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      Eth1/31(P)  Eth1/32(P)
cs1#
```

3. 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 cluster1-01_clus1 up/up      169.254.3.4/23
           e0d           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
           e0d           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
           e0b           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
           e0b           true
cluster1-04 cluster1-04_clus2 up/up      169.254.1.7/23
           e0b           true
cluster1::*>
```

4. 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
cluster1::*>
```

Step 3: Setup 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.

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

What's next?

After you've installed the RCF, you can [verify the SSH configuration](#).

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 prior to 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      N3K-
C3132Q-V
              e0d    cs2                      Ethernet1/7      N3K-
C3132Q-V
cluster1-02/cdp
              e0a    cs1                      Ethernet1/8      N3K-
C3132Q-V
              e0d    cs2                      Ethernet1/8      N3K-
C3132Q-V
cluster1-03/cdp
              e0a    cs1                      Ethernet1/1/1    N3K-
C3132Q-V
              e0b    cs2                      Ethernet1/1/1    N3K-
C3132Q-V
cluster1-04/cdp
              e0a    cs1                      Ethernet1/1/2    N3K-
C3132Q-V
              e0b    cs2                      Ethernet1/1/2    N3K-
C3132Q-V
cluster1::*>
```

2. Check the administrative and operational status of each cluster port.

a. Verify that all the cluster ports are up with a healthy status:

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

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
          Logical          Status      Network
Current   Current Is
Vserver   Interface          Admin/Oper Address/Mask      Node
Port      Home
-----
-----
Cluster
          cluster1-01_clus1 up/up      169.254.3.4/23
cluster1-01 e0a      true
          cluster1-01_clus2 up/up      169.254.3.5/23
cluster1-01 e0d      true
          cluster1-02_clus1 up/up      169.254.3.8/23
cluster1-02 e0a      true
          cluster1-02_clus2 up/up      169.254.3.9/23
cluster1-02 e0d      true
          cluster1-03_clus1 up/up      169.254.1.3/23
cluster1-03 e0a      true
          cluster1-03_clus2 up/up      169.254.1.1/23
cluster1-03 e0b      true
          cluster1-04_clus1 up/up      169.254.1.6/23
cluster1-04 e0a      true
          cluster1-04_clus2 up/up      169.254.1.7/23
cluster1-04 e0b      true
cluster1::*>
```

c. 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
-----
cs1                                       cluster-network     10.0.0.1
NX3132QV
  Serial Number: FOXXXXXXXXGS
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                                     9.3(4)
  Version Source: CDP

cs2                                       cluster-network     10.0.0.2
NX3132QV
  Serial Number: FOXXXXXXXXGD
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                                     9.3(4)
  Version Source: CDP

2 entries were displayed.
```



For ONTAP 9.8 and later, use the command `system switch ethernet show -is-monitoring-enabled-operational true`.

3. Disable auto-revert on the cluster LIFs.

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

Make sure that auto-revert is disabled after running this command.

Step 2: Configure ports

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

```

cs2> enable
cs2# configure
cs2(config)# interface eth1/1/1-2,eth1/7-8
cs2(config-if-range)# shutdown
cs2(config-if-range)# exit
cs2# exit

```



The number of ports displayed varies based on the number of nodes in the cluster.

2. Verify that the cluster ports 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

```

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	e0a	true		
	cluster1-01_clus2	up/up	169.254.3.5/23	
cluster1-01	e0a	false		
	cluster1-02_clus1	up/up	169.254.3.8/23	
cluster1-02	e0a	true		
	cluster1-02_clus2	up/up	169.254.3.9/23	
cluster1-02	e0a	false		
	cluster1-03_clus1	up/up	169.254.1.3/23	
cluster1-03	e0a	true		
	cluster1-03_clus2	up/up	169.254.1.1/23	
cluster1-03	e0a	false		
	cluster1-04_clus1	up/up	169.254.1.6/23	
cluster1-04	e0a	true		
	cluster1-04_clus2	up/up	169.254.1.7/23	
cluster1-04	e0a	false		

```

cluster1::*>

```

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
cluster1::*>
```

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
```

5. Record any custom additions between the current running-config and the RCF file in use.

Make sure to configure the following:



- Username and password
- Management IP address
- Default gateway
- Switch name

6. Save basic configuration details to the `write_erase.cfg` file on the bootflash.



When upgrading or applying a new RCF, you must erase the switch settings and perform basic configuration.

```
cs2# show run | section "switchname" > bootflash:write_erase.cfg
```

```
cs2# show run | section "hostname" >> bootflash:write_erase.cfg
```

```
cs2# show run | i "username admin password" >> bootflash:write_erase.cfg
```

```
cs2# show run | section "vrf context management" >> bootflash:write_erase.cfg
```

```
cs2# show run | section "interface mgmt0" >> bootflash:write_erase.cfg
```

7. When upgrading to RCF version 1.12 and later, run the following commands:

```
cs2# echo "hardware access-list tcam region vpc-convergence 256" >>
bootflash:write_erase.cfg
```

```
cs2# echo "hardware access-list tcam region racl 256" >>
bootflash:write_erase.cfg
```

```
cs2# echo "hardware access-list tcam region e-racl 256" >>
bootflash:write_erase.cfg
```

```
cs2# echo "hardware access-list tcam region qos 256" >>
bootflash:write_erase.cfg
```

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

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

- Issue the `write erase` command to erase the current saved configuration:

```
cs2# write erase
```

Warning: This command will erase the startup-configuration.

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

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

```
cs2# copy bootflash:write_erase.cfg startup-config
```

- Reboot the switch:

```
cs2# reload
```

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

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

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

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

Show example

```
cs2# copy tftp: bootflash: vrf management
Enter source filename: Nexus_3132QV_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)...
```

14. Apply the RCF previously downloaded to the bootflash.

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

Show example

```
cs2# copy Nexus_3132QV_RCF_v1.6-Cluster-HA-Breakout.txt running-  
config echo-commands
```



Make sure to read thoroughly the **Installation notes**, **Important Notes**, and **banner** sections of your RCF. You must read and follow these instructions to ensure the proper configuration and operation of the switch.

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.



For steps on how to bring your 10GbE ports online after an upgrade of the RCF, see the Knowledge Base article [10GbE ports on a Cisco 3132Q cluster switch do not come online](#).

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

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

Show example

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

17. Reboot switch cs2. You can ignore both the "cluster ports down" events reported on the nodes while the switch reboots and the error `% Invalid command at '^' marker` output.

```
cs2# reload
```

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

18. Reapply any previous customizations to the switch configuration. Refer to [Review cabling and configuration considerations](#) for details of any further changes required.
19. Verify the health of cluster 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

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

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

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
N3K-C3132Q-V
          e0d    cs2                      Ethernet1/7
N3K-C3132Q-V
cluster01-2/cdp
          e0a    cs1                      Ethernet1/8
N3K-C3132Q-V
          e0d    cs2                      Ethernet1/8
N3K-C3132Q-V
cluster01-3/cdp
          e0a    cs1                      Ethernet1/1/1
N3K-C3132Q-V
          e0b    cs2                      Ethernet1/1/1
N3K-C3132Q-V
cluster1-04/cdp
          e0a    cs1                      Ethernet1/1/2
N3K-C3132Q-V
          e0b    cs2                      Ethernet1/1/2
N3K-C3132Q-V

cluster1::*> system cluster-switch show -is-monitoring-enabled
-operational true
Switch              Type              Address
Model
-----
-----
cs1                  cluster-network  10.233.205.90
N3K-C3132Q-V
  Serial Number: FOXXXXXXXXGD
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                  9.3(4)
  Version Source: CDP

cs2                  cluster-network  10.233.205.91
```

```

N3K-C3132Q-V
  Serial Number: FOXXXXXXXXGS
    Is Monitored: true
      Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                  9.3(4)
  Version Source: CDP

2 entries were displayed.

```



For ONTAP 9.8 and later, use the command `system switch ethernet show -is -monitoring-enabled-operational true`.

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



```

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

```



It can take up to 5 minutes for the cluster nodes to report as healthy.

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

Show example

```

cs1> enable
cs1# configure
cs1(config)# interface eth1/1/1-2,eth1/7-8
cs1(config-if-range)# shutdown
cs1(config-if-range)# exit
cs1# exit

```



The number of ports displayed varies based on the number of nodes in the cluster.

21. Verify that the cluster LIFs have migrated to the ports hosted on switch cs2. This might take a few seconds.

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

Show example

```
cluster1::*> network interface show -vserver 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	false		
	cluster1-01_clus2	up/up	169.254.3.5/23	
cluster1-01	e0d	true		
	cluster1-02_clus1	up/up	169.254.3.8/23	
cluster1-02	e0d	false		
	cluster1-02_clus2	up/up	169.254.3.9/23	
cluster1-02	e0d	true		
	cluster1-03_clus1	up/up	169.254.1.3/23	
cluster1-03	e0b	false		
	cluster1-03_clus2	up/up	169.254.1.1/23	
cluster1-03	e0b	true		
	cluster1-04_clus1	up/up	169.254.1.6/23	
cluster1-04	e0b	false		
	cluster1-04_clus2	up/up	169.254.1.7/23	
cluster1-04	e0b	true		

```
cluster1::*>
```

22. 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::*>
```

23. Repeat Steps 1 to 19 on switch cs1.
24. Enable auto-revert on the cluster LIFs.

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

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

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

Step 3: Verify the configuration

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

```
show interface brief | grep up
```

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 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      Eth1/31 (P)  Eth1/32 (P)
cs1#
```

3. Verify that the cluster LIFs have reverted to their home ports:

```
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
           e0d           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
           e0d           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
           e0b           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
           e0b           true
cluster1-04 cluster1-04_clus2 up/up      169.254.1.7/23
           e0b           true
cluster1::*>
```

4. 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
cluster1::*>
```

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		
-----	-----	
-----	-----	
cluster1-01		
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		
cluster1-02		
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)

```

What's next?

After you've upgraded your RCF, you [verify the SSH configuration](#).

Verify your SSH configuration

If you are using the Ethernet Switch Health Monitor (CSHM) and log collection features, verify that SSH and SSH keys are enabled on the cluster switches.

Steps

1. Verify that SSH is enabled:

```

(switch) show ssh server
ssh version 2 is enabled

```

2. Verify that the SSH keys are enabled:

```

show ssh key

```

Show example

```
(switch)# show ssh key

rsa Keys generated:Fri Jun 28 02:16:00 2024

ssh-rsa
AAAAB3NzaC1yc2EAAAADAQABAAQGDINrD52Q586wTGJjFABjBlFaA23EpDrZ2sDCew
l7nwlioC6HBejxluIObAH8hrW8kR+gj0ZAFpPNeLGTg3APj/yIPTBoIZZxbWRShywAM5
PqyxWwRb7kp9Zt1YHzVuHYpSO82KUDowKrL6lox/YtpKoZUDZjrZjAp8hTv3JZsPgQ==

bitcount:1024
fingerprint:
SHA256:aHwhpzo7+YCDSrp3isJv2uVGz+mjMMokqdMeXVVXfdo

could not retrieve dsa key information

ecdsa Keys generated:Fri Jun 28 02:30:56 2024

ecdsa-sha2-nistp521
AAAAE2VjZHNhLXNoYTItbmlzdHA1MjEAAAABmlzdHA1MjEAAACFBABJ+ZX5SFKhS57e
vkE273e0VoqZi4/32dt+f14fBuKv80MjMsmLfjKtCWylwgVt1Zi+C5TIBbugpzez529z
kFSF0ADb8JaGCoaAYe2HvWR/f6QLbKbqVIewCdqWgxzrIY5BPP5GBdxQJMBiOwEdnHg1
u/9Pzh/Vz9cHDcCW9qGE780QHA==

bitcount:521
fingerprint:
SHA256:TFGe2hXn6QIpcs/vyHzftHJ7Dceg0vQaULYRALZeHwQ

(switch)# show feature | include scpServer
scpServer          1          enabled
(switch)# show feature | include ssh
sshServer          1          enabled
(switch)#
```



When enabling FIPS, you must change the bitcount to 256 on the switch using the command `ssh key ecdsa 256 force`. See [Configure network security using FIPS](#) for more details.

What's next?

After you've verified your SSH configuration, you can [configure switch health monitoring](#).

Reset the 3132Q-V cluster switch to factory defaults

To reset the 3132Q-V cluster switch to factory defaults, you must erase the 3132Q-V

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 resetting the switch, you can [reconfigure](#) it according to your requirements.

Migrate switches

Migrate from switchless clusters to two-node switched clusters

Migrate from switchless clusters to two-node switched clusters workflow

Follow these workflow steps to migrate from a two-node switchless cluster to a two-node switched cluster that includes Cisco Nexus 3132Q-V cluster network switches.

1

Migration requirements

Review the requirements and example switch information for the migration process.

2

Prepare for migration

Prepare your switchless clusters for migration to two-node switched clusters.

3

Configure your ports

Configure your ports for migration from two-node switchless clusters to two-node switched clusters.

4

Complete your migration

Complete your migration from switchless clusters to two-node switched clusters.

Migration requirements

If you have a two-node switchless cluster, review this procedure for the applicable requirements to migrate to a two-node switched cluster.



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

For more information, see:

- [NetApp CN1601 and CN1610](#)
- [Cisco Ethernet Switch](#)
- [Hardware Universe](#)

Port and node connections

Make sure you understand the port and node connections and cabling requirements when you migrate to a two-node switched cluster with Cisco Nexus 3132Q-V cluster switches.

- The cluster switches use the Inter-Switch Link (ISL) ports e1/31-32.
- The [Hardware Universe](#) contains information about supported cabling to Nexus 3132Q-V switches:
 - The nodes with 10 GbE cluster connections require QSFP optical modules with breakout fiber cables or QSFP to SFP+ copper break-out cables.
 - The nodes with 40 GbE cluster connections require supported QSFP/QSFP28 optical modules with fiber cables or QSFP/QSFP28 copper direct-attach cables.
 - The cluster switches use the appropriate ISL cabling: 2x QSFP28 fiber or copper direct-attach cables.
- On Nexus 3132Q-V, you can operate QSFP ports as either 40 Gb Ethernet or 4x10 Gb Ethernet modes.

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

- On the left side of Nexus 3132Q-V is a set of four SFP+ ports multiplexed to the first QSFP port.

By default, the RCF is structured to use the first QSFP port.

You can make four SFP+ ports active instead of a QSFP port for Nexus 3132Q-V by using the `hardware`

`profile front portmode sfp-plus` command. Similarly, you can reset Nexus 3132Q-V to use a QSFP port instead of four SFP+ ports by using the `hardware profile front portmode qsfp` command.

- Make sure you configured some of the ports on Nexus 3132Q-V to run at 10 GbE or 40 GbE.

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

- The number of 10 GbE and 40 GbE ports are defined in the reference configuration files (RCFs) available at [Cisco® Cluster Network Switch Reference Configuration File Download](#).

Before you begin

- Configurations properly set up and functioning.
- Nodes running ONTAP 9.4 or later.
- All cluster ports in the `up` state.
- The Cisco Nexus 3132Q-V cluster switch is supported.
- The existing cluster network configuration has:
 - The Nexus 3132 cluster infrastructure that is redundant and fully functional on both switches.
 - The latest RCF and NX-OS versions on your switches.

[Cisco Ethernet Switches](#) has information about the ONTAP and NX-OS versions supported in this procedure.

- Management connectivity on both switches.
- Console access to both switches.
- All cluster logical interfaces (LIFs) in the `up` state without being migrated.
- Initial customization of the switch.
- All the ISL ports enabled and cabled.

In addition, you must plan, migrate, and read the required documentation on 10 GbE and 40 GbE connectivity from nodes to Nexus 3132Q-V cluster switches.

About the examples used

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

- Nexus 3132Q-V cluster switches, C1 and C2.
- The nodes are n1 and n2.



The examples in this procedure use two nodes, each using two 40 GbE cluster interconnect ports **e4a** and **e4e**. The [Hardware Universe](#) has details about the cluster ports on your platforms.

This procedure covers the following scenarios:

- **n1_clus1** is the first cluster logical interface (LIF) to be connected to cluster switch C1 for node **n1**.
- **n1_clus2** is the first cluster LIF to be connected to cluster switch C2 for node **n1**.

- **n2_clus1** is the first cluster LIF to be connected to cluster switch C1 for node **n2**.
- **n2_clus2** is the second cluster LIF to be connected to cluster switch C2 for node **n2**.
- The number of 10 GbE and 40 GbE ports are defined in the reference configuration files (RCFs) available at [Cisco® Cluster Network Switch Reference Configuration File Download](#).



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

- The cluster starts with two nodes connected and functioning in a two-node switchless cluster setting.
- The first cluster port is moved to C1.
- The second cluster port is moved to C2.
- The two-node switchless cluster option is disabled.

What's next?

After you've reviewed the migration requirements, you can [prepare to migrate your switches](#).

Prepare for migration from switchless clusters to switched clusters

Follow these steps to prepare your switchless cluster for migration to a two-node switched cluster.

Steps

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

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

x is the duration of the maintenance window in hours.



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

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

```
network port show
```

Show example

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

Ignore

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

Node: n2

Ignore

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

4 entries were displayed.
```

b. Display information about the logical interfaces:

```
network interface show
```

Show example

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

3. Verify that the appropriate RCFs and image are installed on the new 3132Q-V switches as necessary for your requirements, and make any essential site customizations, such as users and passwords, network addresses, and so on.

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

- a. Go to [Cisco Ethernet Switches](#) on the NetApp Support Site.
 - b. Note your switch and the required software versions in the table on that page.
 - c. Download the appropriate version of RCF.
 - d. Select **CONTINUE** on the **Description** page, accept the license agreement, and then follow the instructions on the **Download** page to download the RCF.
 - e. Download the appropriate version of the image software.
4. Select **CONTINUE** on the **Description** page, accept the license agreement, and then follow the instructions on the **Download** page to download the RCF.

What's next?

After you've prepared to migrate your switches, you can [configure your ports](#).

Configure your ports for migration from switchless clusters to switched clusters

Follow these steps to configure your ports for migration from two-node switchless clusters to two-node switched clusters.

Steps

1. On Nexus 3132Q-V switches C1 and C2, disable all node-facing ports C1 and C2, but do not disable the ISL ports.

Show example

The following example shows ports 1 through 30 being disabled on Nexus 3132Q-V cluster switches C1 and C2 using a configuration supported in RCF NX3132_RCF_v1.1_24p10g_26p40g.txt:

```
C1# copy running-config startup-config
[#####] 100%
Copy complete.
C1# configure
C1(config)# int e1/1/1-4,e1/2/1-4,e1/3/1-4,e1/4/1-4,e1/5/1-4,e1/6/1-
4,e1/7-30
C1(config-if-range)# shutdown
C1(config-if-range)# exit
C1(config)# exit

C2# copy running-config startup-config
[#####] 100%
Copy complete.
C2# configure
C2(config)# int e1/1/1-4,e1/2/1-4,e1/3/1-4,e1/4/1-4,e1/5/1-4,e1/6/1-
4,e1/7-30
C2(config-if-range)# shutdown
C2(config-if-range)# exit
C2(config)# exit
```

2. Connect ports 1/31 and 1/32 on C1 to the same ports on C2 using supported cabling.
3. Verify that the ISL ports are operational on C1 and C2:

```
show port-channel summary
```

Show example

```
C1# show port-channel summary
Flags: D - Down          P - Up in port-channel (members)
      I - Individual    H - Hot-standby (LACP only)
      s - Suspended     r - Module-removed
      S - Switched     R - Routed
      U - Up (port-channel)
      M - Not in use. Min-links not met

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

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

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

4. Display the list of neighboring devices on the switch:

```
show cdp neighbors
```

Show example

```
C1# show cdp neighbors
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-
Bridge
                S - Switch, H - Host, I - IGMP, r - Repeater,
                V - VoIP-Phone, D - Remotely-Managed-Device,
                s - Supports-STP-Dispute

Device-ID          Local Intrfce  Hldtme Capability  Platform
Port ID
C2                  Eth1/31        174    R S I s        N3K-C3132Q-V
Eth1/31
C2                  Eth1/32        174    R S I s        N3K-C3132Q-V
Eth1/32

Total entries displayed: 2

C2# show cdp neighbors
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-
Bridge
                S - Switch, H - Host, I - IGMP, r - Repeater,
                V - VoIP-Phone, D - Remotely-Managed-Device,
                s - Supports-STP-Dispute

Device-ID          Local Intrfce  Hldtme Capability  Platform
Port ID
C1                  Eth1/31        178    R S I s        N3K-C3132Q-V
Eth1/31
C1                  Eth1/32        178    R S I s        N3K-C3132Q-V
Eth1/32

Total entries displayed: 2
```

5. Display the cluster port connectivity on each node:

```
network device-discovery show
```

Show example

The following example shows a two-node switchless cluster configuration.

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

Node	Local Port	Discovered Device	Interface	Platform
n1	/cdp			
	e4a	n2	e4a	FAS9000
	e4e	n2	e4e	FAS9000
n2	/cdp			
	e4a	n1	e4a	FAS9000
	e4e	n1	e4e	FAS9000

6. Migrate the clus1 interface to the physical port hosting clus2:

```
network interface migrate
```

Execute this command from each local node.

Show example

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

7. Verify the cluster interfaces migration:

```
network interface show
```

Show example

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

8. Shut down cluster ports clus1 LIF on both nodes:

```
network port modify
```

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

9. 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		

n1		
3/5/2022 19:21:18 -06:00	n1_clus2	n2_clus1
3/5/2022 19:21:20 -06:00	n1_clus2	n2_clus2
		none
		none
n2		
3/5/2022 19:21:18 -06:00	n2_clus2	n1_clus1
3/5/2022 19:21:20 -06:00	n2_clus2	n1_clus2
		none
		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>
```

```

cluster::*> cluster ping-cluster -node n1
Host is n1
Getting addresses from network interface table...
Cluster n1_clus1 n1      e4a 10.10.0.1
Cluster n1_clus2 n1      e4e 10.10.0.2
Cluster n2_clus1 n2      e4a 10.10.0.3
Cluster n2_clus2 n2      e4e 10.10.0.4

Local = 10.10.0.1 10.10.0.2
Remote = 10.10.0.3 10.10.0.4
Cluster Vserver Id = 4294967293
Ping status:....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 1500 byte MTU on 32 path(s):
    Local 10.10.0.1 to Remote 10.10.0.3
    Local 10.10.0.1 to Remote 10.10.0.4
    Local 10.10.0.2 to Remote 10.10.0.3
    Local 10.10.0.2 to Remote 10.10.0.4
Larger than PMTU communication succeeds on 4 path(s)
RPC status:
1 paths up, 0 paths down (tcp check)
1 paths up, 0 paths down (ucp check)

```

10. Disconnect the cable from e4a on node n1.

You can refer to the running configuration and connect the first 40 GbE port on the switch C1 (port 1/7 in this example) to e4a on n1 using supported cabling on Nexus 3132Q-V.



When reconnecting any cables to a new Cisco cluster switch, the cables used must be either fiber or cabling supported by Cisco.

11. Disconnect the cable from e4a on node n2.

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

12. Enable all node-facing ports on C1.

Show example

The following example shows ports 1 through 30 being enabled on Nexus 3132Q-V cluster switches C1 and C2 using the configuration supported in RCF NX3132_RCF_v1.1_24p10g_26p40g.txt:

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

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

```
network port modify
```

Show example

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

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

```
network port show
```

Show example

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

Ignore

Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e4a      Cluster      Cluster      up    9000 auto/40000  -
-
e4e      Cluster      Cluster      up    9000 auto/40000  -
-

Node: n2

Ignore

Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e4a      Cluster      Cluster      up    9000 auto/40000  -
-
e4e      Cluster      Cluster      up    9000 auto/40000  -
-

4 entries were displayed.
```

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

```
network interface revert
```

Show example

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

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

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

```
network interface show
```

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

Show example

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

17. Display the cluster port connectivity on each node:

```
network device-discovery show
```

Show example

```
cluster::*> network device-discovery show
      Local  Discovered
Node   Port    Device           Interface         Platform
-----
n1     /cdp
      e4a    C1               Ethernet1/7       N3K-C3132Q-V
      e4e    n2               e4e               FAS9000
n2     /cdp
      e4a    C1               Ethernet1/8       N3K-C3132Q-V
      e4e    n1               e4e               FAS9000
```

18. On the console of each node, migrate clus2 to port e4a:

```
network interface migrate
```

Show example

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

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

```
network port modify
```

The following example shows the specified ports being shut down on both nodes:

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

20. Verify the cluster LIF status:

```
network interface show
```

Show example

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

21. Disconnect the cable from e4e on node n1.

You can refer to the running configuration and connect the first 40 GbE port on the switch C2 (port 1/7 in this example) to e4e on n1 using supported cabling on Nexus 3132Q-V.

22. Disconnect the cable from e4e on node n2.

You can refer to the running configuration and connect e4e to the next available 40 GbE port on C2, port 1/8, using supported cabling.

23. Enable all node-facing ports on C2.

Show example

The following example shows ports 1 through 30 being enabled on Nexus 3132Q-V cluster switches C1 and C2 using a configuration supported in RCF NX3132_RCF_v1.1_24p10g_26p40g.txt:

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

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

```
network port modify
```

The following example shows the specified ports being brought up:

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

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

```
network interface revert
```

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

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

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

```
network interface show
```

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

Show example

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

27. Verify that all of the cluster interconnect ports are in the up state.

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

Show example

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

Ignore

Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e4a      Cluster      Cluster      up    9000 auto/40000  -
-
e4e      Cluster      Cluster      up    9000 auto/40000  -
-

Node: n2

Ignore

Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e4a      Cluster      Cluster      up    9000 auto/40000  -
-
e4e      Cluster      Cluster      up    9000 auto/40000  -
-

4 entries were displayed.
```

What's next?

After you've configured your switch ports, you can [complete your migration](#).

Complete the migration from two-node switchless clusters to two-node switched clusters

Follow these steps to complete the migration from switchless clusters to two-node switched clusters.

Steps

1. Display the cluster switch port numbers each cluster port is connected to on each node:

```
network device-discovery show
```

Show example

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

Node	Local Port	Discovered Device	Interface	Platform
n1	/cdp			
	e4a	C1	Ethernet1/7	N3K-C3132Q-V
	e4e	C2	Ethernet1/7	N3K-C3132Q-V
n2	/cdp			
	e4a	C1	Ethernet1/8	N3K-C3132Q-V
	e4e	C2	Ethernet1/8	N3K-C3132Q-V

2. Display discovered and monitored cluster switches:

```
system cluster-switch show
```

Show example

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

Switch                               Type                               Address
Model
-----
C1                                    cluster-network                    10.10.1.101
NX3132V
  Serial Number: FOX000001
  Is Monitored: true
  Reason:
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                        7.0(3)I4(1)
  Version Source: CDP

C2                                    cluster-network                    10.10.1.102
NX3132V
  Serial Number: FOX000002
  Is Monitored: true
  Reason:
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                        7.0(3)I4(1)
  Version Source: CDP

2 entries were displayed.
```

3. Disable the two-node switchless configuration settings on any node:

```
network options switchless-cluster
```

```
network options switchless-cluster modify -enabled false
```

4. Verify that the switchless-cluster option has been disabled.

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

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	LIF	
Loss				

n1				
	3/5/2022 19:21:18 -06:00	n1_clus2	n2_clus1	none
	3/5/2022 19:21:20 -06:00	n1_clus2	n2_clus2	none
n2				
	3/5/2022 19:21:18 -06:00	n2_clus2	n1_clus1	none
	3/5/2022 19:21:20 -06:00	n2_clus2	n1_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>
```

```

cluster::*> cluster ping-cluster -node n1
Host is n1
Getting addresses from network interface table...
Cluster n1_clus1 n1      e4a 10.10.0.1
Cluster n1_clus2 n1      e4e 10.10.0.2
Cluster n2_clus1 n2      e4a 10.10.0.3
Cluster n2_clus2 n2      e4e 10.10.0.4

Local = 10.10.0.1 10.10.0.2
Remote = 10.10.0.3 10.10.0.4
Cluster Vserver Id = 4294967293
Ping status:....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 1500 byte MTU on 32 path(s):
    Local 10.10.0.1 to Remote 10.10.0.3
    Local 10.10.0.1 to Remote 10.10.0.4
    Local 10.10.0.2 to Remote 10.10.0.3
    Local 10.10.0.2 to Remote 10.10.0.4
Larger than PMTU communication succeeds on 4 path(s)
RPC status:
1 paths up, 0 paths down (tcp check)
1 paths up, 0 paths down (ucp check)

```

6. 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 completed your switch migration, you can [configure switch health monitoring](#).

Replace switches

Requirements for replacing Cisco Nexus 3132Q-V cluster switches

Make sure you understand the configuration requirements, port connections, and cabling requirements when you replace cluster switches.

Cisco Nexus 3132Q-V requirements

- The Cisco Nexus 3132Q-V cluster switch is supported.
- The number of 10 GbE and 40 GbE ports are defined in the reference configuration files (RCFs) available at [Cisco® Cluster Network Switch Reference Configuration File Download](#).
- The cluster switches use the Inter-Switch Link (ISL) ports e1/31-32.

- The [Hardware Universe](#) contains information about supported cabling to Nexus 3132Q-V switches:
 - The nodes with 10 GbE cluster connections require QSFP optical modules with breakout fiber cables or QSFP to SFP+ copper break-out cables.
 - The nodes with 40 GbE cluster connections require supported QSFP/QSFP28 optical modules with fiber cables or QSFP/QSFP28 copper direct-attach cables.
 - The cluster switches use the appropriate ISL cabling: 2x QSFP28 fiber or copper direct-attach cables.
- On Nexus 3132Q-V, you can operate QSFP ports as either 40 Gb Ethernet or 4x10 Gb Ethernet modes.

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

- On the left side of Nexus 3132Q-V is a set of four SFP+ ports multiplexed to the first QSFP port.

By default, the RCF is structured to use the first QSFP port.

You can make four SFP+ ports active instead of a QSFP port for Nexus 3132Q-V by using the `hardware profile front portmode sfp-plus` command. Similarly, you can reset Nexus 3132Q-V to use a QSFP port instead of four SFP+ ports by using the `hardware profile front portmode qsfp` command.

- You must have configured some of the ports on Nexus 3132Q-V to run at 10 GbE or 40 GbE.

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

- You must have done the planning, migration, and read the required documentation on 10 GbE and 40 GbE connectivity from nodes to Nexus 3132Q-V cluster switches.

[Cisco Ethernet Switches](#) has information about the ONTAP and NX-OS versions supported in this procedure.

Cisco Nexus 5596 requirements

- The following cluster switches are supported:
 - Nexus 5596
 - Nexus 3132Q-V
- The number of 10 GbE and 40 GbE ports are defined in the reference configuration files (RCFs) available at [Cisco® Cluster Network Switch Reference Configuration File Download](#).
- The cluster switches use the following ports for connections to nodes:
 - Ports e1/1-40 (10 GbE): Nexus 5596
 - Ports e1/1-30 (40 GbE): Nexus 3132Q-V
- The cluster switches use the following Inter-Switch Link (ISL) ports:

- Ports e1/41-48 (10 GbE): Nexus 5596
- Ports e1/31-32 (40 GbE): Nexus 3132Q-V
- The [Hardware Universe](#) contains information about supported cabling to Nexus 3132Q-V switches:
 - Nodes with 10 GbE cluster connections require QSFP to SFP+ optical fiber breakout cables or QSFP to SFP+ copper breakout cables.
 - Nodes with 40 GbE cluster connections require supported QSFP/QSFP28 optical modules with fiber cables or QSFP/QSFP28 copper direct-attach cables.
- The cluster switches use the appropriate ISL cabling:
 - Beginning: Nexus 5596 to Nexus 5596 (SFP+ to SFP+)
 - 8x SFP+ fiber or copper direct-attach cables
 - Interim: Nexus 5596 to Nexus 3132Q-V (QSFP to 4xSFP+ break-out)
 - 1x QSFP to SFP+ fiber break-out or copper break-out cables
 - Final: Nexus 3132Q-V to Nexus 3132Q-V (QSFP28 to QSFP28)
 - 2x QSFP28 fiber or copper direct-attach cables
- On Nexus 3132Q-V switches, you can operate QSFP/QSFP28 ports as either 40 Gigabit Ethernet or 4 x10 Gigabit Ethernet modes.

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

- On the left side of Nexus 3132Q-V switches is a set of 4 SFP+ ports multiplexed to that QSFP28 port.

By default, the RCF is structured to use the QSFP28 port.



You can make 4x SFP+ ports active instead of a QSFP port for Nexus 3132Q-V switches by using the `hardware profile front portmode sfp-plus` command. Similarly, you can reset Nexus 3132Q-V switches to use a QSFP port instead of 4x SFP+ ports by using the `hardware profile front portmode qsfp` command.

- You have configured some of the ports on Nexus 3132Q-V switches to run at 10 GbE or 40 GbE.



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

- You have done the planning, migration, and read the required documentation on 10 GbE and 40 GbE connectivity from nodes to Nexus 3132Q-V cluster switches.
- The ONTAP and NX-OS versions supported in this procedure are at [Cisco Ethernet Switches](#).

NetApp CN1610 requirements

- The following cluster switches are supported:
 - NetApp CN1610
 - Cisco Nexus 3132Q-V
- The cluster switches support the following node connections:
 - NetApp CN1610: ports 0/1 through 0/12 (10 GbE)
 - Cisco Nexus 3132Q-V: ports e1/1-30 (40 GbE)
- The cluster switches use the following inter-switch link (ISL) ports:
 - NetApp CN1610: ports 0/13 through 0/16 (10 GbE)
 - Cisco Nexus 3132Q-V: ports e1/31-32 (40 GbE)
- The [Hardware Universe](#) contains information about supported cabling to Nexus 3132Q-V switches:
 - Nodes with 10 GbE cluster connections require QSFP to SFP+ optical fiber breakout cables or QSFP to SFP+ copper breakout cables
 - Nodes with 40 GbE cluster connections require supported QSFP/QSFP28 optical modules with optical fiber cables or QSFP/QSFP28 copper direct-attach cables
- The appropriate ISL cabling is as follows:
 - Beginning: For CN1610 to CN1610 (SFP+ to SFP+), four SFP+ optical fiber or copper direct-attach cables
 - Interim: For CN1610 to Nexus 3132Q-V (QSFP to four SFP+ breakout), one QSFP to SFP+ optical fiber or copper breakout cable
 - Final: For Nexus 3132Q-V to Nexus 3132Q-V (QSFP28 to QSFP28), two QSFP28 optical fiber or copper direct-attach cables
- NetApp twinax cables are not compatible with Cisco Nexus 3132Q-V switches.

If your current CN1610 configuration uses NetApp twinax cables for cluster-node-to-switch connections or ISL connections and you want to continue using twinax in your environment, you need to procure Cisco twinax cables. Alternatively, you can use optical fiber cables for both the ISL connections and the cluster-node-to-switch connections.

- On Nexus 3132Q-V switches, you can operate QSFP/QSFP28 ports as either 40 Gb Ethernet or 4x 10 Gb Ethernet modes.

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

- On the left side of Nexus 3132Q-V switches is a set of four SFP+ ports multiplexed to the first QSFP port.

By default, the reference configuration file (RCF) is structured to use the first QSFP port.

You can make four SFP+ ports active instead of a QSFP port for Nexus 3132Q-V switches by using the `hardware profile front portmode sfp-plus` command. Similarly, you can reset Nexus 3132Q-V switches to use a QSFP port instead of four SFP+ ports by using the `hardware profile front`

portmode qsfp command.



When you use the first four SFP+ ports, it will disable the first 40GbE QSFP port.

- You must have configured some of the ports on Nexus 3132Q-V switches to run at 10 GbE or 40 GbE.

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

- You must have done the planning, migration, and read the required documentation on 10 GbE and 40 GbE connectivity from nodes to Nexus 3132Q-V cluster switches.
- The ONTAP and NX-OS versions that are supported in this procedure are listed on [Cisco Ethernet Switches](#).
- The ONTAP and FASTPATH versions that are supported in this procedure are listed on [NetApp CN1601 and CN1610 Switches](#).

Replace Cisco Nexus 3132Q-V cluster switches

Follow this procedure to replace a defective Cisco Nexus 3132Q-V switch in a cluster network. The replacement procedure is a nondisruptive procedure (NDO).

Review requirements

Switch requirements

Review the [Requirements for replacing Cisco Nexus 3132Q-V cluster switches](#).

Before you begin

- The existing cluster and network configuration has:
 - The Nexus 3132Q-V cluster infrastructure is redundant and fully functional on both switches.
 - [Cisco Ethernet Switch](#) has the latest RCF and NX-OS versions for your switches.
 - All cluster ports are in the `up` state.
 - Management connectivity exists on both switches.
 - All cluster logical interfaces (LIFs) are in the `up` state and have been migrated.
- For the Nexus 3132Q-V replacement switch, make sure that:
 - Management network connectivity on the replacement switch is functional.
 - Console access to the replacement switch is in place.
 - The desired RCF and NX-OS operating system image switch is loaded onto the switch.
 - Initial customization of the switch is complete.
- [Hardware Universe](#)

Enable console logging

NetApp strongly recommends that you enable console logging on the devices that you are using and take the following actions when replacing your switch:

- Leave AutoSupport enabled during maintenance.
- Trigger a maintenance AutoSupport before and after maintenance to disable case creation for the duration of the maintenance. See this Knowledge Base article [SU92: How to suppress automatic case creation during scheduled maintenance windows](#) for further details.
- Enable session logging for any CLI sessions. For instructions on how to enable session logging, review the "Logging Session Output" section in this Knowledge Base article [How to configure PuTTY for optimal connectivity to ONTAP systems](#).

Replace the switch

This procedure replaces the second Nexus 3132Q-V cluster switch CL2 with new 3132Q-V switch C2.

About the examples

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

- n1_clus1 is the first cluster logical interface (LIF) connected to cluster switch C1 for node n1.
- n1_clus2 is the first cluster LIF connected to cluster switch CL2 or C2, for node n1.
- n1_clus3 is the second LIF connected to cluster switch C2, for node n1.
- n1_clus4 is the second LIF connected to cluster switch CL1, for node n1.
- The number of 10 GbE and 40 GbE ports are defined in the reference configuration files (RCFs) available at [Cisco® Cluster Network Switch Reference Configuration File Download](#).
- The nodes are n1, n2, n3, and n4. - The examples in this procedure use four nodes: Two nodes use four 10 GB cluster interconnect ports: e0a, e0b, e0c, and e0d. The other two nodes use two 40 GB cluster interconnect ports: e4a and e4e. See the [Hardware Universe](#) for the actual cluster ports on your platforms.

About this task

This procedure covers the following scenario:

- The cluster starts with four nodes connected to two Nexus 3132Q-V cluster switches, CL1 and CL2.
- Cluster switch CL2 is to be replaced by C2
 - On each node, cluster LIFs connected to CL2 are migrated onto cluster ports connected to CL1.
 - Disconnect cabling from all ports on CL2 and reconnect cabling to the same ports on the replacement switch C2.
 - On each node, its migrated cluster LIFs are reverted.

Step 1: Prepare for replacement

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

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

x is the duration of the maintenance window in hours.



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

2. Display information about the devices in your configuration:

```
network device-discovery show
```

Show example

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

Node	Local Port	Discovered Device	Interface	Platform
n1	/cdp			
	e0a	CL1	Ethernet1/1/1	N3K-C3132Q-V
	e0b	CL2	Ethernet1/1/1	N3K-C3132Q-V
	e0c	CL2	Ethernet1/1/2	N3K-C3132Q-V
	e0d	CL1	Ethernet1/1/2	N3K-C3132Q-V
n2	/cdp			
	e0a	CL1	Ethernet1/1/3	N3K-C3132Q-V
	e0b	CL2	Ethernet1/1/3	N3K-C3132Q-V
	e0c	CL2	Ethernet1/1/4	N3K-C3132Q-V
	e0d	CL1	Ethernet1/1/4	N3K-C3132Q-V
n3	/cdp			
	e4a	CL1	Ethernet1/7	N3K-C3132Q-V
	e4e	CL2	Ethernet1/7	N3K-C3132Q-V
n4	/cdp			
	e4a	CL1	Ethernet1/8	N3K-C3132Q-V
	e4e	CL2	Ethernet1/8	N3K-C3132Q-V

12 entries were displayed

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

a. Display the network port attributes:

```
network port show
```

Show example

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

Node: n1

Ignore

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

Node: n2

Ignore

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

Node: n3

Ignore

Health      Health      Speed (Mbps)
```

```

Port      IPspace      Broadcast Domain Link MTU  Admin/Oper
Status    Status
-----
-----
e4a      Cluster      Cluster      up   9000 auto/40000 -
-
e4e      Cluster      Cluster      up   9000 auto/40000 -
-

Node: n4

Ignore

Health    Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper
Status    Status
-----
-----
e4a      Cluster      Cluster      up   9000 auto/40000 -
-
e4e      Cluster      Cluster      up   9000 auto/40000 -
-

Speed (Mbps)

12 entries were displayed.

```

b. Display information about the logical interfaces:

```
network interface show
```

Show example

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

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

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

12 entries were displayed.

c. Display the information on the discovered cluster switches:

```
system cluster-switch show
```

Show example

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

Switch                               Type                               Address
Model
-----
CL1                                  cluster-network                   10.10.1.101
NX3132V
  Serial Number: FOX000001
  Is Monitored: true
  Reason:
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                               7.0(3)I4(1)
  Version Source: CDP

CL2                                  cluster-network                   10.10.1.102
NX3132V
  Serial Number: FOX000002
  Is Monitored: true
  Reason:
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                               7.0(3)I4(1)
  Version Source: CDP

2 entries were displayed.
```

4. Verify that the appropriate RCF and image are installed on the new Nexus 3132Q-V switch as necessary for your requirements, and make any essential site customizations.

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

- a. On the NetApp Support Site, see [Cisco Ethernet Switches](#).
 - b. Note your switch and the required software versions in the table on that page.
 - c. Download the appropriate version of the RCF.
 - d. Click **CONTINUE** on the **Description** page, accept the license agreement, and then follow the instructions on the **Download** page to download the RCF.
 - e. Download the appropriate version of the image software.
5. Migrate the LIFs associated to the cluster ports connected to switch C2:

```
network interface migrate
```

Show example

This example shows that the LIF migration is done on all the nodes:

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

6. Verify cluster's health:

```
network interface show
```

Show example

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

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

Cluster				
e0a	n1_clus1	up/up	10.10.0.1/24	n1
e0a	true			
e0a	n1_clus2	up/up	10.10.0.2/24	n1
e0a	false			
e0d	n1_clus3	up/up	10.10.0.3/24	n1
e0d	false			
e0d	n1_clus4	up/up	10.10.0.4/24	n1
e0d	true			
e0a	n2_clus1	up/up	10.10.0.5/24	n2
e0a	true			
e0a	n2_clus2	up/up	10.10.0.6/24	n2
e0a	false			
e0d	n2_clus3	up/up	10.10.0.7/24	n2
e0d	false			
e0d	n2_clus4	up/up	10.10.0.8/24	n2
e0d	true			
e4a	n3_clus1	up/up	10.10.0.9/24	n3
e4a	true			
e4a	n3_clus2	up/up	10.10.0.10/24	n3
e4a	false			
e4a	n4_clus1	up/up	10.10.0.11/24	n4
e4a	true			
e4a	n4_clus2	up/up	10.10.0.12/24	n4
e4a	false			

12 entries were displayed.

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

```
network port modify
```

Show example

This example shows the specified ports being shut down on all nodes:

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

8. 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
```

Node	Date		Source LIF	Destination LIF	Packet Loss
n1					
	3/5/2022 19:21:18 -06:00		n1_clus2	n2_clus1	none
	3/5/2022 19:21:20 -06:00		n1_clus2	n2_clus2	none
n2					
	3/5/2022 19:21:18 -06:00		n2_clus2	n1_clus1	none
	3/5/2022 19:21:20 -06:00		n2_clus2	n1_clus2	none
n3					
...					
...					
n4					
...					
...					

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>
```

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

```
Cluster n2_clus3 n2      e0c 10.10.0.7
Cluster n2_clus4 n2      e0d 10.10.0.8
Cluster n3_clus1 n4      e0a 10.10.0.9
Cluster n3_clus2 n3      e0e 10.10.0.10
Cluster n4_clus1 n4      e0a 10.10.0.11
Cluster n4_clus2 n4      e0e 10.10.0.12

Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8 10.10.0.9 10.10.0.10
10.10.0.11 10.10.0.12
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 32 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 1500 byte MTU on 32 path(s):
  Local 10.10.0.1 to Remote 10.10.0.5
  Local 10.10.0.1 to Remote 10.10.0.6
  Local 10.10.0.1 to Remote 10.10.0.7
  Local 10.10.0.1 to Remote 10.10.0.8
  Local 10.10.0.1 to Remote 10.10.0.9
  Local 10.10.0.1 to Remote 10.10.0.10
  Local 10.10.0.1 to Remote 10.10.0.11
  Local 10.10.0.1 to Remote 10.10.0.12
  Local 10.10.0.2 to Remote 10.10.0.5
  Local 10.10.0.2 to Remote 10.10.0.6
  Local 10.10.0.2 to Remote 10.10.0.7
  Local 10.10.0.2 to Remote 10.10.0.8
  Local 10.10.0.2 to Remote 10.10.0.9
  Local 10.10.0.2 to Remote 10.10.0.10
  Local 10.10.0.2 to Remote 10.10.0.11
  Local 10.10.0.2 to Remote 10.10.0.12
  Local 10.10.0.3 to Remote 10.10.0.5
  Local 10.10.0.3 to Remote 10.10.0.6
  Local 10.10.0.3 to Remote 10.10.0.7
  Local 10.10.0.3 to Remote 10.10.0.8
  Local 10.10.0.3 to Remote 10.10.0.9
  Local 10.10.0.3 to Remote 10.10.0.10
  Local 10.10.0.3 to Remote 10.10.0.11
  Local 10.10.0.3 to Remote 10.10.0.12
  Local 10.10.0.4 to Remote 10.10.0.5
  Local 10.10.0.4 to Remote 10.10.0.6
  Local 10.10.0.4 to Remote 10.10.0.7
  Local 10.10.0.4 to Remote 10.10.0.8
  Local 10.10.0.4 to Remote 10.10.0.9
```

```
Local 10.10.0.4 to Remote 10.10.0.10
Local 10.10.0.4 to Remote 10.10.0.11
Local 10.10.0.4 to Remote 10.10.0.12
```

```
Larger than PMTU communication succeeds on 32 path(s)
RPC status:
8 paths up, 0 paths down (tcp check)
8 paths up, 0 paths down (udp check)
```

9. Shut down the ports 1/31 and 1/32 on CL1, and the active Nexus 3132Q-V switch:

```
shutdown
```

Show example

This example shows the ISL ports 1/31 and 1/32 being shut down on switch CL1:

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

Step 2: Configure ports

1. Remove all the cables attached to the Nexus 3132Q-V switch CL2 and reconnect them to the replacement switch C2 on all nodes.
2. Remove the ISL cables from ports e1/31 and e1/32 on CL2 and reconnect them to the same ports on the replacement switch C2.
3. Bring up ISLs ports 1/31 and 1/32 on the Nexus 3132Q-V switch CL1:

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

4. Verify that the ISLs are up on CL1:

```
show port-channel
```

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

Show example

```
CL1# show port-channel summary
Flags: D - Down          P - Up in port-channel (members)
      I - Individual    H - Hot-standby (LACP only)
      s - Suspended     r - Module-removed
      S - Switched     R - Routed
      U - Up (port-channel)
      M - Not in use. Min-links not met

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

5. Verify that the ISLs are up on C2:

```
show port-channel summary
```

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

Show example

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

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

6. On all nodes, bring up all the cluster interconnect ports connected to the Nexus 3132Q-V switch C2:

```
network port modify
```

Show example

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

7. For all nodes, revert all of the migrated cluster interconnect LIFs:

```
network interface revert
```

Show example

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

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

```
network interface show
```

Show example

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

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

```

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

Cluster					
e0a	true	n1_clus1	up/up	10.10.0.1/24	n1
e0b	true	n1_clus2	up/up	10.10.0.2/24	n1
e0c	true	n1_clus3	up/up	10.10.0.3/24	n1
e0d	true	n1_clus4	up/up	10.10.0.4/24	n1
e0a	true	n2_clus1	up/up	10.10.0.5/24	n2
e0b	true	n2_clus2	up/up	10.10.0.6/24	n2
e0c	true	n2_clus3	up/up	10.10.0.7/24	n2
e0d	true	n2_clus4	up/up	10.10.0.8/24	n2
e4a	true	n3_clus1	up/up	10.10.0.9/24	n3
e4e	true	n3_clus2	up/up	10.10.0.10/24	n3
e4a	true	n4_clus1	up/up	10.10.0.11/24	n4
e4e	true	n4_clus2	up/up	10.10.0.12/24	n4

12 entries were displayed.

9. Verify that the cluster ports are connected:

```
network port show
```

Show example

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

Ignore

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

Node: n2

Ignore

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

Node: n3

Ignore

Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
```

```

Status
-----
e4a      Cluster      Cluster      up    9000 auto/40000 -
-
e4e      Cluster      Cluster      up    9000 auto/40000 -
-

Node: n4

Ignore

Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
e4a      Cluster      Cluster      up    9000 auto/40000 -
-
e4e      Cluster      Cluster      up    9000 auto/40000 -
-

12 entries were displayed.

```

10. 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
```

Node	Date		Source LIF	Destination LIF	Packet Loss
n1					
	3/5/2022 19:21:18 -06:00		n1_clus2	n2_clus1	none
	3/5/2022 19:21:20 -06:00		n1_clus2	n2_clus2	none
n2					
	3/5/2022 19:21:18 -06:00		n2_clus2	n1_clus1	none
	3/5/2022 19:21:20 -06:00		n2_clus2	n1_clus2	none
n3					
...					
...					
n4					
...					
...					

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>
```

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

```
Cluster n3_clus1 n3      e0a 10.10.0.9
Cluster n3_clus2 n3      e0e 10.10.0.10
Cluster n4_clus1 n4      e0a 10.10.0.11
Cluster n4_clus2 n4      e0e 10.10.0.12

Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8 10.10.0.9 10.10.0.10
10.10.0.11 10.10.0.12
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 32 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 1500 byte MTU on 32 path(s):
  Local 10.10.0.1 to Remote 10.10.0.5
  Local 10.10.0.1 to Remote 10.10.0.6
  Local 10.10.0.1 to Remote 10.10.0.7
  Local 10.10.0.1 to Remote 10.10.0.8
  Local 10.10.0.1 to Remote 10.10.0.9
  Local 10.10.0.1 to Remote 10.10.0.10
  Local 10.10.0.1 to Remote 10.10.0.11
  Local 10.10.0.1 to Remote 10.10.0.12
  Local 10.10.0.2 to Remote 10.10.0.5
  Local 10.10.0.2 to Remote 10.10.0.6
  Local 10.10.0.2 to Remote 10.10.0.7
  Local 10.10.0.2 to Remote 10.10.0.8
  Local 10.10.0.2 to Remote 10.10.0.9
  Local 10.10.0.2 to Remote 10.10.0.10
  Local 10.10.0.2 to Remote 10.10.0.11
  Local 10.10.0.2 to Remote 10.10.0.12
  Local 10.10.0.3 to Remote 10.10.0.5
  Local 10.10.0.3 to Remote 10.10.0.6
  Local 10.10.0.3 to Remote 10.10.0.7
  Local 10.10.0.3 to Remote 10.10.0.8
  Local 10.10.0.3 to Remote 10.10.0.9
  Local 10.10.0.3 to Remote 10.10.0.10
  Local 10.10.0.3 to Remote 10.10.0.11
  Local 10.10.0.3 to Remote 10.10.0.12
  Local 10.10.0.4 to Remote 10.10.0.5
  Local 10.10.0.4 to Remote 10.10.0.6
  Local 10.10.0.4 to Remote 10.10.0.7
  Local 10.10.0.4 to Remote 10.10.0.8
  Local 10.10.0.4 to Remote 10.10.0.9
  Local 10.10.0.4 to Remote 10.10.0.10
  Local 10.10.0.4 to Remote 10.10.0.11
```

```
Local 10.10.0.4 to Remote 10.10.0.12
```

```
Larger than PMTU communication succeeds on 32 path(s)
```

```
RPC status:
```

```
8 paths up, 0 paths down (tcp check)
```

```
8 paths up, 0 paths down (udp check)
```

Step 3: Verify the configuration

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

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

Show example

```
cluster::> network device-discovery show
      Local   Discovered
Node   Port     Device           Interface         Platform
-----
n1     /cdp
      e0a    C1               Ethernet1/1/1     N3K-C3132Q-V
      e0b    C2               Ethernet1/1/1     N3K-C3132Q-V
      e0c    C2               Ethernet1/1/2     N3K-C3132Q-V
      e0d    C1               Ethernet1/1/2     N3K-C3132Q-V
n2     /cdp
      e0a    C1               Ethernet1/1/3     N3K-C3132Q-V
      e0b    C2               Ethernet1/1/3     N3K-C3132Q-V
      e0c    C2               Ethernet1/1/4     N3K-C3132Q-V
      e0d    C1               Ethernet1/1/4     N3K-C3132Q-V
n3     /cdp
      e4a    C1               Ethernet1/7       N3K-C3132Q-V
      e4e    C2               Ethernet1/7       N3K-C3132Q-V
n4     /cdp
      e4a    C1               Ethernet1/8       N3K-C3132Q-V
      e4e    C2               Ethernet1/8       N3K-C3132Q-V
12 entries were displayed.
```

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

Ignore

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

Node: n2

Ignore

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

Node: n3

Ignore

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

Node: n4

Ignore

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

12 entries were displayed.

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

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

Cluster				
e0a	n1_clus1	up/up	10.10.0.1/24	n1
e0b	n1_clus2	up/up	10.10.0.2/24	n1
e0c	n1_clus3	up/up	10.10.0.3/24	n1
e0d	n1_clus4	up/up	10.10.0.4/24	n1
e0a	n2_clus1	up/up	10.10.0.5/24	n2
e0b	n2_clus2	up/up	10.10.0.6/24	n2
e0c	n2_clus3	up/up	10.10.0.7/24	n2
e0d	n2_clus4	up/up	10.10.0.8/24	n2
e4a	n3_clus1	up/up	10.10.0.9/24	n3
e4e	n3_clus2	up/up	10.10.0.10/24	n3
e4a	n4_clus1	up/up	10.10.0.11/24	n4
e4e	n4_clus2	up/up	10.10.0.12/24	n4

12 entries were displayed.

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

```
Switch                               Type                               Address
Model
-----
CL1                                  cluster-network                   10.10.1.101
NX3132V
  Serial Number: FOX000001
  Is Monitored: true
  Reason:
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                        7.0(3)I4(1)
  Version Source: CDP

CL2                                  cluster-network                   10.10.1.102
NX3132V
  Serial Number: FOX000002
  Is Monitored: true
  Reason:
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                        7.0(3)I4(1)
  Version Source: CDP

C2                                  cluster-network                   10.10.1.103
NX3132V
  Serial Number: FOX000003
  Is Monitored: true
  Reason:
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                        7.0(3)I4(1)
  Version Source: CDP

3 entries were displayed.
```

2. Remove the replaced Nexus 3132Q-V switch, if it is not already removed automatically:

```
system cluster-switch delete
```

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

3. Verify that the proper cluster switches are monitored:

```
system cluster-switch show
```

Show example

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

Switch                                Type                                Address
Model                                -----
-----
CL1                                    cluster-network                    10.10.1.101
NX3132V
  Serial Number: FOX000001
  Is Monitored: true
  Reason:
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                        7.0(3)I4(1)
  Version Source: CDP

C2                                    cluster-network                    10.10.1.103
NX3132V
  Serial Number: FOX000002
  Is Monitored: true
  Reason:
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                        7.0(3)I4(1)
  Version Source: CDP

2 entries were displayed.
```

4. 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 replaced your switch, you can [configure switch health monitoring](#).

Replace Cisco Nexus 3132Q-V cluster switches with switchless connections

In ONTAP 9.3 and later, you can migrate from a cluster with a switched cluster network to one where two nodes are directly connected.

NetApp recommends that you update your ONTAP version before proceeding with the switched to switchless cluster operation for Cisco Nexus 3132Q-V switches.



See the following for more details:

- [SU540: Chelsio T6 NIC errors cause system shutdown when upgrading from 40G to 100G network switches](#)
- [Node panic after migration from switched to switchless cluster](#)

You can migrate from a cluster with a switched cluster network to one where two nodes are directly connected for ONTAP 9.3 and later.

Review requirements

Guidelines

Review the following guidelines:

- Migrating to a two-node switchless cluster configuration is a nondisruptive operation. Most systems have two dedicated cluster interconnect ports on each node, but you can also use this procedure for systems with a larger number of dedicated cluster interconnect ports on each node, such as four, six or eight.
- You cannot use the switchless cluster interconnect feature with more than two nodes.
- If you have an existing two-node cluster that uses cluster interconnect switches and is running ONTAP 9.3 or later, you can replace the switches with direct, back-to-back connections between the nodes.

Before you begin

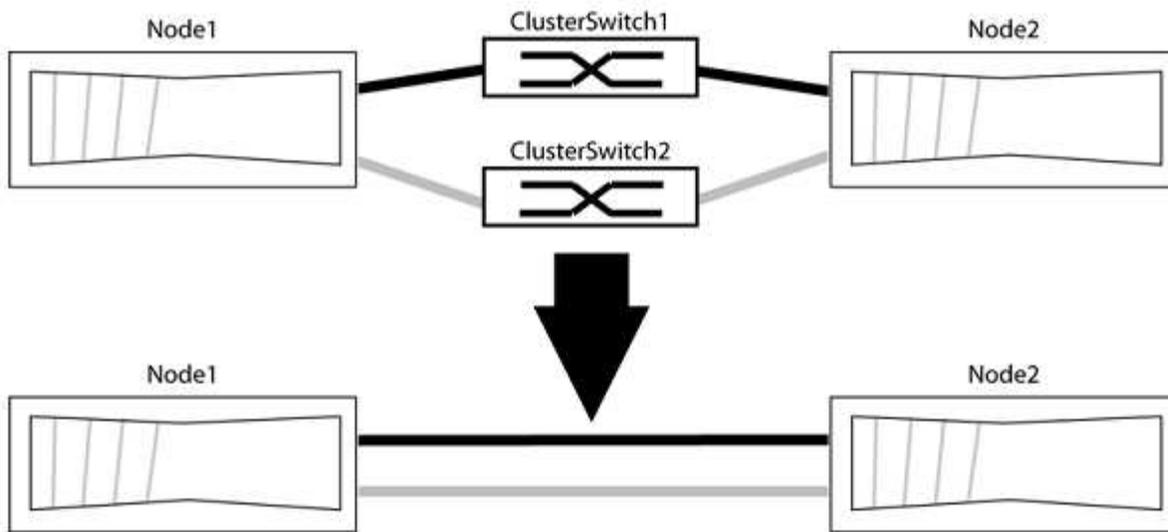
Make sure you have the following:

- A healthy cluster that consists of two nodes connected by cluster switches. The nodes must be running the same ONTAP release.
- Each node with the required number of dedicated cluster ports, which provide redundant cluster interconnect connections to support your system configuration. For example, there are two redundant ports for a system with two dedicated cluster interconnect ports on each node.

Migrate the switches

About this task

The following procedure removes the cluster switches in a two-node cluster and replaces each connection to the switch with a direct connection to the partner node.



About the examples

The examples in the following procedure show nodes that are using "e0a" and "e0b" as cluster ports. Your nodes might be using different cluster ports as they vary by system.

Step 1: Prepare for migration

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

```
set -privilege advanced
```

The advanced prompt `*>` appears.

2. ONTAP 9.3 and later supports automatic detection of switchless clusters, which is enabled by default.

You can verify that detection of switchless clusters is enabled by running the advanced privilege command:

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

Show example

The following example output shows if the option is enabled.

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

If "Enable Switchless Cluster Detection" is `false`, contact NetApp support.

3. 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=<number_of_hours>h
```

where *h* is the duration of the maintenance window in hours. The message notifies technical support of this maintenance task so that they can suppress automatic case creation during the maintenance window.

In the following example, the command suppresses automatic case creation for two hours:

Show example

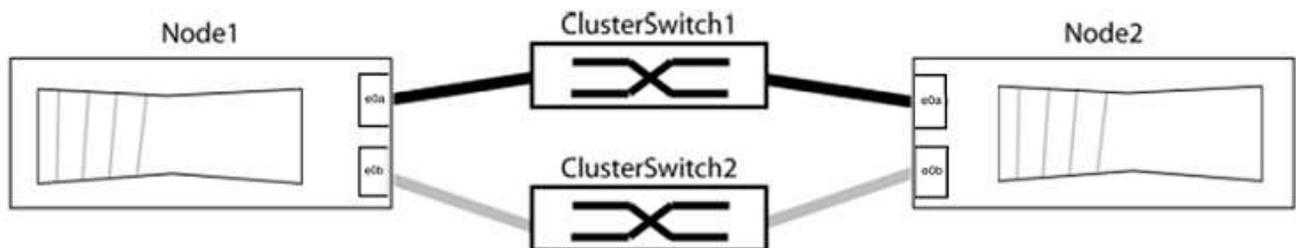
```
cluster::*> system node autosupport invoke -node * -type all  
-message MAINT=2h
```

Step 2: Configure ports and cabling

1. Organize the cluster ports on each switch into groups so that the cluster ports in group1 go to cluster switch1 and the cluster ports in group2 go to cluster switch2. These groups are required later in the procedure.
2. Identify the cluster ports and verify link status and health:

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

In the following example for nodes with cluster ports "e0a" and "e0b", one group is identified as "node1:e0a" and "node2:e0a" and the other group as "node1:e0b" and "node2:e0b". Your nodes might be using different cluster ports because they vary by system.



Verify that the ports have a value of `up` for the "Link" column and a value of `healthy` for the "Health Status" column.

Show example

```
cluster::> network port show -ipSPACE Cluster
Node: node1

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

Node: node2

Ignore
Health
Port IPSPACE Broadcast Domain Link MTU Admin/Oper Status
Speed (Mbps) Health
Status
-----
-----
e0a Cluster Cluster up 9000 auto/10000 healthy
false
e0b Cluster Cluster up 9000 auto/10000 healthy
false
4 entries were displayed.
```

3. Confirm that all the cluster LIFs are on their home ports.

Verify that the “is-home” column is `true` for each of the cluster LIFs:

```
network interface show -vserver Cluster -fields is-home
```

Show example

```
cluster::*> net int show -vserver Cluster -fields is-home
(network interface show)
vserver  lif           is-home
-----  -
Cluster  node1_clus1  true
Cluster  node1_clus2  true
Cluster  node2_clus1  true
Cluster  node2_clus2  true
4 entries were displayed.
```

If there are cluster LIFs that are not on their home ports, revert those LIFs to their home ports:

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

4. Disable auto-revert for the cluster LIFs:

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

5. Verify that all ports listed in the previous step are connected to a network switch:

```
network device-discovery show -port cluster_port
```

The “Discovered Device” column should be the name of the cluster switch that the port is connected to.

Show example

The following example shows that cluster ports "e0a" and "e0b" are correctly connected to cluster switches "cs1" and "cs2".

```
cluster:::> network device-discovery show -port e0a|e0b
(network device-discovery show)
Node/      Local  Discovered
Protocol  Port   Device (LLDP: ChassisID)  Interface  Platform
-----  -
node1/cdp
          e0a    cs1                      0/11      BES-53248
          e0b    cs2                      0/12      BES-53248
node2/cdp
          e0a    cs1                      0/9       BES-53248
          e0b    cs2                      0/9       BES-53248
4 entries were displayed.
```

6. 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 e0a
Cluster node1_clus2 169.254.49.125 node1 e0b
Cluster node2_clus1 169.254.47.194 node2 e0a
Cluster node2_clus2 169.254.19.183 node2 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 169.254.47.194 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)

```

7. Verify that the cluster is healthy:

```
cluster ring show
```

All units must be either master or secondary.

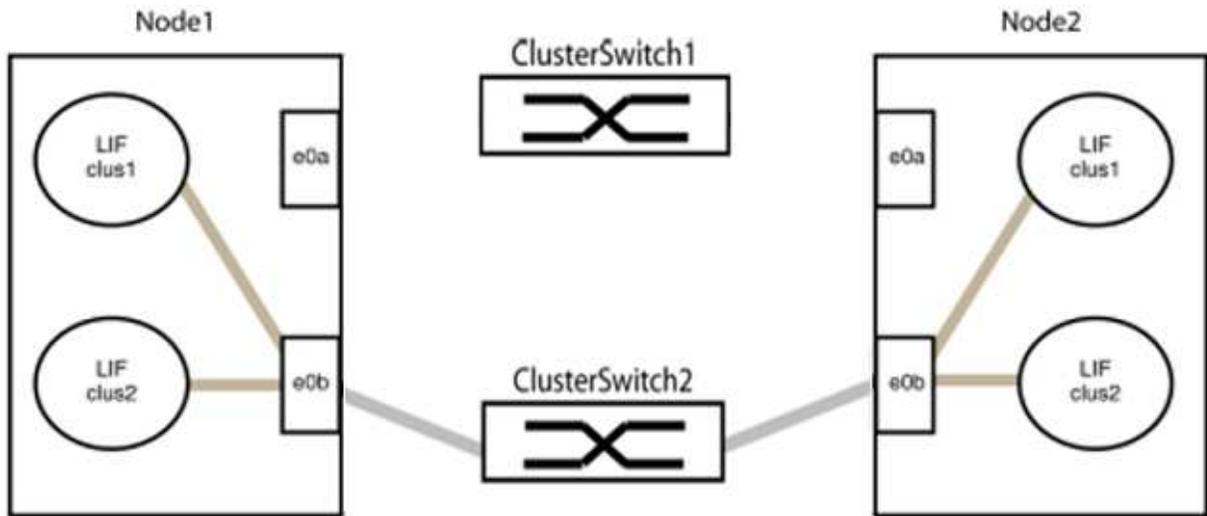
8. Set up the switchless configuration for the ports in group 1.



To avoid potential networking issues, you must disconnect the ports from group1 and reconnect them back-to-back as quickly as possible, for example, **in less than 20 seconds**.

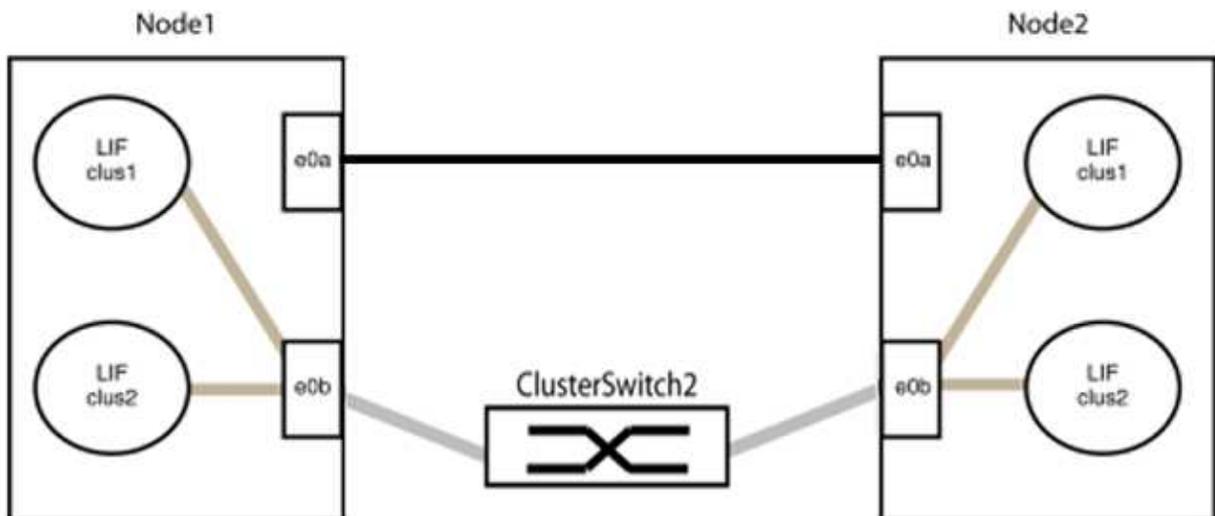
a. Disconnect all the cables from the ports in group1 at the same time.

In the following example, the cables are disconnected from port "e0a" on each node, and cluster traffic continues through the switch and port "e0b" on each node:



b. Cable the ports in group1 back-to-back.

In the following example, "e0a" on node1 is connected to "e0a" on node2:



9. The switchless cluster network option transitions from *false* to *true*. This might take up to 45 seconds. Confirm that the switchless option is set to *true*:

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

The following example shows that the switchless cluster is enabled:

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

10. 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 e0a
Cluster node1_clus2 169.254.49.125 node1 e0b
Cluster node2_clus1 169.254.47.194 node2 e0a
Cluster node2_clus2 169.254.19.183 node2 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 169.254.47.194 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)

```



Before proceeding to the next step, you must wait at least two minutes to confirm a working back-to-back connection on group 1.

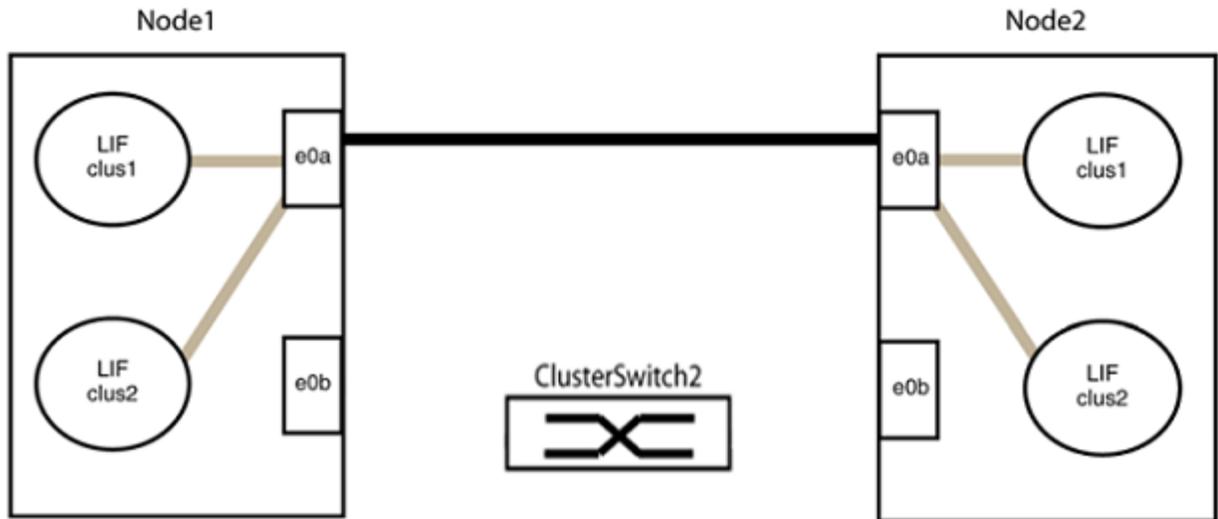
11. Set up the switchless configuration for the ports in group 2.



To avoid potential networking issues, you must disconnect the ports from group2 and reconnect them back-to-back as quickly as possible, for example, **in less than 20 seconds**.

- a. Disconnect all the cables from the ports in group2 at the same time.

In the following example, the cables are disconnected from port "e0b" on each node, and cluster traffic continues through the direct connection between the "e0a" ports:



b. Cable the ports in group2 back-to-back.

In the following example, "e0a" on node1 is connected to "e0a" on node2 and "e0b" on node1 is connected to "e0b" on node2:



Step 3: Verify the configuration

1. Verify that the ports on both nodes are correctly connected:

```
network device-discovery show -port cluster_port
```

Show example

The following example shows that cluster ports "e0a" and "e0b" are correctly connected to the corresponding port on the cluster partner:

```
cluster::> net device-discovery show -port e0a|e0b
(network device-discovery show)
Node/      Local  Discovered
Protocol   Port   Device (LLDP: ChassisID)  Interface  Platform
-----
node1/cdp
           e0a    node2                      e0a        AFF-A300
           e0b    node2                      e0b        AFF-A300
node1/lldp
           e0a    node2 (00:a0:98:da:16:44)  e0a        -
           e0b    node2 (00:a0:98:da:16:44)  e0b        -
node2/cdp
           e0a    node1                      e0a        AFF-A300
           e0b    node1                      e0b        AFF-A300
node2/lldp
           e0a    node1 (00:a0:98:da:87:49)  e0a        -
           e0b    node1 (00:a0:98:da:87:49)  e0b        -
8 entries were displayed.
```

2. Re-enable auto-revert for the cluster LIFs:

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

3. Verify that all LIFs are home. This might take a few seconds.

```
network interface show -vserver Cluster -lif lif_name
```

Show example

The LIFs have been reverted if the “Is Home” column is `true`, as shown for `node1_clus2` and `node2_clus2` in the following example:

```
cluster::> network interface show -vserver Cluster -fields curr-  
port,is-home  
vserver  lif                curr-port  is-home  
-----  -  
Cluster  node1_clus1  e0a       true  
Cluster  node1_clus2  e0b       true  
Cluster  node2_clus1  e0a       true  
Cluster  node2_clus2  e0b       true  
4 entries were displayed.
```

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
```

4. Check the cluster status of the nodes from the system console of either node:

```
cluster show
```

Show example

The following example shows `epsilon` on both nodes to be `false`:

```
Node  Health  Eligibility  Epsilon  
-----  
node1 true     true        false  
node2 true     true        false  
2 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
node2		
3/5/2022 19:21:20 -06:00	node1_clus2	node2_clus2
node1		
3/5/2022 19:21:18 -06:00	node2_clus2	node1_clus1
node2		
3/5/2022 19:21:20 -06:00	node2_clus2	node1_clus2

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 e0a
Cluster node1_clus2 169.254.49.125 node1 e0b
Cluster node2_clus1 169.254.47.194 node2 e0a
Cluster node2_clus2 169.254.19.183 node2 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 169.254.47.194 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. If you suppressed automatic case creation, reenable it by invoking an AutoSupport message:

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

For more information, see [NetApp KB Article 1010449: How to suppress automatic case creation during scheduled maintenance windows](#).

7. Change the privilege level back to admin:

```
set -privilege admin
```

Cisco Nexus 92300YC

Get started

Installation and setup workflow for Cisco Nexus 92300YC switches

Cisco Nexus 92300YC switches can be used as cluster switches in your AFF or FAS cluster. Cluster switches allow you to build ONTAP clusters with more than two nodes.

Follow these workflow steps to install and setup your to Cisco Nexus 92300YC switch.

1

Configuration requirements

Review the configuration requirements for the 92300YC cluster switch.

2

Required documentation

Review specific switch and controller documentation to set up your 92300YC switches and the ONTAP cluster.

3

Smart Call Home requirements

Review the requirements for the Cisco Smart Call Home feature, used to monitor the hardware and software components on your network.

4

Install the hardware

Install the switch hardware.

5

Configure the software

Configure the switch software.

Configuration requirements for Cisco Nexus 92300YC switches

For Cisco Nexus 92300YC switch installation and maintenance, be sure to review all configuration and network requirements.

If you want to build ONTAP clusters with more than two nodes, you need two supported cluster network switches. You can use additional management switches, which are optional.

Configuration requirements

To configure your cluster, 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 A700 systems, the e0M interface uses a dedicated Ethernet port.

Refer to the [Hardware Universe](#) for 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.

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 92300YC switches

For Cisco Nexus 92300YC switch installation and maintenance, be sure to review all switch components and part numbers. See the [Hardware Universe](#) for details. See [What additional information do I need to install my equipment that is not in HWU?](#) for more information about switch installation requirements.

The following table lists the part number and description for the 92300YC switch, fans, and power supplies:

Part number	Description
190003	Cisco 92300YC, CLSW, 48Pt10/25GB, 18Pt100G, PTSX (PTSX = Port Side Exhaust)
190003R	Cisco 92300YC, CLSW, 48Pt10/25GB, 18Pt100G, PSIN (PSIN = Port Side Intake)
X-NXA-FAN-35CFM-B	Fan, Cisco N9K port side intake airflow
X-NXA-FAN-35CFM-F	Fan, Cisco N9K port side exhaust airflow
X-NXA-PAC-650W-B	Power supply, Cisco 650W - port side intake
X-NXA-PAC-650W-F	Power supply, Cisco 650W - port side exhaust

Cisco Nexus 92300YC switch airflow details:

- Port-side exhaust airflow (standard air) — Cool air enters the chassis through the fan and power supply modules in the cold aisle and exhausts through the port end of the chassis in the hot aisle. Port-side exhaust airflow with blue coloring.
- Port-side intake airflow (reverse air) — Cool air enters the chassis through the port end in the cold aisle and exhausts through the fan and power supply modules in the hot aisle. Port-side intake airflow with burgundy coloring.

What's next

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

Documentation requirements for Cisco Nexus 92300YC switches

For Cisco Nexus 92300YC switch installation and maintenance, be sure to review all the recommended documentation.

Switch documentation

To set up the Cisco Nexus 92300YC switches, you need the following documentation from the [Cisco Nexus 9000 Series Switches Support](#) page:

Document title	Description
<i>Nexus 9000 Series Hardware Installation Guide</i>	Provides detailed information about site requirements, switch hardware details, and installation options.
<i>Cisco Nexus 9000 Series Switch Software Configuration Guides</i> (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.
<i>Cisco Nexus 9000 Series NX-OS Software Upgrade and Downgrade Guide</i> (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.
<i>Cisco Nexus 9000 Series NX-OS Command Reference Master Index</i>	Provides links to the various command references provided by Cisco.
<i>Cisco Nexus 9000 MIBs Reference</i>	Describes the Management Information Base (MIB) files for the Nexus 9000 switches.
<i>Nexus 9000 Series NX-OS System Message Reference</i>	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.
<i>Cisco Nexus 9000 Series NX-OS Release Notes</i> (choose the notes for the NX-OS release installed on your switches)	Describes the features, bugs, and limitations for the Cisco Nexus 9000 Series.
Regulatory Compliance and Safety Information for Cisco Nexus 9000 Series	Provides international agency compliance, safety, and statutory information for the Nexus 9000 series switches.

ONTAP systems documentation

To set up an ONTAP system, you need the following documents for your version of the operating system from [ONTAP 9](#).

Name	Description
Controller-specific <i>Installation and Setup Instructions</i>	Describes how to install NetApp hardware.
ONTAP documentation	Provides detailed information about all aspects of the ONTAP releases.
Hardware Universe	Provides NetApp hardware configuration and compatibility information.

Rail kit and cabinet documentation

To install a Cisco Nexus 92300YC switch in a NetApp cabinet, see the following hardware documentation.

Name	Description
42U System Cabinet, Deep Guide	Describes the FRUs associated with the 42U system cabinet, and provides maintenance and FRU replacement instructions.
Install a Cisco Nexus 92300YC switch in a NetApp Cabinet	Describes how to install a Cisco Nexus 92300YC switch in a four-post NetApp cabinet.

Smart Call Home requirements

To use Smart Call Home, you must configure a cluster network switch to communicate using email with the Smart Call Home system. In addition, you can optionally set up your cluster network switch to take advantage of Cisco's embedded Smart Call Home support feature.

Smart Call Home monitors the hardware and software components on your network. When a critical system configuration occurs, it generates an email-based notification and raises an alert to all the recipients that are configured in your destination profile.

Smart Call Home monitors the hardware and software components on your network. When a critical system configuration occurs, it generates an email-based notification and raises an alert to all the recipients that are configured in your destination profile.

Before you can use Smart Call Home, be aware of the following requirements:

- An email server must be in place.
- The switch must have IP connectivity to the email server.
- The contact name (SNMP server contact), phone number, and street address information must be configured. This is required to determine the origin of messages received.
- A CCO ID must be associated with an appropriate Cisco SMARTnet Service contract for your company.
- Cisco SMARTnet Service must be in place for the device to be registered.

The [Cisco support site](#) contains information about the commands to configure Smart Call Home.

Install hardware

Hardware install workflow for Cisco Nexus 92300YC switches

To install and configure the hardware for a 92300YC cluster 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 92300YC switch.

3

Install the switch in a NetApp cabinet

Install the 92300YC switch and pass-through panel in a NetApp cabinet as required.

4

Review cabling and configuration

Review support for NVIDIA Ethernet ports.

Complete Cisco Nexus 92300YC cabling worksheet

If you want to document the supported platforms, download a PDF of this page and 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.

Sample cabling worksheet

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

Cluster switch A		Cluster switch B	
Switch port	Node and port usage	Switch port	Node and port usage
1	10/25 GbE node	1	10/25 GbE node
2	10/25 GbE node	2	10/25 GbE node
3	10/25 GbE node	3	10/25 GbE node
4	10/25 GbE node	4	10/25 GbE node
5	10/25 GbE node	5	10/25 GbE node
6	10/25 GbE node	6	10/25 GbE node
7	10/25 GbE node	7	10/25 GbE node
8	10/25 GbE node	8	10/25 GbE node
9	10/25 GbE node	9	10/25 GbE node
10	10/25 GbE node	10	10/25 GbE node

Cluster switch A		Cluster switch B	
11	10/25 GbE node	11	10/25 GbE node
12	10/25 GbE node	12	10/25 GbE node
13	10/25 GbE node	13	10/25 GbE node
14	10/25 GbE node	14	10/25 GbE node
15	10/25 GbE node	15	10/25 GbE node
16	10/25 GbE node	16	10/25 GbE node
17	10/25 GbE node	17	10/25 GbE node
18	10/25 GbE node	18	10/25 GbE node
19	10/25 GbE node	19	10/25 GbE node
20	10/25 GbE node	20	10/25 GbE node
21	10/25 GbE node	21	10/25 GbE node
22	10/25 GbE node	22	10/25 GbE node
23	10/25 GbE node	23	10/25 GbE node
24	10/25 GbE node	24	10/25 GbE node
25	10/25 GbE node	25	10/25 GbE node
26	10/25 GbE node	26	10/25 GbE node
27	10/25 GbE node	27	10/25 GbE node
28	10/25 GbE node	28	10/25 GbE node
29	10/25 GbE node	29	10/25 GbE node
30	10/25 GbE node	30	10/25 GbE node
31	10/25 GbE node	31	10/25 GbE node
32	10/25 GbE node	32	10/25 GbE node

Cluster switch A		Cluster switch B	
33	10/25 GbE node	33	10/25 GbE node
34	10/25 GbE node	34	10/25 GbE node
35	10/25 GbE node	35	10/25 GbE node
36	10/25 GbE node	36	10/25 GbE node
37	10/25 GbE node	37	10/25 GbE node
38	10/25 GbE node	38	10/25 GbE node
39	10/25 GbE node	39	10/25 GbE node
40	10/25 GbE node	40	10/25 GbE node
41	10/25 GbE node	41	10/25 GbE node
42	10/25 GbE node	42	10/25 GbE node
43	10/25 GbE node	43	10/25 GbE node
44	10/25 GbE node	44	10/25 GbE node
45	10/25 GbE node	45	10/25 GbE node
46	10/25 GbE node	46	10/25 GbE node
47	10/25 GbE node	47	10/25 GbE node
48	10/25 GbE node	48	10/25 GbE node
49	40/100 GbE node	49	40/100 GbE node
50	40/100 GbE node	50	40/100 GbE node
51	40/100 GbE node	51	40/100 GbE node
52	40/100 GbE node	52	40/100 GbE node
53	40/100 GbE node	53	40/100 GbE node
54	40/100 GbE node	54	40/100 GbE node

Cluster switch A		Cluster switch B	
55	40/100 GbE node	55	40/100 GbE node
56	40/100 GbE node	56	40/100 GbE node
57	40/100 GbE node	57	40/100 GbE node
58	40/100 GbE node	58	40/100 GbE node
59	40/100 GbE node	59	40/100 GbE node
60	40/100 GbE node	60	40/100 GbE node
61	40/100 GbE node	61	40/100 GbE node
62	40/100 GbE node	62	40/100 GbE node
63	40/100 GbE node	63	40/100 GbE node
64	40/100 GbE node	64	40/100 GbE node
65	100 GbE ISL to switch B port 65	65	100 GbE ISL to switch A port 65
66	100 GbE ISL to switch B port 66	66	100 GbE ISL to switch A port 65

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* section of the [Hardware Universe](#) defines the cluster ports used by the platform.

Cluster switch A		Cluster switch B	
Switch port	Node/port usage	Switch port	Node/port usage
1		1	
2		2	
3		3	
4		4	
5		5	

Cluster switch A		Cluster switch B	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
16		16	
17		17	
18		18	
19		19	
20		20	
21		21	
22		22	
23		23	
24		24	
25		25	
26		26	
27		27	

Cluster switch A		Cluster switch B	
28		28	
29		29	
30		30	
31		31	
32		32	
33		33	
34		34	
35		35	
36		36	
37		37	
38		38	
39		39	
40		40	
41		41	
42		42	
43		43	
44		44	
45		45	
46		46	
47		47	
48		48	
49		49	

Cluster switch A		Cluster switch B	
50		50	
51		51	
52		52	
53		53	
54		54	
55		55	
56		56	
57		57	
58		58	
59		59	
60		60	
61		61	
62		62	
63		63	
64		64	
65	ISL to switch B port 65	65	ISL to switch A port 65
66	ISL to switch B port 66	66	ISL to switch A port 66

What's next

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

Install the 92300YC cluster switch

Follow this procedure to set up and configure the Cisco Nexus 92300YC switch.

Before you begin

Make sure you have the following:

- Access to an HTTP, FTP, or TFTP server at the installation site to download the applicable NX-OS and Reference Configuration File (RCF) releases.
- Applicable NX-OS version, downloaded from the [Cisco Software Download](#) page.
- Applicable licenses, network and configuration information, and cables.
- Completed [cabling worksheets](#).
- Applicable NetApp cluster network and management network RCFs downloaded from the NetApp Support Site at mysupport.netapp.com. All Cisco cluster network and management network switches arrive with the standard Cisco factory-default configuration. These switches also have the current version of the NX-OS software but do not have the RCFs loaded.
- [Required switch and ONTAP documentation](#).

Steps

1. Rack the cluster network and management network switches and controllers.

If you are installing the...	Then...
Cisco Nexus 92300YC in a NetApp system cabinet	See the <i>Installing a Cisco Nexus 92300YC cluster switch and pass-through panel in a NetApp cabinet</i> guide for instructions to install the switch in a NetApp cabinet.
Equipment in a Telco rack	See the procedures provided in the switch hardware installation guides and the NetApp installation and setup instructions.

2. Cable the cluster network and management network switches to the controllers using the completed cabling worksheets.
3. Power on the cluster network and management network switches and controllers.

What's next?

Optionally, you can [install a Cisco Nexus 3223C switch in a NetApp cabinet](#). Otherwise, go to [Review cabling and configuration](#).

Install a Cisco Nexus 92300YC cluster switch in a NetApp cabinet

Depending on your configuration, you might need to install the Cisco Nexus 92300YC cluster switch and pass-through panel in a NetApp cabinet with the standard brackets that are included with the switch.

Before you begin

- The initial preparation requirements, kit contents, and safety precautions in the [Cisco Nexus 9000 Series Hardware Installation Guide](#).
- For each switch, 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.
- Cisco standard rail kit to install the switch in a NetApp cabinet.



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

Steps

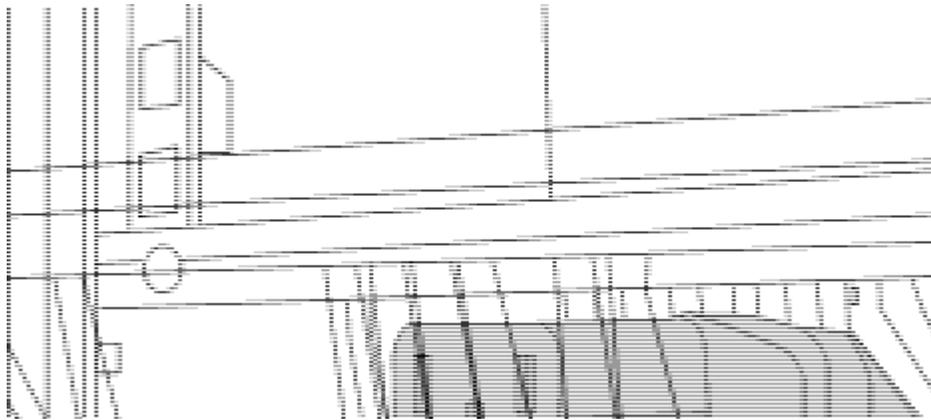
1. Install the pass-through blanking panel in the NetApp cabinet.

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

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

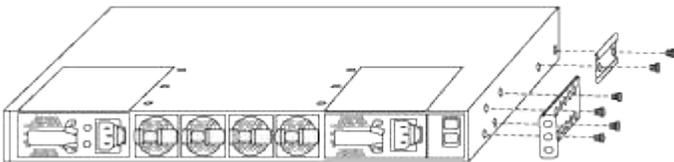
- One pass-through blanking panel
- Four 10-32 x .75 screws
- Four 10-32 clip nuts
 - a. Determine the vertical location of the switches and blanking panel in the cabinet.

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

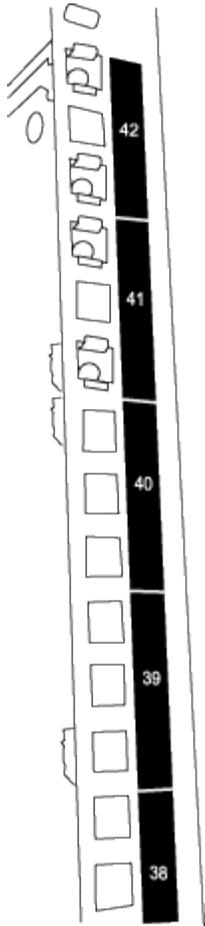


(1) Female connector of the jumper cord.

1. Install the rack-mount brackets on the Nexus 92300YC 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.



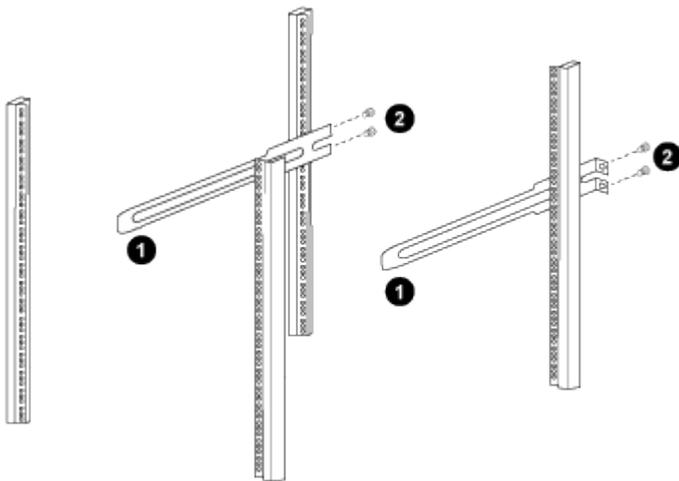
- b. Repeat step 2a with the other front rack-mount bracket on the other side of the switch.
 - c. Install the rear rack-mount bracket on the switch chassis.
 - d. Repeat step 2c with the other rear rack-mount bracket on the other side of the switch.
2. Install the clip nuts in the square hole locations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



The two 92300YC switches will always be mounted in the top 2U of the cabinet RU41 and 42.

3. 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.

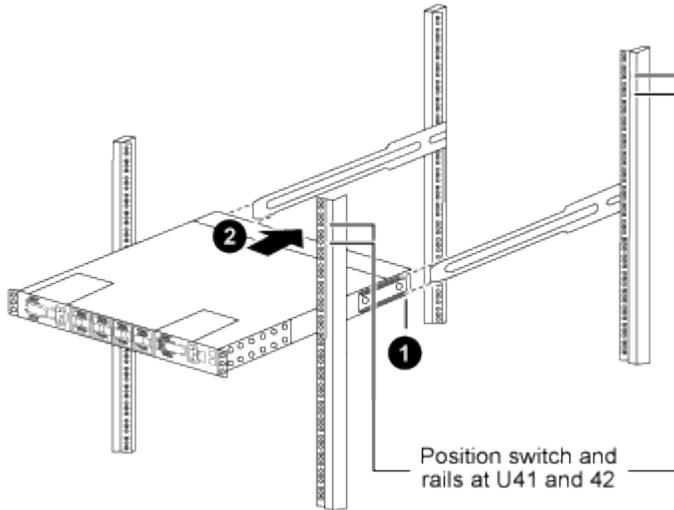
c. Repeat steps 4a and 4b at the RU41 locations on the cabinet.

4. 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.

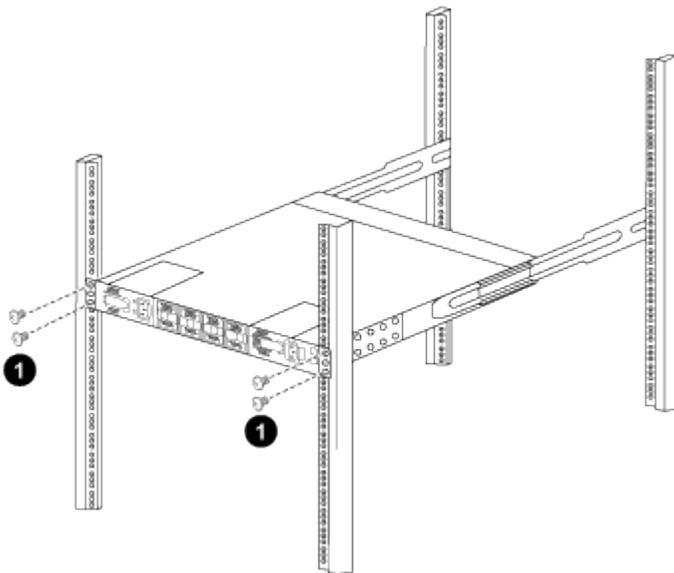
a. Position the back of the switch at RU41.



(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.

5. When the switches are installed, connect the jumper cords to the switch power inlets.

6. 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.

7. Connect the management port on each 92300YC 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.

What's next

After you've installed the switches in the NetApp cabinet, you can [configure the switch](#).

Review cabling and configuration considerations

Before configuring your Cisco 92300YC switch, review the following considerations.

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

If 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
```

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.

Configure the software

Software install workflow for Cisco Nexus 92300YC cluster switches

To install and configure the software for a Cisco Nexus 92300YC switch and to install or

upgrade the Reference Configuration File (RCF), follow these steps:

1

Configure the switch

Configure the 92300YC cluster 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 92300YC cluster switches.

3

Install or upgrade the NX-OS software

Download and install or upgrade the NX-OS software on the Cisco 392300YC cluster switch.

4

Install the RCF

Install the RCF after setting up the Cisco 92300YC switch for the first time.

5

Verify SSH configuration

Verify SSH is enabled on the switches to use the Ethernet Switch Health Monitor (CSHM) and log collection features.

Configure the Cisco Nexus 92300YC switch

Follow this procedure to set up and configure the Cisco Nexus 92300YC switch.

Steps

1. Connect the serial port to a host or serial port.
2. Connect the management port (on the non-port side of the switch) to the same network where your SFTP server is located.
3. At the console, set the host side serial settings:
 - 9600 baud
 - 8 data bits
 - 1 stop bit
 - parity: none
 - flow control: none
4. When booting for the first time or rebooting after erasing the running configuration, the Nexus 92300YC switch loops in a boot cycle. Interrupt this cycle by typing **yes** to abort Power on Auto Provisioning.

The System Admin Account setup is displayed.

Show example

```
$ VDC-1 %$ %POAP-2-POAP_INFO:   - Abort Power On Auto Provisioning
[yes - continue with normal setup, skip - bypass password and basic
configuration, no - continue with Power On Auto Provisioning]
(yes/skip/no)[no]: y
Disabling POAP.....Disabling POAP
2019 Apr 10 00:36:17 switch %$ VDC-1 %$ poap: Rolling back, please
wait... (This may take 5-15 minutes)

----- System Admin Account Setup -----

Do you want to enforce secure password standard (yes/no) [y]:
```

5. Type **y** to enforce secure password standard:

```
Do you want to enforce secure password standard (yes/no) [y]: y
```

6. Enter and confirm the password for user admin:

```
Enter the password for "admin":
Confirm the password for "admin":
```

7. Type **yes** to enter the Basic System Configuration dialog.

Show example

This setup utility will guide you through the basic configuration of the system. Setup configures only enough connectivity for management of the system.

Please register Cisco Nexus9000 Family devices promptly with your supplier. Failure to register may affect response times for initial service calls. Nexus9000 devices must be registered to receive entitled support services.

Press Enter at anytime to skip a dialog. Use ctrl-c at anytime to skip the remaining dialogs.

```
Would you like to enter the basic configuration dialog (yes/no):
```

8. Create another login account:

```
Create another login account (yes/no) [n]:
```

9. Configure read-only and read-write SNMP community strings:

```
Configure read-only SNMP community string (yes/no) [n]:
```

```
Configure read-write SNMP community string (yes/no) [n]:
```

10. Configure the cluster switch name:

```
Enter the switch name : cs2
```

11. Configure the out-of-band management interface:

```
Continue with Out-of-band (mgmt0) management configuration? (yes/no) [y]: y
```

```
Mgmt0 IPv4 address : 172.22.133.216
```

```
Mgmt0 IPv4 netmask : 255.255.224.0
```

```
Configure the default gateway? (yes/no) [y]: y
```

```
IPv4 address of the default gateway : 172.22.128.1
```

12. Configure advanced IP options:

```
Configure advanced IP options? (yes/no) [n]: n
```

13. Configure Telnet services:

```
Enable the telnet service? (yes/no) [n]: n
```

14. Configure SSH services and SSH keys:

```
Enable the ssh service? (yes/no) [y]: y

Type of ssh key you would like to generate (dsa/rsa) [rsa]: rsa

Number of rsa key bits <1024-2048> [1024]: 2048
```

15. Configure other settings:

```
Configure the ntp server? (yes/no) [n]: n

Configure default interface layer (L3/L2) [L2]: L2

Configure default switchport interface state (shut/noshut) [noshut]:
noshut

Configure CoPP system profile (strict/moderate/lenient/dense)
[strict]: strict
```

16. Confirm switch information and save the configuration:

```
Would you like to edit the configuration? (yes/no) [n]: n

Use this configuration and save it? (yes/no) [y]: y

[] 100%
Copy complete, now saving to disk (please wait)...
Copy complete.
```

What's next?

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

Prepare to install NX-OS software and Reference Configuration File (RCF)

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

Before you begin

Make sure you have the following:

- A fully functioning cluster (no errors in the logs or similar issues).
- Appropriate software and upgrade guides, which are available from [Cisco Nexus 9000 Series Switches](#).

About the examples

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

and e0b. See the [Hardware Universe](#) to verify the correct cluster ports on your platforms.

The 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 `node1` and `node2`.
- The cluster LIF names are `node1_clus1` and `node1_clus2` for `node1` and `node2_clus1` and `node2_clus2` for `node2`.
- 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. The command outputs might vary depending on different releases of ONTAP.

Steps

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

```
set -privilege advanced
```

The advanced prompt (`*>`) appears.

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

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

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.

The following command suppresses automatic case creation for two hours:

```
cluster1:> **system node autosupport invoke -node * -type all -message  
MAINT=2h**
```

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	
node2	/cdp			
	e0a	cs1	Eth1/2	N9K-
C92300YC				
	e0b	cs2	Eth1/2	N9K-
C92300YC				
node1	/cdp			
	e0a	cs1	Eth1/1	N9K-
C92300YC				
	e0b	cs2	Eth1/1	N9K-
C92300YC				

4 entries were displayed.

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

Show example

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

Node: node2

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

Node: node1

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

4 entries were displayed.
```

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

Show example

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

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

Cluster				
e0a	node1_clus1	up/up	169.254.209.69/16	node1
e0b	true			
e0a	node1_clus2	up/up	169.254.49.125/16	node1
e0b	true			
e0a	node2_clus1	up/up	169.254.47.194/16	node2
e0b	true			
e0a	node2_clus2	up/up	169.254.19.183/16	node2
e0b	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 e0a
Cluster node1_clus2 169.254.49.125 node1 e0b
Cluster node2_clus1 169.254.47.194 node2 e0a
Cluster node2_clus2 169.254.19.183 node2 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	node1_clus1	true
	node1_clus2	true
	node2_clus1	true
	node2_clus2	true

```
4 entries were displayed.
```

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 92300YC switch.

NX-OS is a network operating system for the Nexus series of Ethernet switches and MDS series of Fibre Channel (FC) storage area network switches provided by Cisco Systems.

Review requirements

Supported ports and node connections

- The Inter-Switch Links (ISLs) supported for the Nexus 92300YC switches are ports 1/65 and 1/66.
- The node connections supported for the Nexus 92300YC switches are ports 1/1 through 1/66.

Before you begin

Make sure you have the following:

- Applicable NetApp Cisco NX-OS software for your switches from the NetApp Support Site, available from mysupport.netapp.com
- A fully functioning cluster (no errors in the logs or similar issues).
- [Cisco Ethernet switch page](#). Consult the switch compatibility table for the supported ONTAP and NX-OS versions.

Install the software

The examples in this procedure use two nodes, but you can have up to 24 nodes in a cluster.

About the examples

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

- The Nexus 92300YC switch names are `cs1` and `cs2`.
- The example used in this procedure starts the upgrade on the second switch, `*cs2*`.
- The cluster LIF names are `node1_clus1` and `node1_clus2` for node1, and `node2_clus1` and `node2_clus2` for node2.
- The IPspace name is `Cluster`.
- The `cluster1::*>` prompt indicates the name of the cluster.
- The cluster ports on each node are named `e0a` and `e0b`.

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

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
Pinging 172.19.2.1 with 0 bytes of data:

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

3. Copy the NX-OS software and EPLD images to the Nexus 92300YC switch.

Show example

```
cs2# copy sftp: bootflash: vrf management
Enter source filename: /code/nxos.9.2.2.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.9.2.2.bin /bootflash/nxos.9.2.2.bin
/code/nxos.9.2.2.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.9.2.2.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.9.2.2.img /bootflash/n9000-
epld.9.2.2.img
/code/n9000-epld.9.2.2.img 100% 161MB 9.5MB/s 00:16
sftp> exit
Copy complete, now saving to disk (please wait)...
Copy complete.
```

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

```
show version
```

Show example

```
cs2# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (C) 2002-2018, 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
own
licenses, such as open source. This software is provided "as is,"
and unless
otherwise stated, there is no warranty, express or implied,
including but not
limited to warranties of merchantability and fitness for a
particular purpose.
Certain components of this software are licensed under
the GNU General Public License (GPL) version 2.0 or
GNU General Public License (GPL) version 3.0 or the GNU
Lesser General Public License (LGPL) Version 2.1 or
Lesser General Public License (LGPL) Version 2.0.
A copy of each such license is available at
http://www.opensource.org/licenses/gpl-2.0.php and
http://opensource.org/licenses/gpl-3.0.html and
http://www.opensource.org/licenses/lgpl-2.1.php and
http://www.gnu.org/licenses/old-licenses/library.txt.

Software
  BIOS: version 05.31
  NXOS: version 9.2(1)
  BIOS compile time: 05/17/2018
  NXOS image file is: bootflash:///nxos.9.2.1.bin
  NXOS compile time: 7/17/2018 16:00:00 [07/18/2018 00:21:19]

Hardware
  cisco Nexus9000 C92300YC Chassis
  Intel(R) Xeon(R) CPU D-1526 @ 1.80GHz with 16337884 kB of memory.
  Processor Board ID FDO220329V5

  Device name: cs2
  bootflash: 115805356 kB
  Kernel uptime is 0 day(s), 4 hour(s), 23 minute(s), 11 second(s)

  Last reset at 271444 usecs after Wed Apr 10 00:25:32 2019
  Reason: Reset Requested by CLI command reload
```

```
System version: 9.2(1)
```

```
Service:
```

```
plugin
```

```
Core Plugin, Ethernet Plugin
```

```
Active Package(s):
```

```
cs2#
```

5. Install the NX-OS image.

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

Show example

```
cs2# install all nxos bootflash:nxos.9.2.2.bin
```

```
Installer will perform compatibility check first. Please wait.  
Installer is forced disruptive
```

```
Verifying image bootflash:/nxos.9.2.2.bin for boot variable "nxos".  
[] 100% -- SUCCESS
```

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

```
Preparing "nxos" version info using image bootflash:/nxos.9.2.2.bin.  
[] 100% -- SUCCESS
```

```
Preparing "bios" version info using image bootflash:/nxos.9.2.2.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 Version	Image	Running-Version (pri:alt)	New-
		Upg-Required	
1	nxos		9.2(1)
9.2(2)		yes	
1	bios	v05.31(05/17/2018):v05.28(01/18/2018)	
v05.33(09/08/2018)		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
```

```
2019 Apr 10 04:59:35 cs2 %$ VDC-1 %$ %VMAN-2-ACTIVATION_STATE:  
Successfully deactivated virtual service 'guestshell+'
```

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

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

```
show version
```

Show example

```
cs2# show version
```

```
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (C) 2002-2018, 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
own
licenses, such as open source. This software is provided "as is,"
and unless
otherwise stated, there is no warranty, express or implied,
including but not
limited to warranties of merchantability and fitness for a
particular purpose.
Certain components of this software are licensed under
the GNU General Public License (GPL) version 2.0 or
GNU General Public License (GPL) version 3.0 or the GNU
Lesser General Public License (LGPL) Version 2.1 or
Lesser General Public License (LGPL) Version 2.0.
A copy of each such license is available at
http://www.opensource.org/licenses/gpl-2.0.php and
http://opensource.org/licenses/gpl-3.0.html and
http://www.opensource.org/licenses/lgpl-2.1.php and
http://www.gnu.org/licenses/old-licenses/library.txt.
```

Software

```
BIOS: version 05.33
NXOS: version 9.2(2)
BIOS compile time: 09/08/2018
NXOS image file is: bootflash:///nxos.9.2.2.bin
NXOS compile time: 11/4/2018 21:00:00 [11/05/2018 06:11:06]
```

Hardware

```
cisco Nexus9000 C92300YC Chassis
Intel(R) Xeon(R) CPU D-1526 @ 1.80GHz with 16337884 kB of memory.
Processor Board ID FDO220329V5

Device name: cs2
bootflash: 115805356 kB
Kernel uptime is 0 day(s), 0 hour(s), 3 minute(s), 52 second(s)
```

```
Last reset at 182004 usecs after Wed Apr 10 04:59:48 2019
```

Reason: Reset due to upgrade

System version: 9.2(1)

Service:

plugin

Core Plugin, Ethernet Plugin

Active Package(s):

7. 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

```
cs2# install epld bootflash:n9000-epld.9.2.2.img module 1
```

Compatibility check:

Module	Type	Upgradable	Impact	Reason
1	SUP	Yes	disruptive	Module Upgradable

Retrieving EPLD versions.... Please wait.

Images will be upgraded according to following table:

Module	Type	EPLD	Running-Version	New-Version	Upg-Required
1	SUP	MI FPGA	0x07	0x07	No
1	SUP	IO FPGA	0x17	0x19	Yes
1	SUP	MI FPGA2	0x02	0x02	No

The above modules require upgrade.

The switch will be reloaded at the end of the upgrade

Do you want to continue (y/n) ? [n] **y**

Proceeding to upgrade Modules.

Starting Module 1 EPLD Upgrade

Module 1 : IO FPGA [Programming] : 100.00% (64 of 64 sectors)

Module 1 EPLD upgrade is successful.

Module	Type	Upgrade-Result
--------	------	----------------

```
1 SUP Success
```

```
EPLDs upgraded.
```

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

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

Show example

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

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

What's next?

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

Install the Reference Configuration File (RCF)

You can install the RCF after setting up the Nexus 92300YC switch for the first time. You can also use this procedure to upgrade your RCF version.

See the Knowledge Base article [How to clear configuration on a Cisco interconnect switch while retaining remote connectivity](#) for further information when installing or upgrading your RCF.

About this task

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

- The names of the two Cisco switches are `cs1` and `cs2`.
- The node names are `node1` and `node2`.
- The cluster LIF names are `node1_clus1`, `node1_clus2`, `node2_clus1`, and `node2_clus2`.
- The `cluster1::*>` prompt indicates the name of the cluster.



- The procedure requires the use of both ONTAP commands and [Cisco Nexus 9000 Series Switches](#); ONTAP commands are used unless otherwise indicated.
- Before you perform this procedure, make sure that you have a current backup of the switch configuration.
- 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.

Steps

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
-----
node1/cdp
C92300YC      e0a    cs1                      Ethernet1/1/1      N9K-
C92300YC      e0b    cs2                      Ethernet1/1/1      N9K-
node2/cdp
C92300YC      e0a    cs1                      Ethernet1/1/2      N9K-
C92300YC      e0b    cs2                      Ethernet1/1/2      N9K-
cluster1::*>
```

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

Show example

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

Node: node1

Ignore

Health      Health
Port        IPspace    Broadcast Domain Link MTU  Admin/Oper
Status      Status
-----
e0c         Cluster    Cluster          up   9000  auto/100000
healthy false
e0d         Cluster    Cluster          up   9000  auto/100000
healthy false

Node: node2

Ignore

Health      Health
Port        IPspace    Broadcast Domain Link MTU  Admin/Oper
Status      Status
-----
e0c         Cluster    Cluster          up   9000  auto/100000
healthy false
e0d         Cluster    Cluster          up   9000  auto/100000
healthy false
cluster1::*>
```

- 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*
      Logical      Status      Network
Current Current Is
Vserver Interface Admin/Oper Address/Mask Node
Port Home
-----
Cluster
e0c      true      node1_clus1      up/up      169.254.3.4/23      node1
e0d      true      node1_clus2      up/up      169.254.3.5/23      node1
e0c      true      node2_clus1      up/up      169.254.3.8/23      node2
e0d      true      node2_clus2      up/up      169.254.3.9/23      node2
cluster1::*>
```

- c. 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
-----
cs1                                    cluster-network                    10.233.205.92
N9K-C92300YC
  Serial Number: FOXXXXXXXXGS
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                                     9.3(4)
  Version Source: CDP

cs2                                    cluster-network                    10.233.205.93
N9K-C92300YC
  Serial Number: FOXXXXXXXXGD
  Is Monitored: true
  Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                                     9.3(4)
  Version Source: CDP

2 entries were displayed.
```

3. Disable auto-revert on the cluster LIFs.

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

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

```
cs2(config)# interface e1/1-64
cs2(config-if-range)# shutdown
```

5. Verify that the cluster ports have migrated to the ports hosted on cluster switch cs1. This might take a few seconds.
`network interface show -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
          node1_clus1      up/up      169.254.3.4/23   node1
e0c       true
          node1_clus2      up/up      169.254.3.5/23   node1
e0c       false
          node2_clus1      up/up      169.254.3.8/23   node2
e0c       true
          node2_clus2      up/up      169.254.3.9/23   node2
e0c       false
cluster1::*>
```

6. 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
cluster1::*>
```

7. 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
```

8. Clean the configuration on switch cs2 and perform a basic setup.



When updating or applying a new RCF, you must erase the switch settings and perform basic configuration. You must be connected to the switch serial console port to set up the switch again.

a. Clean the configuration:

Show example

```
(cs2)# write erase

Warning: This command will erase the startup-configuration.

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

b. Perform a reboot of the switch:

Show example

```
(cs2)# reload

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

9. Copy the RCF to the bootflash of switch cs2 using one of the following transfer protocols: FTP, TFTP, SFTP, or SCP. For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 9000 Series Switches](#) guides.

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

```
cs2# copy tftp: bootflash: vrf management
Enter source filename: /code/Nexus_92300YC_RCF_v1.0.2.txt
Enter hostname for the tftp 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:
tftp> progress
Progress meter enabled
tftp> get /code/Nexus_92300YC_RCF_v1.0.2.txt /bootflash/nxos.9.2.2.bin
/code/Nexus_92300YC_R 100% 9687 530.2KB/s 00:00
tftp> exit
Copy complete, now saving to disk (please wait)...
Copy complete.
```

10. Apply the RCF previously downloaded to the bootflash.

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 9000 Series Switches](#) guides.

This example shows the RCF file `Nexus_92300YC_RCF_v1.0.2.txt` being installed on switch `cs2`:

```
cs2# copy Nexus_92300YC_RCF_v1.0.2.txt running-config echo-commands

Disabling ssh: as its enabled right now:
  generating ecdsa key(521 bits).....
generated ecdsa key

Enabling ssh: as it has been disabled
  this command enables edge port type (portfast) by default on all
  interfaces. You
  should now disable edge port type (portfast) explicitly on switched
  ports leading to hubs,
  switches and bridges as they may create temporary bridging loops.

Edge port type (portfast) should only be enabled on ports connected to a
single
  host. Connecting hubs, concentrators, switches, bridges, etc... to
  this
  interface when edge port type (portfast) is enabled, can cause
  temporary bridging loops.
  Use with CAUTION

Edge Port Type (Portfast) has been configured on Ethernet1/1 but will
only
  have effect when the interface is in a non-trunking mode.

...

Copy complete, now saving to disk (please wait)...
Copy complete.
```

11. Verify on the switch that the RCF has been merged successfully:

```
show running-config
```

```

cs2# show running-config
!Command: show running-config
!Running configuration last done at: Wed Apr 10 06:32:27 2019
!Time: Wed Apr 10 06:36:00 2019

version 9.2(2) Bios:version 05.33
switchname cs2
vdc cs2 id 1
  limit-resource vlan minimum 16 maximum 4094
  limit-resource vrf minimum 2 maximum 4096
  limit-resource port-channel minimum 0 maximum 511
  limit-resource u4route-mem minimum 248 maximum 248
  limit-resource u6route-mem minimum 96 maximum 96
  limit-resource m4route-mem minimum 58 maximum 58
  limit-resource m6route-mem minimum 8 maximum 8

feature lacp

no password strength-check
username admin password 5
$5$HY9Kk3F9$YdCZ8iQJlRtoiEFa0sKP5IO/LNG1k9C4lSJfi5kesl
6 role network-admin
ssh key ecdsa 521

banner motd #

*
*
* Nexus 92300YC Reference Configuration File (RCF) v1.0.2 (10-19-2018)
*
*
*
* Ports 1/1 - 1/48: 10GbE Intra-Cluster Node Ports
*
* Ports 1/49 - 1/64: 40/100GbE Intra-Cluster Node Ports
*
* Ports 1/65 - 1/66: 40/100GbE Intra-Cluster ISL Ports
*
*
*

```



When applying the RCF for the first time, the **ERROR: Failed to write VSH commands** message is expected and can be ignored.

- 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.

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

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 9000 Series Switches](#) guides.

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

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

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

16. Verify the health of the cluster ports on the cluster.
 - a. Verify that e0d 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: node1

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: node2

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
```

- b. Verify the switch health from the cluster (this might not show switch cs2, since LIFs are not homed on e0d).

Show example



```

cluster1::*> *network device-discovery show -protocol cdp*
Node/          Local  Discovered
Protocol       Port   Device (LLDP: ChassisID)  Interface
Platform
-----
-----
node1/cdp
          e0a   cs1                      Ethernet1/1
N9K-C92300YC
          e0b   cs2                      Ethernet1/1
N9K-C92300YC
node2/cdp
          e0a   cs1                      Ethernet1/2
N9K-C92300YC
          e0b   cs2                      Ethernet1/2
N9K-C92300YC

cluster1::*> *system cluster-switch show -is-monitoring-enabled
-operational true*
Switch                Type                Address
Model
-----
-----
cs1                    cluster-network    10.233.205.90
N9K-C92300YC
    Serial Number: FOXXXXXXXXGD
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                    9.3(4)
    Version Source: CDP

cs2                    cluster-network    10.233.205.91
N9K-C92300YC
    Serial Number: FOXXXXXXXXGS
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                    9.3(4)
    Version Source: CDP

2 entries were displayed.

```

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



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

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

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

```
cs1(config)# interface e1/1-64
cs1(config-if-range)# shutdown
```

18. Verify that the cluster LIFs have migrated to the ports hosted on switch cs2. 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
e0d      node1_clus1    up/up      169.254.3.4/23  node1
false
e0d      node1_clus2    up/up      169.254.3.5/23  node1
true
e0d      node2_clus1    up/up      169.254.3.8/23  node2
false
e0d      node2_clus2    up/up      169.254.3.9/23  node2
true
cluster1::*>
```

19. 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
cluster1::*>
```

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

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

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

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

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

```
cs1# show interface brief | grep up
.
.
Ethernet1/1      1      eth  access up    none
10G(D) --
Ethernet1/2      1      eth  access up    none
10G(D) --
Ethernet1/3      1      eth  trunk  up    none
100G(D) --
Ethernet1/4      1      eth  trunk  up    none
100G(D) --
.
.
```

24. 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      Eth1/65 (P)  Eth1/66 (P)
cs1#
```

25. 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
          node1_clus1  up/up      169.254.3.4/23  node1
e0d      true
          node1_clus2  up/up      169.254.3.5/23  node1
e0d      true
          node2_clus1  up/up      169.254.3.8/23  node2
e0d      true
          node2_clus2  up/up      169.254.3.9/23  node2
e0d      true
cluster1::*>
```

26. 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
```

27. 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 node1
Getting addresses from network interface table...
Cluster node1_clus1 169.254.3.4 node1 e0a
Cluster node1_clus2 169.254.3.5 node1 e0b
Cluster node2_clus1 169.254.3.8 node2 e0a
Cluster node2_clus2 169.254.3.9 node2 e0b
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 installed the RCF, you can [verify the SSH configuration](#).

Verify your SSH configuration

If you are using the Ethernet Switch Health Monitor (CSHM) and log collection features, verify that SSH and SSH keys are enabled on the cluster switches.

Steps

1. Verify that SSH is enabled:

```
(switch) show ssh server  
ssh version 2 is enabled
```

2. Verify that the SSH keys are enabled:

```
show ssh key
```

Show example

```
(switch)# show ssh key  
  
rsa Keys generated:Fri Jun 28 02:16:00 2024  
  
ssh-rsa  
AAAAB3NzaC1yc2EAAAADAQABAAQGDINrD52Q586wTGJjFABjBlFaA23EpDrZ2sDCew  
17nwlIoc6HBejxluIObAH8hrW8kR+gj0ZAfPpNeLGTg3APj/yIPTBoIZZxbWRShywAM5  
PqyxWwRb7kp9Zt1YHzVuHYpSO82KUDowKrL6lox/YtpKoZUDZjrZjAp8hTv3JZsPgQ==  
  
bitcount:1024  
fingerprint:  
SHA256:aHwhpzo7+YCDsrp3isJv2uVGz+mjMMokqdMeXVVXfdo  
  
could not retrieve dsa key information  
  
ecdsa Keys generated:Fri Jun 28 02:30:56 2024  
  
ecdsa-sha2-nistp521  
AAAAE2VjZHNhLXNoYTItbmlzdHA1MjEAAAABmlzdHA1MjEAAACFBABJ+ZX5SFKhS57e  
vKE273e0VoqZi4/32dt+f14fBuKv80MjMsmLfjKtCWy1wgVt1Zi+C5TIBbugpzez529z  
kFSF0ADb8JaGCoaAYe2HvWR/f6QLbKbqVIewCdqWgxzrIY5BPP5GBdxQJMBiOwEdnHg1  
u/9Pzh/Vz9cHDcCW9qGE780QHA==  
  
bitcount:521  
fingerprint:  
SHA256:TFGe2hXn6QIpcs/vyHzftHJ7Dceg0vQaULYRALZeHwQ  
  
(switch)# show feature | include scpServer  
scpServer          1          enabled  
(switch)# show feature | include ssh  
sshServer          1          enabled  
(switch)#
```



When enabling FIPS, you must change the bitcount to 256 on the switch using the command `ssh key ecdsa 256 force`. See [Configure network security using FIPS](#) for more details.

What's next?

After you've verified your SSH configuration, you can [configure switch health monitoring](#).

Migrate switches

Migrate to a two-node switched cluster with a Cisco Nexus 92300YC switch

If you have an existing two-node *switchless* cluster environment, you can migrate to a two-node *switched* cluster environment using Cisco Nexus 92300YC switches to enable you to scale beyond two nodes in the cluster.

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.



After your migration completes, you might need to install the required configuration file to support the Cluster Switch Health Monitor (CSHM) for 92300YC cluster switches. See [Switch Health Monitoring \(CSHM\)](#).

Review requirements

Before you begin

Make sure you have the following:

For a two-node switchless configuration, ensure that:

- The two-node switchless configuration is properly set up and functioning.
- The nodes are running ONTAP 9.6 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 92300YC switch configuration:

- Both switches have management network connectivity.
- There is console access to the cluster switches.
- Nexus 92300YC node-to-node switch and switch-to-switch connections use twinax or fiber cables.

[Hardware Universe - Switches](#) contains more information about cabling.

- Inter-Switch Link (ISL) cables are connected to ports 1/65 and 1/66 on both 92300YC switches.
- Initial customization of both the 92300YC switches are completed. So that the:
 - 92300YC switches are running the latest version of software

- Reference Configuration Files (RCFs) are applied to the switches Any site customization, such as SMTP, SNMP, and SSH is configured on the new switches.

Migrate the switch

About the examples

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

- The names of the 92300YC 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 e0a and e0b.

[Hardware Universe](#) contains the latest information about the actual cluster ports for your platforms.

Step 1: Prepare for migration

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

```
set -privilege advanced
```

The advanced prompt (`*>`) appears.

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

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

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.

Show example

The following command suppresses automatic case creation for two hours:

```
cluster1::*> system node autosupport invoke -node * -type all  
-message MAINT=2h
```

Step 2: Configure cables and ports

1. 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 64 are disabled on switch cs1:

```
cs1# config  
Enter configuration commands, one per line. End with CNTL/Z.  
cs1(config)# interface e/1-64  
cs1(config-if-range)# shutdown
```

2. Verify that the ISL and the physical ports on the ISL between the two 92300YC switches cs1 and cs2 are up on ports 1/65 and 1/66:

```
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      Eth1/65 (P)  Eth1/66 (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      Eth1/65 (P)  Eth1/66 (P)
```

3. 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 Infrfce  Hldtme Capability  Platform
Port ID
cs2 (FDO220329V5)  Eth1/65       175      R S I s      N9K-C92300YC
Eth1/65
cs2 (FDO220329V5)  Eth1/66       175      R S I s      N9K-C92300YC
Eth1/66

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 Infrfce  Hldtme Capability  Platform
Port ID
cs1 (FDO220329KU)  Eth1/65       177      R S I s      N9K-C92300YC
Eth1/65
cs1 (FDO220329KU)  Eth1/66       177      R S I s      N9K-C92300YC
Eth1/66

Total entries displayed: 2
```

4. 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
```

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

```
Node: node2
```

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

```
4 entries were displayed.
```

5. 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
```

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

Cluster				
	node1_clus1	up/up	169.254.209.69/16	node1
e0a	true			
	node1_clus2	up/up	169.254.49.125/16	node1
e0b	true			
	node2_clus1	up/up	169.254.47.194/16	node2
e0a	true			
	node2_clus2	up/up	169.254.19.183/16	node2
e0b	true			

4 entries were displayed.

6. Disable auto-revert on all of the cluster LIFs:

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

Show example

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

Vserver	Logical	Interface	auto-revert

Cluster			
	node1_clus1		false
	node1_clus2		false
	node2_clus1		false
	node2_clus2		false

4 entries were displayed.

7. Disconnect the cable from cluster port e0a on node1, and then connect e0a to port 1 on cluster switch cs1, using the appropriate cabling supported by the 92300YC switches.

The [Hardware Universe - Switches](#) contains more information about cabling.

8. Disconnect the cable from cluster port e0a on node2, and then connect e0a to port 2 on cluster switch cs1, using the appropriate cabling supported by the 92300YC switches.
9. Enable all node-facing ports on cluster switch cs1.

Show example

The following example shows that ports 1/1 through 1/64 are enabled on switch cs1:

```
cs1# config
Enter configuration commands, one per line. End with CNTL/Z.
cs1(config)# interface e1/1-64
cs1(config-if-range)# no shutdown
```

10. 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 of 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	Interface	Admin/Oper	Address/Mask	Node	Port
Home					
-----	-----	-----	-----	-----	-----
Cluster					
true	node1_clus1	up/up	169.254.209.69/16	node1	e0a
true	node1_clus2	up/up	169.254.49.125/16	node1	e0b
true	node2_clus1	up/up	169.254.47.194/16	node2	e0a
true	node2_clus2	up/up	169.254.19.183/16	node2	e0b

4 entries were displayed.

11. 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.
```

12. Disconnect the cable from cluster port e0b on node1, and then connect e0b to port 1 on cluster switch cs2, using the appropriate cabling supported by the 92300YC switches.
13. Disconnect the cable from cluster port e0b on node2, and then connect e0b to port 2 on cluster switch cs2, using the appropriate cabling supported by the 92300YC switches.
14. Enable all node-facing ports on cluster switch cs2.

Show example

The following example shows that ports 1/1 through 1/64 are enabled on switch cs2:

```
cs2# config  
Enter configuration commands, one per line. End with CNTL/Z.  
cs2(config)# interface e1/1-64  
cs2(config-if-range)# no shutdown
```

Step 3: Verify the configuration

1. Enable auto-revert on the cluster LIFs.

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

2. Verify that all cluster ports are up:

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

Show example

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

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

Node: node1

Ignore

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: node2

Ignore

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

4 entries were displayed.
```

3. 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
```

Current Is	Logical	Status	Network	Current	
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port
Home					
Cluster					
true	node1_clus1	up/up	169.254.209.69/16	node1	e0a
true	node1_clus2	up/up	169.254.49.125/16	node1	e0b
true	node2_clus1	up/up	169.254.47.194/16	node2	e0a
true	node2_clus2	up/up	169.254.19.183/16	node2	e0b

4 entries were displayed.

4. 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 Port ID	Local Intrfce	Hldtme	Capability	Platform
node1 e0a	Eth1/1	133	H	FAS2980
node2 e0a	Eth1/2	133	H	FAS2980
cs2 (FDO220329V5) Eth1/65	Eth1/65	175	R S I s	N9K-C92300YC
cs2 (FDO220329V5) Eth1/66	Eth1/66	175	R S I s	N9K-C92300YC

```
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 Port ID	Local Intrfce	Hldtme	Capability	Platform
node1 e0b	Eth1/1	133	H	FAS2980
node2 e0b	Eth1/2	133	H	FAS2980
cs1 (FDO220329KU) Eth1/65	Eth1/65	175	R S I s	N9K-C92300YC
cs1 (FDO220329KU) Eth1/66	Eth1/66	175	R S I s	N9K-C92300YC

```
Total entries displayed: 4
```

5. 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
               e0a    cs1                       0/2          N9K-
C92300YC
               e0b    cs2                       0/2          N9K-
C92300YC
node1          /cdp
               e0a    cs1                       0/1          N9K-
C92300YC
               e0b    cs2                       0/1          N9K-
C92300YC

4 entries were displayed.
```

6. 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.

Show example

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

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

7. 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

8. 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
node2		
3/5/2022 19:21:20 -06:00	node1_clus2	node2_clus2
node1		
3/5/2022 19:21:18 -06:00	node2_clus2	node1_clus1
node2		
3/5/2022 19:21:20 -06:00	node2_clus2	node1_clus2

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 e0a
```

```
Cluster node1_clus2 169.254.49.125 node1 e0b
```

```
Cluster node2_clus1 169.254.47.194 node2 e0a
```

```
Cluster node2_clus2 169.254.19.183 node2 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 169.254.47.194 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)
```

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

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

Show example

```
cluster1::~*> system node autosupport invoke -node * -type all  
-message MAINT=END
```

9. Change the privilege level back to admin:

```
set -privilege admin
```

What's next?

After you've verified your SSH configuration, you can [configure switch health monitoring](#).

Replace switches

Replace a Cisco Nexus 92300YC switch

Replacing a defective Nexus 92300YC switch in a cluster network is a nondisruptive procedure (NDU).

Review requirements

Before you begin

Before performing the switch replacement, ensure 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 92300YC replacement switch:
 - Management network connectivity on the replacement switch are functional.
 - Console access to the replacement switch are in place.
 - The node connections are ports 1/1 through 1/64.
 - All Inter-Switch Link (ISL) ports are disabled on ports 1/65 and 1/66.
 - The desired reference configuration file (RCF) and NX-OS operating system image switch are loaded onto the switch.
 - Initial customization of the switch are complete, as detailed in: [Configure the Cisco Nexus 92300YC switch](#).

Any previous site customizations, such as STP, SNMP, and SSH, are copied to the new switch.

Enable console logging

NetApp strongly recommends that you enable console logging on the devices that you are using and take the following actions when replacing your switch:

- Leave AutoSupport enabled during maintenance.
- Trigger a maintenance AutoSupport before and after maintenance to disable case creation for the duration of the maintenance. See this Knowledge Base article [SU92: How to suppress automatic case creation during scheduled maintenance windows](#) for further details.
- Enable session logging for any CLI sessions. For instructions on how to enable session logging, review the "Logging Session Output" section in this Knowledge Base article [How to configure PuTTY for optimal connectivity to ONTAP systems](#).

Replace the switch

About the examples

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

- The names of the existing Nexus 92300YC switches are cs1 and cs2.
- The name of the new Nexus 92300YC switch is newcs2.
- The node names are node1 and node2.
- The cluster ports on each node are named e0a and e0b.
- 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::<*>

About this task

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

The following procedure is based on the following cluster network topology:

Show topology

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

```
Node: node1
```

```
Ignore
```

```
Speed(Mbps) Health
```

```
Health
```

```
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
```

```
Status
```

```
-----
```

```
-----
```

```
e0a      Cluster      Cluster      up    9000  auto/10000  healthy
```

```
false
```

```
e0b      Cluster      Cluster      up    9000  auto/10000  healthy
```

```
false
```

```
Node: node2
```

```
Ignore
```

```
Speed(Mbps) Health
```

```
Health
```

```
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
```

```
Status
```

```
-----
```

```
-----
```

```
e0a      Cluster      Cluster      up    9000  auto/10000  healthy
```

```
false
```

```
e0b      Cluster      Cluster      up    9000  auto/10000  healthy
```

```
false
```

```
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      e0a
```

```
true
```

```
node1_clus2  up/up      169.254.49.125/16  node1      e0b
```

```

true
      node2_clus1  up/up    169.254.47.194/16  node2      e0a
true
      node2_clus2  up/up    169.254.19.183/16  node2      e0b
true
4 entries were displayed.

```

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

Node/ Protocol	Local Port	Discovered Device (LLDP: ChassisID)	Interface	Platform
node2	/cdp			
	e0a	cs1	Eth1/2	N9K-
C92300YC				
	e0b	cs2	Eth1/2	N9K-
C92300YC				
node1	/cdp			
	e0a	cs1	Eth1/1	N9K-
C92300YC				
	e0b	cs2	Eth1/1	N9K-
C92300YC				

4 entries were displayed.

```
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 ID	Local Intrfce	Hldtme	Capability	Platform	Port
node1	Eth1/1	144	H	FAS2980	e0a
node2	Eth1/2	145	H	FAS2980	e0a
cs2 (FDO220329V5)	Eth1/65	176	R S I s	N9K-C92300YC	
Eth1/65					
cs2 (FDO220329V5)	Eth1/66	176	R S I s	N9K-C92300YC	
Eth1/66					

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 ID	Local Intrfce	Hldtme	Capability	Platform	Port
node1	Eth1/1	139	H	FAS2980	e0b
node2	Eth1/2	124	H	FAS2980	e0b
cs1 (FDO220329KU) Eth1/65	Eth1/65	178	R S I s	N9K-C92300YC	
cs1 (FDO220329KU) Eth1/66	Eth1/66	178	R S I s	N9K-C92300YC	

```
Total entries displayed: 4
```

Step 1: Prepare for replacement

1. Install the appropriate RCF and image on the switch, newcs2, and make any necessary site preparations.

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 2.

- a. Go to the *NetApp Cluster and Management Network Switches Reference Configuration File Description Page* on the NetApp Support Site.
 - b. Click the link for the *Cluster Network and Management Network Compatibility Matrix*, and then note the required switch software version.
 - c. 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.
 - d. 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.
2. On the new switch, log in as admin and shut down all of the ports that will be connected to the node cluster interfaces (ports 1/1 to 1/64).

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

```
newcs2# config  
Enter configuration commands, one per line. End with CNTL/Z.  
newcs2(config)# interface e1/1-64  
newcs2(config-if-range)# shutdown
```

3. 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.

4. 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
node2		
3/5/2022 19:21:20 -06:00	node1_clus2	node2_clus2
node1		
3/5/2022 19:21:18 -06:00	node2_clus2	node1_clus1
node2		
3/5/2022 19:21:20 -06:00	node2_clus2	node1_clus2

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 e0a
Cluster node1_clus2 169.254.49.125 node1 e0b
Cluster node2_clus1 169.254.47.194 node2 e0a
Cluster node2_clus2 169.254.19.183 node2 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 169.254.47.194 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)

```

Step 2: Configure cables and ports

1. Shut down the ISL ports 1/65 and 1/66 on the Nexus 92300YC switch cs1:

Show example

```

cs1# configure
Enter configuration commands, one per line. End with CNTL/Z.
cs1(config)# interface e1/65-66
cs1(config-if-range)# shutdown
cs1(config-if-range)#

```

2. Remove all of the cables from the Nexus 92300YC cs2 switch, and then connect them to the same ports on the Nexus 92300YC newcs2 switch.
3. Bring up the ISLs ports 1/65 and 1/66 between the cs1 and newcs2 switches, and then verify the port channel operation status.

Port-Channel should indicate Po1(SU) and Member Ports should indicate Eth1/65(P) and Eth1/66(P).

Show example

This example enables ISL ports 1/65 and 1/66 and displays the port channel summary on switch cs1:

```
cs1# configure
Enter configuration commands, one per line. End with CNTL/Z.
cs1(config)# int e1/65-66
cs1(config-if-range)# no shutdown

cs1(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      Eth1/65(P)  Eth1/66(P)

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

4. Verify that port e0b is up on all nodes:

```
network port show ipspace Cluster
```

Show example

The output should be similar to 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
-----
e0a         Cluster   Cluster           up   9000  auto/10000
healthy    false
e0b         Cluster   Cluster           up   9000  auto/10000
healthy    false

Node: node2

Ignore

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

4 entries were displayed.
```

5. 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.

7. Verify that all physical cluster ports are up:

```
network port show ipspace Cluster
```

Show example

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

Node: node1

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: node2

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

4 entries were displayed.
```

Step 3: Complete the procedure

1. 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
node2		
3/5/2022 19:21:20 -06:00	node1_clus2	node2_clus2
node1		
3/5/2022 19:21:18 -06:00	node2_clus2	node1_clus1
node2		
3/5/2022 19:21:20 -06:00	node2_clus2	node1_clus2

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 e0a
Cluster node1_clus2 169.254.49.125 node1 e0b
Cluster node2_clus1 169.254.47.194 node2 e0a
Cluster node2_clus2 169.254.19.183 node2 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 169.254.47.194 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)
```

2. 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

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

	e0a	Cluster	Cluster	up	9000	auto/10000	
healthy		false					
	e0b	Cluster	Cluster	up	9000	auto/10000	
healthy		false					

```
Node: node2
```

```
Ignore
```

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

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

	e0a	Cluster	Cluster	up	9000	auto/10000	
healthy		false					
	e0b	Cluster	Cluster	up	9000	auto/10000	
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

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

	Cluster				
		node1_clus1	up/up	169.254.209.69/16	node1
e0a	true				
		node1_clus2	up/up	169.254.49.125/16	node1

```

e0b      true
          node2_clus1  up/up    169.254.47.194/16  node2
e0a      true
          node2_clus2  up/up    169.254.19.183/16  node2
e0b      true

```

4 entries were displayed.

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

```

Node/      Local  Discovered
Protocol   Port   Device (LLDP: ChassisID)  Interface
Platform
-----
node2      /cdp
          e0a    cs1                        0/2          N9K-
C92300YC
          e0b    newcs2                    0/2          N9K-
C92300YC
node1      /cdp
          e0a    cs1                        0/1          N9K-
C92300YC
          e0b    newcs2                    0/1          N9K-
C92300YC

```

4 entries were displayed.

```
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        144     H           FAS2980
e0a
node2          Eth1/2        145     H           FAS2980
e0a
newcs2 (FDO296348FU)  Eth1/65      176     R S I s     N9K-C92300YC
Eth1/65
newcs2 (FDO296348FU)  Eth1/66      176     R S I s     N9K-C92300YC

```

```
Eth1/66
```

```
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 Port ID	Local Intrfce	Hldtme	Capability	Platform
node1 e0b	Eth1/1	139	H	FAS2980
node2 e0b	Eth1/2	124	H	FAS2980
cs1 (FDO220329KU) Eth1/65	Eth1/65	178	R S I s	N9K-C92300YC
cs1 (FDO220329KU) Eth1/66	Eth1/66	178	R S I s	N9K-C92300YC

```
Total entries displayed: 4
```

What's next?

After you've verified your SSH configuration, you can [configure switch health monitoring](#).

Replace Cisco Nexus 92300YC cluster switches with switchless connections

You can migrate from a cluster with a switched cluster network to one where two nodes are directly connected for ONTAP 9.3 and later.

Review requirements

Guidelines

Review the following guidelines:

- Migrating to a two-node switchless cluster configuration is a nondisruptive operation. Most systems have two dedicated cluster interconnect ports on each node, but you can also use this procedure for systems with a larger number of dedicated cluster interconnect ports on each node, such as four, six or eight.
- You cannot use the switchless cluster interconnect feature with more than two nodes.
- If you have an existing two-node cluster that uses cluster interconnect switches and is running ONTAP 9.3 or later, you can replace the switches with direct, back-to-back connections between the nodes.

Before you begin

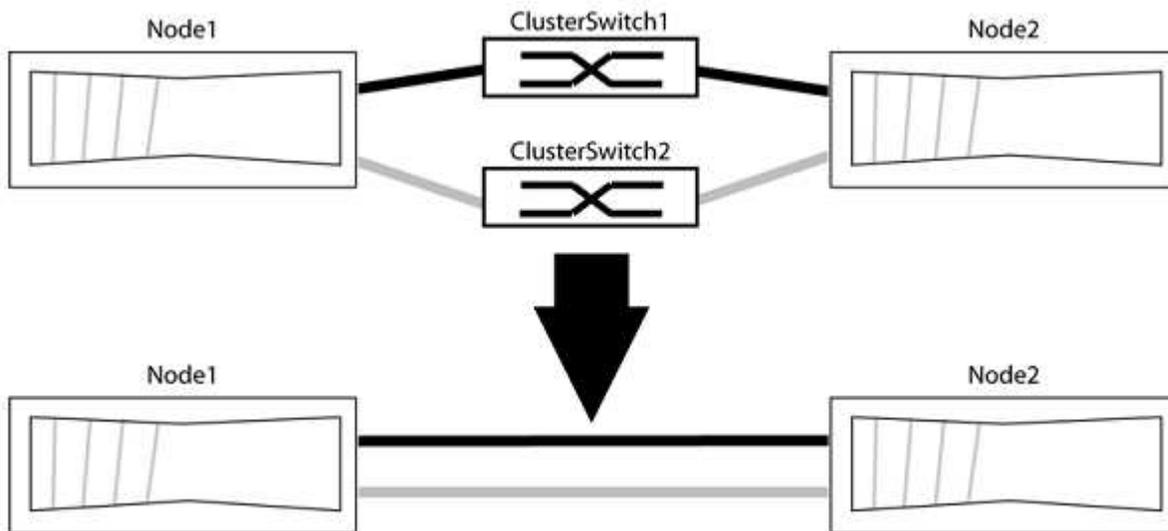
Make sure you have the following:

- A healthy cluster that consists of two nodes connected by cluster switches. The nodes must be running the same ONTAP release.
- Each node with the required number of dedicated cluster ports, which provide redundant cluster interconnect connections to support your system configuration. For example, there are two redundant ports for a system with two dedicated cluster interconnect ports on each node.

Migrate the switches

About this task

The following procedure removes the cluster switches in a two-node cluster and replaces each connection to the switch with a direct connection to the partner node.



About the examples

The examples in the following procedure show nodes that are using "e0a" and "e0b" as cluster ports. Your nodes might be using different cluster ports as they vary by system.

Step 1: Prepare for migration

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

```
set -privilege advanced
```

The advanced prompt `*>` appears.

2. ONTAP 9.3 and later supports automatic detection of switchless clusters, which is enabled by default.

You can verify that detection of switchless clusters is enabled by running the advanced privilege command:

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

Show example

The following example output shows if the option is enabled.

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

If "Enable Switchless Cluster Detection" is `false`, contact NetApp support.

3. 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=<number_of_hours>h
```

where `h` is the duration of the maintenance window in hours. The message notifies technical support of this maintenance task so that they can suppress automatic case creation during the maintenance window.

In the following example, the command suppresses automatic case creation for two hours:

Show example

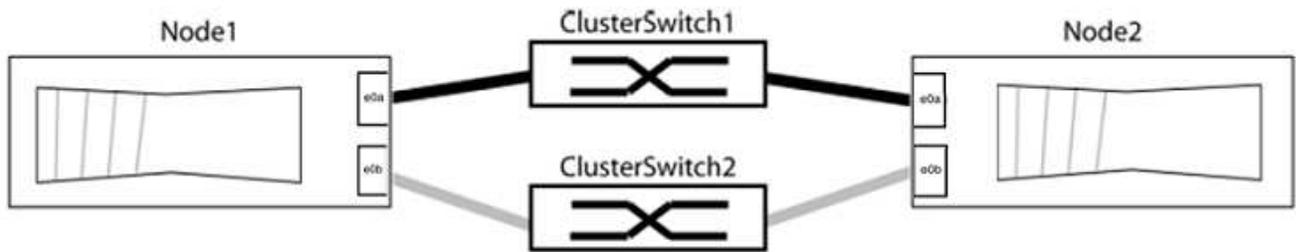
```
cluster::*> system node autosupport invoke -node * -type all
-message MAINT=2h
```

Step 2: Configure ports and cabling

1. Organize the cluster ports on each switch into groups so that the cluster ports in group1 go to cluster switch1 and the cluster ports in group2 go to cluster switch2. These groups are required later in the procedure.
2. Identify the cluster ports and verify link status and health:

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

In the following example for nodes with cluster ports "e0a" and "e0b", one group is identified as "node1:e0a" and "node2:e0a" and the other group as "node1:e0b" and "node2:e0b". Your nodes might be using different cluster ports because they vary by system.



Verify that the ports have a value of `up` for the “Link” column and a value of `healthy` for the “Health Status” column.

Show example

```

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

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

Node: node2

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

3. Confirm that all the cluster LIFs are on their home ports.

Verify that the “is-home” column is true for each of the cluster LIFs:

```
network interface show -vserver Cluster -fields is-home
```

Show example

```
cluster::*> net int show -vserver Cluster -fields is-home
(network interface show)
vserver  lif           is-home
-----  -
Cluster  node1_clus1  true
Cluster  node1_clus2  true
Cluster  node2_clus1  true
Cluster  node2_clus2  true
4 entries were displayed.
```

If there are cluster LIFs that are not on their home ports, revert those LIFs to their home ports:

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

4. Disable auto-revert for the cluster LIFs:

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

5. Verify that all ports listed in the previous step are connected to a network switch:

```
network device-discovery show -port cluster_port
```

The “Discovered Device” column should be the name of the cluster switch that the port is connected to.

Show example

The following example shows that cluster ports "e0a" and "e0b" are correctly connected to cluster switches "cs1" and "cs2".

```
cluster::> network device-discovery show -port e0a|e0b
(network device-discovery show)
Node/      Local  Discovered
Protocol   Port   Device (LLDP: ChassisID)  Interface  Platform
-----
node1/cdp
           e0a    cs1                        0/11       BES-53248
           e0b    cs2                        0/12       BES-53248
node2/cdp
           e0a    cs1                        0/9        BES-53248
           e0b    cs2                        0/9        BES-53248
4 entries were displayed.
```

6. 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 e0a
Cluster node1_clus2 169.254.49.125 node1 e0b
Cluster node2_clus1 169.254.47.194 node2 e0a
Cluster node2_clus2 169.254.19.183 node2 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 169.254.47.194 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)

```

7. Verify that the cluster is healthy:

```
cluster ring show
```

All units must be either master or secondary.

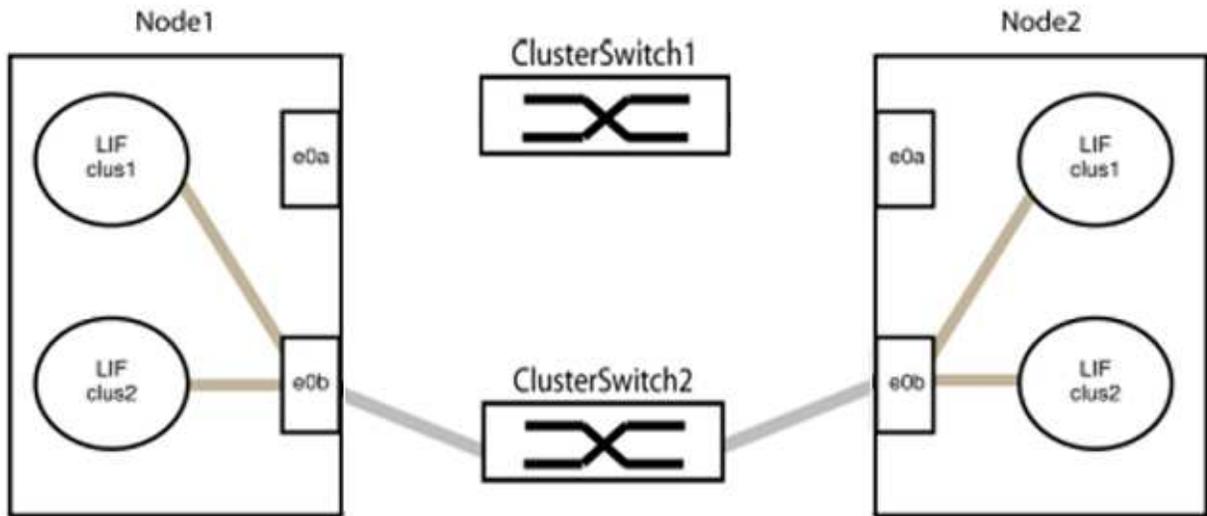
8. Set up the switchless configuration for the ports in group 1.



To avoid potential networking issues, you must disconnect the ports from group1 and reconnect them back-to-back as quickly as possible, for example, **in less than 20 seconds**.

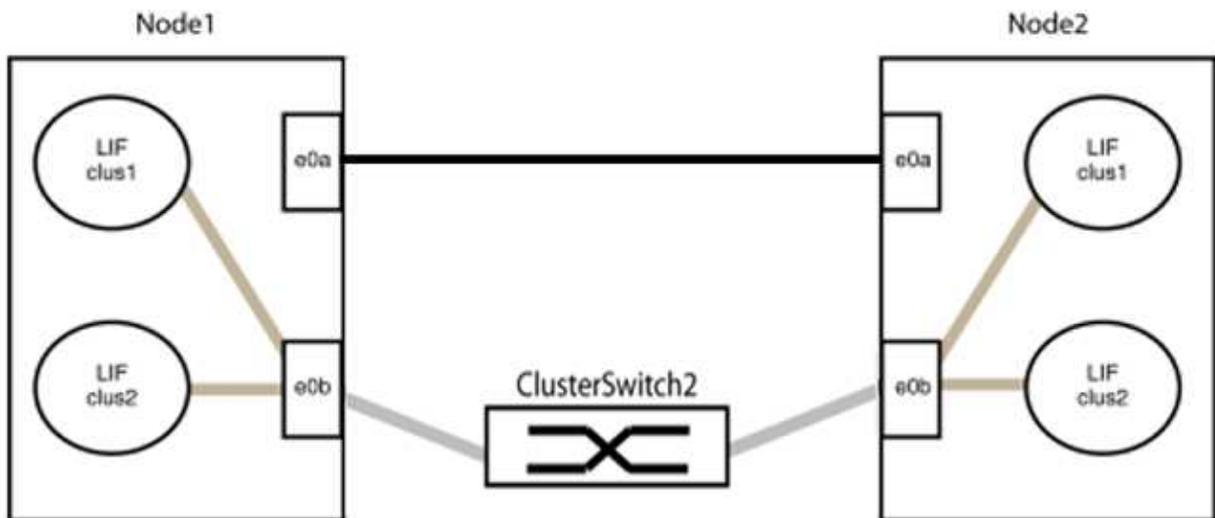
a. Disconnect all the cables from the ports in group1 at the same time.

In the following example, the cables are disconnected from port "e0a" on each node, and cluster traffic continues through the switch and port "e0b" on each node:



b. Cable the ports in group1 back-to-back.

In the following example, "e0a" on node1 is connected to "e0a" on node2:



9. The switchless cluster network option transitions from *false* to *true*. This might take up to 45 seconds. Confirm that the switchless option is set to *true*:

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

The following example shows that the switchless cluster is enabled:

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

10. 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 e0a
Cluster node1_clus2 169.254.49.125 node1 e0b
Cluster node2_clus1 169.254.47.194 node2 e0a
Cluster node2_clus2 169.254.19.183 node2 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 169.254.47.194 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)

```



Before proceeding to the next step, you must wait at least two minutes to confirm a working back-to-back connection on group 1.

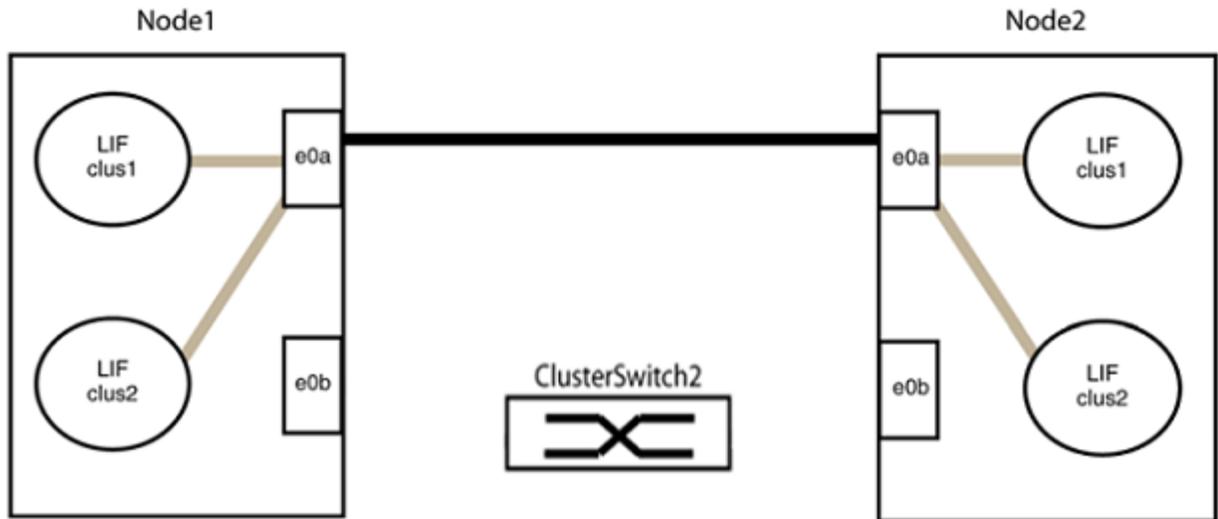
11. Set up the switchless configuration for the ports in group 2.



To avoid potential networking issues, you must disconnect the ports from group2 and reconnect them back-to-back as quickly as possible, for example, **in less than 20 seconds**.

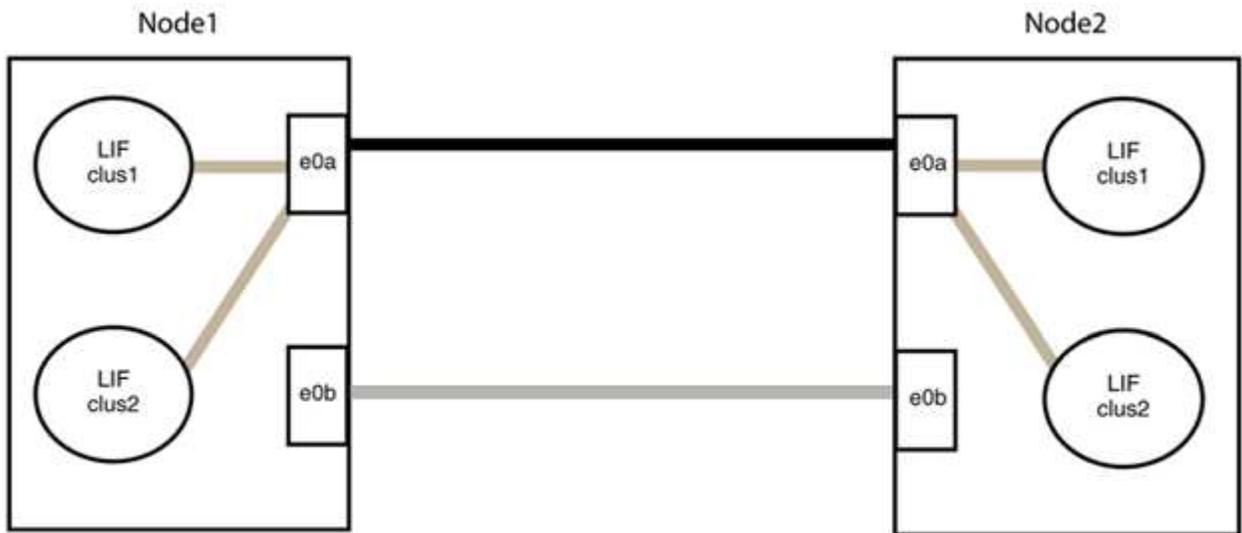
- a. Disconnect all the cables from the ports in group2 at the same time.

In the following example, the cables are disconnected from port "e0b" on each node, and cluster traffic continues through the direct connection between the "e0a" ports:



b. Cable the ports in group2 back-to-back.

In the following example, "e0a" on node1 is connected to "e0a" on node2 and "e0b" on node1 is connected to "e0b" on node2:



Step 3: Verify the configuration

1. Verify that the ports on both nodes are correctly connected:

```
network device-discovery show -port cluster_port
```

Show example

The following example shows that cluster ports "e0a" and "e0b" are correctly connected to the corresponding port on the cluster partner:

```
cluster::> net device-discovery show -port e0a|e0b
(network device-discovery show)
Node/      Local  Discovered
Protocol   Port   Device (LLDP: ChassisID)  Interface  Platform
-----
node1/cdp
          e0a    node2                      e0a        AFF-A300
          e0b    node2                      e0b        AFF-A300
node1/lldp
          e0a    node2 (00:a0:98:da:16:44)  e0a        -
          e0b    node2 (00:a0:98:da:16:44)  e0b        -
node2/cdp
          e0a    node1                      e0a        AFF-A300
          e0b    node1                      e0b        AFF-A300
node2/lldp
          e0a    node1 (00:a0:98:da:87:49)  e0a        -
          e0b    node1 (00:a0:98:da:87:49)  e0b        -
8 entries were displayed.
```

2. Re-enable auto-revert for the cluster LIFs:

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

3. Verify that all LIFs are home. This might take a few seconds.

```
network interface show -vserver Cluster -lif lif_name
```

Show example

The LIFs have been reverted if the “Is Home” column is `true`, as shown for `node1_clus2` and `node2_clus2` in the following example:

```
cluster::> network interface show -vserver Cluster -fields curr-
port,is-home
vserver  lif                curr-port  is-home
-----  -
Cluster  node1_clus1           e0a        true
Cluster  node1_clus2           e0b        true
Cluster  node2_clus1           e0a        true
Cluster  node2_clus2           e0b        true
4 entries were displayed.
```

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
```

4. Check the cluster status of the nodes from the system console of either node:

```
cluster show
```

Show example

The following example shows `epsilon` on both nodes to be `false`:

```
Node  Health  Eligibility  Epsilon
-----  -
node1 true    true        false
node2 true    true        false
2 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 e0a
Cluster node1_clus2 169.254.49.125 node1 e0b
Cluster node2_clus1 169.254.47.194 node2 e0a
Cluster node2_clus2 169.254.19.183 node2 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 169.254.47.194 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. If you suppressed automatic case creation, reenable it by invoking an AutoSupport message:

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

For more information, see [NetApp KB Article 1010449: How to suppress automatic case creation during scheduled maintenance windows](#).

7. Change the privilege level back to admin:

```
set -privilege admin
```

NetApp CN1610

Overview of installation and configuration for NetApp CN1610 switches

The CN1610 is a high bandwidth, managed Layer 2 switch that provides 16 10-Gigabit Small Form-Factor Pluggable Plus (SFP+) ports.

The switch includes redundant power supplies and fan trays that support hot swapping for high availability. This 1U switch can be installed in a standard 19-inch NetApp 42U system cabinet or third-party cabinet.

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

Install and configure workflow for NetApp CN1610 switches

To install and configure a NetApp CN1610 switch on systems running ONTAP, follow these steps:

1. [Install hardware](#)
2. [Install FASTPATH software](#)
3. [Install Reference Configuration file](#)

If the switches are running ONTAP 8.3.1 or later, follow the instructions in [Install FASTPATH and RCFs on switches running ONTAP 8.3.1 and later](#).

4. [Configure switch](#)

Documentation requirements for NetApp CN1610 switches

For NetApp CN1610 switch installation and maintenance, be sure to review all the recommended documentation.

Document title	Description
1G Installation Guide	An overview of the CN1601 switch hardware and software features and installation process.
10G Installation Guide	An overview of the CN1610 switch hardware and software features and describes the features to install the switch and access the CLI.
CN1601 and CN1610 Switch Setup and Configuration Guide	Details how to configure the switch hardware and software for your cluster environment.
CN1601 Switch Administrator's Guide	Provides examples of how to use the CN1601 switch in a typical network. <ul style="list-style-type: none"> • Administrator's Guide • Administrator's Guide, Version 1.1.x.x • Administrator's Guide, Version 1.2.x.x
CN1610 Network Switch CLI Command Reference	Provides detailed information about the command-line interface (CLI) commands you use to configure the CN1601 software. <ul style="list-style-type: none"> • Command Reference • Command Reference, Version 1.1.x.x • Command Reference, Version 1.2.x.x

Install and configure

Install the hardware for the NetApp CN1610 switch

To install the NetApp CN1610 switch hardware, use the instructions in one of the following guides.

- [1G Installation Guide](#).

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

- [10G Installation Guide](#)

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

Install FASTPATH software

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

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 and no defective cluster network interface cards (NICs) or similar issues).
- Fully functional port connections on the cluster switch.
- All cluster ports set up.
- All cluster logical interfaces (LIFs) set up (must not have been migrated).
- A successful communication path: The ONTAP (privilege: advanced) `cluster ping-cluster -node node1` command must indicate that larger than PMTU communication is successful on all paths.
- A supported version of FASTPATH and ONTAP.

Make sure you consult the switch compatibility table on the [NetApp CN1601 and CN1610 Switches](#) page for the supported FASTPATH and ONTAP versions.

Install FASTPATH

The following procedure uses the clustered Data ONTAP 8.2 syntax. As a result, the cluster Vserver, LIF names, and CLI output are different than those in Data ONTAP 8.3.

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

About the examples

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

- The two NetApp switches are `cs1` and `cs2`.

- The two cluster LIFs are clus1 and clus2.
- The Vservers are vs1 and vs2.
- The `cluster::*>` prompt indicates the name of the cluster.
- The cluster ports on each node are named e1a and e2a.

[Hardware Universe](#) has more information about the actual cluster ports that are supported on your platform.

- The supported Inter-Switch Links (ISLs) are ports 0/13 through 0/16.
- The supported node connections are ports 0/1 through 0/12.

Step 1: Migrate cluster

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

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

x is the duration of the maintenance window in hours.



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

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

Show example

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

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

```
network interface migrate
```

Show example

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

4. On the console of each node, verify that the migration took place:

```
network interface show
```

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

Show example

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

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

Step 2: Install FASTPATH software

1. Shut down cluster port e2a on both nodes:

```
network port modify
```

Show example

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

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

2. Verify that port e2a is shut down on both nodes:

```
network port show
```

Show example

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

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

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

Show example

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

4. Back up the current active image on cs2.

Show example

```
(cs2) # show bootvar

Image Descriptions .

  active:
  backup:

Images currently available on Flash

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

      1          1.1.0.3      1.1.0.1      1.1.0.3      1.1.0.3

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

(cs2) #
```

5. Download the image file to the switch.

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

Show example

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

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

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

File transfer operation completed successfully.
```

6. Verify the running version of the FASTPATH software.

```
show version
```

Show example

```
(cs2) # show version

Switch: 1

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

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

```
show bootvar
```

Show example

```
(cs2) # show bootvar
```

```
Image Descriptions
```

```
active :
```

```
backup :
```

```
Images currently available on Flash
```

```
-----  
--  
unit          active      backup      current-active      next-  
active  
-----  
--  
1             1.1.0.3      1.1.0.3      1.1.0.3              1.1.0.5
```

8. Reboot the switch.

```
reload
```

Show example

```
(cs2) # reload
```

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

```
System will now restart!
```

Step 3: Validate installation

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

```
show version
```

Show example

```
(cs2) # show version

Switch: 1

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

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

```
configure
```

Show example

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

3. Verify that the ISLs are operational:

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

The Link State field should indicate Up.

Show example

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

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

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

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

Show example

```
(cs2) # write memory

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

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

Config file 'startup-config' created successfully .

Configuration Saved!
```

5. Enable the second cluster port, e2a, on each node:

```
network port modify
```

Show example

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

6. Revert clus2 that is associated with port e2a:

```
network interface revert
```

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

Show example

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

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

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

Show example

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

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

8. View the status of the nodes:

```
cluster show
```

Show example

```
cluster::> cluster show
```

Node	Health	Eligibility
node1	true	true
node2	true	true

9. Repeat the previous steps to install the FASTPATH software on the other switch, cs1.
10. If you suppressed automatic case creation, re-enable it by invoking an AutoSupport message:

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

Install a Reference Configuration File on a CN1610 switch

Follow this procedure to install a Reference Configuration File (RCF).

Before installing an RCF, you must first migrate the cluster LIFs away from switch cs2. After the RCF is installed and validated, the LIFs can be migrated back.

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 and no defective cluster network interface cards (NICs) or similar issues).
- Fully functional port connections on the cluster switch.
- All cluster ports set up.
- All cluster logical interfaces (LIFs) set up.
- A successful communication path: The ONTAP (privilege: advanced) `cluster ping-cluster -node node1` command must indicate that larger than PMTU communication is successful on all paths.
- A supported version of RCF and ONTAP.

Make sure you consult the switch compatibility table on the [NetApp CN1601 and CN1610 Switches](#) page for the supported RCF and ONTAP versions.

Install the RCF

The following procedure uses the clustered Data ONTAP 8.2 syntax. As a result, the cluster Vserver, LIF names, and CLI output are different than those in Data ONTAP 8.3.

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



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

About the examples

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

- The two NetApp switches are cs1 and cs2.
- The two cluster LIFs are clus1 and clus2.
- The Vservers are vs1 and vs2.
- The `cluster: :*>` prompt indicates the name of the cluster.
- The cluster ports on each node are named e1a and e2a.

[Hardware Universe](#) has more information about the actual cluster ports that are supported on your platform.

- The supported Inter-Switch Links (ISLs) are ports 0/13 through 0/16.
- The supported node connections are ports 0/1 through 0/12.
- A supported version of FASTPATH, RCF, and ONTAP.

Make sure you consult the switch compatibility table on the [NetApp CN1601 and CN1610 Switches](#) page for the supported FASTPATH, RCF, and ONTAP versions.

Step 1: Migrate cluster

1. Save your current switch configuration information:

```
write memory
```

Show example

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

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

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

Config file 'startup-config' created successfully.

Configuration Saved!
```

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

```
network interface migrate
```

Show example

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

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

3. On the console of each node, verify that the migration occurred:

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

Show example

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

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

4. Shut down port e2a on both nodes:

```
network port modify
```

Show example

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

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

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

```
network port show
```

Show example

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

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

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

Show example

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

Step 2: Install RCF

1. Copy the RCF to the switch.



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

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

Show example

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

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

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

Show example

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

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

3. Validate the script.



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

Show example

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

4. Apply the script to the switch.

Show example

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

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

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

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

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

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

6. Save the changes.
7. Set the `running-config` file to be the standard one.

Show example

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

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

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

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

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

Show example

```
(cs2) # reload

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

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

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

Show example

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

10. Verify that the ISLs are operational:

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

The Link State field should indicate Up.

Show example

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

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

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

11. Bring up cluster port e2a on both nodes:

```
network port modify
```

Show example

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

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

Step 3: Validate installation

1. Verify that port e2a is up on both nodes:

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

Show example

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

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

2. On both nodes, revert clus2 that is associated with port e2a:

```
network interface revert
```

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

Show example

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

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

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

Show example

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

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

4. View the status of the node members:

```
cluster show
```

Show example

```
cluster::> cluster show

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

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

Show example

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

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

Config file 'startup-config' created successfully.

Configuration Saved!
```

6. Repeat the previous steps to install the RCF on the other switch, cs1.

What's next?

[Configure switch health monitoring](#)

Install FASTPATH software and RCFs for ONTAP 8.3.1 and later

Follow this procedure to install FASTPATH software and RCFs for ONTAP 8.3.1 and later.

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

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 and no defective cluster network interface cards (NICs) or similar issues).
- Fully functional port connections on the cluster switch.
- All cluster ports set up.
- All cluster logical interfaces (LIFs) set up (must not have been migrated).
- A successful communication path: The ONTAP (privilege: advanced) `cluster ping-cluster -node node1` command must indicate that larger than PMTU communication is successful on all paths.
- A supported version of FASTPATH, RCF, and ONTAP.

Make sure you consult the switch compatibility table on the [NetApp CN1601 and CN1610 Switches](#) page for the supported FASTPATH, RCF, and ONTAP versions.

Install the FASTPATH software

The following procedure uses the clustered Data ONTAP 8.2 syntax. As a result, the cluster Vserver, LIF names, and CLI output are different than those in Data ONTAP 8.3.

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



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

About the examples

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

- The two NetApp switch names are cs1 and cs2.
- The cluster logical interface (LIF) names are node1_clus1 and node1_clus2 for node1, and node2_clus1 and node2_clus2 for node2. (You can have up to 24 nodes in a cluster.)
- The storage virtual machine (SVM) name is Cluster.
- The `cluster1::*>` prompt indicates the name of the cluster.
- The cluster ports on each node are named e0a and e0b.

[Hardware Universe](#) has more information about the actual cluster ports that are supported on your platform.

- The supported Inter-Switch Links (ISLs) are ports 0/13 through 0/16.
- The supported node connections are ports 0/1 through 0/12.

Step 1: Migrate cluster

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

```
network port show -ipspace cluster
```

Show example

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

```
cluster1::> network port show -ip-space cluster
```

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

node1					
	e0a	Cluster	Cluster	up	9000
auto/10000					
	e0b	Cluster	Cluster	up	9000
auto/10000					
node2					
	e0a	Cluster	Cluster	up	9000
auto/10000					
	e0b	Cluster	Cluster	up	9000
auto/10000					

4 entries were displayed.

2. Display information about the LIFs on the cluster:

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

Show example

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

```
cluster1::> network interface show -role cluster
(network interface show)

Current Is
Vserver   Logical   Status   Network   Current
Port      Home
-----
Cluster
e0a       true     node1_clus1  up/up    10.254.66.82/16  node1
e0b       true     node1_clus2  up/up    10.254.206.128/16 node1
e0a       true     node2_clus1  up/up    10.254.48.152/16  node2
e0b       true     node2_clus2  up/up    10.254.42.74/16  node2
4 entries were displayed.
```

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

```
network interface migrate
```

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

Show example

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



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

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

Show example

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

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

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

```
set -privilege advanced
```

The advanced prompt (*>) appears.

6. Shut down cluster port e0b on both nodes:

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

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

Show example

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

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

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

network port show

Show example

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

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

node1					
	e0a	Cluster	Cluster	up	9000
auto/10000					
	e0b	Cluster	Cluster	down	9000
auto/10000					
node2					
	e0a	Cluster	Cluster	up	9000
auto/10000					
	e0b	Cluster	Cluster	down	9000
auto/10000					

4 entries were displayed.

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

Show example

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

9. Back up the current active image on cs2.

Show example

```
(cs2) # show bootvar
```

```
Image Descriptions
```

```
active :
```

```
backup :
```

```
Images currently available on Flash
```

```
-----  
unit      active      backup      current-active      next-active  
-----  
1         1.1.0.5      1.1.0.3      1.1.0.5              1.1.0.5
```

```
(cs2) # copy active backup
```

```
Copying active to backup
```

```
Copy operation successful
```

Step 2: Install the FASTPATH software and RCF

1. Verify the running version of the FASTPATH software.

Show example

```
(cs2) # show version

Switch: 1

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

--More-- or (q)uit

Additional Packages..... FASTPATH QOS
                               FASTPATH IPv6

Management
```

2. Download the image file to the switch.

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

Show example

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

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

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

File transfer operation completed successfully.
```

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

```
show bootvar
```

Show example

```
(cs2) #show bootvar

Image Descriptions

active :
backup :

Images currently available on Flash

-----
unit      active      backup      current-active      next-active
-----
1         1.1.0.8      1.1.0.8      1.1.0.8              1.2.0.7
```

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

If the RCF version is already correct, bring up the ISL ports.

Show example

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

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

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

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

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

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



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

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

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

Show example

```
(cs2) #script list

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

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

6. Apply the script to the switch.

Show example

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

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

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

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

```
show running-config
```

Show example

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

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

Show example

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

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

Config file 'startup-config' created successfully.

Configuration Saved!
```

9. Reboot the switch.

Show example

```
(cs2) #reload

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

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

Step 3: Validate installation

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

Show example

```
(cs2) #show version

Switch: 1

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

Additional Packages..... FASTPATH QOS
                                     FASTPATH IPv6

Management
```

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

2. Bring up the ISL ports on cs1, the active switch.

Show example

```
(cs1) #configure
(cs1) (Config) #interface 0/13-0/16
(cs1) (Interface 0/13-0/16) #no shutdown
(cs1) (Interface 0/13-0/16) #exit
(cs1) (Config) #exit
```

3. Verify that the ISLs are operational:

```
show port-channel 3/1
```

The Link State field should indicate Up.

Show example

```
(cs1) #show port-channel 3/1

Local Interface..... 3/1
Channel Name..... ISL-LAG
Link State..... Up
Admin Mode..... Enabled
Type..... Static
Load Balance Option..... 7
(Enhanced hashing mode)

Mbr      Device/      Port      Port
Ports   Timeout     Speed     Active
-----
0/13    actor/long   10G Full   True
        partner/long
0/14    actor/long   10G Full   True
        partner/long
0/15    actor/long   10G Full   False
        partner/long
0/16    actor/long   10G Full   True
        partner/long
```

4. Bring up cluster port e0b on all nodes:

```
network port modify
```

You must enter the commands on the controller consoles that own the respective cluster LIFs.

Show example

The following example shows port e0b being brought up on node1 and node2:

```
cluster1::*> network port modify -node node1 -port e0b -up-admin
true
cluster1::*> network port modify -node node2 -port e0b -up-admin
true
```

5. Verify that the port e0b is up on all nodes:

```
network port show -ip-space cluster
```

Show example

```
cluster1::*> network port show -ip-space cluster
```

(Mbps)					Speed
Node	Port	IPspace	Broadcast Domain	Link	MTU
Admin/Oper					

node1					
	e0a	Cluster	Cluster	up	9000
auto/10000					
	e0b	Cluster	Cluster	up	9000
auto/10000					
node2					
	e0a	Cluster	Cluster	up	9000
auto/10000					
	e0b	Cluster	Cluster	up	9000
auto/10000					

4 entries were displayed.

6. Verify that the LIF is now home (`true`) on both nodes:

```
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				
e0a	node1_clus1	up/up	169.254.66.82/16	node1
e0b	true			
e0a	node1_clus2	up/up	169.254.206.128/16	node1
e0b	true			
e0a	node2_clus1	up/up	169.254.48.152/16	node2
e0b	true			
e0a	node2_clus2	up/up	169.254.42.74/16	node2
e0b	true			

4 entries were displayed.

7. Show the status of the node members:

```
cluster show
```

Show example

```
cluster1::*> cluster show
```

Node	Health	Eligibility	Epsilon

node1	true	true	false
node2	true	true	false

2 entries were displayed.

8. Return to the admin privilege level:

```
set -privilege admin
```

9. Repeat the previous steps to install the FASTPATH software and RCF on the other switch, cs1.

Configure the hardware for the NetApp CN1610 switch

To configure the switch hardware and software for your cluster environment, refer to the

Migrate switches

Migrate from a switchless cluster environment to a switched NetApp CN1610 cluster environment

If you have an existing two-node switchless cluster environment, you can migrate to a two-node switched cluster environment using CN1610 cluster network switches that enables you to scale beyond two nodes.

Review requirements

Before you begin

Make sure you have the following:

For a two-node switchless configuration, ensure that:

- The two-node switchless configuration is properly set up and functioning.
- The nodes are running ONTAP 8.2 or 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 CN1610 cluster switch configuration:

- The CN1610 cluster switch infrastructure are fully functional on both switches.
- Both switches have management network connectivity.
- There is console access to the cluster switches.
- CN1610 node-to-node switch and switch-to-switch connections use twinax or fiber cables.

The [Hardware Universe](#) contains more information about cabling.

- Inter-Switch Link (ISL) cables are connected to ports 13 through 16 on both CN1610 switches.
- Initial customization of both the CN1610 switches are completed.

Any previous site customization, such as SMTP, SNMP, and SSH should be copied to the new switches.

Related information

- [Hardware Universe](#)
- [NetApp CN1601 and CN1610](#)
- [CN1601 and CN1610 Switch Setup and Configuration](#)
- [NetApp KB Article 1010449: How to suppress automatic case creation during scheduled maintenance windows](#)

Migrate the switches

About the examples

The examples in this procedure use the following cluster switch and node nomenclature:

- The names of the CN1610 switches are cs1 and cs2.
- The names of the LIFs are clus1 and clus2.
- The names of the nodes are node1 and node2.
- The `cluster::*>` prompt indicates the name of the cluster.
- The cluster ports used in this procedure are e1a and e2a.

The [Hardware Universe](#) contains the latest information about the actual cluster ports for your platforms.

Step 1: Prepare for migration

1. Change the privilege level to advanced, entering `y` when prompted to continue:

```
set -privilege advanced
```

The advanced prompt (`*>`) appears.

2. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all -message MAINT=xh
```

`x` is the duration of the maintenance window in hours.



The AutoSupport message notifies technical support of this maintenance task so that automatic case creation is suppressed during the maintenance window.

Show example

The following command suppresses automatic case creation for two hours:

```
cluster::*> system node autosupport invoke -node * -type all
-message MAINT=2h
```

Step 2: Configure ports

1. Disable all of the node-facing ports (not ISL ports) on both the new cluster switches cs1 and cs2.

You must not disable the ISL ports.

Show example

The following example shows that node-facing ports 1 through 12 are disabled on switch cs1:

```
(cs1)> enable
(cs1)# configure
(cs1) (Config)# interface 0/1-0/12
(cs1) (Interface 0/1-0/12)# shutdown
(cs1) (Interface 0/1-0/12)# exit
(cs1) (Config)# exit
```

The following example shows that node-facing ports 1 through 12 are disabled on switch cs2:

```
(c2)> enable
(cs2)# configure
(cs2) (Config)# interface 0/1-0/12
(cs2) (Interface 0/1-0/12)# shutdown
(cs2) (Interface 0/1-0/12)# exit
(cs2) (Config)# exit
```

2. Verify that the ISL and the physical ports on the ISL between the two CN1610 cluster switches cs1 and cs2 are up:

```
show port-channel
```

Show example

The following example shows that the ISL ports are up on switch cs1:

```
(cs1)# show port-channel 3/1
Local Interface..... 3/1
Channel Name..... ISL-LAG
Link State..... Up
Admin Mode..... Enabled
Type..... Static
Load Balance Option..... 7
(Enhanced hashing mode)

Mbr      Device/      Port      Port
Ports   Timeout     Speed     Active
-----
0/13    actor/long   10G Full   True
        partner/long
0/14    actor/long   10G Full   True
        partner/long
0/15    actor/long   10G Full   True
        partner/long
0/16    actor/long   10G Full   True
        partner/long
```

The following example shows that the ISL ports are up on switch cs2:

```
(cs2)# show port-channel 3/1
Local Interface..... 3/1
Channel Name..... ISL-LAG
Link State..... Up
Admin Mode..... Enabled
Type..... Static
Load Balance Option..... 7
(Enhanced hashing mode)
```

Mbr	Device/	Port	Port
Ports	Timeout	Speed	Active
-----	-----	-----	-----
0/13	actor/long	10G Full	True
	partner/long		
0/14	actor/long	10G Full	True
	partner/long		
0/15	actor/long	10G Full	True
	partner/long		
0/16	actor/long	10G Full	True
	partner/long		

3. Display the list of neighboring devices:

```
show isdp 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 isdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route
Bridge,
                S - Switch, H - Host, I - IGMP, r - Repeater
Device ID      Intf      Holdtime  Capability  Platform
Port ID
-----
cs2            0/13     11        S           CN1610
0/13
cs2            0/14     11        S           CN1610
0/14
cs2            0/15     11        S           CN1610
0/15
cs2            0/16     11        S           CN1610
0/16
```

The following example lists the neighboring devices on switch cs2:

```
(cs2)# show isdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route
Bridge,
                S - Switch, H - Host, I - IGMP, r - Repeater
Device ID      Intf      Holdtime  Capability  Platform
Port ID
-----
cs1            0/13     11        S           CN1610
0/13
cs1            0/14     11        S           CN1610
0/14
cs1            0/15     11        S           CN1610
0/15
cs1            0/16     11        S           CN1610
0/16
```

4. Display the list of cluster ports:

```
network port show
```

Show example

The following example shows the available cluster ports:

```
cluster::*> network port show -ipspace Cluster
```

```
Node: node1
```

```
Ignore
```

Health					Speed(Mbps)	Health	
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							
-----	-----	-----	-----	-----	-----	-----	-----
e0a	Cluster	Cluster		up	9000	auto/10000	
healthy	false						
e0b	Cluster	Cluster		up	9000	auto/10000	
healthy	false						
e0c	Cluster	Cluster		up	9000	auto/10000	
healthy	false						
e0d	Cluster	Cluster		up	9000	auto/10000	
healthy	false						
e4a	Cluster	Cluster		up	9000	auto/10000	
healthy	false						
e4b	Cluster	Cluster		up	9000	auto/10000	
healthy	false						

```
Node: node2
```

```
Ignore
```

Health					Speed(Mbps)	Health	
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							
-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----
e0a	Cluster	Cluster		up	9000	auto/10000	
healthy	false						
e0b	Cluster	Cluster		up	9000	auto/10000	
healthy	false						
e0c	Cluster	Cluster		up	9000	auto/10000	
healthy	false						
e0d	Cluster	Cluster		up	9000	auto/10000	
healthy	false						
e4a	Cluster	Cluster		up	9000	auto/10000	
healthy	false						
e4b	Cluster	Cluster		up	9000	auto/10000	
healthy	false						

```
12 entries were displayed.
```

5. Verify that each cluster port is connected to the corresponding port on its partner cluster node:

```
run * cdpd show-neighbors
```

Show example

The following example shows that cluster ports e1a and e2a are connected to the same port on their cluster partner node:

```
cluster::*> run * cdpd show-neighbors
2 entries were acted on.

Node: node1
Local Remote Remote Remote Remote Hold
Remote
Port Device Interface Platform Time
Capability
-----
-----
e1a node2 e1a FAS3270 137
H
e2a node2 e2a FAS3270 137
H

Node: node2
Local Remote Remote Remote Remote Hold
Remote
Port Device Interface Platform Time
Capability
-----
-----
e1a node1 e1a FAS3270 161
H
e2a node1 e2a FAS3270 161
H
```

6. Verify that all of the cluster LIFs are up and operational:

```
network interface show -vserver Cluster
```

Each cluster LIF should display `true` in the “Is Home” column.

Show example

```
cluster::*> network interface show -vserver Cluster
          Logical   Status   Network   Current
Current Is
Vserver   Interface  Admin/Oper Address/Mask Node      Port
Home
-----
node1
true      clus1      up/up    10.10.10.1/16 node1     e1a
true      clus2      up/up    10.10.10.2/16 node1     e2a
node2
true      clus1      up/up    10.10.11.1/16 node2     e1a
true      clus2      up/up    10.10.11.2/16 node2     e2a

4 entries were displayed.
```



The following modification and migration commands in steps 10 through 13 must be done from the local node.

7. Verify that all cluster ports are up:

```
network port show -ipSPACE Cluster
```

Show example

```
cluster::*> network port show -ipSpace Cluster
```

(Mbps)					Auto-Negot	Duplex	Speed
Node	Port	Role	Link	MTU	Admin/Oper	Admin/Oper	
Admin/Oper							

node1							
	e1a	clus1	up	9000	true/true	full/full	
auto/10000							
	e2a	clus2	up	9000	true/true	full/full	
auto/10000							
node2							
	e1a	clus1	up	9000	true/true	full/full	
auto/10000							
	e2a	clus2	up	9000	true/true	full/full	
auto/10000							

4 entries were displayed.

8. Set the `-auto-revert` parameter to `false` on cluster LIFs `clus1` and `clus2` on both nodes:

```
network interface modify
```

Show example

```
cluster::*> network interface modify -vserver node1 -lif clus1 -auto-revert false
cluster::*> network interface modify -vserver node1 -lif clus2 -auto-revert false
cluster::*> network interface modify -vserver node2 -lif clus1 -auto-revert false
cluster::*> network interface modify -vserver node2 -lif clus2 -auto-revert false
```



For release 8.3 and later, use the following command: `network interface modify -vserver Cluster -lif * -auto-revert false`

9. 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 e0a
Cluster node1_clus2 169.254.49.125 node1 e0b
Cluster node2_clus1 169.254.47.194 node2 e0a
Cluster node2_clus2 169.254.19.183 node2 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 169.254.47.194 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)

```

10. Migrate clus1 to port e2a on the console of each node:

```
network interface migrate
```

Show example

The following example shows the process for migrating clus1 to port e2a on node1 and node2:

```

cluster::*> network interface migrate -vserver node1 -lif clus1
-source-node node1 -dest-node node1 -dest-port e2a
cluster::*> network interface migrate -vserver node2 -lif clus1
-source-node node2 -dest-node node2 -dest-port e2a

```



For release 8.3 and later, use the following command: `network interface migrate -vserver Cluster -lif clus1 -destination-node node1 -destination-port e2a`

11. Verify that the migration took place:

```
network interface show -vserver Cluster
```

Show example

The following example verifies that clus1 is migrated to port e2a on node1 and node2:

```
cluster::*> network interface show -vserver Cluster
      Logical   Status   Network   Current
Current Is
Vserver   Interface  Admin/Oper Address/Mask  Node        Port
Home
-----
-----
node1
false     clus1      up/up     10.10.10.1/16  node1       e2a
true      clus2      up/up     10.10.10.2/16  node1       e2a
node2
false     clus1      up/up     10.10.11.1/16  node2       e2a
true      clus2      up/up     10.10.11.2/16  node2       e2a

4 entries were displayed.
```

12. Shut down cluster port e1a on both nodes:

```
network port modify
```

Show example

The following example shows how to shut down the port e1a on node1 and node2:

```
cluster::*> network port modify -node node1 -port e1a -up-admin
false
cluster::*> network port modify -node node2 -port e1a -up-admin
false
```

13. Verify the port status:

```
network port show
```

Show example

The following example shows that port e1a is down on node1 and node2:

```
cluster::*> network port show -role cluster

                                     Auto-Negot  Duplex      Speed
(Mbps)
Node  Port  Role      Link  MTU  Admin/Oper  Admin/Oper
Admin/Oper
-----
node1
      e1a  clus1    down  9000  true/true   full/full
auto/10000
      e2a  clus2    up    9000  true/true   full/full
auto/10000
node2
      e1a  clus1    down  9000  true/true   full/full
auto/10000
      e2a  clus2    up    9000  true/true   full/full
auto/10000

4 entries were displayed.
```

14. Disconnect the cable from cluster port e1a on node1, and then connect e1a to port 1 on cluster switch cs1, using the appropriate cabling supported by the CN1610 switches.

The [Hardware Universe](#) contains more information about cabling.

15. Disconnect the cable from cluster port e1a on node2, and then connect e1a to port 2 on cluster switch cs1, using the appropriate cabling supported by the CN1610 switches.
16. Enable all of the node-facing ports on cluster switch cs1.

Show example

The following example shows that ports 1 through 12 are enabled on switch cs1:

```
(cs1)# configure
(cs1)(Config)# interface 0/1-0/12
(cs1)(Interface 0/1-0/12)# no shutdown
(cs1)(Interface 0/1-0/12)# exit
(cs1)(Config)# exit
```

17. Enable the first cluster port e1a on each node:

```
network port modify
```

Show example

The following example shows how to enable the port e1a on node1 and node2:

```
cluster::*> network port modify -node node1 -port e1a -up-admin true
cluster::*> network port modify -node node2 -port e1a -up-admin true
```

18. Verify that all of the cluster ports are up:

```
network port show -ipSpace Cluster
```

Show example

The following example shows that all of the cluster ports are up on node1 and node2:

```
cluster::*> network port show -ipSpace Cluster
                                     Auto-Negot Duplex      Speed
(Mbps)
Node  Port  Role      Link  MTU Admin/Oper Admin/Oper
Admin/Oper
-----
-----
node1
   e1a  clus1    up    9000 true/true  full/full
auto/10000
   e2a  clus2    up    9000 true/true  full/full
auto/10000
node2
   e1a  clus1    up    9000 true/true  full/full
auto/10000
   e2a  clus2    up    9000 true/true  full/full
auto/10000

4 entries were displayed.
```

19. Revert clus1 (which was previously migrated) to e1a on both nodes:

```
network interface revert
```

Show example

The following example shows how to revert clus1 to the port e1a on node1 and node2:

```
cluster::*> network interface revert -vserver node1 -lif clus1
cluster::*> network interface revert -vserver node2 -lif clus1
```



For release 8.3 and later, use the following command: `network interface revert -vserver Cluster -lif <nodename_clus<N>>`

20. Verify that all of the cluster LIFs are up, operational, and display as true in the "Is Home" column:

```
network interface show -vserver Cluster
```

Show example

The following example shows that all of the LIFs are up on node1 and node2 and that the "Is Home" column results are true:

```
cluster::*> network interface show -vserver Cluster
      Logical      Status      Network      Current
Current Is
Vserver  Interface  Admin/Oper  Address/Mask  Node      Port
Home
-----
node1
      clus1      up/up      10.10.10.1/16  node1      e1a
true
      clus2      up/up      10.10.10.2/16  node1      e2a
true
node2
      clus1      up/up      10.10.11.1/16  node2      e1a
true
      clus2      up/up      10.10.11.2/16  node2      e2a
true

4 entries were displayed.
```

21. 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:

```
cluster::*> cluster show
Node           Health Eligibility  Epsilon
-----
node1          true   true         false
node2          true   true         false
```

22. Migrate clus2 to port e1a on the console of each node:

```
network interface migrate
```

Show example

The following example shows the process for migrating clus2 to port e1a on node1 and node2:

```
cluster::*> network interface migrate -vserver node1 -lif clus2
-source-node node1 -dest-node node1 -dest-port e1a
cluster::*> network interface migrate -vserver node2 -lif clus2
-source-node node2 -dest-node node2 -dest-port e1a
```



For release 8.3 and later, use the following command: `network interface migrate -vserver Cluster -lif node1_clus2 -dest-node node1 -dest-port e1a`

23. Verify that the migration took place:

```
network interface show -vserver Cluster
```

Show example

The following example verifies that clus2 is migrated to port e1a on node1 and node2:

```
cluster::*> network interface show -vserver Cluster
          Logical   Status   Network   Current
Current Is
Vserver   Interface  Admin/Oper  Address/Mask  Node      Port
Home
-----
node1
true      clus1      up/up      10.10.10.1/16  node1     e1a
false     clus2      up/up      10.10.10.2/16  node1     e1a
node2
true      clus1      up/up      10.10.11.1/16  node2     e1a
false     clus2      up/up      10.10.11.2/16  node2     e1a

4 entries were displayed.
```

24. Shut down cluster port e2a on both nodes:

```
network port modify
```

Show example

The following example shows how to shut down the port e2a on node1 and node2:

```
cluster::*> network port modify -node node1 -port e2a -up-admin
false
cluster::*> network port modify -node node2 -port e2a -up-admin
false
```

25. Verify the port status:

```
network port show
```

Show example

The following example shows that port e2a is down on node1 and node2:

```
cluster::*> network port show -role cluster

                                     Auto-Negot   Duplex       Speed
(Mbps)
Node   Port   Role           Link   MTU Admin/Oper   Admin/Oper
Admin/Oper
-----
node1
      e1a   clus1         up     9000  true/true   full/full
auto/10000
      e2a   clus2         down   9000  true/true   full/full
auto/10000
node2
      e1a   clus1         up     9000  true/true   full/full
auto/10000
      e2a   clus2         down   9000  true/true   full/full
auto/10000

4 entries were displayed.
```

26. Disconnect the cable from cluster port e2a on node1, and then connect e2a to port 1 on cluster switch cs2, using the appropriate cabling supported by the CN1610 switches.
27. Disconnect the cable from cluster port e2a on node2, and then connect e2a to port 2 on cluster switch cs2, using the appropriate cabling supported by the CN1610 switches.
28. Enable all of the node-facing ports on cluster switch cs2.

Show example

The following example shows that ports 1 through 12 are enabled on switch cs2:

```
(cs2)# configure
(cs2)(Config)# interface 0/1-0/12
(cs2)(Interface 0/1-0/12)# no shutdown
(cs2)(Interface 0/1-0/12)# exit
(cs2)(Config)# exit
```

29. Enable the second cluster port e2a on each node.

Show example

The following example shows how to enable the port e2a on node1 and node2:

```
cluster::*> network port modify -node node1 -port e2a -up-admin true
cluster::*> network port modify -node node2 -port e2a -up-admin true
```

30. Verify that all of the cluster ports are up:

```
network port show -ipSPACE Cluster
```

Show example

The following example shows that all of the cluster ports are up on node1 and node2:

```
cluster::*> network port show -ipSPACE Cluster
                                     Auto-Negot Duplex      Speed
(Mbps)
Node  Port  Role      Link  MTU Admin/Oper  Admin/Oper
Admin/Oper
-----
node1
      e1a  clus1    up    9000 true/true   full/full
auto/10000
      e2a  clus2    up    9000 true/true   full/full
auto/10000
node2
      e1a  clus1    up    9000 true/true   full/full
auto/10000
      e2a  clus2    up    9000 true/true   full/full
auto/10000

4 entries were displayed.
```

31. Revert clus2 (which was previously migrated) to e2a on both nodes:

```
network interface revert
```

Show example

The following example shows how to revert clus2 to the port e2a on node1 and node2:

```
cluster::*> network interface revert -vserver node1 -lif clus2
cluster::*> network interface revert -vserver node2 -lif clus2
```



For release 8.3 and later, the commands are: `cluster::*> network interface revert -vserver Cluster -lif node1_clus2` and `cluster::*> network interface revert -vserver Cluster -lif node2_clus2`

Step 3: Complete the configuration

1. Verify that all of the interfaces display `true` in the "Is Home" column:

```
network interface show -vserver Cluster
```

Show example

The following example shows that all of the LIFs are up on node1 and node2 and that the "Is Home" column results are true:

```
cluster::*> network interface show -vserver Cluster
```

Current Is	Logical	Status	Network	Current
Vserver	Interface	Admin/Oper	Address/Mask	Node
Port	Home			

node1				
e1a	clus1	up/up	10.10.10.1/16	node1
e2a	clus2	up/up	10.10.10.2/16	node1
node2				
e1a	clus1	up/up	10.10.11.1/16	node2
e2a	clus2	up/up	10.10.11.2/16	node2

2. 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 e0a
Cluster node1_clus2 169.254.49.125 node1 e0b
Cluster node2_clus1 169.254.47.194 node2 e0a
Cluster node2_clus2 169.254.19.183 node2 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 169.254.47.194 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)
```

3. Verify that both nodes have two connections to each switch:

```
show isdp neighbors
```

Show example

The following example shows the appropriate results for both switches:

```
(cs1)# show isdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route
Bridge,
                S - Switch, H - Host, I - IGMP, r - Repeater
Device ID      Intf      Holdtime  Capability  Platform
Port ID
-----
node1          0/1       132       H           FAS3270
e1a
node2          0/2       163       H           FAS3270
e1a
cs2            0/13      11        S           CN1610
0/13
cs2            0/14      11        S           CN1610
0/14
cs2            0/15      11        S           CN1610
0/15
cs2            0/16      11        S           CN1610
0/16

(cs2)# show isdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route
Bridge,
                S - Switch, H - Host, I - IGMP, r - Repeater
Device ID      Intf      Holdtime  Capability  Platform
Port ID
-----
node1          0/1       132       H           FAS3270
e2a
node2          0/2       163       H           FAS3270
e2a
cs1            0/13      11        S           CN1610
0/13
cs1            0/14      11        S           CN1610
0/14
cs1            0/15      11        S           CN1610
0/15
cs1            0/16      11        S           CN1610
0/16
```

4. Display information about the devices in your configuration:

```
network device discovery show
```

5. Disable the two-node switchless configuration settings on both nodes using the advanced privilege command:

```
network options detect-switchless modify
```

Show example

The following example shows how to disable the switchless configuration settings:

```
cluster::*> network options detect-switchless modify -enabled false
```



For release 9.2 and later, skip this step since the configuration is automatically converted.

6. Verify that the settings are disabled:

```
network options detect-switchless-cluster show
```

Show example

The false output in the following example shows that the configuration settings are disabled:

```
cluster::*> network options detect-switchless-cluster show
Enable Switchless Cluster Detection: false
```



For release 9.2 and later, wait until `Enable Switchless Cluster` is set to false. This can take up to three minutes.

7. Configure clusters `clus1` and `clus2` to auto revert on each node and confirm.

Show example

```
cluster::*> network interface modify -vserver node1 -lif clus1 -auto
-revert true
cluster::*> network interface modify -vserver node1 -lif clus2 -auto
-revert true
cluster::*> network interface modify -vserver node2 -lif clus1 -auto
-revert true
cluster::*> network interface modify -vserver node2 -lif clus2 -auto
-revert true
```



For release 8.3 and later, use the following command: `network interface modify -vserver Cluster -lif * -auto-revert true` to enable auto-revert on all nodes in the cluster.

8. 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:

```
cluster::*> cluster show
Node                Health  Eligibility  Epsilon
-----
node1                true    true         false
node2                true    true         false
```

9. If you suppressed automatic case creation, reenable it by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all -message MAINT=END
```

Show example

```
cluster::*> system node autosupport invoke -node * -type all
-messsage MAINT=END
```

10. Change the privilege level back to admin:

```
set -privilege admin
```

Replace switches

Replace a NetApp CN1610 cluster switch

Follow these steps to replace a defective NetApp CN1610 switch in a cluster network. This is a non-disruptive procedure (NDU).

Review requirements

Before you begin

Before you perform the switch replacement, the following conditions must exist before you perform the switch replacement in the current environment and on the replacement switch for existing cluster and network infrastructure:

- The existing cluster must be verified as completely functional, with at least one fully connected cluster switch.
- All of the cluster ports must be **up**.
- All of the cluster logical interfaces (LIFs) must be up and must not have been migrated.
- The ONTAP cluster `ping-cluster -node node1` command must indicate that basic connectivity and larger than PMTU communication are successful on all of the paths.

Enable console logging

NetApp strongly recommends that you enable console logging on the devices that you are using and take the following actions when replacing your switch:

- Leave AutoSupport enabled during maintenance.
- Trigger a maintenance AutoSupport before and after maintenance to disable case creation for the duration of the maintenance. See this Knowledge Base article [SU92: How to suppress automatic case creation during scheduled maintenance windows](#) for further details.
- Enable session logging for any CLI sessions. For instructions on how to enable session logging, review the "Logging Session Output" section in this Knowledge Base article [How to configure PuTTY for optimal connectivity to ONTAP systems](#).

Replace the switch

About this task

You must execute the command for migrating a cluster LIF from the node where the cluster LIF is hosted.

The examples in this procedure use the following cluster switch and node nomenclature:

- The names of the two CN1610 cluster switches are `cs1` and `cs2`.
- The name of the CN1610 switch that is to be replaced (the defective switch) is `old_cs1`.
- The name of the new CN1610 switch (the replacement switch) is `new_cs1`.
- The name of the partner switch that is not being replaced is `cs2`.

Steps

1. Confirm that the startup configuration file matches the running configuration file. You must save these files locally for use during the replacement.

The configuration commands in the following example are for FASTPATH 1.2.0.7:

Show example

```
(old_cs1) > enable
(old_cs1) # show running-config
(old_cs1) # show startup-config
```

2. Create a copy of the running configuration file.

The command in the following example is for FASTPATH 1.2.0.7:

Show example

```
(old_cs1)# show running-config filename.scr  
Config script created successfully.
```



You can use any file name except `CN1610_CS_RCF_v1.2.scr`. The file name must have the `.scr` extension.

3. Save the running configuration file of the switch to an external host in preparation for the replacement.

Show example

```
(old_cs1)# copy nvram:script filename.scr  
scp://<Username>@<remote_IP_address>/path_to_file/filename.scr
```

4. Verify that the switch and ONTAP versions match in the compatibility matrix. See the [NetApp CN1601 and CN1610 Switches](#) page for details.
5. From the [Software Downloads page](#) on the NetApp Support Site, select NetApp Cluster Switches to download the appropriate RCF and FASTPATH versions.
6. Set up a Trivial File Transfer Protocol (TFTP) server with the FASTPATH, RCF, and saved configuration `.scr` file for use with the new switch.
7. Connect the serial port (the RJ-45 connector labeled “IOIOI” on the right side of the switch) to an available host with terminal emulation.
8. On the host, set the serial terminal connection settings:
 - a. 9600 baud
 - b. 8 data bits
 - c. 1 stop bit
 - d. parity: none
 - e. flow control: none
9. Connect the management port (the RJ-45 wrench port on the left side of the switch) to the same network where your TFTP server is located.
10. Prepare to connect to the network with the TFTP server.

If you are using Dynamic Host Configuration Protocol (DHCP), you do not have to configure an IP address for the switch at this time. The service port is set to use DHCP by default. The network management port is set to none for the IPv4 and IPv6 protocol settings. If your wrench port is connected to a network that has a DHCP server, then the server settings are configured automatically.

To set a static IP address, you should use the `serviceport protocol`, `network protocol`, and `serviceport ip` commands.

Show example

```
(new_cs1) # serviceport ip <ipaddr> <netmask> <gateway>
```

11. Optionally, if the TFTP server is on a laptop, then connect the CN1610 switch to the laptop by using a standard Ethernet cable, and then configure its network port in the same network with an alternate IP address.

You can use the `ping` command to verify the address. If you are unable to establish the connectivity, you should use a nonrouted network, and configure the service port using IP 192.168.x or 172.16.x. You can reconfigure the service port to the production management IP address at a later date.

12. Optionally, verify and install the appropriate versions of the RCF and FASTPATH software for the new switch. If you have verified that the new switch is correctly set up and does not require updates to the RCF and FASTPATH software, you should go to step 13.
 - a. Verify the new switch settings.

Show example

```
(new_cs1) > enable  
(new_cs1) # show version
```

- b. Download the RCF to the new switch.

Show example

```
(new_cs1)# copy tftp://<server_ip_address>/CN1610_CS_RCF_v1.2.txt
nvram:script CN1610_CS_RCF_v1.2.scr
Mode.      TFTP
Set Server IP.  172.22.201.50
Path.      /
Filename.....
CN1610_CS_RCF_v1.2.txt
Data Type..... Config Script
Destination Filename.....
CN1610_CS_RCF_v1.2.scr
File with same name already exists.
WARNING:Continuing with this command will overwrite the existing
file.

Management access will be blocked for the duration of the
transfer Are you sure you want to start? (y/n) y

File transfer in progress. Management access will be blocked for
the duration of the transfer. please wait...
Validating configuration script...
(the entire script is displayed line by line)
...
description "NetApp CN1610 Cluster Switch RCF v1.2 - 2015-01-13"
...
Configuration script validated.
File transfer operation completed successfully.
```

- c. Verify that the RCF is downloaded to the switch.

Show example

```
(new_cs1)# script list
Configuration Script Nam    Size(Bytes)
-----
CN1610_CS_RCF_v1.1.scr      2191
CN1610_CS_RCF_v1.2.scr      2240
latest_config.scr           2356

4 configuration script(s) found.
2039 Kbytes free.
```

13. Apply the RCF to the CN1610 switch.

Show example

```
(new_cs1)# script apply CN1610_CS_RCF_v1.2.scr
Are you sure you want to apply the configuration script? (y/n) y
...
(the entire script is displayed line by line)
...
description "NetApp CN1610 Cluster Switch RCF v1.2 - 2015-01-13"
...
Configuration script 'CN1610_CS_RCF_v1.2.scr' applied. Note that the
script output will go to the console.
After the script is applied, those settings will be active in the
running-config file. To save them to the startup-config file, you
must use the write memory command, or if you used the reload answer
yes when asked if you want to save the changes.
```

a. Save the running configuration file so that it becomes the startup configuration file when you reboot the switch.

Show example

```
(new_cs1)# write memory
This operation may take a few minutes.
Management interfaces will not be available during this time.

Are you sure you want to save? (y/n) y

Config file 'startup-config' created successfully.

Configuration Saved!
```

b. Download the image to the CN1610 switch.

Show example

```
(new_cs1)# copy
tftp://<server_ip_address>/NetApp_CN1610_1.2.0.7.stk active
Mode.      TFTP
Set Server IP.  tftp_server_ip_address
Path.      /
Filename.....
NetApp_CN1610_1.2.0.7.stk
Data Type.  Code
Destination Filename.  active

Management access will be blocked for the duration of the
transfer

Are you sure you want to start? (y/n) y

TFTP Code transfer starting...

File transfer operation completed successfully.
```

- c. Run the new active boot image by rebooting the switch.

The switch must be rebooted for the command in step 6 to reflect the new image. There are two possible views for a response that you might see after you enter the reload command.

Show example

```
(new_cs1)# reload
The system has unsaved changes.
Would you like to save them now? (y/n) y

Config file 'startup-config' created successfully.

Configuration Saved! System will now restart!
.
.
.
Cluster Interconnect Infrastructure

User:admin Password: (new_cs1) >*enable*
```

- d. Copy the saved configuration file from the old switch to the new switch.

Show example

```
(new_cs1)# copy tftp://<server_ip_address>/<filename>.scr  
nvram:script <filename>.scr
```

- e. Apply the previously saved configuration to the new switch.

Show example

```
(new_cs1)# script apply <filename>.scr  
Are you sure you want to apply the configuration script? (y/n) y  
  
The system has unsaved changes.  
Would you like to save them now? (y/n) y  
  
Config file 'startup-config' created successfully.  
  
Configuration Saved!
```

- f. Save the running configuration file to the startup configuration file.

Show example

```
(new_cs1)# write memory
```

14. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport message: `system node autosupport invoke -node * -type all - message MAINT=xh`

x is the duration of the maintenance window in hours.



The AutoSupport message notifies technical support of this maintenance task so that automatic case creation is suppressed during the maintenance window.

15. On the new switch new_cs1, log in as the admin user, and shut down all of the ports that are connected to the node cluster interfaces (ports 1 through 12).

Show example

```
User:*admin*
Password:
(new_cs1)> enable
(new_cs1)#
(new_cs1)# config
(new_cs1) (config)# interface 0/1-0/12
(new_cs1) (interface 0/1-0/12)# shutdown
(new_cs1) (interface 0/1-0/12)# exit
(new_cs1)# write memory
```

16. Migrate the cluster LIFs from the ports that are connected to the old_cs1 switch.

You must migrate each cluster LIF from its current node's management interface.

Show example

```
cluster::> set -privilege advanced
cluster::> network interface migrate -vserver <vserver_name> -lif
<Cluster_LIF_to_be_moved> - sourcenode <current_node> -dest-node
<current_node> -dest-port <cluster_port_that_is_UP>
```

17. Verify that all of the cluster LIFs have been moved to the appropriate cluster port on each node.

Show example

```
cluster::> network interface show -role cluster
```

18. Shut down the cluster ports that are attached to the switch that you replaced.

Show example

```
cluster::*> network port modify -node <node_name> -port
<port_to_admin_down> -up-admin false
```

19. Verify the health of the cluster.

Show example

```
cluster::*> cluster show
```

20. Verify that the ports are down.

Show example

```
cluster::*> cluster ping-cluster -node <node_name>
```

21. On the switch cs2, shut down the ISL ports 13 through 16.

Show example

```
(cs2)# config  
(cs2)(config)# interface 0/13-0/16  
(cs2)(interface 0/13-0/16)# shutdown  
(cs2)# show port-channel 3/1
```

22. Verify whether the storage administrator is ready for the replacement of the switch.
23. Remove all of the cables from the old_cs1 switch, and then connect the cables to the same ports on the new_cs1 switch.
24. On the cs2 switch, bring up the ISL ports 13 through 16.

Show example

```
(cs2)# config  
(cs2)(config)# interface 0/13-0/16  
(cs2)(interface 0/13-0/16)# no shutdown
```

25. Bring up the ports on the new switch that are associated with the cluster nodes.

Show example

```
(new_cs1)# config  
(new_cs1)(config)# interface 0/1-0/12  
(new_cs1)(interface 0/13-0/16)# no shutdown
```

26. On a single node, bring up the cluster node port that is connected to the replaced switch, and then confirm that the link is up.

Show example

```
cluster::*> network port modify -node node1 -port
<port_to_be_onlined> -up-admin true
cluster::*> network port show -role cluster
```

27. Revert the cluster LIFs that are associated with the port in step 25 on the same node.

In this example, the LIFs on node1 are successfully reverted if the “Is Home” column is true.

Show example

```
cluster::*> network interface revert -vserver node1 -lif
<cluster_lif_to_be_reverted>
cluster::*> network interface show -role cluster
```

28. If the first node’s cluster LIF is up and is reverted to its home port, repeat steps 25 and 26 to bring up the cluster ports and to revert the cluster LIFs on the other nodes in the cluster.
29. Display information about the nodes in the cluster.

Show example

```
cluster::*> cluster show
```

30. Confirm that the startup configuration file and running configuration file are correct on the replaced switch. This configuration file should match the output in step 1.

Show example

```
(new_cs1)> enable
(new_cs1)# show running-config
(new_cs1)# show startup-config
```

31. If you suppressed automatic case creation, re-enable it by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all -message MAINT=END
```

Replace NetApp CN1610 cluster switches with switchless connections

You can migrate from a cluster with a switched cluster network to one where two nodes are directly connected for ONTAP 9.3 and later.

Review requirements

Guidelines

Review the following guidelines:

- Migrating to a two-node switchless cluster configuration is a nondisruptive operation. Most systems have two dedicated cluster interconnect ports on each node, but you can also use this procedure for systems with a larger number of dedicated cluster interconnect ports on each node, such as four, six or eight.
- You cannot use the switchless cluster interconnect feature with more than two nodes.
- If you have an existing two-node cluster that uses cluster interconnect switches and is running ONTAP 9.3 or later, you can replace the switches with direct, back-to-back connections between the nodes.

Before you begin

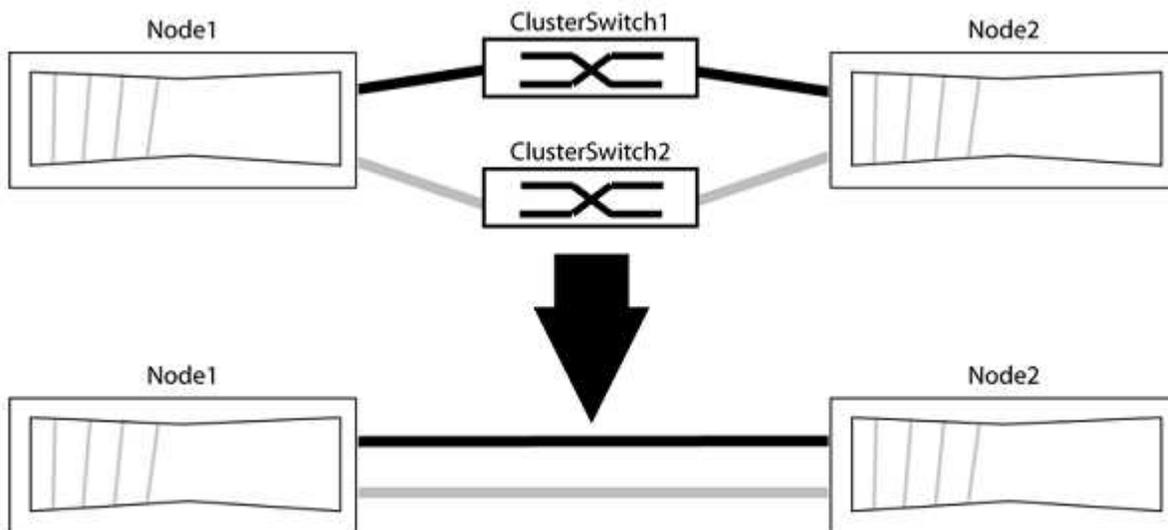
Make sure you have the following:

- A healthy cluster that consists of two nodes connected by cluster switches. The nodes must be running the same ONTAP release.
- Each node with the required number of dedicated cluster ports, which provide redundant cluster interconnect connections to support your system configuration. For example, there are two redundant ports for a system with two dedicated cluster interconnect ports on each node.

Migrate the switches

About this task

The following procedure removes the cluster switches in a two-node cluster and replaces each connection to the switch with a direct connection to the partner node.



About the examples

The examples in the following procedure show nodes that are using "e0a" and "e0b" as cluster ports. Your nodes might be using different cluster ports as they vary by system.

Step 1: Prepare for migration

1. Change the privilege level to advanced, entering `y` when prompted to continue:

```
set -privilege advanced
```

The advanced prompt `*>` appears.

2. ONTAP 9.3 and later supports automatic detection of switchless clusters, which is enabled by default.

You can verify that detection of switchless clusters is enabled by running the advanced privilege command:

```
network options detect-switchless-cluster show
```

Show example

The following example output shows if the option is enabled.

```
cluster::*> network options detect-switchless-cluster show
(network options detect-switchless-cluster show)
Enable Switchless Cluster Detection: true
```

If "Enable Switchless Cluster Detection" is `false`, contact NetApp support.

3. 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=<number_of_hours>h
```

where `h` is the duration of the maintenance window in hours. The message notifies technical support of this maintenance task so that they can suppress automatic case creation during the maintenance window.

In the following example, the command suppresses automatic case creation for two hours:

Show example

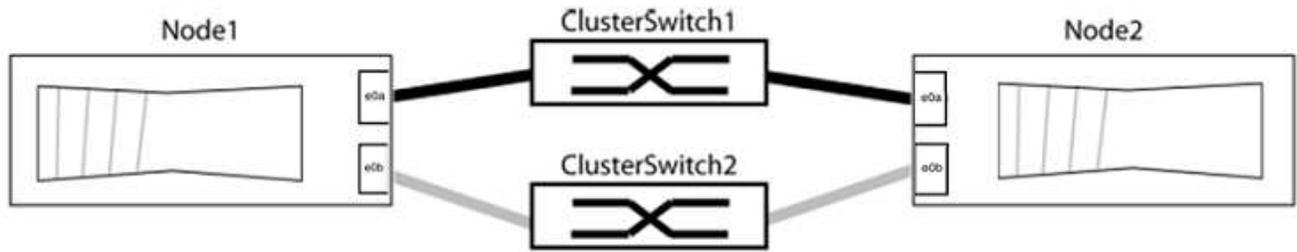
```
cluster::*> system node autosupport invoke -node * -type all
-message MAINT=2h
```

Step 2: Configure ports and cabling

1. Organize the cluster ports on each switch into groups so that the cluster ports in `group1` go to cluster switch1 and the cluster ports in `group2` go to cluster switch2. These groups are required later in the procedure.
2. Identify the cluster ports and verify link status and health:

```
network port show -ipSpace Cluster
```

In the following example for nodes with cluster ports "e0a" and "e0b", one group is identified as "node1:e0a" and "node2:e0a" and the other group as "node1:e0b" and "node2:e0b". Your nodes might be using different cluster ports because they vary by system.



Verify that the ports have a value of `up` for the "Link" column and a value of `healthy` for the "Health Status" column.

Show example

```
cluster::> network port show -ipSPACE Cluster
Node: node1

Ignore
Health
Port IPSPACE Broadcast Domain Link MTU Admin/Oper Status
Speed (Mbps) Health
Status
-----
-----
e0a Cluster Cluster up 9000 auto/10000 healthy
false
e0b Cluster Cluster up 9000 auto/10000 healthy
false

Node: node2

Ignore
Health
Port IPSPACE Broadcast Domain Link MTU Admin/Oper Status
Speed (Mbps) Health
Status
-----
-----
e0a Cluster Cluster up 9000 auto/10000 healthy
false
e0b Cluster Cluster up 9000 auto/10000 healthy
false
4 entries were displayed.
```

3. Confirm that all the cluster LIFs are on their home ports.

Verify that the “is-home” column is `true` for each of the cluster LIFs:

```
network interface show -vserver Cluster -fields is-home
```

Show example

```
cluster::*> net int show -vserver Cluster -fields is-home
(network interface show)
vserver  lif           is-home
-----  -
Cluster  node1_clus1  true
Cluster  node1_clus2  true
Cluster  node2_clus1  true
Cluster  node2_clus2  true
4 entries were displayed.
```

If there are cluster LIFs that are not on their home ports, revert those LIFs to their home ports:

```
network interface revert -vserver Cluster -lif *
```

4. Disable auto-revert for the cluster LIFs:

```
network interface modify -vserver Cluster -lif * -auto-revert false
```

5. Verify that all ports listed in the previous step are connected to a network switch:

```
network device-discovery show -port cluster_port
```

The “Discovered Device” column should be the name of the cluster switch that the port is connected to.

Show example

The following example shows that cluster ports "e0a" and "e0b" are correctly connected to cluster switches "cs1" and "cs2".

```
cluster:::> network device-discovery show -port e0a|e0b
(network device-discovery show)
Node/      Local  Discovered
Protocol  Port   Device (LLDP: ChassisID)  Interface  Platform
-----  -
node1/cdp
          e0a    cs1                      0/11       BES-53248
          e0b    cs2                      0/12       BES-53248
node2/cdp
          e0a    cs1                      0/9        BES-53248
          e0b    cs2                      0/9        BES-53248
4 entries were displayed.
```

6. 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 e0a
Cluster node1_clus2 169.254.49.125 node1 e0b
Cluster node2_clus1 169.254.47.194 node2 e0a
Cluster node2_clus2 169.254.19.183 node2 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 169.254.47.194 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)

```

7. Verify that the cluster is healthy:

```
cluster ring show
```

All units must be either master or secondary.

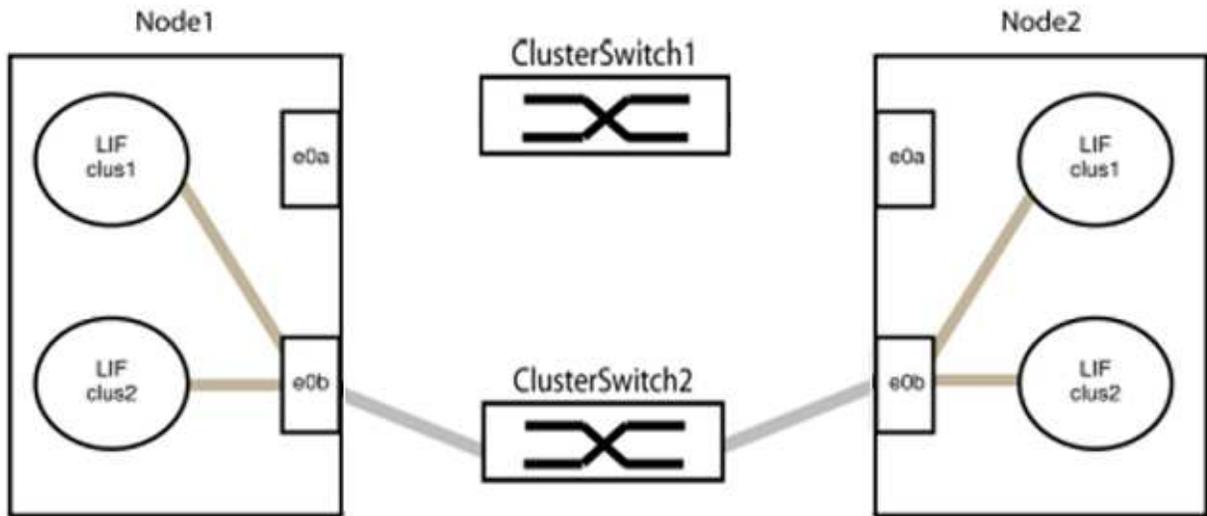
8. Set up the switchless configuration for the ports in group 1.



To avoid potential networking issues, you must disconnect the ports from group1 and reconnect them back-to-back as quickly as possible, for example, **in less than 20 seconds**.

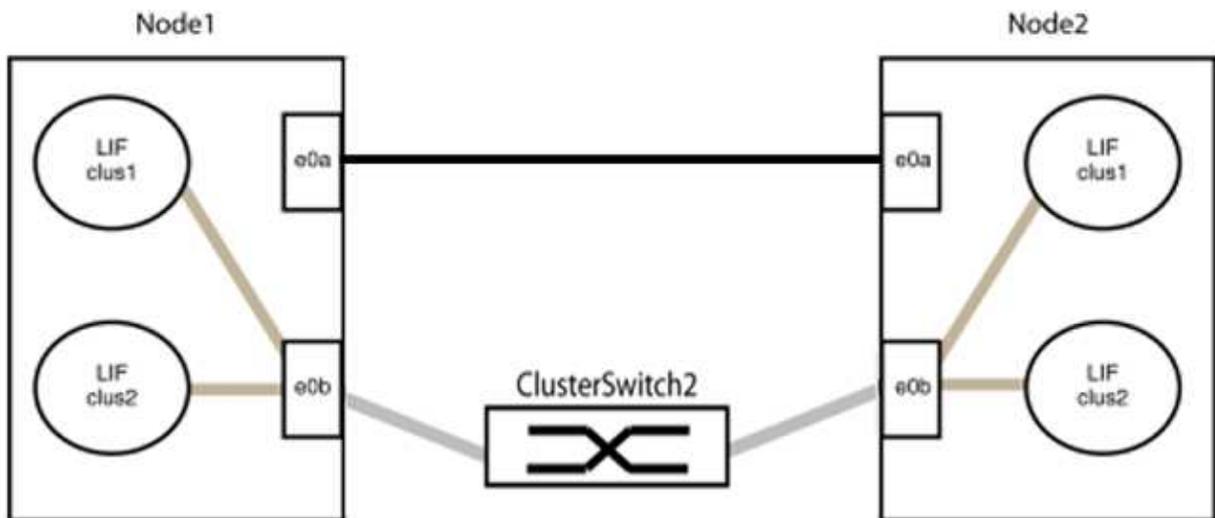
a. Disconnect all the cables from the ports in group1 at the same time.

In the following example, the cables are disconnected from port "e0a" on each node, and cluster traffic continues through the switch and port "e0b" on each node:



b. Cable the ports in group1 back-to-back.

In the following example, "e0a" on node1 is connected to "e0a" on node2:



9. The switchless cluster network option transitions from *false* to *true*. This might take up to 45 seconds. Confirm that the switchless option is set to *true*:

```
network options switchless-cluster show
```

The following example shows that the switchless cluster is enabled:

```
cluster::*> network options switchless-cluster show
Enable Switchless Cluster: true
```

10. 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 e0a
Cluster node1_clus2 169.254.49.125 node1 e0b
Cluster node2_clus1 169.254.47.194 node2 e0a
Cluster node2_clus2 169.254.19.183 node2 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 169.254.47.194 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)

```



Before proceeding to the next step, you must wait at least two minutes to confirm a working back-to-back connection on group 1.

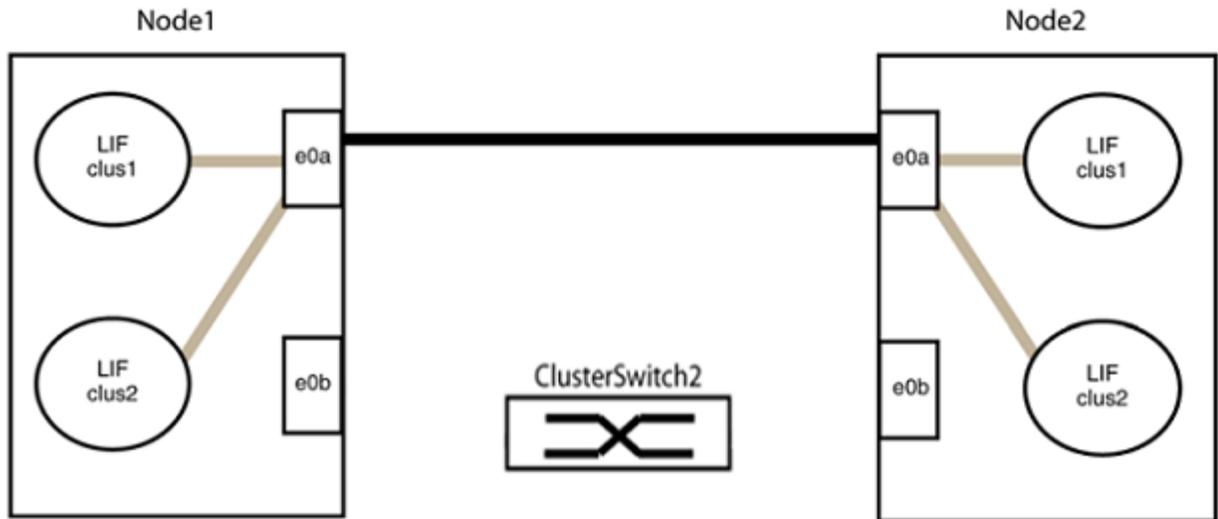
11. Set up the switchless configuration for the ports in group 2.



To avoid potential networking issues, you must disconnect the ports from group2 and reconnect them back-to-back as quickly as possible, for example, **in less than 20 seconds**.

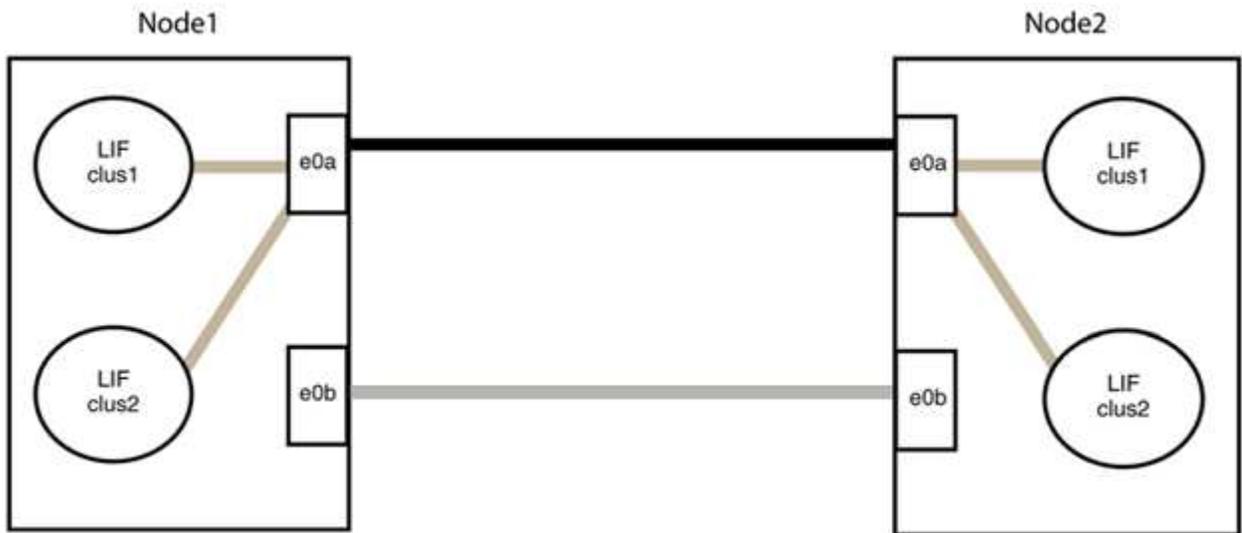
- a. Disconnect all the cables from the ports in group2 at the same time.

In the following example, the cables are disconnected from port "e0b" on each node, and cluster traffic continues through the direct connection between the "e0a" ports:



b. Cable the ports in group2 back-to-back.

In the following example, "e0a" on node1 is connected to "e0a" on node2 and "e0b" on node1 is connected to "e0b" on node2:



Step 3: Verify the configuration

1. Verify that the ports on both nodes are correctly connected:

```
network device-discovery show -port cluster_port
```

Show example

The following example shows that cluster ports "e0a" and "e0b" are correctly connected to the corresponding port on the cluster partner:

```
cluster::> net device-discovery show -port e0a|e0b
(network device-discovery show)
Node/      Local  Discovered
Protocol   Port   Device (LLDP: ChassisID)  Interface  Platform
-----
node1/cdp
          e0a    node2                      e0a        AFF-A300
          e0b    node2                      e0b        AFF-A300
node1/lldp
          e0a    node2 (00:a0:98:da:16:44)  e0a        -
          e0b    node2 (00:a0:98:da:16:44)  e0b        -
node2/cdp
          e0a    node1                      e0a        AFF-A300
          e0b    node1                      e0b        AFF-A300
node2/lldp
          e0a    node1 (00:a0:98:da:87:49)  e0a        -
          e0b    node1 (00:a0:98:da:87:49)  e0b        -
8 entries were displayed.
```

2. Re-enable auto-revert for the cluster LIFs:

```
network interface modify -vserver Cluster -lif * -auto-revert true
```

3. Verify that all LIFs are home. This might take a few seconds.

```
network interface show -vserver Cluster -lif lif_name
```

Show example

The LIFs have been reverted if the “Is Home” column is `true`, as shown for `node1_clus2` and `node2_clus2` in the following example:

```
cluster::> network interface show -vserver Cluster -fields curr-  
port,is-home  
vserver  lif                curr-port  is-home  
-----  -  
Cluster  node1_clus1  e0a       true  
Cluster  node1_clus2  e0b       true  
Cluster  node2_clus1  e0a       true  
Cluster  node2_clus2  e0b       true  
4 entries were displayed.
```

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
```

4. Check the cluster status of the nodes from the system console of either node:

```
cluster show
```

Show example

The following example shows `epsilon` on both nodes to be `false`:

```
Node  Health  Eligibility  Epsilon  
-----  
node1 true     true        false  
node2 true     true        false  
2 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 e0a
Cluster node1_clus2 169.254.49.125 node1 e0b
Cluster node2_clus1 169.254.47.194 node2 e0a
Cluster node2_clus2 169.254.19.183 node2 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 169.254.47.194 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. If you suppressed automatic case creation, reenable it by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all -message MAINT=END
```

For more information, see [NetApp KB Article 1010449: How to suppress automatic case creation during scheduled maintenance windows](#).

7. Change the privilege level back to admin:

```
set -privilege admin
```

Copyright information

Copyright © 2026 NetApp, Inc. All Rights Reserved. Printed in the U.S. No part of this document covered by copyright may be reproduced in any form or by any means—graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system—without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP “AS IS” AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

LIMITED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (b)(3) of the Rights in Technical Data -Noncommercial Items at DFARS 252.227-7013 (FEB 2014) and FAR 52.227-19 (DEC 2007).

Data contained herein pertains to a commercial product and/or commercial service (as defined in FAR 2.101) and is proprietary to NetApp, Inc. All NetApp technical data and computer software provided under this Agreement is commercial in nature and developed solely at private expense. The U.S. Government has a non-exclusive, non-transferrable, nonsublicensable, worldwide, limited irrevocable license to use the Data only in connection with and in support of the U.S. Government contract under which the Data was delivered. Except as provided herein, the Data may not be used, disclosed, reproduced, modified, performed, or displayed without the prior written approval of NetApp, Inc. United States Government license rights for the Department of Defense are limited to those rights identified in DFARS clause 252.227-7015(b) (FEB 2014).

Trademark information

NETAPP, the NETAPP logo, and the marks listed at <http://www.netapp.com/TM> are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.