



AFF and FAS Switch Documentation

ONTAP Systems Switches

NetApp
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AFF and FAS Switch Documentation

Broadcom-supported BES-53248 switches

Overview of the Broadcom-supported BES-53248 cluster switch

Broadcom-supported BES-53248 cluster switches are designed to work in clusters ranging in size from two to 24 nodes in ONTAP 9.5P8 and later. Support for 40/100 GbE cluster ports starts with EFOS firmware version 3.4.4.6 and later.

BES-53248 is a switch running on a Broadcom-embedded OS known as Ethernet Fabric OS (EFOS).

The following table lists the part number and description for the BES-53248 cluster switch, rack mount rail kit, fans, and power supplies:

Part number	Description
X190005	BES-53248, CLSW, 16Pt10/25GB, PTSX, BRDCM SUPP (PTSX = Port Side Exhaust)
X190005R	BES-53248, CLSW, 16Pt10/25GB, PSIN, BRDCM SUPP (PSIN = Port Side Intake)
X-RAIL-4POST-190005	Rack mount rail kit Ozeki 4 post 19"
X-FAN-190005-R	Fan, port side intake X190005
X-FAN-190005-F	Fan, port side exhaust X190005
X-PSU-190005-R	Power supply, port side intake X190005
X-PSU-190005-F	Power supply, port side exhaust X190005

Overview of airflow based on the two models offered:

- 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. Blue coloring indicates port-side exhaust airflow. This is the most common option.
- 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.

See the [NetApp KB article: How to add additional port licensing for the Broadcom-supported BES-53248 switch](#) for details on adding additional port licenses.

For information on the relevant connectors and cable options to use along with their part numbers, see the [NetApp Hardware Universe](#).

For more information, see the *Cluster Network and Management Network Compatibility Matrix* available from the BES-53248 switch download site [Broadcom cluster switches](#).

Set up the switch

BES-53248 cluster switch required documentation

You need specific switch and controller documentation to set up your Cluster-Mode configuration.

Required documentation for BES-53248 cluster switches

To set up the BES-53248 cluster switch, you need the following documents available from the Broadcom Support Site: [Broadcom Ethernet Switch Product Line](#)

Document title	Description
<i>EFOS Administrator's Guide v3.4.3</i>	Provides examples of how to use the BES-53248 switch in a typical network.
<i>EFOS CLI Command Reference v3.4.3</i>	Describes the command-line interface (CLI) commands you use to view and configure the BES-53248 software.
<i>EFOS Getting Started Guide v3.4.3</i>	Provides detailed information about for the BES-53248 switch.
<i>EFOS SNMP Reference Guide v3.4.3</i>	Provides examples of how to use the BES-53248 switch in a typical network.
<i>EFOS Scaling Parameters and Values v3.4.3</i>	Describes the default scaling parameters with which EFOS software is delivered and validated on the supported platforms.
<i>EFOS Functional Specifications v3.4.3</i>	Describes the specifications for the EFOS software on the supported platforms.
<i>EFOS Release Notes v3.4.3</i>	Provides release-specific information about BES-53248 software.

Required documentation for supported ONTAP systems

To set up an ONTAP system, you need the following documents from the NetApp Support Site at [mysupport.netapp.com](#)

Name	Description
<i>Hardware Universe</i>	Describes the power and site requirements for all NetApp hardware, including system cabinets.
<i>Controller-specific Installation and Setup Instructions</i>	Describes how to install NetApp hardware.
ONTAP 9	Provides detailed information about all aspects of the ONTAP 9 release.

BES-53248 cluster switch configuration requirements

To configure your cluster, you need the appropriate number and type of cables and cable connectors for your cluster switches. Depending on the type of cluster switch you are initially configuring, you need to connect to the switch console port with the included console cable and you need specific network information.

Configure a new BES-53248 cluster switch

You can configure a new BES-53248 cluster switch by completing the steps detailed in this chapter.

About this task

Installing the BES-53248 cluster switch on systems running ONTAP starts with setting up an IP address and configuration to allow the switch to communicate through the management interface. Then you can install the Ethernet Fabric OS (EFOS) software, reference configuration file (RCF), and other licenses as needed. This procedure is intended for preparing the BES-53248 switch before controllers are added. In addition, you might need to install the required configuration file to support the Cluster Switch Health Monitor (CSHM) for the BES-53248 cluster switches. See [Installing the Cluster Switch Health Monitor \(CSHM\) configuration file](#) for more details.

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

- The NetApp 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 [NetApp Hardware Universe](#) for the actual cluster ports supported on your platform.

- The Inter-Switch Links (ISLs) supported for the NetApp switches are ports 0/55 and 0/56.
- The node connections supported for the NetApp switches are ports 0/1 through 0/16 with default licensing.
- The examples in this procedure use two nodes, but you can have up to 24 nodes in a cluster.

Initial installation of the BES-53248 cluster switch - BES-53248 switches

You can use this procedure to perform the initial installation of the BES-53248 cluster switch.

You can download the applicable Broadcom EFOS software for your cluster switches from the [Broadcom Ethernet Switch Support](#) site.

EFOS is a wide-ranging software set of advanced networking features and protocols necessary to develop a variety of Ethernet and IP infrastructure systems for data center applications. EFOS software is an architecture suitable for any network organizational device using leading-edge applications that require thorough packet inspection or separation.

This procedure provides a summary of the process to install your switches and get them running:

Steps

1. Connect the serial port to the host or serial port of your choice.
2. 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.
3. At the console, set the host side serial settings:
 - 115200 baud
 - 8 data bits
 - 1 stop bit
 - parity: none
 - flow control: none
4. Log in to the switch as admin and press enter when prompted for a password. The default switch name is routing. At the prompt, enable. This gives you access to Privileged EXEC mode for switch configuration.

```
User: admin
Password:
(Routing)> enable
Password:
(Routing) #
```

5. Change the switch name to cs2:

```
(Routing) # hostname cs2
(cs2) #
```

6. To set a static IP address, use the serviceport protocol, network protocol, and serviceport ip commands as shown in the example.

The serviceport is set to use DHCP by default. The IP address, subnet mask, and default gateway address are assigned automatically.

```
(cs2) # serviceport protocol none
(cs2) # network protocol none
(cs2) # serviceport ip ipaddr netmask gateway
```

7. Verify the results using the command:

```
show serviceport
```

The following example shows IP information provided by DHCP server.


```
(cs2) # show serviceport
Interface Status..... Up
IP Address..... 172.19.2.2
Subnet Mask..... 255.255.255.0
Default Gateway..... 172.19.2.254
IPv6 Administrative Mode..... Enabled
IPv6 Prefix is .....
fe80::dac4:97ff:fe71:123c/64
IPv6 Default Router..... fe80::20b:45ff:fea9:5dc0
Configured IPv4 Protocol..... DHCP
Configured IPv6 Protocol..... None
IPv6 AutoConfig Mode..... Disabled
Burned In MAC Address..... D8:C4:97:71:12:3C
```

8. Configure the domain and name server:

configure

```
(cs2) # configure
(cs2) (Config)#ip domain name company.com
(cs2) (Config)#ip name server 10.10.99.1 10.10.99.2
(cs2) (Config)#exit
(cs2) (Config)#
```

9. Configure the NTP server.

a. Configure the time zone and time synchronization (SNTP):

sntp

```
(cs2) #
(cs2) (Config)#sntp client mode unicast
(cs2) (Config)#sntp server 10.99.99.5
(cs2) (Config)#clock timezone -7
(cs2) (Config)#exit
(cs2) (Config)#
```

b. Configure the time manually:

clock

```
(cs2) #config
(cs2) (Config)#no sntp client mode
(cs2) (Config)#clock summer-time recurring 1 sun mar 02:00 1 sun nov
02:00 offset 60 zone EST
(cs2) (Config)#clock timezone -5 zone EST
(cs2) (Config)#clock set 07:00:00
(cs2) (Config)#clock set 10/20/2020

(cs2) (Config)#show clock

07:00:11 EST(UTC-5:00) Oct 20 2020
No time source

(cs2) (Config)#exit

(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!
```

Enable SSH on BES-53248 cluster switches - BES-53248 switches

SSH is a requirement when using the Cluster Switch Health Monitor (CSHM) and log collection features. To enable SSH on BES-53248 cluster switches, you generate the SSH keys first and then enable SSH.

Steps

1. Generate the SSH keys:

```
crypto key generate
```

```
(switch) # show ip ssh
```

SSH Configuration

```
Administrative Mode: ..... Disabled
SSH Port: ..... 22
Protocol Level: ..... Version 2
SSH Sessions Currently Active: ..... 0
Max SSH Sessions Allowed: ..... 5
SSH Timeout (mins): ..... 5
Keys Present: ..... DSA(1024) RSA(1024)
ECDSA(521)
Key Generation In Progress: ..... None
SCP server Administrative Mode: ..... Disabled
```

```
(switch) # config
```

```
(switch) (Config)# crypto key generate rsa
```

```
Do you want to overwrite the existing RSA keys? (y/n): y
```

```
(switch) (Config)# crypto key generate dsa
```

```
Do you want to overwrite the existing DSA keys? (y/n): y
```

```
(switch) (Config)# crypto key generate ecdsa 521
```

```
Do you want to overwrite the existing ECDSA keys? (y/n): y
```

```
(switch) (Config)# exit
```

2. Verify that SSH is enabled:

show ip ssh

```

(switch) # show ip ssh

SSH Configuration

Administrative Mode: ..... Enabled
SSH Port: ..... 22
Protocol Level: ..... Version 2
SSH Sessions Currently Active: ..... 0
Max SSH Sessions Allowed: ..... 5
SSH Timeout (mins): ..... 5
Keys Present: ..... DSA(1024) RSA(1024)
ECDSA(521)
Key Generation In Progress: ..... None
SCP server Administrative Mode: ..... Disabled

(switch) #

```

Install the EFOS software

You can use this procedure to install the EFOS software on the BES-53248 cluster switch. You can download the applicable Broadcom EFOS software for your cluster switches from the [Broadcom Ethernet Switch Support site](#).

About this task

Note the following:

- When upgrading from EFOS 3.4.x.x to EFOS 3.7.x.x or later, the switch must be running EFOS 3.4.4.6 (or later 3.4.x.x release). If you are running a release prior to that, then upgrade the switch to EFOS 3.4.4.6 (or later 3.4.x.x release) first, then upgrade the switch to EFOS 3.7.x.x or later.
- The configuration for EFOS 3.4.x.x and 3.7.x.x or later are different. Changing the EFOS version from 3.4.x.x to 3.7.x.x or later, or vice versa, requires the switch to be reset to factory defaults and the RCF files for the corresponding EFOS version to be (re)applied. This procedure requires access through the serial console port.
- Beginning with EFOS version 3.7.x.x or later, a non-FIPS compliant and a FIPS compliant version is available. Different steps apply when moving to from a non-FIPS compliant to a FIPS compliant version or vice versa. Changing EFOS from a non-FIPS compliant to a FIPS compliant version or vice versa will reset the switch to factory defaults. This procedure requires access through the serial console port.

Procedure	Current EFOS version	New EFOS version	High level steps
-----------	----------------------	------------------	------------------

Steps to upgrade EFOS between two (non) FIPS compliant versions	3.4.x.x	3.4.x.x	Install the new EFOS image using method 1) The configuration and license information is retained
	3.4.4.6 (or later 3.4.x.x)	3.7.x.x or later non-FIPS compliant	Upgrade EFOS using method 1. Reset the switch to factory defaults and apply the RCF file for EFOS 3.7.x.x or later
	3.7.x.x or later non-FIPS compliant	3.4.4.6 (or later 3.4.x.x)	Downgrade EFOS using method 1. Reset the switch to factory defaults and apply the RCF file for EFOS 3.4.x.x
		3.7.x.x or later non-FIPS compliant	Install the new EFOS image using method 1. The configuration and license information is retained
	3.7.x.x or later FIPS compliant	3.7.x.x or later FIPS compliant	Install the new EFOS image using method 1. The configuration and license information is retained
Steps to upgrade to/from a FIPS compliant EFOS version	Non-FIPS compliant	FIPS compliant	Installation of the EFOS image using method 2. The switch configuration and license information will be lost.
	FIPS compliant	Non-FIPS compliant	



Note that after upgrading BES-53248 cluster switches from EFOS 3.3.x.x or 3.4.x.x to EFOS 3.7.0.4 or 3.8.0.2, Inter-Switch Links (ISLs) and port channel are marked in the **Down** state. See this [KB article](#) for further details.

Steps

1. Connect the BES-53248 cluster switch to the management network.
2. Use the `ping` command to verify connectivity to the server hosting EFOS, licenses, and the RCF file.

This example verifies that the switch is connected to 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. Back up the current active image on cs2:

```
show bootvar
```

```
(cs2) # show bootvar
```

Image Descriptions

active :

backup :

Images currently available on Flash

unit	active	backup	current-active	next-active
1	3.4.3.3	Q.10.22.1	3.4.3.3	3.4.3.3

```
(cs2) # copy active backup
```

Copying active to backup

Management access will be blocked for the duration of the operation

Copy operation successful

```
(cs2) # show bootvar
```

Image Descriptions

active :

backup :

Images currently available on Flash

unit	active	backup	current-active	next-active
1	3.4.3.3	3.4.3.3	3.4.3.3	3.4.3.3

```
(cs2) #
```

4. Verify the running version of the EFOS software:

```
show version
```

```
(cs2) # show version
```

```
Switch: 1
```

```
System Description..... Quanta IX8-B 48x25GB SFP
8x100GB QSFP, 3.4.3.3, Linux 4.4.117-ceeeb99d, 2016.05.00.04
Machine Type..... Quanta IX8-B 48x25GB SFP
8x100GB QSFP
Machine Model..... IX8-B
Serial Number..... QTFCU38260014
Maintenance Level..... A
Manufacturer..... 0xbc00
Burned In MAC Address..... D8:C4:97:71:12:3D
Software Version..... 3.4.3.3
Operating System..... Linux 4.4.117-ceeeb99d
Network Processing Device..... BCM56873_A0
CPLD Version..... 0xff040c03

Additional Packages..... BGP-4
..... QOS
..... Multicast
..... IPv6
..... Routing
..... Data Center
..... OpEN API
..... Prototype Open API
```

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 EFOS version. The previous image remains available as a backup.


```
(cs2) # copy sftp://root@172.19.2.1//tmp/EFOS-3.4.4.6.stk active
Remote Password:*****

Mode..... SFTP
Set Server IP..... 172.19.2.1
Path..... //tmp/
Filename..... EFOS-3.4.4.6.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.
```

6. Display the boot images for the active and backup configuration:

```
show bootvar
```

```
(cs2) # show bootvar

Image Descriptions

active :
backup :

Images currently available on Flash
```

unit	active	backup	current-active	next-active
1	3.4.3.3	3.4.3.3	3.4.3.3	3.4.4.6

7. Reboot the switch:

```
reload
```

```
(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!

8. Log in again and verify the new version of the EFOS software:

```
show version
```

```
(cs2) # show version
```

Switch: 1

```
System Description..... x86_64-
quanta_common_rglbmc-r0, 3.4.4.6, Linux 4.4.211-28a6fe76, 2016.05.00.04
Machine Type..... x86_64-
quanta_common_rglbmc-r0
Machine Model..... BES-53248
Serial Number..... QTFCU38260023
Maintenance Level..... A
Manufacturer..... 0xbc00
Burned In MAC Address..... D8:C4:97:71:0F:40
Software Version..... 3.4.4.6
Operating System..... Linux 4.4.211-28a6fe76
Network Processing Device..... BCM56873_A0
CPLD Version..... 0xff040c03

Additional Packages..... BGP-4
..... QOS
..... Multicast
..... IPv6
..... Routing
..... Data Center
..... OpEN API
..... Prototype Open API
```

Upgrade EFOS using the ONIE OS installation

You can perform the following steps if one EFOS version is FIPS compliant and the other EFOS version is non-FIPS compliant. These steps can be used to install the non-FIPS or FIPS compliant EFOS 3.7.x.x image from ONIE if the switch fails to boot.



This functionality is only available for EFOS 3.7.x.x or later non-FIPS compliant.

Steps

1. Boot the switch into ONIE installation mode.

During boot, select ONIE when the following screen appears:

```
+-----+
| EFOS                                     |
| *ONIE                                  |
|                                       |
|                                       |
|                                       |
|                                       |
|                                       |
|                                       |
|                                       |
|                                       |
|                                       |
|                                       |
+-----+
```

After selecting **ONIE**", the switch will then load and present you with the following choices:

```
+-----+
| *ONIE: Install OS                       |
| ONIE: Rescue                           |
| ONIE: Uninstall OS                     |
| ONIE: Update ONIE                      |
| ONIE: Embed ONIE                       |
| DIAG: Diagnostic Mode                   |
| DIAG: Burn-In Mode                     |
|                                       |
|                                       |
|                                       |
|                                       |
+-----+
```

The switch now will boot into ONIE installation mode.

2. Stop the ONIE discovery and configure the Ethernet interface.

Once the following message appears press <Enter> to invoke the ONIE console:

```
Please press Enter to activate this console. Info: eth0: Checking
link... up.
ONIE:/ #
```



The ONIE discovery will continue and messages will be printed to the console.

```
Stop the ONIE discovery
ONIE:/ # onie-discovery-stop
discover: installer mode detected.
Stopping: discover... done.
ONIE:/ #
```

3. Configure the Ethernet interface and add the route using `ifconfig eth0 <ipAddress> netmask <netmask> up` and `route add default gw <gatewayAddress>`

```
ONIE:/ # ifconfig eth0 10.10.10.10 netmask 255.255.255.0 up
ONIE:/ # route add default gw 10.10.10.1
```

4. Verify that the server hosting the ONIE installation file is reachable:

```
ONIE:/ # ping 50.50.50.50
PING 50.50.50.50 (50.50.50.50): 56 data bytes
64 bytes from 50.50.50.50: seq=0 ttl=255 time=0.429 ms
64 bytes from 50.50.50.50: seq=1 ttl=255 time=0.595 ms
64 bytes from 50.50.50.50: seq=2 ttl=255 time=0.369 ms
^C
--- 50.50.50.50 ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 0.369/0.464/0.595 ms
ONIE:/ #
```

5. Install the new switch software:

```

ONIE:/ # onie-nos-install http:// 50.50.50.50/Software/onie-installer-
x86_64
discover: installer mode detected.
Stopping: discover... done.
Info: Fetching http:// 50.50.50.50/Software/onie-installer-3.7.0.4 ...
Connecting to 50.50.50.50 (50.50.50.50:80)
installer          100% |*****| 48841k
0:00:00 ETA
ONIE: Executing installer: http:// 50.50.50.50/Software/onie-installer-
3.7.0.4
Verifying image checksum ... OK.
Preparing image archive ... OK.

```

The software will install and then reboot the switch. Let the switch reboot normally into the new EFOS version.

6. Verify that the new switch software is installed: `show bootvar`

```

(cs2) # show bootvar
Image Descriptions
active :
backup :
Images currently available on Flash
----
unit      active      backup    current-active  next-active
----
1         3.7.0.4      3.7.0.4   3.7.0.4         3.7.0.4
(cs2) #

```

7. Complete the installation.

The switch will reboot with no configuration applied and reset to factory defaults.

Related information

[Broadcom Ethernet Switch Support](#)

Install licenses

Install licenses for BES-53248 cluster switches - BES-53248 switches

The BES-53248 cluster switch base model is licensed for 16 10GbE or 25GbE ports and two 100GbE ports. New ports can be added by purchasing more licenses.

The following licenses are available for use on the BES-53248 cluster switch:

License type	License details
Supported firmware version	SW-BES-53248A1-G1-8P-LIC
Broadcom 8P 10-25,2P40-100 License Key, X190005/R	EFOS 3.4.3.3 and later
SW-BES-53248A1-G1-16P-LIC	Broadcom 16P 10-25,4P40-100 License Key, X190005/R
EFOS 3.4.3.3 and later	SW-BES-53248A1-G1-24P-LIC
Broadcom 24P 10-25,6P40-100 License Key, X190005/R	EFOS 3.4.3.3 and later
SW-BES54248-40-100G-LIC	Broadcom 6Port 40G100G License Key, X190005/R
EFOS 3.4.4.6 and later	SW-BES53248-8P-10G25G-LIC
Broadcom 8Port 10G25G License Key, X190005/R	EFOS 3.4.4.6 and later
SW-BES53248-16P-1025G-LIC	Broadcom 16Port 10G25G License Key, X190005/R
EFOS 3.4.4.6 and later	SW-BES53248-24P-1025G-LIC
Broadcom 24Port 10G25G License Key, X190005/R	EFOS 3.4.4.6 and later

Steps

1. Connect the cluster switch to the management network.
2. Use the `ping` command to verify connectivity to the server hosting EFOS, licenses, and the RCF file.

This example verifies that the switch is connected to 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. Check the current license usage on switch cs2:

```
show license
```

```
(cs2) # show license
Reboot needed..... No
Number of active licenses..... 0

License Index   License Type      Status
-----
No license file found.
```

4. Install the license file. The following example uses SFTP to copy a license file to a key index 1.

Repeat this step to load more licenses and to use different key index numbers.

```
(cs2) #copy sftp://root@172.19.2.1/var/lib/tftpboot/license.dat
nvram:license-key 1
Remote Password:*****

Mode..... SFTP
Set Server IP..... 172.19.2.1
Path..... /var/lib/tftpboot/
Filename..... license.dat
Data Type..... license

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...

License Key transfer operation completed successfully. System reboot is
required.
```

5. Display all current license information and note the license status before switch cs2 is rebooted:

```
show license
```

```
(cs2) # show license
```

```
Reboot needed..... Yes
```

```
Number of active licenses..... 0
```

License Index	License Type	Status
1	Port	License valid but not applied

6. Display all licensed ports:

```
show port all | exclude Detach
```

The ports from the additional license files are not displayed until after the switch is rebooted.


```
(cs2) # show port all \ | exclude Detach
```

Actor		Admin	Physical	Physical	Link	Link	LACP
Intf	Type	Mode	Mode	Status	Status	Trap	Mode
Timeout							
-----	-----	-----	-----	-----	-----	-----	-----
0/1		Disable	Auto		Down	Enable	Enable
long							
0/2		Disable	Auto		Down	Enable	Enable
long							
0/3		Disable	Auto		Down	Enable	Enable
long							
0/4		Disable	Auto		Down	Enable	Enable
long							
0/5		Disable	Auto		Down	Enable	Enable
long							
0/6		Disable	Auto		Down	Enable	Enable
long							
0/7		Disable	Auto		Down	Enable	Enable
long							
0/8		Disable	Auto		Down	Enable	Enable
long							
0/9		Disable	Auto		Down	Enable	Enable
long							
0/10		Disable	Auto		Down	Enable	Enable
long							
0/11		Disable	Auto		Down	Enable	Enable
long							
0/12		Disable	Auto		Down	Enable	Enable
long							
0/13		Disable	Auto		Down	Enable	Enable
long							
0/14		Disable	Auto		Down	Enable	Enable
long							
0/15		Disable	Auto		Down	Enable	Enable
long							
0/16		Disable	Auto		Down	Enable	Enable
long							
0/55		Disable	Auto		Down	Enable	Enable
long							
0/56		Disable	Auto		Down	Enable	Enable
long							

7. Reboot the switch:

```
reload
```

```
(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!
```

```
Are you sure you would like to reset the system? (y/n) y
```

8. Check that the new license is active and note that the license has been applied:

```
show license
```

```
(cs2) # show license
```

```
Reboot needed..... No
```

```
Number of installed licenses..... 1
```

```
Total Downlink Ports enabled..... 16
```

```
Total Uplink Ports enabled..... 8
```

License Index	License Type	Status
1	Port	License applied

```
(cs2) #
```

9. Check that all new ports are available:

```
show port all | exclude Detach
```

```
(cs2) # show port all \| exclude Detach
```

Actor	Intf	Type	Admin Mode	Physical Mode	Physical Status	Link Status	Link Trap	LACP Mode
Timeout								
0/1			Disable	Auto		Down	Enable	Enable
long								

0/2 long	Disable	Auto	Down	Enable	Enable
0/3 long	Disable	Auto	Down	Enable	Enable
0/4 long	Disable	Auto	Down	Enable	Enable
0/5 long	Disable	Auto	Down	Enable	Enable
0/6 long	Disable	Auto	Down	Enable	Enable
0/7 long	Disable	Auto	Down	Enable	Enable
0/8 long	Disable	Auto	Down	Enable	Enable
0/9 long	Disable	Auto	Down	Enable	Enable
0/10 long	Disable	Auto	Down	Enable	Enable
0/11 long	Disable	Auto	Down	Enable	Enable
0/12 long	Disable	Auto	Down	Enable	Enable
0/13 long	Disable	Auto	Down	Enable	Enable
0/14 long	Disable	Auto	Down	Enable	Enable
0/15 long	Disable	Auto	Down	Enable	Enable
0/16 long	Disable	Auto	Down	Enable	Enable
0/49 long	Disable	100G Full	Down	Enable	Enable
0/50 long	Disable	100G Full	Down	Enable	Enable
0/51 long	Disable	100G Full	Down	Enable	Enable
0/52 long	Disable	100G Full	Down	Enable	Enable
0/53 long	Disable	100G Full	Down	Enable	Enable
0/54 long	Disable	100G Full	Down	Enable	Enable
0/55 long	Disable	100G Full	Down	Enable	Enable
0/56 long	Disable	100G Full	Down	Enable	Enable

```
(cs2) #
```

Restrictions and limitations - BES-53248 switches

Where problems arise when installing a license, the following debug commands should be run before running the `copy` command again to install the license.

Debug commands to use:

+

```
debug transfer debug license
```

```
(cs2) # debug transfer
Debug transfer output is enabled.
(cs2) # debug license
Enabled capability licensing debugging.
```

When you run the `copy` command with the `debug transfer` and `debug license` options enabled, the following log output is returned:

```

transfer.c(3083):Transfer process  key or certificate file type = 43
transfer.c(3229):Transfer process  key/certificate cmd = cp
/mnt/download//license.dat.1 /mnt/fastpath/ >/dev/null 2>&1CAPABILITY
LICENSING :
Fri Sep 11 13:41:32 2020: License file with index 1 added.
CAPABILITY LICENSING : Fri Sep 11 13:41:32 2020: Validating hash value
29de5e9a8af3e510f1f16764a13e8273922d3537d3f13c9c3d445c72a180a2e6.
CAPABILITY LICENSING : Fri Sep 11 13:41:32 2020: Parsing JSON buffer {
  "license": {
    "header": {
      "version": "1.0",
      "license-key": "964B-2D37-4E52-BA14",
      "serial-number": "QTFCU38290012",
      "model": "BES-53248"
    },
    "description": "",
    "ports": "0+6"
  }
}.
CAPABILITY LICENSING : Fri Sep 11 13:41:32 2020: License data does not
contain 'features' field.
CAPABILITY LICENSING : Fri Sep 11 13:41:32 2020: Serial number
QTFCU38290012 matched.
CAPABILITY LICENSING : Fri Sep 11 13:41:32 2020: Model BES-53248 matched.
CAPABILITY LICENSING : Fri Sep 11 13:41:32 2020: Feature not found in
license file with index = 1.
CAPABILITY LICENSING : Fri Sep 11 13:41:32 2020: Applying license file 1.

```

Check for the following in the debug output:

- Check that the Serial number matches: Serial number QTFCU38290012 matched.
- Check that the switch Model matches: Model BES-53248 matched.
- Check that the specified license index was not used previously. Where a license index is already used, the following error is returned: License file /mnt/download//license.dat.1 already exists.
- A port license is not a feature license. Therefore, the following statement is expected: Feature not found in license file with index = 1.

Use the `copy` command to backup port licenses to the server:

```

(cs2) # copy nvram:license-key 1
scp://<UserName>@<IP_address>/saved_license_1.dat

```

See [Installing licenses for BES-53248 cluster switches](#) for details of the firmware versions supported for available licenses.



If you need to downgrade the switch software from version 3.4.4.6, the licenses are removed. This is expected behavior.

You must install an appropriate older license before reverting to an older version of the software.

Edit the Reference Configuration File (RCF) - BES-53248 switches

In order to activate newly licensed ports, you need to edit the latest version of the RCF and uncomment the applicable port details. The default license activates ports 0/1 to 0/16 and 0/55 to 0/56 while the newly licensed ports will be between ports 0/17 to 0/54 depending on the type and number of licenses available.

For details of the available license types for use on the BES-53248 cluster switch, see [Installing licenses for BES-53248 cluster switches](#).

For example to activate the SW-BES54248-40-100G-LIC license, you must uncomment the following section in the RCF:

```
.
.
!
! 2-port or 6-port 40/100GbE node port license block
!
interface 0/49
no shutdown
description "40/100GbE Node Port"
!speed 100G full-duplex
speed 40G full-duplex
service-policy in WRED_100G
spanning-tree edgeport
mtu 9216
switchport mode trunk
datacenter-bridging
priority-flow-control mode on
priority-flow-control priority 5 no-drop
exit
exit
!
interface 0/50
no shutdown
description "40/100GbE Node Port"
!speed 100G full-duplex
speed 40G full-duplex
service-policy in WRED_100G
spanning-tree edgeport
mtu 9216
switchport mode trunk
```

```
datacenter-bridging
priority-flow-control mode on
priority-flow-control priority 5 no-drop
exit
exit
!
interface 0/51
no shutdown
description "40/100GbE Node Port"
speed 100G full-duplex
!speed 40G full-duplex
service-policy in WRED_100G
spanning-tree edgeport
mtu 9216
switchport mode trunk
datacenter-bridging
priority-flow-control mode on
priority-flow-control priority 5 no-drop
exit
exit
!
interface 0/52
no shutdown
description "40/100GbE Node Port"
speed 100G full-duplex
!speed 40G full-duplex
service-policy in WRED_100G
spanning-tree edgeport
mtu 9216
switchport mode trunk
datacenter-bridging
priority-flow-control mode on
priority-flow-control priority 5 no-drop
exit
exit
!
interface 0/53
no shutdown
description "40/100GbE Node Port"
speed 100G full-duplex
!speed 40G full-duplex
service-policy in WRED_100G
spanning-tree edgeport
mtu 9216
switchport mode trunk
datacenter-bridging
```

```

priority-flow-control mode on
priority-flow-control priority 5 no-drop
exit
exit
!
interface 0/54
no shutdown
description "40/100GbE Node Port"
speed 100G full-duplex
!speed 40G full-duplex
service-policy in WRED_100G
spanning-tree edgeport
mtu 9216
switchport mode trunk
datacenter-bridging
priority-flow-control mode on
priority-flow-control priority 5 no-drop
exit
exit
!
.
.

```



For high-speed ports between 0/49 to 0/54 inclusive, uncomment each port but only uncomment one **speed** line in the RCF for each of these ports, either:

- speed 100G full-duplex
- speed 40G full-duplex

as shown in the example.

For low-speed ports between 0/17 to 0/48 inclusive, uncomment the entire 8-port section when an appropriate license has been activated.

Install the Reference Configuration File (RCF)

You can install the RCF after setting up the BES-53248 cluster switch for the first time and after the new license or licenses have been applied. If you are upgrading an RCF from an older version, you must reset the Broadcom switch settings and perform basic configuration to re-apply the RCF. You must perform this operation every time you want to upgrade or change an RCF. See the following [KB article](#) for details.

Steps

1. Connect the cluster switch to the management network.
2. Use the `ping` command to verify connectivity to the server hosting EFOS, licenses, and the RCF.

If connectivity is an issue, use a nonrouted network and configure the service port using IP address

192.168.x or 172.19.x. You can reconfigure the service port to the production management IP address later.

This example verifies that the switch is connected to 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. Install the RCF on the BES-53248 cluster switch using the `copy` command.

```
(cs2) # copy http://172.19.2.1/tmp/BES-53248_RCF_v1.6-Cluster-HA.txt
nvram:script BES-53248_RCF_v1.6-Cluster-HA.scr

Remote Password *****

Mode..... HTTP
Set Server IP..... 172.19.2.1
Path..... //tmp/
Filename..... BES-53248_RCF_v1.6-Cluster-HA.txt
Data Type..... Config Script
Destination Filename..... BES-53248_RCF_v1.6-Cluster-HA.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 script is now displayed line by line]

Configuration script validated.
File transfer operation completed successfully.
```



Depending on your environment, you might need to use a double slash in the `copy` command, for example: `copy http://172.19.2.1//tmp/BES-53248_RCF_v1.6-Cluster-HA.txt nvram:script BES-53248_RCF_v1.6-Cluster-HA.scr`.



The .scr extension must be set as part of the file name before invoking the script. This extension is the extension for the EFOS operating system. The switch validates the script automatically when it is downloaded to the switch, and the output goes to the console. Also, you can change the name of the .scr to fit your console screen for easier readability, for example: copy http://172.19.2.1/tmp/BES-53248_RCF_v1.6-Cluster-HA.txt nvram:script RCF_v1.6-Cluster-HA.scr.

4. Verify that the script was downloaded and saved to the file name you gave it:

```
script list
```

```
(cs2) # script list

Configuration Script Name                Size(Bytes)  Date of
Modification
-----
BES-53248_RCF_v1.6-Cluster-HA.scr      2241         2020 09 30
05:41:00

1 configuration script(s) found.
```

5. Apply the script to the switch.

```
script apply
```

```
(cs2) # script apply BES-53248_RCF_v1.6-Cluster-HA.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!

Configuration script 'BES-53248_RCF_v1.6-Cluster-HA.scr' applied.
```

6. Verify the ports for an additional license after the RCF is applied:

```
show port all | exclude Detach
```

```
(cs2) # show port all \| exclude Detach

Admin    Physical    Physical    Link    Link    LACP
Actor
```

Intf Timeout	Type	Mode	Mode	Status	Status	Trap	Mode
-----	-----	-----	-----	-----	-----	-----	-----
0/1 long		Enable	Auto		Down	Enable	Enable
0/2 long		Enable	Auto		Down	Enable	Enable
0/3 long		Enable	Auto		Down	Enable	Enable
0/4 long		Enable	Auto		Down	Enable	Enable
0/5 long		Enable	Auto		Down	Enable	Enable
0/6 long		Enable	Auto		Down	Enable	Enable
0/7 long		Enable	Auto		Down	Enable	Enable
0/8 long		Enable	Auto		Down	Enable	Enable
0/9 long		Enable	Auto		Down	Enable	Enable
0/10 long		Enable	Auto		Down	Enable	Enable
0/11 long		Enable	Auto		Down	Enable	Enable
0/12 long		Enable	Auto		Down	Enable	Enable
0/13 long		Enable	Auto		Down	Enable	Enable
0/14 long		Enable	Auto		Down	Enable	Enable
0/15 long		Enable	Auto		Down	Enable	Enable
0/16 long		Enable	Auto		Down	Enable	Enable
0/49 long		Enable	40G Full		Down	Enable	Enable
0/50 long		Enable	40G Full		Down	Enable	Enable
0/51 long		Enable	100G Full		Down	Enable	Enable
0/52 long		Enable	100G Full		Down	Enable	Enable
0/53 long		Enable	100G Full		Down	Enable	Enable

0/54 long	Enable	100G Full	Down	Enable	Enable
0/55 long	Enable	100G Full	Down	Enable	Enable
0/56 long	Enable	100G Full	Down	Enable	Enable

7. Verify on the switch that your changes have been made:

```
show running-config
```

```
(cs2) # show running-config
```

8. Save the running configuration so that it becomes the startup configuration when you reboot the switch:

```
write memory
```

```
(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 and verify that the running configuration is correct:

```
reload
```

```
(cs2) # reload

Are you sure you would like to reset the system? (y/n)y

System will now restart!
```

Configure the cluster switch log collection feature

The cluster switch health monitor log collection feature is used to collect switch-related log files in ONTAP. You must make sure that you have set up your environment using the BES-53248 cluster switch CLI as detailed here.

Steps

1. Generate the SSH keys:

```
crypto key generate
```

```
(switch) # show ip ssh
```

SSH Configuration

```
Administrative Mode: ..... Disabled
SSH Port: ..... 22
Protocol Level: ..... Version 2
SSH Sessions Currently Active: ..... 0
Max SSH Sessions Allowed: ..... 5
SSH Timeout (mins): ..... 5
Keys Present: ..... DSA(1024) RSA(1024)
ECDSA(521)
Key Generation In Progress: ..... None
SCP server Administrative Mode: ..... Disabled
```

```
(switch) # config
```

```
(switch) (Config)# crypto key generate rsa
```

```
Do you want to overwrite the existing RSA keys? (y/n): y
```

```
(switch) (Config)# crypto key generate dsa
```

```
Do you want to overwrite the existing DSA keys? (y/n): y
```

```
(switch) (Config)# crypto key generate ecdsa 521
```

```
Do you want to overwrite the existing ECDSA keys? (y/n): y
```

```
(switch) (Config)# aaa authorization commands "noCmdAuthList" none
```

```
(switch) (Config)# exit
```

```
(switch) # ip ssh server enable
```

```
(switch) # ip ssh pubkey-auth
```

```
(switch) # ip scp server enable
```

```
(switch) # write mem
```

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!

```
(switch) #
```

2. Verify that SSH is enabled:

show ip ssh

```
(switch) # show ip ssh

SSH Configuration

Administrative Mode: ..... Enabled
SSH Port: ..... 22
Protocol Level: ..... Version 2
SSH Sessions Currently Active: ..... 0
Max SSH Sessions Allowed: ..... 5
SSH Timeout (mins): ..... 5
Keys Present: ..... DSA(1024) RSA(1024)
ECDSA(521)
Key Generation In Progress: ..... None
SCP server Administrative Mode: ..... Disabled

(switch) #
```

3. For ONTAP 9.8 and later, enable the cluster switch health monitor log collection feature for collecting switch-related log files, using the commands:

```
system switch ethernet log setup-password system switch ethernet log enable-
collection
```

```

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

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

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

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

cluster1::*> system switch ethernet log setup-password
Enter the switch name: cs2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

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

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

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

Enabling cluster switch log collection.

cluster1::*>

```

4. For ONTAP 9.5P15, 9.6P11, 9.7P8 and later patch releases, enable the cluster switch health monitor log collection feature for collecting switch-related log files, using the commands:

```

system cluster-switch log setup-password system cluster-switch log enable-
collection

```



```

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

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

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

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

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

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

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

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

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

Enabling cluster switch log collection.

cluster1::*>

```



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

5. Begin an initial data collection from each switch:

- ° cluster1::*> system cluster-switch log collect -device <cs1>
- ° cluster1::*> system cluster-switch log collect -device <cs2>

Install the Cluster Switch Health Monitor (CSHM) configuration file

You can use this procedure to install the applicable configuration file for cluster switch health monitoring of BES-53248 cluster switches. In ONTAP releases 9.5P7 and earlier

and 9.6P2 and earlier, you must download the cluster switch health monitor configuration file separately. In ONTAP releases 9.5P8 and later, 9.6P3 and later, and 9.7 and later, the cluster switch health monitor configuration file is bundled with ONTAP.

What you'll need

Before you setup the switch health monitor for BES-53248 cluster switches, you must ensure that the ONTAP cluster is up and running.



It is advisable to enable SSH in order to use all features available in CSHM.

Steps

1. Download the cluster switch health monitor configuration zip file based on the corresponding ONTAP release version. This file is available from the page: [NetApp Software download](#)
 - a. On the Software download page, select **Switch Health Monitor Configuration Files**
 - b. Select Platform = **ONTAP** and click **Go!**
 - c. On the Switch Health Monitor Configuration Files for ONTAP page, click **View & Download**
 - d. On the Switch Health Monitor Configuration Files for ONTAP - Description page, click **Download** for the applicable cluster switch model, for example: **Broadcom-supported BES-53248**
 - e. On the End User License Agreement page, click **Accept**
 - f. On the Switch Health Monitor Configuration Files for ONTAP - Download page, select the applicable configuration file, for example, **Broadcom_BES-53248.zip**
2. Upload the applicable zip file to your internal web server where the IP address is X.X.X.X.

For an internal web server IP address of 192.168.2.20 and assuming a /usr/download directory exists, you can upload your zip file to your web server using scp:

```
% scp Broadcom_BES-53248.zip
admin@192.168.2.20:/usr/download/Broadcom_BES-53248.zip
```

3. Access the advanced mode setting from one of the ONTAP systems in the cluster, using the command `set -privilege advanced`:

```
cluster1::> set -privilege advanced
```

4. Run the switch health monitor configure command `system cluster-switch configure-health-monitor -node * -package-url http://server/file-location`:

```
cluster1::> system cluster-switch configure-health-monitor -node *
-package-url
http://192.168.2.20/usr/download/Broadcom_BES-53248.zip
```

5. Verify that the command output contains the text string "downloaded package processed successfully". If an error occurs, contact NetApp support.

6. Run the command `system cluster-switch show` on the ONTAP system and ensure that the cluster switches are discovered with the monitored field set to "True".

```
cluster1::> system cluster-switch show
```



If at any time you revert to an earlier version of ONTAP, you will need to install the CSHM configuration file again to enable switch health monitoring of BES-53248 cluster switches.

Migrate from CN1610 switches to BES-53248 switches

Migrate CN1610 cluster switches to Broadcom-supported BES-53248 cluster switches

You must be aware of certain configuration information, port connections, and cabling requirements when you migrate CN1610 cluster switches to Broadcom-supported BES-53248 cluster switches.

- The following cluster switches are supported:
 - CN1610
 - BES-53248
- The cluster switches support the following node connections:
 - NetApp CN1610: ports 0/1 through 0/12 (10 GbE)
 - BES-53248: ports 0/1-0/16 (10/25 GbE)



Additional ports can be activated by purchasing port licenses.

- The cluster switches use the following inter-switch link (ISL) ports:
 - NetApp CN1610: ports 0/13 through 0/16 (10 GbE)
 - BES-53248: ports 0/55-0/56 (100 GbE)
- The Hardware Universe contains information about ONTAP compatibility, supported EFOS firmware, and cabling to BES-53248 cluster switches.
- 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 BES-53248 (SFP+ to SFP28), four 10G SFP+ optical transceiver/fiber or copper direct-attach cables.
 - **Final:** For BES-53248 to BES-53248 (QSFP28 to QSFP28), two QSFP28 optical transceivers/fiber or copper direct-attach cables.



After your migration completes, you might need to install the required configuration file to support the Cluster Switch Health Monitor (CSHM) for BES-53248 cluster switches.

See [Installing the Cluster Switch Health Monitor \(CSHM\) configuration file](#) in the *Switch Setup and*

See *Configuring the cluster switch log collection feature* in the [Switch Setup and Configuration Guide for Broadcom-supported BES-53248 switches](#) for the steps required to enable cluster health switch log collection used for collecting switch-related log files.

How to migrate CN1610 cluster switches to BES-53248 cluster switches - BES-53248 switches

To replace the existing CN1610 cluster switches in a cluster with Broadcom-supported BES-53248 cluster switches, you must perform a specific sequence of tasks.

What you'll need

The examples in this procedure use two nodes, each deploying two 10 GbE cluster interconnect ports: e0a and e0b.

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

- The command outputs might vary depending on different releases of ONTAP software.
- The CN1610 switches to be replaced are CL1 and CL2.
- The BES-53248 switches to replace the CN1610 switches are cs1 and cs2.
- The nodes are node1 and node2.
- The switch CL2 is replaced by cs2 first, followed with CL1 by cs1.
- The BES-53248 switches are pre-loaded with the supported versions of Reference Configuration File (RCF) and Ethernet Fabric OS (EFOS) with ISL cables connected on ports 55 and 56.
- The cluster LIF names are node1_clus1 and node1_clus2 for node1, and node2_clus1 and node2_clus2 for node2.

About this task

This procedure covers the following scenario:

- The cluster starts with two nodes connected to two CN1610 cluster switches.
- CN1610 switch CL2 is replaced by BES-53248 switch cs2:
 - Disconnect the cables from all cluster ports on all nodes connected to CL2, and then use supported cables to reconnect the ports to the new cluster switch cs2.
 - Disconnect the cables between ISL ports CL1 and CL2, and then use supported cables to reconnect the ports from CL1 to cs2.
- CN1610 switch CL1 is replaced by BES-53248 switch cs1:
 - Disconnect the cables from all cluster ports on all nodes connected to CL1, and then use supported cables to reconnect the ports to the new cluster switch cs1.
 - Disconnect the cables between ISL ports CL1 and cs2, and then use supported cables to reconnect the ports from cs1 to cs2.

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.

The following command suppresses automatic case creation for two hours:

```
cluster1::*> system node autosupport invoke -node \* -type all -message  
MAINT=2h
```

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

```
set -privilege advanced
```

The advanced prompt (*>) appears.

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

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

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

Vserver	Logical Interface	Auto-revert
Cluster	node1_clus1	true
	node1_clus2	true
	node2_clus1	true
	node2_clus2	true

4 entries were displayed.

4. Display information about the devices in your configuration:

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

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

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

Node/ Protocol	Local Port	Discovered Device (LLDP: ChassisID)	Interface	Platform
node2	/cdp			
	e0a	CL2	0/2	CN1610
	e0b	CL1	0/2	CN1610
node1	/cdp			
	e0a	CL2	0/1	CN1610
	e0b	CL1	0/1	CN1610

4 entries were displayed.

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

a. Display the cluster network port attributes:

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

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

Node: node1

Ignore

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

b. Display information about the logical interfaces:

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

```
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	node1_clus2	up/up	169.254.49.125/16	node1
e0a	node2_clus1	up/up	169.254.47.194/16	node2
e0b	node2_clus2	up/up	169.254.19.183/16	node2

4 entries were displayed.

- Verify that the appropriate port licenses, RCF, and EFOS image are installed on the new BES-53248 switches as necessary for your requirements, and make any essential site customizations, such as users and passwords, network addresses, and so on.
- Ping the remote cluster interfaces:

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

The following example shows how to ping the remote cluster interfaces:


```

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

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. Shut down the ISL ports 13 through 16 on the active CN1610 switch CL1:

```
shutdown
```

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

```

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

```

9. Build a temporary ISL between CN1610 CL1 and new BES-53248 cs2. The ISL will only be defined on cs2 as the existing ISL on CL1 can be reused.

The following example builds a temporary ISL on cs2 (ports 13-16) to be connected to the existing ISL on CL1 (ports 13-16):

```

(cs2) # configure
(cs2) (Config)# port-channel name 1/2 temp-isl-cn1610
(cs2) (Config)# interface 0/13-0/16
(cs2) (Interface 0/13-0/16)# no spanning-tree edgeport
(cs2) (Interface 0/13-0/16)# addport 1/2
(cs2) (Interface 0/13-0/16)# exit
(cs2) (Config)# interface lag 2
(cs2) (Interface lag 2)# mtu 9216
(cs2) (Interface lag 2)# port-channel load-balance 7
(cs2) (Config)# exit

(cs2) # show port-channel 1/2
Local Interface..... 1/2
Channel Name..... temp-isl-cn1610
Link State..... Down
Admin Mode..... Enabled
Type..... Static
Port-channel Min-links..... 1
Load Balance Option..... 7
(Enhanced hashing mode)

```

Mbr Ports	Device/ Timeout	Port Speed	Port Active
0/13	actor/long	10G Full	False
	partner/long		
0/14	actor/long	10G Full	False
	partner/long		
0/15	actor/long	10G Full	False
	partner/long		
0/16	actor/long	10G Full	False
	partner/long		

10. On all nodes, remove the cables that are attached to the CN1610 switch CL2.

You must then reconnect the disconnected ports on all nodes to the new BES-53248 switch cs2. Refer to the *Hardware Universe* for approved cabling options.

11. Remove four ISL cables from ports 13 to 16 on the CN1610 switch CL2.

You must attach appropriate approved cabling connecting port 0/13 to 0/16 on the new BES-53248 switch cs2, to ports 13 to 16 on the existing CN1610 switch CL1.

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

The following example illustrates the process of bringing up ISL ports 13 through 16 on CL1:

```

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

```

13. Verify that the ISLs are **up** on the CN1610 switch CL1:

```
show port-channel
```

The Link State should be Up, Type should be Static, and Port Active should be True for ports 0/13 to 0/16:

```

(CL2)# 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 Ports	Device/ Timeout	Port Speed	Port Active
-----	-----	-----	-----
0/13	actor/long partner/long	10 Gb Full	True
0/14	actor/long partner/long	10 Gb Full	True
0/15	actor/long partner/long	10 Gb Full	True
0/16	actor/long partner/long	10 Gb Full	True

14. Verify that the ISL ports are up on the BES-53248 switch:

```
show port-channel
```

```
(cs2) # show port-channel 1/2
```

```
Local Interface..... 1/2
Channel Name..... temp-isl-cn1610
Link State..... Up
Admin Mode..... Enabled
Type..... Static
Port-channel Min-links..... 1
Load Balance Option..... 7
```

```
(Src/Dest MAC, VLAN, EType, incoming port)
```

Mbr Ports	Device/ Timeout	Port Speed	Port 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		

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

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

```

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.				

16. Verify that all of the cluster ports are connected:

```

network port show -ipspace Cluster

```

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

```
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.

17. Ping the remote cluster interfaces:

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

The following example shows how to ping the remote cluster interfaces:

```

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

```

18. On all nodes, remove the cables that are attached to the CN1610 switch CL1.

You must then reconnect the disconnected ports on all nodes to the new BES-53248 switch cs1. Refer to the *Hardware Universe* for approved cabling options.

19. Remove four ISL cables from ports 13 to 16 on BES-53248 switch cs2.
20. Remove the temporary port-channel 2 on cs2.

The following example removes port-channel 2 and copies the running-configuration file to the startup-configuration file:

```
(cs2) # configure
(cs2) (Config)# deleteport 1/2 all
(cs2) (Config)# interface 0/13-0/16
(cs2) (Interface 0/13-0/16)# spanning-tree edgeport
(cs2) (Interface 0/13-0/16)# exit
(cs2) (Config)# exit
(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 .

21. Verify the status of the cluster node port:

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

The following example verifies that all of the cluster interconnect ports on node1 and node2 are up:


```
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.
```

22. Verify that the interface is now home:

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

The following example shows the status of cluster interconnect interfaces are up and Is home for node1 and node2:

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

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

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

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

The following example shows how to ping the remote cluster interfaces:

```

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

```

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

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

The following examples show node1 and node2 have been migrated from CN1610 CL2 and CL1 to BES-53248 cs2 and cs1:

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

Node/ Protocol	Local Port	Discovered Device (LLDP: ChassisID)	Interface	Platform
node1	/cdp			
	e0a	cs2	0/1	BES-53248
	e0b	cs1	0/1	BES-53248
node2	/cdp			
	e0a	cs2	0/2	BES-53248
	e0b	cs1	0/2	BES-53248

4 entries were displayed.

25. Remove the replaced CN1610 switches if they are not automatically removed:

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

The following example shows how to remove the CN1610 switches:

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

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

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

```
cluster::*> system node autosupport invoke -node \* -type all -message
MAINT=END
```

After you finish

See *Configuring the cluster switch log collection feature* in the [Switch Setup and Configuration Guide for Broadcom-supported BES-53248 switches](#) for the steps required to enable cluster health switch log collection used for collecting switch-related log files.

Related information

[Hardware Universe](#)

[Switch Setup and Configuration Guide for Broadcom-supported BES-53248 switches](#)

Migrate to a two-node switched cluster

Migrate to a two-node switched cluster with Broadcom-supported BES-53248 cluster switches

If you have a two-node switchless cluster, you can migrate, non-disruptively, to a two-node switched cluster that includes Broadcom-supported BES-53248 cluster switches. The documented process works for all cluster node ports using optical or Twinax ports but is not supported on this switch if nodes are using onboard 10GBASE-T RJ45 ports for the cluster network ports.

About this task

Most systems require two dedicated cluster-network ports on each controller.

Ensure that the BES-53248 cluster switch is set up as described in the [Switch Setup and Configuration Guide for Broadcom-supported BES-53248 switches](#) guide before starting this migration process.



After your migration completes, you might need to install the required configuration file to support the Cluster Switch Health Monitor (CSHM) for BES-53248 cluster switches.

See [Installing the Cluster Switch Health Monitor \(CSHM\) configuration file](#) in the *Switch Setup and Configuration Guide for Broadcom-supported BES-53248 switches* guide.

Also, see *Configuring the cluster switch log collection feature* in the [Switch Setup and Configuration Guide for Broadcom-supported BES-53248 switches](#) for the steps required to enable cluster health switch log collection used for collecting switch-related log files.

Migrate to a switched NetApp cluster environment using Broadcom-supported BES-53248 cluster switches

If you have an existing two-node switchless cluster environment, you can migrate to a two-node switched cluster environment using Broadcom-supported BES-53248 cluster switches to enable you to scale beyond two nodes in the cluster.

What you'll need

Two-node switchless configuration:

- The two-node switchless configuration must be properly set up and functioning.
- The nodes must be running ONTAP 9.5P8 and later. Support for 40/100 GbE cluster ports starts with EFOS firmware version 3.4.4.6 and later.
- All cluster ports must be in the up state.
- All cluster logical interfaces (LIFs) must be in the up state and on their home ports.

Broadcom-supported BES-53248 cluster switch configuration:

- The BES-53248 cluster switch must be fully functional on both switches.
- Both switches must have management network connectivity.
- There must be console access to the cluster switches.
- BES-53248 node-to-node switch and switch-to-switch connections must use Twinax or fiber cables.

The *NetAppHardware Universe* contains information about ONTAP compatibility, supported EFOS

firmware, and cabling to BES-53248 switches.

Hardware Universe - Switches

- Inter-Switch Link (ISL) cables must be connected to ports 0/55 and 0/56 on both BES-53248 switches.
- Initial customization of both the BES-53248 switches must be completed. So that the:
 - BES-53248 switches are running the latest version of software
 - BES-53248 switches have optional port licenses installed, if purchased
 - Reference Configuration Files (RCFs) have been applied to the switches

Any site customization, such as SMTP, SNMP, and SSH must be configured on the new switches.

About this task

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

- The names of the BES-53248 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`.

The *Hardware Universe* contains the latest information about the actual cluster ports for your platforms.

Hardware Universe

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.

The following command suppresses automatic case creation for two hours:

```
cluster1::*> system node autosupport invoke -node \* -type all -message  
MAINT=2h
```

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

```
set -privilege advanced
```

The advanced prompt (`*>`) appears.

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



You must not disable the ISL ports.

The following example shows that node-facing ports 1 through 16 are disabled on switch cs1:

```
(cs1)# configure
(cs1)(Config)# interface 0/1-0/16
(cs1)(Interface 0/1-0/16)# shutdown
(cs1)(Interface 0/1-0/16)# exit
(cs1)(Config)# exit
```

4. Verify that the ISL and the physical ports on the ISL between the two BES-53248 switches cs1 and cs2 are up:

```
show port-channel
```

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

```
(cs1)# show port-channel 1/1
Local Interface..... 1/1
Channel Name..... Cluster-ISL
Link State..... Up
Admin Mode..... Enabled
Type..... Dynamic
Port channel Min-links..... 1
Load Balance Option..... 7
(Enhanced hashing mode)

Mbr      Device/      Port      Port
Ports   Timeout    Speed     Active
-----
0/55    actor/long   100G Full  True
        partner/long
0/56    actor/long   100G Full  True
        partner/long
(cs1) #
```

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

```
(cs2)# show port-channel 1/1
Local Interface..... 1/1
Channel Name..... Cluster-ISL
Link State..... Up
Admin Mode..... Enabled
Type..... Dynamic
Port channel Min-links..... 1
Load Balance Option..... 7
(Enhanced hashing mode)
```

Mbr Ports	Device/ Timeout	Port Speed	Port Active
-----	-----	-----	-----
0/55	actor/long	100G Full	True
	partner/long		
0/56	actor/long	100G Full	True
	partner/long		

```
(cs2) #
```

5. Display the list of neighboring devices:

```
show isdp neighbors
```

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

The following example lists the neighboring devices on switch cs1:

```
(cs1)# show 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	0/55	176	R	BES-53248	0/55
cs2	0/56	176	R	BES-53248	0/56

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
cs2	0/55	176	R	BES-53248	0/55
cs2	0/56	176	R	BES-53248	0/56

6. Verify that all cluster ports are up:

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

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

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

Node: node1

Port	IPspace	Broadcast Domain	Link	MTU	Speed(Mbps) 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.

7. Verify that all cluster LIFs are up and operational: `network interface show -vserver Cluster`

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

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

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

4 entries were displayed.

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

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

Vserver	Logical Interface	Auto-revert
Cluster	node1_clus1	true
	node1_clus2	true
	node2_clus1	true
	node2_clus2	true

4 entries were displayed.

9. Disconnect the cable from cluster port e0a on node1, and then connect e0a to port 1 on cluster switch cs1, using the appropriate cabling supported by the BES-53248 switches.

The *NetApp Hardware Universe* contains more information about cabling.

[Hardware Universe - Switches](#)

10. 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 BES-53248 switches.
11. Enable all node-facing ports on cluster switch cs1.

The following example shows that ports 1 through 16 are enabled on switch cs1:

```
(cs1)# configure
(cs1) (Config)# interface 0/1-0/16
(cs1) (Interface 0/1-0/16)# no shutdown
(cs1) (Interface 0/1-0/16)# exit
(cs1) (Config)# exit
```

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

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

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
```

Is	Logical	Status	Network	Current	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
true					

4 entries were displayed.

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

```
cluster show
```

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

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

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

```
2 entries were displayed.
```

14. Disconnect the cable from cluster port e0b on node1, and then connect e0b to port 1 on cluster switch cs2, using the appropriate cabling supported by the BES-53248 switches.
15. 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 BES-53248 switches.
16. Enable all node-facing ports on cluster switch cs2.

The following example shows that ports 1 through 16 are enabled on switch cs2:

```
(cs2)# configure
(cs2)(Config)# interface 0/1-0/16
(cs2)(Interface 0/1-0/16)# no shutdown
(cs2)(Interface 0/1-0/16)# exit
(cs2)(Config)# exit
```

17. Verify that all cluster ports are up:

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

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

						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.

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

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



This might take several minutes to complete.

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

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

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

Cluster					
	node1_clus1	up/up	169.254.209.69/16	node1	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.
```

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

```
show isdp neighbors
```

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	175	H	FAS2750	e0a
node2	0/2	157	H	FAS2750	e0a
cs2	0/55	178	R	BES-53248	0/55
cs2	0/56	178	R	BES-53248	0/56

```
(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	137	H	FAS2750	e0b
node2	0/2	179	H	FAS2750	e0b
cs1	0/55	175	R	BES-53248	0/55
cs1	0/56	175	R	BES-53248	0/56

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

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

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

Node/	Local	Discovered		
Protocol	Port	Device (LLDP: ChassisID)	Interface	Platform
node2	/cdp			
	e0a	cs1	0/2	BES-53248
	e0b	cs2	0/2	BES-53248
node1	/cdp			
	e0a	cs1	0/1	BES-53248
	e0b	cs2	0/1	BES-53248

4 entries were displayed.

21. Verify that the settings are disabled:

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



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

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

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

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

```
cluster show
```

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

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

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

23. Ensure that the cluster network has full connectivity using the command:

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



```

cluster1::*> cluster ping-cluster -node local

Host is node2
Getting addresses from network interface table...
Cluster node1_clus1 192.168.168.26 node1 e0a
Cluster node1_clus2 192.168.168.27 node1 e0b
Cluster node2_clus1 192.168.168.28 node2 e0a
Cluster node2_clus2 192.168.168.29 node2 e0b
Local = 192.168.168.28 192.168.168.29
Remote = 192.168.168.26 192.168.168.27
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 4 path(s):
    Local 192.168.168.28 to Remote 192.168.168.26
    Local 192.168.168.28 to Remote 192.168.168.27
    Local 192.168.168.29 to Remote 192.168.168.26
    Local 192.168.168.29 to Remote 192.168.168.27
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)

```

24. Change the privilege level back to admin:

```
set -privilege admin
```

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

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

```

cluster1::*> system node autosupport invoke -node \* -type all -message
MAINT=END

```

After you finish

See *Configuring the cluster switch log collection feature* in the [Switch Setup and Configuration Guide for Broadcom-supported BES-53248 switches](#) for the steps required to enable cluster health switch log collection used for collecting switch-related log files.

Related information

[Hardware Universe](#)

Upgrade a switch in an NDO/NDU environment

Upgrade a BES-53248 cluster switch in an NDO/NDU environment

Upgrading BES-53248 cluster switches starts with preparing the controller for upgrade, installing the EFOS software, licenses, and reference configuration file (RCF). After the installation, you can restore the controller configuration in a nondisruptive upgrade (NDU) and nondisruptive operation (NDO) environment.

What you'll need

The following conditions must exist before you install the EFOS software, licenses, and the RCF file on an existing NetApp BES-53248 cluster switch:

- The cluster must be a fully functioning cluster (no error log messages or other issues).
- The cluster must not contain any defective cluster network interface cards (NICs).
- All connected ports on both cluster switches must be functional.
- All cluster ports must be up.
- All cluster LIFs must be administratively and operationally up and on their home ports.
- The `ONTAP cluster ping-cluster -node node1` advanced privilege command must indicate that larger than PMTU communication is successful on all paths.
- There might be command dependencies between command syntax in the RCF and EFOS versions.

About this task

You must consult the switch compatibility table on the NetApp BES-53248 switches page for the supported EFOS, RCF, and ONTAP versions at: [NetApp BES-53248 switches](#).

This procedure applies to a functioning cluster and allows for NDU and NDO. The examples in this procedure use the following switch and node nomenclature:

- The NetApp 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.

[NetApp Hardware Universe](#)

- The Inter-Switch Links (ISLs) supported for the NetApp cluster switches are ports 0/55 and 0/56.

- The node connections supported for the NetApp cluster switches are ports 0/1 through 0/16 with default licensing.
- The examples in this procedure use two nodes, but you can have up to 24 nodes in a cluster.
- Repeat all procedures in this section to upgrade the EFOS software and RCF file on the other switch, **cs1**.

Prepare the controller for a cluster switch upgrade

You can use this procedure to prepare the controller for a BES-53248 cluster switch upgrade.

Steps

1. Connect the cluster switch to the management network.
2. Use the ping command to verify connectivity to the server hosting EFOS, licenses, and the RCF.

If this is an issue, use a nonrouted network and configure the service port using IP address 192.168.x or 172.19.x. You can reconfigure the service port to the production management IP address later.

This example verifies that the switch is connected to 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. Verify that the cluster ports are healthy and have a link using the command:

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

The following example shows the type of output with all ports having a `Link` value of `up` and a `Health Status` of `healthy`:

```
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.
```

4. Verify that the cluster LIFs are administratively and operationally up and reside on their home ports, using the command:

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

In this example, the `-vserver` parameter displays information about the LIFs that are associated with cluster ports. Status Admin/Oper must be up and Is Home must be true:

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

	Logical	Status	Network	Current	
Current Is					
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port
Home					
-----	-----	-----	-----	-----	
-----	-----				
Cluster	node1_clus1	up/up	169.254.217.125/16	node1	e0a
true	node1_clus2	up/up	169.254.205.88/16	node1	e0b
true	node2_clus1	up/up	169.254.252.125/16	node2	e0a
true	node2_clus2	up/up	169.254.110.131/16	node2	e0b
true					

4 entries were displayed.

Install the EFOS software

You can use this procedure to install the EFOS software on the BES-53248 cluster switch. You can download the applicable Broadcom EFOS software for your cluster switches from the [Broadcom Ethernet Switch Support site](#).

About this task

Note the following:

- When upgrading from EFOS 3.4.x.x to EFOS 3.7.x.x or later, the switch must be running EFOS 3.4.4.6 (or later 3.4.x.x release). If you are running a release prior to that, then upgrade the switch to EFOS 3.4.4.6 (or later 3.4.x.x release) first, then upgrade the switch to EFOS 3.7.x.x or later.
- The configuration for EFOS 3.4.x.x and 3.7.x.x or later are different. Changing the EFOS version from 3.4.x.x to 3.7.x.x or later, or vice versa, requires the switch to be reset to factory defaults and the RCF files for the corresponding EFOS version to be (re)applied. This procedure requires access through the serial console port.
- Beginning with EFOS version 3.7.x.x or later, a non-FIPS compliant and a FIPS compliant version is available. Different steps apply when moving to from a non-FIPS compliant to a FIPS compliant version or vice versa. Changing EFOS from a non-FIPS compliant to a FIPS compliant version or vice versa will reset the switch to factory defaults. This procedure requires access through the serial console port.

Procedure	Current EFOS version	New EFOS version	High level steps
Steps to upgrade EFOS between two (non) FIPS compliant versions	3.4.x.x	3.4.x.x	Install the new EFOS image using method 1) The configuration and license information is retained
	3.4.4.6 (or later 3.4.x.x)	3.7.x.x or later non-FIPS compliant	Upgrade EFOS using method 1. Reset the switch to factory defaults and apply the RCF file for EFOS 3.7.x.x or later
	3.7.x.x or later non-FIPS compliant	3.4.4.6 (or later 3.4.x.x)	Downgrade EFOS using method 1. Reset the switch to factory defaults and apply the RCF file for EFOS 3.4.x.x
		3.7.x.x or later non-FIPS compliant	Install the new EFOS image using method 1. The configuration and license information is retained
	3.7.x.x or later FIPS compliant	3.7.x.x or later FIPS compliant	Install the new EFOS image using method 1. The configuration and license information is retained

Steps to upgrade to/from a FIPS compliant EFOS version	Non-FIPS compliant	FIPS compliant	Installation of the EFOS image using method 2. The switch configuration and license information will be lost.
	FIPS compliant	Non-FIPS compliant	



Note that after upgrading BES-53248 cluster switches from EFOS 3.3.x.x or 3.4.x.x to EFOS 3.7.0.4 or 3.8.0.2, Inter-Switch Links (ISLs) and port channels are marked in the **Down** state. See this [KB article](#) for further details.

Steps

1. Connect the BES-53248 cluster switch to the management network.
2. Use the `ping` command to verify connectivity to the server hosting EFOS, licenses, and the RCF file.

This example verifies that the switch is connected to 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. Back up the current active image on cs2:

```
show bootvar
```

```
(cs2) # show bootvar
```

Image Descriptions

active :

backup :

Images currently available on Flash

unit	active	backup	current-active	next-active
1	3.4.3.3	Q.10.22.1	3.4.3.3	3.4.3.3

```
(cs2) # copy active backup
```

Copying active to backup

Management access will be blocked for the duration of the operation

Copy operation successful

```
(cs2) # show bootvar
```

Image Descriptions

active :

backup :

Images currently available on Flash

unit	active	backup	current-active	next-active
1	3.4.3.3	3.4.3.3	3.4.3.3	3.4.3.3

```
(cs2) #
```

4. Verify the running version of the EFOS software:

```
show version
```



```
(cs2) # show version
```

```
Switch: 1
```

```
System Description..... Quanta IX8-B 48x25GB SFP
8x100GB QSFP, 3.4.3.3, Linux 4.4.117-ceeeb99d, 2016.05.00.04
Machine Type..... Quanta IX8-B 48x25GB SFP
8x100GB QSFP
Machine Model..... IX8-B
Serial Number..... QTFCU38260014
Maintenance Level..... A
Manufacturer..... 0xbc00
Burned In MAC Address..... D8:C4:97:71:12:3D
Software Version..... 3.4.3.3
Operating System..... Linux 4.4.117-ceeeb99d
Network Processing Device..... BCM56873_A0
CPLD Version..... 0xff040c03

Additional Packages..... BGP-4
..... QOS
..... Multicast
..... IPv6
..... Routing
..... Data Center
..... OpEN API
..... Prototype Open API
```

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 EFOS version. The previous image remains available as a backup.

```
(cs2) # copy sftp://root@172.19.2.1//tmp/EFOS-3.4.4.6.stk active
Remote Password:*****

Mode..... SFTP
Set Server IP..... 172.19.2.1
Path..... //tmp/
Filename..... EFOS-3.4.4.6.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.
```

6. Display the boot images for the active and backup configuration:

show bootvar

```
(cs2) # show bootvar
```

Image Descriptions

```
active :
backup :
```

Images currently available on Flash

unit	active	backup	current-active	next-active
1	3.4.3.3	3.4.3.3	3.4.3.3	3.4.4.6

7. Reboot the switch:

reload

```
(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!

8. Log in again and verify the new version of the EFOS software:

```
show version
```

```
(cs2) # show version
```

Switch: 1

```
System Description..... x86_64-
quanta_common_rglbmc-r0, 3.4.4.6, Linux 4.4.211-28a6fe76, 2016.05.00.04
Machine Type..... x86_64-
quanta_common_rglbmc-r0
Machine Model..... BES-53248
Serial Number..... QTFCU38260023
Maintenance Level..... A
Manufacturer..... 0xbc00
Burned In MAC Address..... D8:C4:97:71:0F:40
Software Version..... 3.4.4.6
Operating System..... Linux 4.4.211-28a6fe76
Network Processing Device..... BCM56873_A0
CPLD Version..... 0xff040c03

Additional Packages..... BGP-4
..... QOS
..... Multicast
..... IPv6
..... Routing
..... Data Center
..... OpEN API
..... Prototype Open API
```

Upgrade EFOS using the ONIE OS installation

You can perform the following steps if one EFOS version is FIPS compliant and the other EFOS version is non-FIPS compliant. These steps can be used to install the non-FIPS or FIPS compliant EFOS 3.7.x.x image from ONIE if the switch fails to boot.



This functionality is only available for EFOS 3.7.x.x or later non-FIPS compliant.

Steps

1. Boot the switch into ONIE installation mode.

During boot, select ONIE when the following screen appears:

```
+-----+
| EFOS                                     |
| *ONIE                                  |
|                                       |
|                                       |
|                                       |
|                                       |
|                                       |
|                                       |
|                                       |
|                                       |
|                                       |
|                                       |
+-----+
```

After selecting **ONIE**", the switch will then load and present you with the following choices:

```
+-----+
| *ONIE: Install OS                       |
| ONIE: Rescue                           |
| ONIE: Uninstall OS                     |
| ONIE: Update ONIE                      |
| ONIE: Embed ONIE                       |
| DIAG: Diagnostic Mode                   |
| DIAG: Burn-In Mode                     |
|                                       |
|                                       |
|                                       |
|                                       |
|                                       |
+-----+
```

The switch now will boot into ONIE installation mode.

2. Stop the ONIE discovery and configure the Ethernet interface.

Once the following message appears press <Enter> to invoke the ONIE console:

```
Please press Enter to activate this console. Info: eth0: Checking
link... up.
ONIE:/ #
```



The ONIE discovery will continue and messages will be printed to the console.

```
Stop the ONIE discovery
ONIE:/ # onie-discovery-stop
discover: installer mode detected.
Stopping: discover... done.
ONIE:/ #
```

3. Configure the Ethernet interface and add the route using `ifconfig eth0 <ipAddress> netmask <netmask> up` and `route add default gw <gatewayAddress>`

```
ONIE:/ # ifconfig eth0 10.10.10.10 netmask 255.255.255.0 up
ONIE:/ # route add default gw 10.10.10.1
```

4. Verify that the server hosting the ONIE installation file is reachable:

```
ONIE:/ # ping 50.50.50.50
PING 50.50.50.50 (50.50.50.50): 56 data bytes
64 bytes from 50.50.50.50: seq=0 ttl=255 time=0.429 ms
64 bytes from 50.50.50.50: seq=1 ttl=255 time=0.595 ms
64 bytes from 50.50.50.50: seq=2 ttl=255 time=0.369 ms
^C
--- 50.50.50.50 ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 0.369/0.464/0.595 ms
ONIE:/ #
```

5. Install the new switch software:

```

ONIE:/ # onie-nos-install http:// 50.50.50.50/Software/onie-installer-
x86_64
discover: installer mode detected.
Stopping: discover... done.
Info: Fetching http:// 50.50.50.50/Software/onie-installer-3.7.0.4 ...
Connecting to 50.50.50.50 (50.50.50.50:80)
installer          100% |*****| 48841k
0:00:00 ETA
ONIE: Executing installer: http:// 50.50.50.50/Software/onie-installer-
3.7.0.4
Verifying image checksum ... OK.
Preparing image archive ... OK.

```

The software will install and then reboot the switch. Let the switch reboot normally into the new EFOS version.

6. Verify that the new switch software is installed: `show bootvar`

```

(cs2) # show bootvar
Image Descriptions
active :
backup :
Images currently available on Flash
----
unit      active      backup    current-active  next-active
----
1         3.7.0.4      3.7.0.4   3.7.0.4         3.7.0.4
(cs2) #

```

7. Complete the installation.

The switch will reboot with no configuration applied and reset to factory defaults.

Related information

[Broadcom Ethernet Switch Support](#)

Install licenses for BES-53248 cluster switches

The BES-53248 cluster switch base model is licensed for 16 10GbE or 25GbE ports and two 100GbE ports. New ports can be added by purchasing more licenses.

The following licenses are available for use on the BES-53248 cluster switch:

License type	License details
Supported firmware version	SW-BES-53248A1-G1-8P-LIC
Broadcom 8P 10-25,2P40-100 License Key, X190005/R	EFOS 3.4.3.3 and later
SW-BES-53248A1-G1-16P-LIC	Broadcom 16P 10-25,4P40-100 License Key, X190005/R
EFOS 3.4.3.3 and later	SW-BES-53248A1-G1-24P-LIC
Broadcom 24P 10-25,6P40-100 License Key, X190005/R	EFOS 3.4.3.3 and later
SW-BES54248-40-100G-LIC	Broadcom 6Port 40G100G License Key, X190005/R
EFOS 3.4.4.6 and later	SW-BES53248-8P-10G25G-LIC
Broadcom 8Port 10G25G License Key, X190005/R	EFOS 3.4.4.6 and later
SW-BES53248-16P-1025G-LIC	Broadcom 16Port 10G25G License Key, X190005/R
EFOS 3.4.4.6 and later	SW-BES53248-24P-1025G-LIC
Broadcom 24Port 10G25G License Key, X190005/R	EFOS 3.4.4.6 and later

Steps

1. Connect the cluster switch to the management network.
2. Use the `ping` command to verify connectivity to the server hosting EFOS, licenses, and the RCF file.

This example verifies that the switch is connected to 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. Check the current license usage on switch cs2:

```
show license
```

```
(cs2) # show license
Reboot needed..... No
Number of active licenses..... 0

License Index   License Type      Status
-----
No license file found.
```

4. Install the license file. The following example uses SFTP to copy a license file to a key index 1.

Repeat this step to load more licenses and to use different key index numbers.

```
(cs2) #copy sftp://root@172.19.2.1/var/lib/tftpboot/license.dat
nvram:license-key 1
Remote Password:*****

Mode..... SFTP
Set Server IP..... 172.19.2.1
Path..... /var/lib/tftpboot/
Filename..... license.dat
Data Type..... license

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...

License Key transfer operation completed successfully. System reboot is
required.
```

5. Display all current license information and note the license status before switch cs2 is rebooted:

```
show license
```



```
(cs2) # show license
```

```
Reboot needed..... Yes
```

```
Number of active licenses..... 0
```

License Index	License Type	Status
1	Port	License valid but not applied

6. Display all licensed ports:

```
show port all | exclude Detach
```

The ports from the additional license files are not displayed until after the switch is rebooted.

```
(cs2) # show port all \ | exclude Detach
```

Actor		Admin	Physical	Physical	Link	Link	LACP
Intf	Type	Mode	Mode	Status	Status	Trap	Mode
Timeout							
-----	-----	-----	-----	-----	-----	-----	-----
0/1		Disable	Auto		Down	Enable	Enable
long							
0/2		Disable	Auto		Down	Enable	Enable
long							
0/3		Disable	Auto		Down	Enable	Enable
long							
0/4		Disable	Auto		Down	Enable	Enable
long							
0/5		Disable	Auto		Down	Enable	Enable
long							
0/6		Disable	Auto		Down	Enable	Enable
long							
0/7		Disable	Auto		Down	Enable	Enable
long							
0/8		Disable	Auto		Down	Enable	Enable
long							
0/9		Disable	Auto		Down	Enable	Enable
long							
0/10		Disable	Auto		Down	Enable	Enable
long							
0/11		Disable	Auto		Down	Enable	Enable
long							
0/12		Disable	Auto		Down	Enable	Enable
long							
0/13		Disable	Auto		Down	Enable	Enable
long							
0/14		Disable	Auto		Down	Enable	Enable
long							
0/15		Disable	Auto		Down	Enable	Enable
long							
0/16		Disable	Auto		Down	Enable	Enable
long							
0/55		Disable	Auto		Down	Enable	Enable
long							
0/56		Disable	Auto		Down	Enable	Enable
long							

7. Reboot the switch:

```
reload
```

```
(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!
```

```
Are you sure you would like to reset the system? (y/n) y
```

8. Check that the new license is active and note that the license has been applied:

```
show license
```

```
(cs2) # show license
```

```
Reboot needed..... No
```

```
Number of installed licenses..... 1
```

```
Total Downlink Ports enabled..... 16
```

```
Total Uplink Ports enabled..... 8
```

License Index	License Type	Status
1	Port	License applied

```
(cs2) #
```

9. Check that all new ports are available:

```
show port all | exclude Detach
```

```
(cs2) # show port all \ | exclude Detach
```

Actor	Intf	Type	Admin Mode	Physical Mode	Physical Status	Link Status	Link Trap	LACP Mode
Timeout								
0/1			Disable	Auto		Down	Enable	Enable
long								

0/2 long	Disable	Auto	Down	Enable	Enable
0/3 long	Disable	Auto	Down	Enable	Enable
0/4 long	Disable	Auto	Down	Enable	Enable
0/5 long	Disable	Auto	Down	Enable	Enable
0/6 long	Disable	Auto	Down	Enable	Enable
0/7 long	Disable	Auto	Down	Enable	Enable
0/8 long	Disable	Auto	Down	Enable	Enable
0/9 long	Disable	Auto	Down	Enable	Enable
0/10 long	Disable	Auto	Down	Enable	Enable
0/11 long	Disable	Auto	Down	Enable	Enable
0/12 long	Disable	Auto	Down	Enable	Enable
0/13 long	Disable	Auto	Down	Enable	Enable
0/14 long	Disable	Auto	Down	Enable	Enable
0/15 long	Disable	Auto	Down	Enable	Enable
0/16 long	Disable	Auto	Down	Enable	Enable
0/49 long	Disable	100G Full	Down	Enable	Enable
0/50 long	Disable	100G Full	Down	Enable	Enable
0/51 long	Disable	100G Full	Down	Enable	Enable
0/52 long	Disable	100G Full	Down	Enable	Enable
0/53 long	Disable	100G Full	Down	Enable	Enable
0/54 long	Disable	100G Full	Down	Enable	Enable
0/55 long	Disable	100G Full	Down	Enable	Enable
0/56 long	Disable	100G Full	Down	Enable	Enable

```
(cs2) #
```

Restrictions and limitations - BES-53248 switches

Where problems arise when installing a license, the following debug commands should be run before running the `copy` command again to install the license.

Debug commands to use:

```
debug transferdebug license
```

```
(cs2) # debug transfer
Debug transfer output is enabled.
(cs2) # debug license
Enabled capability licensing debugging.
```

When you run the `copy` command with the `debug transfer` and `debug license` options enabled, the following log output is returned:

```

transfer.c(3083):Transfer process  key or certificate file type = 43
transfer.c(3229):Transfer process  key/certificate cmd = cp
/mnt/download//license.dat.1 /mnt/fastpath/ >/dev/null 2>&1CAPABILITY
LICENSING :
Fri Sep 11 13:41:32 2020: License file with index 1 added.
CAPABILITY LICENSING : Fri Sep 11 13:41:32 2020: Validating hash value
29de5e9a8af3e510f1f16764a13e8273922d3537d3f13c9c3d445c72a180a2e6.
CAPABILITY LICENSING : Fri Sep 11 13:41:32 2020: Parsing JSON buffer {
  "license": {
    "header": {
      "version": "1.0",
      "license-key": "964B-2D37-4E52-BA14",
      "serial-number": "QTFCU38290012",
      "model": "BES-53248"
    },
    "description": "",
    "ports": "0+6"
  }
}.
CAPABILITY LICENSING : Fri Sep 11 13:41:32 2020: License data does not
contain 'features' field.
CAPABILITY LICENSING : Fri Sep 11 13:41:32 2020: Serial number
QTFCU38290012 matched.
CAPABILITY LICENSING : Fri Sep 11 13:41:32 2020: Model BES-53248 matched.
CAPABILITY LICENSING : Fri Sep 11 13:41:32 2020: Feature not found in
license file with index = 1.
CAPABILITY LICENSING : Fri Sep 11 13:41:32 2020: Applying license file 1.

```

Check for the following in the debug output:

- Check that the Serial number matches: Serial number QTFCU38290012 matched.
- Check that the switch Model matches: Model BES-53248 matched.
- Check that the specified license index was not used previously. Where a license index is already used, the following error is returned: License file /mnt/download//license.dat.1 already exists.
- A port license is not a feature license. Therefore, the following statement is expected: Feature not found in license file with index = 1.

Use the `copy` command to backup port licenses to the server:

```

(cs2) # copy nvram:license-key 1
scp://<UserName>@<IP_address>/saved_license_1.dat

```

See [Installing licenses for BES-53248 cluster switches](#) for details of the firmware versions supported for available licenses.



If you need to downgrade the switch software from version 3.4.4.6, the licenses are removed. This is expected behavior.

You must install an appropriate older license before reverting to an older version of the software.

Edit the Reference Configuration File (RCF)

In order to activate newly licensed ports, you need to edit the latest version of the RCF and uncomment the applicable port details. The default license activates ports 0/1 to 0/16 and 0/55 to 0/56 while the newly licensed ports will be between ports 0/17 to 0/54 depending on the type and number of licenses available.



If you try to edit a previously installed RCF, the process might fail because there is an existing configuration for other areas in the RCF, see [Edit a previously installed RCF file](#).

For details of the available license types for use on the BES-53248 cluster switch, see [Installing licenses for BES-53248 cluster switches](#).

For example to activate the SW-BES54248-40-100G-LIC license, you must uncomment the following section in the RCF:

```
.
.
!
! 2-port or 6-port 40/100GbE node port license block
!
interface 0/49
no shutdown
description "40/100GbE Node Port"
!speed 100G full-duplex
speed 40G full-duplex
service-policy in WRED_100G
spanning-tree edgeport
mtu 9216
switchport mode trunk
datacenter-bridging
priority-flow-control mode on
priority-flow-control priority 5 no-drop
exit
exit
!
interface 0/50
no shutdown
description "40/100GbE Node Port"
!speed 100G full-duplex
speed 40G full-duplex
service-policy in WRED_100G
```

```

spanning-tree edgeport
mtu 9216
switchport mode trunk
datacenter-bridging
priority-flow-control mode on
priority-flow-control priority 5 no-drop
exit
exit
!
interface 0/51
no shutdown
description "40/100GbE Node Port"
speed 100G full-duplex
!speed 40G full-duplex
service-policy in WRED_100G
spanning-tree edgeport
mtu 9216
switchport mode trunk
datacenter-bridging
priority-flow-control mode on
priority-flow-control priority 5 no-drop
exit
exit
!
interface 0/52
no shutdown
description "40/100GbE Node Port"
speed 100G full-duplex
!speed 40G full-duplex
service-policy in WRED_100G
spanning-tree edgeport
mtu 9216
switchport mode trunk
datacenter-bridging
priority-flow-control mode on
priority-flow-control priority 5 no-drop
exit
exit
!
interface 0/53
no shutdown
description "40/100GbE Node Port"
speed 100G full-duplex
!speed 40G full-duplex
service-policy in WRED_100G
spanning-tree edgeport

```



```

mtu 9216
switchport mode trunk
datacenter-bridging
priority-flow-control mode on
priority-flow-control priority 5 no-drop
exit
exit
!
interface 0/54
no shutdown
description "40/100GbE Node Port"
speed 100G full-duplex
!speed 40G full-duplex
service-policy in WRED_100G
spanning-tree edgeport
mtu 9216
switchport mode trunk
datacenter-bridging
priority-flow-control mode on
priority-flow-control priority 5 no-drop
exit
exit
!
.
.

```



For high-speed ports between 0/49 to 0/54 inclusive, uncomment each port but only uncomment one **speed** line in the RCF for each of these ports, either:

- speed 100G full-duplex
- speed 40G full-duplex

as shown in the example.

For low-speed ports between 0/17 to 0/48 inclusive, uncomment the entire 8-port section when an appropriate license has been activated.

Edit a previously installed RCF file

After you edit a previously installed RCF file and run the `script apply` command, you might get the following error message:

```

(CS1) #script apply BES-53248_RCF_v1.6-Cluster-HA.scr
Are you sure you want to apply the configuration script? (y/n)

```

After you select `y`, you get the following error message:

```
config
...
match cos 5
Unrecognized command : match cos 5
Error! in configuration script file at line number 40.
CLI Command :: match cos 5.
Aborting script.
```

To either avoid or resolve this issue, you can choose one of the following options:

- To avoid the error, you can use following procedure:

1. Create a second a RCF file containing the new port configuration only.
2. Copy the second RCF file to the switch.
3. Apply the script to the switch:

```
script apply
```

- To resolve the error, see the Knowledge Base article: [Error! in configuration script file at line number XX when applying a new RCF](#)

Install the Reference Configuration File (RCF)

You can install the RCF after setting up the BES-53248 cluster switch for the first time and after the new license or licenses have been applied. If you are upgrading an RCF from an older version, you must reset the Broadcom switch settings and perform basic configuration to re-apply the RCF. You must perform this operation every time you want to upgrade or change an RCF. See the following [KB article](#) for details.

Reset the Broadcom IP switch to factory defaults

Before installing a new switch software version and RCFs, you must erase the Broadcom switch settings and perform basic configuration.

About this task

- You must repeat these steps on each of the cluster switches.
- You must be connected to the switch using the serial console.
- This task resets the configuration of the management network.

Steps

1. Change to the elevated command prompt (#): enable

```
(cs2)> enable
(cs2) #
```

2. Erase the startup configuration and remove the banner

- a. Erase the startup configuration:

erase startup-config

```
(cs2) #erase startup-config
Are you sure you want to clear the configuration? (y/n) y
(cs2) #
```

This command does not erase the banner.

- b. Remove the banner:

no set clibanner

```
(cs2) #configure
(cs2)(Config) # no set clibanner
(cs2)(Config) #
```

3. Reboot the switch:

(cs2) #reload

```
Are you sure you would like to reset the system? (y/n) y
```



If the system asks whether to save the unsaved or changed configuration before reloading the switch, select **No**.

4. Wait for the switch to reload, and then log in to the switch.

The default user is “admin”, and no password is set. A prompt similar to the following is displayed:

```
(Routing)>
```

5. Change to the elevated command prompt:

enable

```
Routing> enable
(Routing) #
```

6. Set the service port protocol to none:

serviceport protocol none

```
(Routing) #serviceport protocol none
Changing protocol mode will reset ip configuration.
Are you sure you want to continue? (y/n) y

(Routing) #
```

7. Assign the IP address to the service port:

```
serviceport ip ip-address netmask gateway
```

The following example shows a service port assigned IP address "10.10.10.10" with subnet "255.255.255.0" and gateway "10.10.10.1":

```
(Routing) #serviceport ip 10.10.10.10 255.255.255.0 10.10.10.1
```

8. Verify that the service port is correctly configured:

```
show serviceport
```

The following example shows that the port is up and the correct addresses have been assigned:

```
(Routing) #show serviceport

Interface Status..... Up
IP Address..... 10.10.10.10
Subnet Mask..... 255.255.255.0
Default Gateway..... 10.10.10.1
IPv6 Administrative Mode..... Enabled
IPv6 Prefix is .....
fe80::dac4:97ff:fe56:87d7/64
IPv6 Default Router..... fe80::222:bdff:fef8:19ff
Configured IPv4 Protocol..... None
Configured IPv6 Protocol..... None
IPv6 AutoConfig Mode..... Disabled
Burned In MAC Address..... D8:C4:97:56:87:D7

(Routing) #
```

9. If desired, configure the SSH server.



The RCF file disables the Telnet protocol. If you do not configure the SSH server, you can only access the bridge using the serial port connection.

a. Generate RSA keys.

```
(Routing) #configure
(Routing) (Config)#crypto key generate rsa
```

b. Generate DSA keys (optional)

```
(Routing) #configure
(Routing) (Config)#crypto key generate dsa
```

c. If you are using the FIPS compliant version of EFOS, generate the ECDSA keys. The following example creates the keys with a length of 256. Valid values are 256, 384 or 521.

```
(Routing) #configure
(Routing) (Config)#crypto key generate ecdsa 256
```

d. Enable the SSH server.

If necessary, exit the configuration context.

```
(Routing) (Config)#end
(Routing) #ip ssh server enable
```



If keys already exist, then you might be asked to overwrite them.

10. If desired, configure the domain and name server:

configure

The following example shows the `ip domain` and `ip name server` commands:

```
(Routing) # configure
(Routing) (Config)#ip domain name lab.netapp.com
(Routing) (Config)#ip name server 10.99.99.1 10.99.99.2
(Routing) (Config)#exit
(Routing) (Config)#
```

11. If desired, configure the time zone and time synchronization (SNTP).

The following example shows the `sntp` commands, specifying the IP address of the SNTP server and the relative time zone.

```
(Routing) #
(Routing) (Config)#ntp client mode unicast
(Routing) (Config)#ntp server 10.99.99.5
(Routing) (Config)#clock timezone -7
(Routing) (Config)#exit
(Routing) (Config)#
```

12. Configure the switch name:

```
hostname cs2
```

The switch prompt will display the new name:

```
(Routing) # hostname cs2

(cs2) #
```

13. Save the configuration:

```
write memory
```

You receive prompts and output similar to the following 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!

(cs2) #
```

14. Repeat the previous steps on the other cluster switch.

Install the Reference Configuration File (RCF)

Steps

1. Connect the cluster switch to the management network.
2. Use the ping command to verify connectivity to the server hosting EFOS, licenses, and the RCF.

If connectivity is an issue, use a nonrouted network and configure the service port using IP address 192.168.x or 172.19.x. You can reconfigure the service port to the production management IP address later.

This example verifies that the switch is connected to 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. Install the RCF on the BES-53248 cluster switch using the copy command.

```
(cs2) # copy http://172.19.2.1/tmp/BES-53248_RCF_v1.6-Cluster-HA.txt
nvram:script BES-53248_RCF_v1.6-Cluster-HA.scr

Remote Password *****

Mode..... HTTP
Set Server IP..... 172.19.2.1
Path..... //tmp/
Filename..... BES-53248_RCF_v1.6-Cluster-HA.txt
Data Type..... Config Script
Destination Filename..... BES-53248_RCF_v1.6-Cluster-HA.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 script is now displayed line by line]

Configuration script validated.
File transfer operation completed successfully.
```



Depending on your environment, you might need to use a double slash in the copy command, for example: `copy http://172.19.2.1//tmp/BES-53248_RCF_v1.6-Cluster-HA.txt nvram:script BES-53248_RCF_v1.6-Cluster-HA.scr`.



The .scr extension must be set as part of the file name before invoking the script. This extension is the extension for the EFOS operating system. The switch validates the script automatically when it is downloaded to the switch, and the output goes to the console. Also, you can change the name of the .scr to fit your console screen for easier readability, for example: copy http://172.19.2.1/tmp/BES-53248_RCF_v1.6-Cluster-HA.txt nvram:script RCF_v1.6-Cluster-HA.scr.

4. Verify that the script was downloaded and saved to the file name you gave it:

```
script list
```

```
(cs2) # script list

Configuration Script Name                Size(Bytes)  Date of
Modification
-----
BES-53248_RCF_v1.6-Cluster-HA.scr      2241        2020 09 30
05:41:00

1 configuration script(s) found.
```

5. Apply the script to the switch.

```
script apply
```

```
(cs2) # script apply BES-53248_RCF_v1.6-Cluster-HA.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!

Configuration script 'BES-53248_RCF_v1.6-Cluster-HA.scr' applied.
```

6. Verify the ports for an additional license after the RCF is applied:

```
show port all | exclude Detach
```

```
(cs2) # show port all \ | exclude Detach

Admin    Physical    Physical    Link    Link    LACP
Actor
```


Intf Timeout	Type	Mode	Mode	Status	Status	Trap	Mode
-----	-----	-----	-----	-----	-----	-----	-----
0/1 long		Enable	Auto		Down	Enable	Enable
0/2 long		Enable	Auto		Down	Enable	Enable
0/3 long		Enable	Auto		Down	Enable	Enable
0/4 long		Enable	Auto		Down	Enable	Enable
0/5 long		Enable	Auto		Down	Enable	Enable
0/6 long		Enable	Auto		Down	Enable	Enable
0/7 long		Enable	Auto		Down	Enable	Enable
0/8 long		Enable	Auto		Down	Enable	Enable
0/9 long		Enable	Auto		Down	Enable	Enable
0/10 long		Enable	Auto		Down	Enable	Enable
0/11 long		Enable	Auto		Down	Enable	Enable
0/12 long		Enable	Auto		Down	Enable	Enable
0/13 long		Enable	Auto		Down	Enable	Enable
0/14 long		Enable	Auto		Down	Enable	Enable
0/15 long		Enable	Auto		Down	Enable	Enable
0/16 long		Enable	Auto		Down	Enable	Enable
0/49 long		Enable	40G Full		Down	Enable	Enable
0/50 long		Enable	40G Full		Down	Enable	Enable
0/51 long		Enable	100G Full		Down	Enable	Enable
0/52 long		Enable	100G Full		Down	Enable	Enable
0/53 long		Enable	100G Full		Down	Enable	Enable

0/54 long	Enable	100G Full	Down	Enable	Enable
0/55 long	Enable	100G Full	Down	Enable	Enable
0/56 long	Enable	100G Full	Down	Enable	Enable

7. Verify on the switch that your changes have been made:

```
show running-config
```

```
(cs2) # show running-config
```

8. Save the running configuration so that it becomes the startup configuration when you reboot the switch:

```
write memory
```

```
(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 and verify that the running configuration is correct:

```
reload
```

```
(cs2) # reload

Are you sure you would like to reset the system? (y/n) y

System will now restart!
```

Configure the cluster switch log collection feature

The cluster switch health monitor log collection feature is used to collect switch-related log files in ONTAP. You must make sure that you have set up your environment using the BES-53248 cluster switch CLI as detailed here.

Steps

1. Generate the SSH keys:

```
crypto key generate
```

```

(switch) # show ip ssh
SSH Configuration

Administrative Mode: ..... Disabled
SSH Port: ..... 22
Protocol Level: ..... Version 2
SSH Sessions Currently Active: ..... 0
Max SSH Sessions Allowed: ..... 5
SSH Timeout (mins): ..... 5
Keys Present: ..... DSA(1024) RSA(1024)
ECDSA(521)
Key Generation In Progress: ..... None
SCP server Administrative Mode: ..... Disabled

(switch) # config

(switch) (Config)# crypto key generate rsa

Do you want to overwrite the existing RSA keys? (y/n): y

(switch) (Config)# crypto key generate dsa

Do you want to overwrite the existing DSA keys? (y/n): y

(switch) (Config)# crypto key generate ecdsa 521

Do you want to overwrite the existing ECDSA keys? (y/n): y

(switch) (Config)# aaa authorization commands "noCmdAuthList" none
(switch) (Config)# exit
(switch) # ip ssh server enable
(switch) # ip ssh pubkey-auth
(switch) # ip scp server enable
(switch) # write mem
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!

(switch) #

```

2. Verify that SSH is enabled:

show ip ssh

```
(switch) # show ip ssh
```

SSH Configuration

```
Administrative Mode: ..... Enabled
SSH Port: ..... 22
Protocol Level: ..... Version 2
SSH Sessions Currently Active: ..... 0
Max SSH Sessions Allowed: ..... 5
SSH Timeout (mins): ..... 5
Keys Present: ..... DSA(1024) RSA(1024)
ECDSA(521)
Key Generation In Progress: ..... None
SCP server Administrative Mode: ..... Disabled
```

```
(switch) #
```

3. For ONTAP 9.8 and later, enable the cluster switch health monitor log collection feature for collecting switch-related log files, using the commands:

system switch ethernet log setup-password system switch ethernet log enable-collection

```

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

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

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

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

cluster1::*> system switch ethernet log setup-password
Enter the switch name: cs2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

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

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

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

Enabling cluster switch log collection.

cluster1::*>

```

4. For ONTAP 9.5P15, 9.6P11, 9.7P8 and later patch releases, enable the cluster switch health monitor log collection feature for collecting switch-related log files, using the commands:

```
system cluster-switch log setup-password system cluster-switch log enable-
collection
```

```

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

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

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

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

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

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

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

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

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

Enabling cluster switch log collection.

cluster1::*>

```



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

Install the Cluster Switch Health Monitor (CSHM) configuration file

You can use this procedure to install the applicable configuration file for cluster switch health monitoring of BES-53248 cluster switches. In ONTAP releases 9.5P7 and earlier and 9.6P2 and earlier, you must download the cluster switch health monitor configuration file separately. In ONTAP releases 9.5P8 and later, 9.6P3 and later, and 9.7 and later, the cluster switch health monitor configuration file is bundled with ONTAP.

What you'll need

Before you setup the switch health monitor for BES-53248 cluster switches, you must ensure that the ONTAP cluster is up and running.



It is advisable to enable SSH in order to use all features available in CSHM.

Steps

1. Download the cluster switch health monitor configuration zip file based on the corresponding ONTAP release version. This file is available from the page: [NetApp Software download](#)
 - a. On the Software download page, select **Switch Health Monitor Configuration Files**
 - b. Select Platform = **ONTAP** and click **Go!**
 - c. On the Switch Health Monitor Configuration Files for ONTAP page, click **View & Download**
 - d. On the Switch Health Monitor Configuration Files for ONTAP - Description page, click **Download** for the applicable cluster switch model, for example: **Broadcom-supported BES-53248**
 - e. On the End User License Agreement page, click **Accept**
 - f. On the Switch Health Monitor Configuration Files for ONTAP - Download page, select the applicable configuration file, for example, **Broadcom_BES-53248.zip**
2. Upload the applicable zip file to your internal web server where the IP address is X.X.X.X.

For an internal web server IP address of 192.168.2.20 and assuming a /usr/download directory exists, you can upload your zip file to your web server using scp:

```
% scp Broadcom_BES-53248.zip
admin@192.168.2.20:/usr/download/Broadcom_BES-53248.zip
```

3. Access the advanced mode setting from one of the ONTAP systems in the cluster, using the command `set -privilege advanced`:

```
cluster1::> set -privilege advanced
```

4. Run the switch health monitor configure command `system cluster-switch configure-health-monitor -node * -package-url http://server/file-location`:

```
cluster1::> system cluster-switch configure-health-monitor -node *
-package-url
http://192.168.2.20/usr/download/Broadcom_BES-53248.zip
```

5. Verify that the command output contains the text string "downloaded package processed successfully". If an error occurs, contact NetApp support.
6. Run the command `system cluster-switch show` on the ONTAP system and ensure that the cluster switches are discovered with the monitored field set to "True".


```
cluster1::> system cluster-switch show
```



If at any time you revert to an earlier version of ONTAP, you will need to install the CSHM configuration file again to enable switch health monitoring of BES-53248 cluster switches.

Verify the configuration after a cluster switch upgrade - BES-53248 switches

You can use the commands provided here to verify that all is operational after a BES-53248 cluster switch upgrade.

Steps

1. Display information about the network ports on the cluster using the command:

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

Link must have the value up and Health Status must be healthy.

The following example shows the output from the command:

```
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.

2. Verify that for each LIF Is Home is true and Status Admin/Oper is up on both nodes using the command:

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

```
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	169.254.217.125/16	node1	e0a
true					
	node1_clus2	up/up	169.254.205.88/16	node1	e0b
true					
	node2_clus1	up/up	169.254.252.125/16	node2	e0a
true					
	node2_clus2	up/up	169.254.110.131/16	node2	e0b
true					

```
4 entries were displayed.
```

3. Verify that the Health Status of each node is true using the command: `cluster show`

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

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

```
2 entries were displayed.
```

Replace a Broadcom-supported BES-53248 cluster switch - BES-53248 switches

Replacing a defective Broadcom-supported BES-53248 cluster switch in a cluster network is a nondisruptive procedure (NDU).

What you'll need

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

- Existing cluster and network infrastructure:
 - The existing cluster must be verified as completely functional, with at least one fully connected cluster switch.

- All cluster ports must be up.
- All cluster logical interfaces (LIFs) must be administratively and operationally 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.
- BES-53248 replacement cluster switch:
 - Management network connectivity on the replacement switch must be functional.
 - Console access to the replacement switch must be in place.
 - The node connections are ports 0/1 through 0/16 with default licensing.
 - All Inter-Switch Link (ISL) ports must be disabled on ports 0/55 and 0/56.
 - The desired reference configuration file (RCF) and EFOS operating system switch image must be loaded onto the switch.
 - Initial customization of the switch must be complete, as detailed in [Configuring a new Broadcom-supported BES-53248 switch](#).

About this task

- The names of the existing BES-53248 switches are `cs1` and `cs2`.
- The name of the new BES-53248 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::>`

The following procedure is based on the following cluster network topology:

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

Node: node1

Ignore

Speed(Mbps)  Health
Health
Port          IPspace      Broadcast Domain Link MTU   Admin/Oper  Status
Status
-----
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/	Local	Discovered		
Protocol	Port	Device (LLDP: ChassisID)	Interface	Platform

```

node2      /cdp
           e0a      cs1              0/2              BES-53248
           e0b      cs2              0/2              BES-53248
node1      /cdp
           e0a      cs1              0/1              BES-53248
           e0b      cs2              0/1              BES-53248

```

4 entries were displayed.

```
(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 Port ID	Intf	Holdtime	Capability	Platform
node1 e0a	0/1	175	H	FAS2750
node2 e0a	0/2	152	H	FAS2750
cs2 0/55	0/55	179	R	BES-53248
cs2 0/56	0/56	179	R	BES-53248

```
(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 Port ID	Intf	Holdtime	Capability	Platform
node1 e0b	0/1	129	H	FAS2750
node2 e0b	0/2	165	H	FAS2750
cs1 0/55	0/55	179	R	BES-53248
cs1 0/56	0/56	179	R	BES-53248

Steps

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 EFOS 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 EFOS software, continue to step 2.

- a. You can download the applicable Broadcom EFOS software for your cluster switches from the [Broadcom Ethernet Switch Support](#) site. Follow the steps on the Download page to download the EFOS file for the version of ONTAP software you are installing.
 - b. The appropriate RCF is available from the [Broadcom Cluster Switches](#) page. Follow the steps on the Download page to download the correct RCF 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 to 16).



If you purchased additional licenses for additional ports, shut down these ports too.

If the switch that you are replacing is not functional and is powered down, the LIFs on the cluster nodes should have already failed over to the other cluster port for each node.



No password is required to enter `enable` mode.

```
User: admin
Password:
(newcs2) >enable
(newcs2) #config
(newcs2) (config)#interface 0/1-0/16
(newcs2) (interface 0/1-0/16)#shutdown
(newcs2) (interface 0/1-0/16)#exit
(newcs2) (config)#exit
```

3. Verify that all cluster LIFs have `auto-revert` enabled:

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

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

Logical

Vserver	Interface	Auto-revert
Cluster	node1_clus1	true
Cluster	node1_clus2	true
Cluster	node2_clus1	true
Cluster	node2_clus2	true

4 entries were displayed.

4. Shut down the ISL ports 0/55 and 0/56 on the BES-53248 switch cs1:

```
(cs1) # config
(cs1)(config)# interface 0/55-0/56
(cs1)(interface 0/55-0/56)# shutdown
```

5. Remove all cables from the BES-53248 cs2 switch, and then connect them to the same ports on the BES-53248 newcs2 switch.
6. Bring up the ISLs ports 0/55 and 0/56 between the cs1 and newcs2 switches, and then verify the port channel operation status.

The Link State for port-channel 1/1 should be up and all member ports should be True under the Port Active heading.

This example enables ISL ports 0/55 and 0/56 and displays the Link State for port-channel 1/1 on switch cs1:


```
(cs1) # config
(cs1)(config)# interface 0/55-0/56
(cs1)(interface 0/55-0/56)# no shutdown
(cs1) # show port-channel 1/1
```

```
Local Interface..... 1/1
Channel Name..... Cluster-ISL
Link State..... Up
Admin Mode..... Enabled
Type..... Dynamic
Port-channel Min-links..... 1
Load Balance Option..... 7
(Enhanced hashing mode)
```

Mbr	Device/	Port	Port
Ports	Timeout	Speed	Active
-----	-----	-----	-----
0/55	actor/long	100G Full	True
	partner/long		
0/56	actor/long	100G Full	True
	partner/long		

- On the new switch newcs2, re-enable all of the ports that are connected to the node cluster interfaces (ports 1 to 16).



If you purchased additional licenses for additional ports, shut down these ports too.

```
User:admin
Password:
(newcs2) >enable
(newcs2) #config
(newcs2)(config)#interface 0/1-0/16
(newcs2)(interface 0/1-0/16)#no shutdown
(newcs2)(interface 0/1-0/16)#exit
(newcs2)(config)#exit
```

- Verify that port e0b is up:

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

The output should be similar to the following:

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

```
Node: node1
```

```
Ignore
```

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

```
4 entries were displayed.
```

9. On the same node as you used in the previous step, wait for the cluster LIF node1_clus2 on node1 to auto-revert.

In this example, LIF node1_clus2 on node1 is successfully reverted if `Is Home` is `true` and the port is e0b.

The following command displays information about the LIFs on both nodes. Bringing up the first node is successful if `Is Home` is `true` for both cluster interfaces and they show the correct port assignments, in this example e0a and e0b on node1.

```
cluster::> 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	e0a
false					

4 entries were displayed.

10. Display information about the nodes in a cluster: `cluster show`

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

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

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

11. Confirm the following cluster network configuration:

`network port show`

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

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.

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	Eth1/1	144	H	FAS2980	e0a
node2	Eth1/2	145	H	FAS2980	e0a
newcs2 (FDO296348FU) Eth1/65	Eth1/65	176	R S I s	N9K-C92300YC	
newcs2 (FDO296348FU) Eth1/66	Eth1/66	176	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 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

12. Verify that the cluster network is healthy:

show isdp neighbors

```
(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	175	H	FAS2750	e0a
node2	0/2	152	H	FAS2750	e0a
newcs2	0/55	179	R	BES-53248	0/55
newcs2	0/56	179	R	BES-53248	0/56

```
(newcs2) # 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	129	H	FAS2750	e0b
node2	0/2	165	H	FAS2750	e0b
cs1	0/55	179	R	BES-53248	0/55
cs1	0/56	179	R	BES-53248	0/56

See [Configuring the cluster switch log collection feature](#) for the steps required to enable cluster health switch log collection used for collecting switch-related log files.

Related information

[NetApp Support Site](#)

[NetApp Hardware Universe](#)

[Switch Setup and Configuration Guide for Broadcom-supported BES-53248 switches](#)

Cisco Nexus 3132Q-V switches

Cisco Nexus 3132Q-V switches

You can use the Cisco Nexus 3132Q-V switches as cluster switches in your AFF or FAS cluster.

- You can install NX-OS and reference configuration files (RCFs) on the Cisco Nexus 3132Q-V cluster switch.
- You can migrate from a two-node switchless cluster environment to a two-node switched environment using Cisco Nexus 3132Q-V cluster switches.
- You can replace a defective Cisco Nexus 3132Q-V switch in a cluster and download the switch operating system and reference configuration file.
- You can replace Cisco Nexus 5596, Nexus 5020, or Nexus 5010 cluster switches with Cisco Nexus 3132Q-V switches.
- You can replace NetApp CN1610 switches with Cisco Nexus 3132Q-V cluster switches.

Available documentation

The following table lists the documentation available for the Cisco Nexus 3132Q-V switches.

Title	Description
<i>Install a Cisco® Nexus 3132Q-V cluster switch and pass-through panel in a NetApp® cabinet</i>	Describes how to install the pass-through panel in system cabinets where power connectors are at the front of the chassis and power distribution units are located in the rear of the chassis.
<i>Setup the Cisco® Nexus 3132Q-V cluster switches</i>	Describes how to setup and configure your Cisco Nexus 3132Q-V cluster switches.
<i>Install NX-OS and Reference Configuration Files (RCFs)</i>	Describes how to install NX-OS and reference configuration files (RCFs) on Nexus 3132Q-V cluster switch.
<i>Replace Cisco Nexus 5596 cluster switches with Cisco Nexus 3132Q-V cluster switches</i>	Describes how to migrate from environments that use older Cisco switches to environments that use Cisco 3132Q-V switches.
<i>Replace CN1610 cluster switches with Cisco Nexus 3132Q-V cluster switches</i>	Describes the procedure to replace a CN1610 switch with a Cisco Nexus 3132Q-V cluster switch.
<i>Migrate from a two-node Switchless Cluster</i>	Describes how to migrate from a two-node switchless cluster environment to a two-node switched environment using Cisco Nexus 3132Q-V cluster switches.

Install a Cisco Nexus 3132Q-V cluster switch and a pass-through panel in a NetApp cabinet

You can 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

You must have reviewed the initial preparation requirements, kit contents, and safety precautions.

[Cisco Nexus 3000 Series Hardware Installation Guide](#)

About this task

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



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

Steps

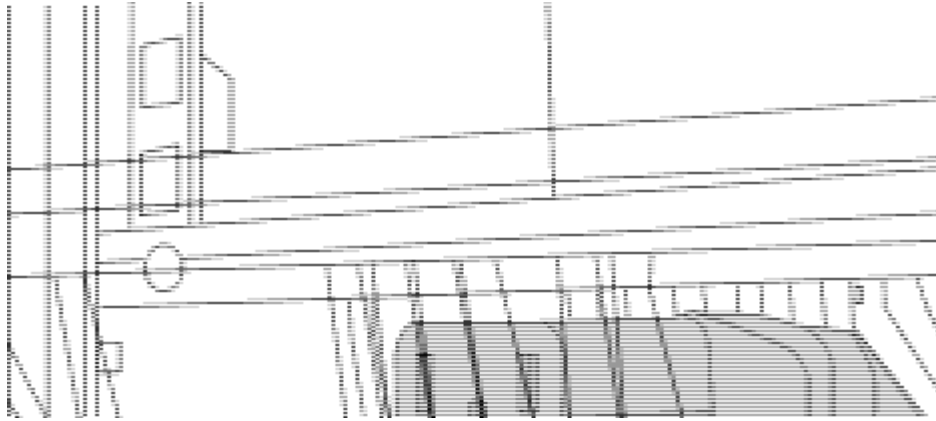
1. Install the pass-through blanking panel in the NetApp cabinet.

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

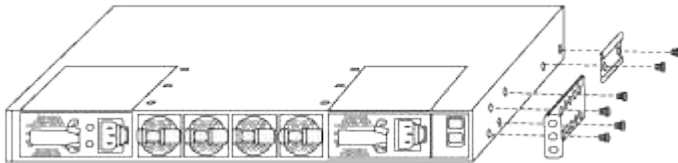
The NetApp pass-through panel kit contains the following hardware:

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

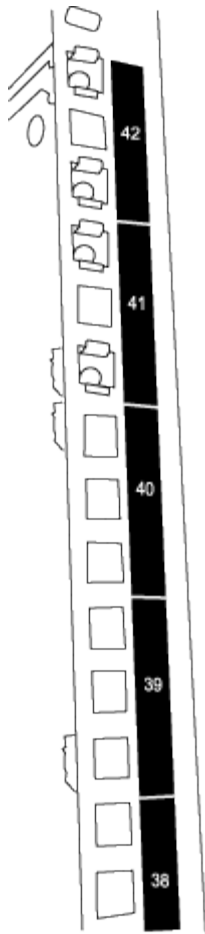
In this procedure, the blanking panel will be installed in U40.
 - b. Install two clip nuts on each side in the appropriate square holes for front cabinet rails.
 - c. Center the panel vertically to prevent intrusion into adjacent rack space, and then tighten the screws.
 - d. Insert the female connectors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



1. Female connector of the jumper cord.
2. Install the rack-mount brackets on the Nexus 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.



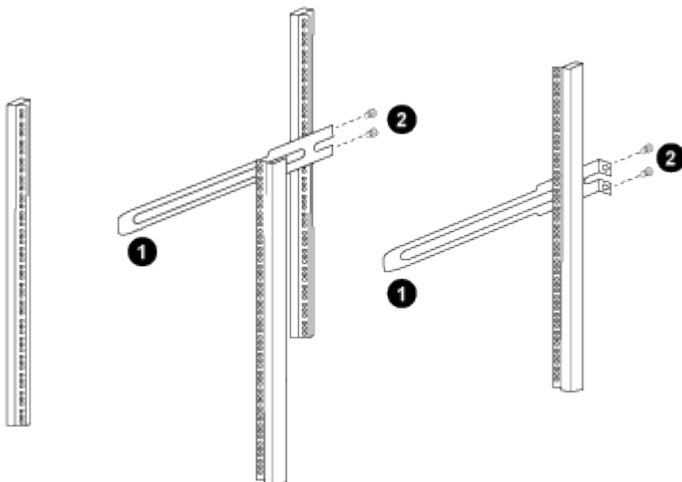
- b. Repeat step 2a with the other front rack-mount bracket on the other side of the switch.
 - c. Install the rear rack-mount bracket on the switch chassis.
 - d. Repeat step 2c with the other rear rack-mount bracket on the other side of the switch.
3. Install the clip nuts in the square hole locations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

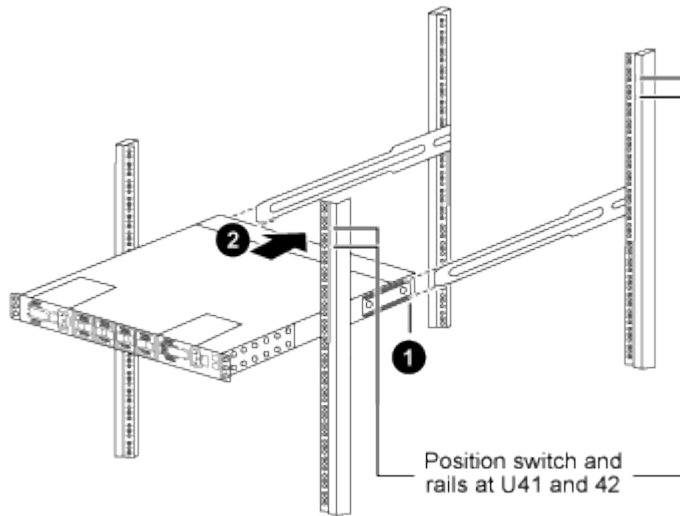
c. Repeat steps 4a and 4b at the RU41 locations on the cabinet.

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.

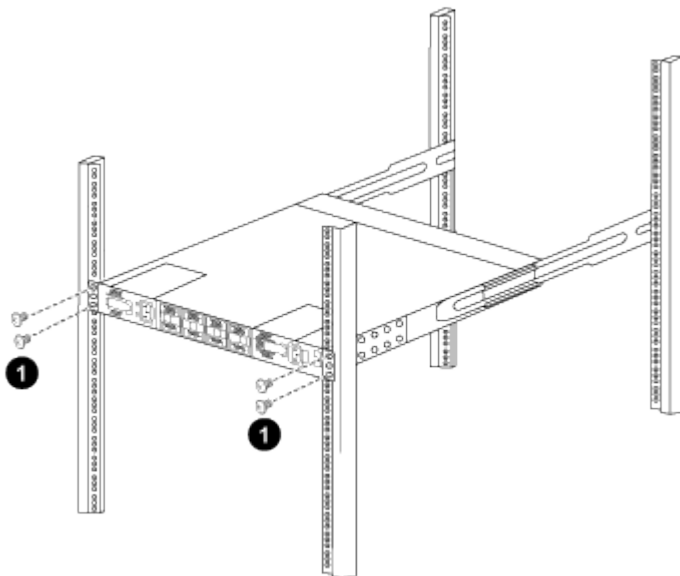
a. Position the back of the switch at RU41.



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, it is not necessary to hold the front of the second switch during the installation process.

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



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

8. Connect the management port on each 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.

Set up

Set up the switches

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

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

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

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

[NetApp documentation](#)

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



Due to the complexity that can result from illustrating layers of cabling, this guide does not provide cabling graphics. This guide does provide sample worksheets with recommended port assignments and blank worksheets that you can use to set up your cluster.



For more information refer to the [Hardware Universe](#).

- 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.



You must download the applicable NetApp cluster network and management network RCFs from the NetApp Support Site at mysupport.netapp.com for the switches that you receive.

- In addition, you might need to install the required configuration file to support the Cluster Switch Health Monitor (CSHM) for the 92300YC cluster switches. See [Installing the Cluster Switch Health Monitor \(CSHM\) configuration file for 92300YC switches](#) for details.

Steps

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

If you are installing your...	Then...
Cisco Nexus 9336C-FX2 in a NetApp system cabinet	See the <i>Installing a Cisco Nexus 9336C-FX2 cluster switch and pass-through panel in a NetApp cabinet</i> guide for instructions to install the switch in a NetApp cabinet.
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.
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.
Equipment in a Telco rack	See the procedures provided in the switch hardware installation guides and the NetApp installation and setup instructions.
Cisco Nexus 5596UP/5596T in a NetApp system cabinet	See the <i>Installing a Cisco Nexus 5596 cluster switch and pass-through panel in a NetApp cabinet</i> guide for instructions to install the switch in a NetApp cabinet.

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 based on information provided in [Required configuration information](#).
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.

If you download the NetApp-supported version of the software, then you must also download the *NetApp Cluster Network Switch Reference Configuration File* and merge it with the configuration you saved in Step 5. You can download the file and the instructions from the [Cisco Ethernet Switches](#) page.

7. Check the software version on the network switches and, if necessary, download the NetApp-supported version of the software to the switches. If you have your own switches, refer to the [Cisco site](#).

If you download the NetApp-supported version of the software, then you must also download the *NetApp Management Network Switch Reference Configuration File* and merge it with the configuration you saved in Step 5. You can download the file and instructions from the [Cisco Ethernet Switches](#) page.

Related information

[Required cluster configuration information](#)

[Required documentation](#)

[Sample and blank cabling worksheets](#)

Required cluster configuration information

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.

Required network information for all switches

You need the following network information for all switch configurations:

- IP subnet for management network traffic
- Host names and IP addresses for each of the storage system controllers and all applicable switches
- Most storage system controllers are managed through the e0M interface by connecting to the Ethernet service port (wrench icon). On AFF A800 and AFF A700 systems, the e0M interface uses a dedicated Ethernet port.

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

Required network information for Cisco Nexus 9336C-FX2, 92300YC, 3232C, 3132Q-V, and 5596UP/5596T switches

For the Cisco Nexus 9336C-FX2, 92300YC, 3232C, 3132Q-V, and 5596UP/5596T switches, you need to provide applicable responses to the following initial setup questions when you first boot the switch. Your site's security policy defines the responses and services to enable.

- 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.

- 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 Cluster 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).
- 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.

For more information about the initial configuration of your switch, see the following guides:

[Cisco Nexus 9336C-FX2 Installation and Upgrade Guides](#)

[Cisco Nexus 92300YC Installation and Upgrade Guides](#)

[Cisco Nexus 5000 Series Hardware Installation Guide](#)

[Cisco Nexus 3000 Series Hardware Installation Guide](#)

Install the Cluster Switch Health Monitor (CSHM) configuration file for 92300YC switches

You can use this procedure to install the applicable configuration file for cluster switch health monitoring of Nexus 92300YC cluster switches. In ONTAP releases 9.5P7 and earlier and 9.6P2 and earlier, you must download the cluster switch health monitor configuration file separately. In ONTAP releases 9.5P8 and later, 9.6P3 and later, and 9.7 and later, the cluster switch health monitor configuration file is bundled with ONTAP.

Before you setup the switch health monitor for 92300YC cluster switches, you must ensure that the ONTAP cluster is up and running.



It is advisable to enable SSH in order to use all features available in CSHM.

1. Download the cluster switch health monitor configuration zip file based on the corresponding ONTAP release version. This file is available from the [NetApp Software download](#) page.
 - a. On the Software download page, select **Switch Health Monitor Configuration Files**
 - b. Select Platform = **ONTAP** and click **Go!**
 - c. On the Switch Health Monitor Configuration Files for ONTAP page, click **View & Download**
 - d. On the Switch Health Monitor Configuration Files for ONTAP - Description page, click **Download** for the applicable cluster switch model, for example: **Cisco Nexus 92300YC**
 - e. On the End User License Agreement page, click **Accept**
 - f. On the Switch Health Monitor Configuration Files for ONTAP - Download page, select the applicable configuration file, for example, **Cisco_Nexus_92300YC.zip**
2. Upload the applicable zip file to your internal web server where the IP address is X.X.X.X.

For an internal web server IP address of 192.168.2.20 and assuming a /usr/download directory exists, you can upload your zip file to your web server using scp:


```
% scp Cisco_Nexus_92300YC.zip
admin@192.168.2.20:/usr/download/Cisco_Nexus_92300YC.zip
```

3. Access the advanced mode setting from one of the ONTAP systems in the cluster, using the command `set-privilege advanced`:

```
cluster1::> set -privilege advanced
```

4. Run the switch health monitor configure command `system cluster-switch configure-health-monitor -node * -package-url X.X.X/location_to_download_zip_file`:

```
cluster1::> system cluster-switch configure-health-monitor -node *
-package-url 192.168.2.20/usr/download/Cisco_Nexus_92300YC.zip
```

5. Verify that the command output contains the text string "downloaded package processed successfully". If an error occurs, contact NetApp support.
6. Run the command `system cluster-switch show` on the ONTAP system and ensure that the cluster switches are discovered with the monitored field set to "True".

```
cluster1::> system cluster-switch show
```



If at any time you revert to an earlier version of ONTAP, you will need to install the CSHM configuration file again to enable switch health monitoring of 92300YC cluster switches.

Required documentation

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

Required documentation for cluster network switches

To set up the Cisco Nexus 9336C-FX2 and 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.

Document title	Description
<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.

To set up the Cisco Nexus 3232C and 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.
<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.

Document title	Description
<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 (choose the notes for the NX-OS release installed on your switches)</i>	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.

To set up the Cisco Nexus 5596 switch, you need the following documents from [Cisco Nexus 5000 Series Switches Support](#) page:

Document title	Description
<i>Nexus 5000 Series Hardware Installation Guide</i>	Provides detailed information about site requirements, switch hardware details, and installation options.
<i>Cisco Nexus 5000 Series Switch Software Configuration Guide (choose the guide for the software you are using)</i>	Provides initial switch configuration information that you need before you can configure the switch for ONTAP operation.
<i>Cisco Nexus 5000 Series NX-OS Software Upgrade and Downgrade Guide</i>	Provides information about how to downgrade the switch to the supported ONTAP switch software, if necessary.
<i>Cisco Nexus 5000 Series NX-OS Command Reference Master Index</i>	Provides an alphabetical list of all the commands supported for a specific NX-OS release.
<i>Cisco Nexus 5000 and Nexus 2000 MIBs Reference</i>	Describes the Management Information Base (MIB) files for the Nexus 5000 switches.
<i>Nexus 5000 Series NX-OS System Message Reference</i>	Describes troubleshooting information.

Document title	Description
<i>Regulatory, Compliance, and Safety Information for the Cisco Nexus 6000 Series, Cisco Nexus 5000 Series, Cisco Nexus 3000 Series, and Cisco Nexus 2000 Series</i>	Provides international agency compliance, safety, and statutory information for the Nexus 5000 series switches.

Required documentation for supported ONTAP systems

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

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 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.
Installing a Cisco Nexus 3232C cluster switch and pass-through panel in a NetApp cabinet	Describes how to install a Cisco Nexus 3232C switch in a four-post NetApp cabinet.
Installing a Cisco Nexus 3132Q-V switch and pass-through panel in a NetApp Cabinet	Describes how to install a Cisco Nexus 3132Q-V switch in a four-post NetApp cabinet.
Installing a Cisco Nexus 5596 switch and pass-through panel in a NetApp Cabinet	Describes how to install a Cisco Nexus 5596 switch in a NetApp cabinet.

Considerations for using Smart Call Home

Smart Call Home monitors the hardware and software components on your network, to generate an email-based notification of critical system conditions. When an event occurs on your device, Smart Call Home raises an alert to all the recipients that are configured in your destination profile.

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

Before you can use Smart Call Home feature, you need to be aware of the following considerations:

- 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.

[Cisco support site](#)

Sample and blank cabling worksheets

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

Cisco Nexus 9336C-FX2 cabling worksheet

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

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 node 1	1	4x10GbE node 1
2	4x10GbE node 2	2	4x10GbE node 2
3	4x10GbE node 3	3	4x10GbE node 3
4	4x25GbE node 4	4	4x25GbE node 4
5	4x25GbE node 5	5	4x25GbE node 5
6	4x25GbE node 6	6	4x25GbE node 6

Cluster switch A		Cluster switch B	
7	4x100GbE node 7	7	4x100GbE node 7
8	4x100GbE node 8	8	4x100GbE node 8
9	4x100GbE node 9	9	4x100GbE node 9
10	4x100GbE node 10	10	4x100GbE node 10
11	4x100GbE node 11	11	4x100GbE node 11
12	4x100GbE node 12	12	4x100GbE node 12
13	4x100GbE node 13	13	4x100GbE node 13
14	4x100GbE node 14	14	4x100GbE node 14
15	4x100GbE node 15	15	4x100GbE node 15
16	4x100GbE node 16	16	4x100GbE node 16
17	4x100GbE node 17	17	4x100GbE node 17
18	4x100GbE node 18	18	4x100GbE node 18
19	4x100GbE node 19	19	4x100GbE node 19
20	4x100GbE node 20	20	4x100GbE node 20
21	4x100GbE node 21	21	4x100GbE node 21
22	4x100GbE node 22	22	4x100GbE node 22
23	4x100GbE node 23	23	4x100GbE node 23
24	4x100GbE node 24	24	4x100GbE node 24
25 through 34	Reserved	25 through 34	Reserved
35	100G ISL to switch B port 35	35	100G ISL to switch A port 35
36	100G ISL to switch B port 36	36	100G ISL to switch A port 36

Blank cabling worksheet

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

Cluster switch A		Cluster switch B	
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	

Cluster switch A		Cluster switch B	
20		20	
21		21	
22		22	
23		23	
24		24	
25 through 34	Reserved	25 through 34	Reserved
35	100G ISL to switch B port 35	35	100G ISL to switch A port 35
36	100G ISL to switch B port 36	36	100G ISL to switch A port 36

Cisco Nexus 92300YC cabling worksheet

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

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

Cluster switch A		Cluster switch B	
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
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

Cluster switch A		Cluster switch B	
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
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

Cluster switch A		Cluster switch B	
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
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	

Cluster switch A		Cluster switch B	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
16		16	
17		17	
18		18	
19		19	
20		20	
21		21	
22		22	
23		23	
24		24	

Cluster switch A		Cluster switch B	
25		25	
26		26	
27		27	
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	

Cluster switch A		Cluster switch B	
47		47	
48		48	
49		49	
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

Cisco Nexus 3232C cabling worksheet

If you want to document the supported platforms, you must complete the blank cabling

worksheet by using the completed sample cabling worksheet as a guide. 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	4x10G/40G/100G node	1	4x10G/40G/100G node
2	4x10G/40G/100G node	2	4x10G/40G/100G node
3	4x10G/40G/100G node	3	4x10G/40G/100G node
4	4x10G/40G/100G node	4	4x10G/40G/100G node
5	4x10G/40G/100G node	5	4x10G/40G/100G node
6	4x10G/40G/100Gnode	6	4x10G/40G/100Gnode
7	4x10G/40G/100G node	7	4x10G/40G/100G node
8	4x10G/40G/100G node	8	4x10G/40G/100G node
9	4x10G/40G/100G node	9	4x10G/40G/100G node
10	4x10G/40G/100G node	10	4x10G/40G/100G node
11	4x10G/40G/100G node	11	4x10G/40G/100G node
12	4x10G/40G/100G node	12	4x10G/40G/100G node
13	4x10G/40G/100G node	13	4x10G/40G/100G node
14	4x10G/40G/100G node	14	4x10G/40G/100G node
15	4x10G/40G/100G node	15	4x10G/40G/100G node
16	4x10G/40G/100G node	16	4x10G/40G/100G node
17	4x10G/40G/100G node	17	4x10G/40G/100G node
18	4x10G/40G/100G node	18	4x10G/40G/100G node

Cluster switch A		Cluster switch B	
19	40G/100G node 19	19	40G/100G node 19
20	40G/100G node 20	20	40G/100G node 20
21	40G/100G node 21	21	40G/100G node 21
22	40G/100G node 22	22	40G/100G node 22
23	40G/100G node 23	23	40G/100G node 23
24	40G/100G node 24	24	40G/100G node 24
25 through 30	Reserved	25 through 30	Reserved
31	100G ISL to switch B port 31	31	100G ISL to switch A port 31
32	100G ISL to switch B port 32	32	100G 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	

Cluster switch A		Cluster switch B	
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 through 30	Reserved	25 through 30	Reserved
31	100G ISL to switch B port 31	31	100G ISL to switch A port 31
32	100G ISL to switch B port 32	32	100G ISL to switch A port 32

Cisco Nexus 3132Q-V cabling worksheet

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

Cluster switch A		Cluster switch B	
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	

Cluster switch A		Cluster switch B	
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 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

Cisco Nexus 5596UP and 5596T cabling worksheet

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

Sample cabling worksheet

Some platforms support more than one 10GbE cluster port connection per cluster interconnect switch. To support additional cluster connections, you can use ports 25 through 40, as well as ports 49 through 80 when expansion modules are installed.

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	Node port 1	1	Node port 1
2	Node port 2	2	Node port 2
3	Node port 3	3	Node port 3
4	Node port 4	4	Node port 4
5	Node port 5	5	Node port 5
6	Node port 6	6	Node port 6
7	Node port 7	7	Node port 7
8	Node port 8	8	Node port 8
9	Node port 9	9	Node port 9
10	Node port 10	10	Node port 10
11	Node port 11	11	Node port 11
12	Node port 12	12	Node port 12
13	Node port 13	13	Node port 13
14	Node port 14	14	Node port 14
15	Node port 15	15	Node port 15
16	Node port 16	16	Node port 16
17	Node port 17	17	Node port 17
18	Node port 18	18	Node port 18

Cluster switch A		Cluster switch B	
19	Node port 19	19	Node port 19
20	Node port 20	20	Node port 20
21	Node port 21	21	Node port 21
22	Node port 22	22	Node port 22
23	Node port 23	23	Node port 23
24	Node port 24	24	Node port 24
25 through 40	Reserved	25 through 40	Reserved
41	ISL to switch B port 41	41	ISL to switch A port 41
42	ISL to switch B port 42	42	ISL to switch A port 42
43	ISL to switch B port 43	43	ISL to switch A port 43
44	ISL to switch B port 44	44	ISL to switch A port 44
45	ISL to switch B port 45	45	ISL to switch A port 45
46	ISL to switch B port 46	46	ISL to switch A port 46
47	ISL to switch B port 47	47	ISL to switch A port 47
48	ISL to switch B port 48	48	ISL to switch A port 48

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.



Switch ports 1 through 24 function as 10 GbE ports. Switch ports 41 through 48 are reserved for Inter-Switch Links (ISLs).

Cluster switch A		Cluster switch B	
Switch port	Node/port usage	Switch port	Node/port usage
1		1	

Cluster switch A		Cluster switch B	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
16		16	
17		17	
18		18	
19		19	
20		20	
21		21	
22		22	
23		23	

Cluster switch A		Cluster switch B	
24		24	
25 through 40	Reserved	25 through 40	Reserved
41	ISL to switch B port 41	41	ISL to switch A port 41
42	ISL to switch B port 42	42	ISL to switch A port 42
43	ISL to switch B port 43	43	ISL to switch A port 43
44	ISL to switch B port 44	44	ISL to switch A port 44
45	ISL to switch B port 45	45	ISL to switch A port 45
46	ISL to switch B port 46	46	ISL to switch A port 46
47	ISL to switch B port 47	47	ISL to switch A port 47
48	ISL to switch B port 48	48	ISL to switch A port 48

Install NX-OS software and RCFs on Cisco Nexus 3132Q-V cluster switches

The Cisco NX-OS software and reference configuration files (RCFs) must be installed on Cisco Nexus 3132Q-V cluster switches.

Before you begin

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

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

- You must have the current RCF.

About this task

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

See the [Hardware Universe](#) to verify the correct cluster ports on your platforms.



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

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

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



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

Steps

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

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

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



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

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

```
set -privilege advanced
```

The advanced prompt (`*>`) appears.

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

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

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

Node/ Protocol	Local Port	Discovered Device (LLDP: ChassisID)	Interface	Platform
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 entries were displayed.

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

a. Display the network port attributes:

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

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

Node: cluster1-02

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

Node: cluster1-01

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.

b. Display information about the LIFs:

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

```
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	169.254.209.69/16	
cluster1-01	e0a true			
	cluster1-01_clus2	up/up	169.254.49.125/16	
cluster1-01	e0b true			
	cluster1-02_clus1	up/up	169.254.47.194/16	
cluster1-02	e0a true			
	cluster1-02_clus2	up/up	169.254.19.183/16	
cluster1-02	e0b true			

4 entries were displayed.

5. Ping the remote cluster LIFs:

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

```

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

```

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

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

```

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

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

```

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

```
system switch ethernet log setup-password
```

```
system switch ethernet log enable-collection
```

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

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

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

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

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

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

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

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

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

Enabling cluster switch log collection.

cluster1::*>
```



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

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

```
system cluster-switch log setup-password

system cluster-switch log enable-collection
```

```

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

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

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

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

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

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

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

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

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

Enabling cluster switch log collection.

cluster1::*>

```



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

Install the NX-OS software

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

Steps

1. Connect the cluster switch to the management network.

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

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

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

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

3. Copy the NX-OS software to the Nexus 3132Q-V switch.

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

Outbound-ReKey for 172.19.2.1:22
Inbound-ReKey for 172.19.2.1:22
user1@172.19.2.1's password: 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.
```

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

```
cs2# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
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 FOxxxxxxx23
```

```
    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#
```

5. Install the NX-OS image.

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

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


Verifying image bootflash:/nxos.9.3.4.bin for boot variable "nxos".

[] 100% -- SUCCESS

Verifying image type.

[] 100% -- SUCCESS

Preparing "nxos" version info using image bootflash:/nxos.9.3.4.bin.

[] 100% -- SUCCESS

Preparing "bios" version info using image bootflash:/nxos.9.3.4.bin.

[] 100% -- SUCCESS

Performing module support checks.

[] 100% -- SUCCESS

Notifying services about system upgrade.

[] 100% -- SUCCESS

Compatibility check is done:

Module	bootable	Impact	Install-type	Reason
1	yes	disruptive	reset	default

upgrade is not hitless

Images will be upgraded according to following table:

Module Version	Image Upg-Required	Running-Version(pri:alt)	New-
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#

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

show version

```
cs2# show version
```

Cisco Nexus Operating System (NX-OS) Software

TAC support: <http://www.cisco.com/tac>

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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 FOxxxxxxx23
```

```
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#
```

Install the Reference Configuration File (RCF)

You can install the RCF after setting up the Nexus 3132Q-V switch for the first time. You can also use this procedure to upgrade your RCF version.

About this task

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

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



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

Steps

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

```
network device-discovery show
```

```
cluster1::*> network device-discovery show
Node/      Local  Discovered
Protocol   Port   Device (LLDP: ChassisID)  Interface      Platform
-----
cluster1-01/cdp
           e0a    cs1                      Ethernet1/7     N3K-
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 -role cluster
```

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

Node: cluster1-01

Ignore

Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
```

```

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

```

Node: cluster1-02

Ignore

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

```

-----
-----
e0a      Cluster      Cluster      up    9000  auto/100000
healthy false
e0d      Cluster      Cluster      up    9000  auto/100000
healthy false
8 entries were displayed.

```

Node: cluster1-03

Ignore

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

```

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

```

Node: cluster1-04

Ignore

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

```

-----
-----
e0a      Cluster      Cluster      up    9000  auto/10000 healthy

```

```
false
e0b      Cluster      Cluster      up    9000  auto/10000 healthy
false
cluster1::*>
```

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

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

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

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

Cluster					
01	e0a	cluster1-01_clus1	up/up	169.254.3.4/23	cluster1-
		true			
01	e0d	cluster1-01_clus2	up/up	169.254.3.5/23	cluster1-
		true			
02	e0a	cluster1-02_clus1	up/up	169.254.3.8/23	cluster1-
		true			
02	e0d	cluster1-02_clus2	up/up	169.254.3.9/23	cluster1-
		true			
03	e0a	cluster1-03_clus1	up/up	169.254.1.3/23	cluster1-
		true			
03	e0b	cluster1-03_clus2	up/up	169.254.1.1/23	cluster1-
		true			
04	e0a	cluster1-04_clus1	up/up	169.254.1.6/23	cluster1-
		true			
04	e0b	cluster1-04_clus2	up/up	169.254.1.7/23	cluster1-
		true			

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

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

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

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

Switch	Type	Address	Model
cs1	cluster-network	10.0.0.1	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.

3. Disable auto-revert on the cluster LIFs.

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

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

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

5. Verify that the cluster ports have migrated to the ports hosted on cluster switch cs1. This might take a few seconds.

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

```

cluster1::*> network interface show -role cluster

```

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

Cluster				
e0a	true	cluster1-01_clus1 up/up	169.254.3.4/23	cluster1-01
e0a	false	cluster1-01_clus2 up/up	169.254.3.5/23	cluster1-01
e0a	true	cluster1-02_clus1 up/up	169.254.3.8/23	cluster1-02
e0a	false	cluster1-02_clus2 up/up	169.254.3.9/23	cluster1-02
e0a	true	cluster1-03_clus1 up/up	169.254.1.3/23	cluster1-03
e0a	false	cluster1-03_clus2 up/up	169.254.1.1/23	cluster1-03
e0a	true	cluster1-04_clus1 up/up	169.254.1.6/23	cluster1-04
e0a	false	cluster1-04_clus2 up/up	169.254.1.7/23	cluster1-04

```

8 entries were displayed.
cluster1::*>

```

6. Verify that the cluster is healthy:

```
cluster show
```

```

cluster1::*> cluster show

```

Node	Health	Eligibility	Epsilon
cluster1-01	true	true	false
cluster1-02	true	true	false
cluster1-03	true	true	true
cluster1-04	true	true	false

```

4 entries were displayed.
cluster1::*>

```

7. Clean the configuration on switch cs2 and perform a basic setup.

- Clean the configuration. This step requires a console connection to the switch.


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

b. Perform a basic setup of the switch.

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

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

```
cs2# copy tftp: bootflash: vrf management
Enter source filename: Nexus_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)...
```

9. Apply the RCF previously downloaded to the bootflash.

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

This example shows the RCF file `Nexus_3132QV_RCF_v1.6-Cluster-HA-Breakout.txt` being installed on switch cs2:

```
cs2# copy Nexus_3132QV_RCF_v1.6-Cluster-HA-Breakout.txt running-config
echo-commands
```

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

```
cs2# show banner motd
```

```
*****
*****
* NetApp Reference Configuration File (RCF)
*
* Switch    : Cisco Nexus 3132Q-V
* Filename  : Nexus_3132QV_RCF_v1.6-Cluster-HA-Breakout.txt
* Date      : Nov-02-2020
* Version   : v1.6
*
* Port Usage : Breakout configuration
* Ports 1- 6: Breakout mode (4x10GbE) Intra-Cluster Ports, int e1/1/1-
4,
* e1/2/1-4, e1/3/1-4,int e1/4/1-4, e1/5/1-4, e1/6/1-4
* Ports 7-30: 40GbE Intra-Cluster/HA Ports, int e1/7-30
* Ports 31-32: Intra-Cluster ISL Ports, int e1/31-32
*
* IMPORTANT NOTES
* - Load Nexus_3132QV_RCF_v1.6-Cluster-HA.txt for non breakout config
*
* - This RCF utilizes QoS and requires specific TCAM configuration,
requiring
*   cluster switch to be rebooted before the cluster becomes
operational.
*
* - Perform the following steps to ensure proper RCF installation:
*
*   (1) Apply RCF, expect following messages:
*       - Please save config and reload the system...
*       - Edge port type (portfast) should only be enabled on ports...
*       - TCAM region is not configured for feature QoS class IPv4...
*
*   (2) Save running-configuration and reboot Cluster Switch
*
*****
*****
```

11. Verify that the RCF file is the correct newer version:

```
show running-config
```

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

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

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

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

[illegible]

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

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

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

```
cs2# copy Nexus_3l32QV_RCF_v1.6-Cluster-HA-Breakout.txt running-config
echo-commands
cs2# copy running-config startup-config
[#####] 100% Copy complete
```

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

a. Verify that e0d ports are up and healthy across all nodes in the cluster:

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

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

Node: cluster1-01

Ignore

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

```

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

Node: cluster1-02

Ignore

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

Node: cluster1-03

Ignore

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

Node: cluster1-04

Ignore

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

```

```
healthy false
8 entries were displayed.
```

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

```
cluster1::*> network device-discovery show -protocol cdp
Node/      Local  Discovered
Protocol   Port   Device (LLDP: ChassisID)  Interface
Platform
-----
-----
cluster1-01/cdp
           e0a    cs1                      Ethernet1/7      N3K-
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: FOXXXXXXXGD
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                        9.3(4)
    Version Source: CDP
```

```

cs2                                cluster-network    10.233.205.91    N3K-
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.

```

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



```

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

```

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

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

```

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

```

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

```

network interface show -role cluster

```

```

cluster1::*> network interface show -role cluster

```

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

Cluster				
e0d	cluster1-01_clus1	up/up	169.254.3.4/23	cluster1-01
	false			
e0d	cluster1-01_clus2	up/up	169.254.3.5/23	cluster1-01
	true			
e0d	cluster1-02_clus1	up/up	169.254.3.8/23	cluster1-02
	false			
e0d	cluster1-02_clus2	up/up	169.254.3.9/23	cluster1-02
	true			
e0b	cluster1-03_clus1	up/up	169.254.1.3/23	cluster1-03
	false			
e0b	cluster1-03_clus2	up/up	169.254.1.1/23	cluster1-03
	true			
e0b	cluster1-04_clus1	up/up	169.254.1.6/23	cluster1-04
	false			
e0b	cluster1-04_clus2	up/up	169.254.1.7/23	cluster1-04
	true			

```

8 entries were displayed.
cluster1::*>

```

18. Verify that the cluster is healthy:

```
cluster show
```

```

cluster1::*> cluster show

```

Node	Health	Eligibility	Epsilon
cluster1-01	true	true	false
cluster1-02	true	true	false
cluster1-03	true	true	true
cluster1-04	true	true	false

```

4 entries were displayed.
cluster1::*>

```

19. Repeat Steps 7 to 14 on switch cs1.

20. Enable auto-revert on the cluster LIFs.

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

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

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

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

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

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

```
show port-channel summary
```



```

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

```

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

```

network interface show -role cluster

```

```

cluster1::*> network interface show -role cluster

```

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

Cluster				
e0d	cluster1-01_clus1	up/up	169.254.3.4/23	cluster1-01
e0d	cluster1-01_clus2	up/up	169.254.3.5/23	cluster1-01
e0d	cluster1-02_clus1	up/up	169.254.3.8/23	cluster1-02
e0d	cluster1-02_clus2	up/up	169.254.3.9/23	cluster1-02
e0d	cluster1-03_clus1	up/up	169.254.1.3/23	cluster1-03
e0b	cluster1-03_clus2	up/up	169.254.1.1/23	cluster1-03
e0b	cluster1-04_clus1	up/up	169.254.1.6/23	cluster1-04
e0b	cluster1-04_clus2	up/up	169.254.1.7/23	cluster1-04
e0b	cluster1-04_clus2	up/up	169.254.1.7/23	cluster1-04

```

8 entries were displayed.
cluster1::*>

```

25. Verify that the cluster is healthy:

```
cluster show
```

```

cluster1::*> cluster show

```

Node	Health	Eligibility	Epsilon
cluster1-01	true	true	false
cluster1-02	true	true	false
cluster1-03	true	true	true
cluster1-04	true	true	false

```

4 entries were displayed.
cluster1::*>

```

26. Ping the remote cluster interfaces to verify connectivity:

```
cluster ping-cluster -node local
```

```

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

```

Migrate to a two-node switched cluster with Cisco Nexus 3132Q-V cluster switches

You must be aware of certain configuration information, port connections and cabling requirements when you migrate to a two-node switched cluster with Cisco Nexus 3132Q-V cluster switches.

- 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 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 40/100 GbE cluster connections require supported QSFP/QSFP28 optical modules with fiber cables or QSFP/QSFP28 copper direct-attach cables.
 - The cluster switches use the appropriate ISL cabling: 2x QSFP28 fiber or copper direct-attach cables.
- On Nexus 3132Q-V, you can operate QSFP ports as either 40/100 Gb Ethernet or 4 x10 Gb Ethernet modes.

By default, there are 32 ports in the 40/100 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 40/100 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 40/100 Gb Ethernet port are numbered as 1/2/1, 1/2/2, 1/2/3, 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 40/100 GbE.

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

- You must have done the planning, migration, and read the required documentation on 10 GbE and 40/100 GbE connectivity from nodes to Nexus 3132Q-V cluster switches.

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

How to migrate a two-node switched cluster with Cisco Nexus 3132Q-V cluster switches

If you have a two-node switchless cluster, you can migrate nondisruptively to a two-node switched cluster that includes Cisco Nexus 3132Q-V cluster network switches.

Before you begin

- The configurations must be properly set up and functioning.
- The nodes must be running ONTAP 9.4 or later.

- All cluster ports must be in the `up` state.
- The Cisco Nexus 3132Q-V cluster switch must be supported.
- The existing cluster network configuration must have:
 - The Nexus 3132 cluster infrastructure that is redundant and fully functional 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 being migrated.
- Initial customization of the switch.
- All the ISL ports enabled and cabled.

About this task

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 utilizing two 40/100 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.

- The cluster starts with two nodes connected and functioning in a two-node switchless cluster setting.
- The first cluster port moved to C1 ([Steps 1- 20](#))
- The second cluster port moved to C2 ([Steps 21- 32](#)).
- Disable the two-node switchless cluster option ([Steps 33- 35](#))

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
```

```
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.
```

b. Display information about the logical interfaces:

```
network interface show
```

```

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				
	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.

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 the [Cisco Ethernet Switches](#) page on the NetApp Support Site.
 - b. Note your switch and the required software versions in the table on that page.
 - c. Download the appropriate version of 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.
4. Click **CONTINUE** on the **Description** page, accept the license agreement, and then follow the instructions on the **Download** page to download the RCF.
 5. On Nexus 3132Q-V switches C1 and C2, disable all node-facing ports C1 and C2, but do not disable the ISL ports.

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

```

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
```



```
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)
```

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

```
show cdp neighbors
```

```
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
```

9. Display the cluster port connectivity on each node:

```
network device-discovery show
```

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

10. Migrate the clus1 interface to the physical port hosting clus2:

```
network interface migrate
```

Execute this command from each local node.

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

11. Verify the cluster interfaces migration:

```
network interface show
```

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

12. 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
```

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

```
cluster ping-cluster
```

```

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)

```

14. Disconnect the cable from e4a on node n1.

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

15. Disconnect the cable from e4a on node n2.

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

16. Enable all node-facing ports on C1.

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
```

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

```
network port modify
```

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

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

```
network port show
```

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

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

Node: n2

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

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

```
network interface revert
```

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
```

20. 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.

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

21. Display the cluster port connectivity on each node:

```
network device-discovery show
```

```
cluster::*> network device-discovery show
Local Discovered
Node Port Device Interface Platform
-----
n1 /cdp
e4a C1 Ethernet1/7 N3K-C3132Q-V
e4e n2 e4e FAS9000
n2 /cdp
e4a C1 Ethernet1/8 N3K-C3132Q-V
e4e n1 e4e FAS9000
```

22. On the console of each node, migrate clus2 to port e4a:

```
network interface migrate
```



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

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

```
network port modify
```

The following example shows the specified ports being 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
```

24. Verify the cluster LIF status:

```
network interface show
```

```
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					
	n1_clus1	up/up	10.10.0.1/24	n1	e4a
true					
	n1_clus2	up/up	10.10.0.2/24	n1	e4a
false					
	n2_clus1	up/up	10.10.0.3/24	n2	e4a
true					
	n2_clus2	up/up	10.10.0.4/24	n2	e4a
false					
4 entries were displayed.					

25. Disconnect the cable from e4e on node n1.

You can refer to the running configuration and connect the first 40 GbE port on the switch C2 (port 1/7 in this example) to e4e on n1 using supported cabling on Nexus 3132Q-V.

26. Disconnect the cable from e4e on node n2.

You can refer to the running configuration and connect e4e to the next available 40 GbE port on C2, port 1/8, using supported cabling.

27. Enable all node-facing ports on C2.

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

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
```

28. 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
```

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

```
network interface revert
```

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

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

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

```
network interface show
```

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

```

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

```

Current Is	Logical	Status	Network	Current	
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port
Home					
-----	-----	-----	-----	-----	
-----	-----				
Cluster					
	n1_clus1	up/up	10.10.0.1/24	n1	e4a
true					
	n1_clus2	up/up	10.10.0.2/24	n1	e4e
true					
	n2_clus1	up/up	10.10.0.3/24	n2	e4a
true					
	n2_clus2	up/up	10.10.0.4/24	n2	e4e
true					

4 entries were displayed.

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

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

Ignore

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

Node: n2

Ignore

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

32. Display the cluster switch port numbers each cluster port is connected to on each node:

```
network device-discovery show
```

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

Local   Discovered
Node    Port    Device      Interface      Platform
-----
n1      /cdp
        e4a     C1          Ethernet1/7    N3K-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
```

33. Display discovered and monitored cluster switches:

```
system cluster-switch show
```

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

Switch	Type	Address	Model

C1	cluster-network	10.10.1.101	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.

34. Disable the two-node switchless configuration settings on any node:

```
network options switchless-cluster
```

```
network options switchless-cluster modify -enabled false
```

35. Verify that the switchless-cluster option has been disabled.

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

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

```
cluster ping-cluster
```

```

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)

```

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

```

system cluster-switch log setup-password

system cluster-switch log enable-collection

```

```

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

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

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

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

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

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

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

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

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

Enabling cluster switch log collection.

cluster::*>

```



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

38. 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 Cisco Nexus 3132Q-V cluster switches

You must be aware of certain configuration information, port connections and cabling requirements when you replace Cisco Nexus 3132Q-V cluster switches.

- The Cisco Nexus 3132Q-V cluster switch is supported.
- 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 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 40/100 GbE cluster connections require supported QSFP/QSFP28 optical modules with fiber cables or QSFP/QSFP28 copper direct-attach cables.
 - The cluster switches use the appropriate ISL cabling: 2x QSFP28 fiber or copper direct-attach cables.
- On Nexus 3132Q-V, you can operate QSFP ports as either 40/100 Gb Ethernet or 4 x10 Gb Ethernet modes.

By default, there are 32 ports in the 40/100 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 40/100 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 40/100 Gb Ethernet port are numbered as 1/2/1, 1/2/2, 1/2/3, 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 40/100 GbE.

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

- You must have done the planning, migration, and read the required documentation on 10 GbE and 40/100 GbE connectivity from nodes to Nexus 3132Q-V cluster switches.

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

How to replace Cisco Nexus 3132Q-V cluster switches

Replacing a defective Cisco Nexus 3132Q-V switch in a cluster network is a nondisruptive procedure (NDO), and you must perform a specific sequence of tasks.

Before you begin

- The existing cluster and network configuration must have:

- The Nexus 3132Q-V cluster infrastructure must be redundant and fully functional on both switches.

The [Cisco Ethernet Switch](#) page has the latest RCF and NX-OS versions on your switches.

- All cluster ports must be in the `up` state.
- Management connectivity must exist on both switches.
- All cluster logical interfaces (LIFs) must be in the `up` state and must not have been migrated.
- The Nexus 3132Q-V replacement switch:
 - Management network connectivity on the replacement switch must be functional.
 - Console access to the replacement switch must be in place.
 - The desired RCF and NX-OS operating system image switch must be loaded onto the switch.
 - Initial customization of the switch must be complete.

About this task

This procedure replaces the second Nexus 3132Q-V cluster switch CL2 with new 3132Q-V switch C2. 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 40/100 GbE ports are defined in the reference configuration files (RCFs) available on the [Cisco® Cluster Network Switch Reference Configuration File Download](#) page.
- The nodes are n1, n2, n3, and n4.

-

The examples in this procedure use four nodes: Two nodes use four 10 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.

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 ([Steps 1 -21](#))
 - 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.

Steps

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

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

x is the duration of the maintenance window in hours.



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

2. Display information about the devices in your configuration:

```
network device-discovery show
```

```
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
```

```
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

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

Node: n3

Ignore

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

Node: n4

```

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

b. Display information about the logical interfaces:

```
network interface show
```

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

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

```
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, go to the [Cisco Ethernet Switch](#) page.
 - 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
```

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
```

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

12 entries were displayed.

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

```
network port modify
```

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

```
cluster ping-cluster
```

```

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
```

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)#
```

10. Remove all the cables attached to the Nexus 3132Q-V switch CL2 and reconnect them to the replacement switch C2 on all nodes.

11. 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.
12. 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)#
```

13. 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.

```
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)
```

14. 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.

```
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)
```

15. On all nodes, bring up all the cluster interconnect ports connected to the Nexus 3132Q-V switch C2:
network port modify

```
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
```

16. For all nodes, revert all of the migrated cluster interconnect LIFs:

```
network interface revert
```

```
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
```

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

```
network interface show
```

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)

```

	Logical	Status	Network	Current	
Current Is					
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port
Home					
Cluster					
	n1_clus1	up/up	10.10.0.1/24	n1	e0a
true					
	n1_clus2	up/up	10.10.0.2/24	n1	e0b
true					
	n1_clus3	up/up	10.10.0.3/24	n1	e0c
true					
	n1_clus4	up/up	10.10.0.4/24	n1	e0d
true					
	n2_clus1	up/up	10.10.0.5/24	n2	e0a
true					
	n2_clus2	up/up	10.10.0.6/24	n2	e0b
true					
	n2_clus3	up/up	10.10.0.7/24	n2	e0c
true					
	n2_clus4	up/up	10.10.0.8/24	n2	e0d
true					
	n3_clus1	up/up	10.10.0.9/24	n3	e4a
true					
	n3_clus2	up/up	10.10.0.10/24	n3	e4e
true					
	n4_clus1	up/up	10.10.0.11/24	n4	e4a
true					
	n4_clus2	up/up	10.10.0.12/24	n4	e4e
true					

12 entries were displayed.

18. Verify that the cluster ports are connected:

```
network port show
```

```

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

Ignore

Speed(Mbps) Health

```

```

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

Node: n2

Ignore

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

Node: n3

Ignore

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

Node: n4

Ignore

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

```

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

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

```
cluster ping-cluster
```

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

```
Local 10.10.0.2 to Remote 10.10.0.10
Local 10.10.0.2 to Remote 10.10.0.11
Local 10.10.0.2 to Remote 10.10.0.12
Local 10.10.0.3 to Remote 10.10.0.5
Local 10.10.0.3 to Remote 10.10.0.6
Local 10.10.0.3 to Remote 10.10.0.7
Local 10.10.0.3 to Remote 10.10.0.8
Local 10.10.0.3 to Remote 10.10.0.9
Local 10.10.0.3 to Remote 10.10.0.10
Local 10.10.0.3 to Remote 10.10.0.11
Local 10.10.0.3 to Remote 10.10.0.12
Local 10.10.0.4 to Remote 10.10.0.5
Local 10.10.0.4 to Remote 10.10.0.6
Local 10.10.0.4 to Remote 10.10.0.7
Local 10.10.0.4 to Remote 10.10.0.8
Local 10.10.0.4 to Remote 10.10.0.9
Local 10.10.0.4 to Remote 10.10.0.10
Local 10.10.0.4 to Remote 10.10.0.11
Local 10.10.0.4 to Remote 10.10.0.12
```

Larger than PMTU communication succeeds on 32 path(s)

RPC status:

8 paths up, 0 paths down (tcp check)

8 paths up, 0 paths down (udp check)

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

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


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

	Local	Discovered		
Node	Port	Device	Interface	Platform

n1	/cdp			
	e0a	C1	Ethernet1/1/1	N3K-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
```

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

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

```
Node: n2
```

```

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

```

Node: n3

```

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

```

Node: n4

```

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

```

12 entries were displayed.

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

```
(network interface show)
```

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

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

```
12 entries were displayed.
```

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

Switch	Type	Address	Model
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.

21. 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
```

22. Verify that the proper cluster switches are monitored:

```
system cluster-switch show
```

```
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.

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

```
system cluster-switch log setup-password
```

```
system cluster-switch log enable-collection
```

```

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

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

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

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

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

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

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

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

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

Enabling cluster switch log collection.

cluster::*>

```



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

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

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

Related information

[Cisco Ethernet Switch description page](#)

[Hardware Universe](#)

Replace a Cisco Nexus 5596 cluster switch with a Cisco Nexus 3132Q-V cluster switch

You must be aware of certain configuration information, port connections and cabling requirements when you are replacing a Cisco Nexus 5596 cluster switch with a Cisco Nexus 3132Q-V cluster switch.

- The following cluster switches are supported:
 - Nexus 5596
 - Nexus 3132Q-V
- 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 cluster switches use the following ports for connections to nodes:
 - Ports e1/1-40 (10 GbE): Nexus 5596
 - Ports e1/1-30 (40/100 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 (40/100 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 40/100 GbE cluster connections require supported QSFP/QSFP28 optical modules with fiber cables or QSFP/QSFP28 copper direct-attach cables.
- The cluster switches use the appropriate ISL cabling:
 - Beginning: Nexus 5596 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 40/100 Gigabit Ethernet or 4 x10 Gigabit Ethernet modes.

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



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

- You have done the planning, migration, and read the required documentation on 10 GbE and 40/100 GbE connectivity from nodes to Nexus 3132Q-V cluster switches.
- The ONTAP and NX-OS versions supported in this procedure are on the [Cisco Ethernet Switches](#) page.

How to replace a Cisco Nexus 5596 cluster switch with a Cisco Nexus 3132Q-V cluster switch

To replace an existing Nexus 5596 cluster switch with a Nexus 3132Q-V cluster switch, you must perform a specific sequence of tasks.

About this task

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

- The command outputs might vary depending on different releases of ONTAP.
- The Nexus 5596 switches to be replaced are CL1 and CL2.
- The Nexus 3132Q-V switches to replace the Nexus 5596 switches are C1 and C2.
- n1_clus1 is the first cluster logical interface (LIF) connected to cluster switch 1 (CL1 or C1) for node n1.
- n1_clus2 is the first cluster LIF connected to cluster switch 2 (CL2 or C2) for node n1.
- n1_clus3 is the second LIF connected to cluster switch 2 (CL2 or C2) for node n1.
- n1_clus4 is the second LIF connected to cluster switch 1 (CL1 or C1) for node n1.
- The nodes are n1, n2, n3, and n4.
- The examples in this procedure use four nodes: Two nodes use four 10 GbE cluster interconnect ports: e0a, e0b, e0c, and e0d. The other two nodes use two 40/100 GbE cluster interconnect ports: e4a, e4e. The [Hardware Universe](#) lists the actual cluster ports on your platforms.
- 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.

This procedure covers the following scenarios:

- The cluster starts with two nodes connected and functioning in a 2 Nexus 5596 cluster switches.
- The cluster switch CL2 to be replaced by C2 ([Steps 1 - 19](#))
 - Traffic on all cluster ports and LIFs on all nodes connected to CL2 are migrated onto the first cluster ports and LIFs connected to CL1.
 - Disconnect cabling from all cluster ports on all nodes connected to CL2, and then use supported break-out cabling to reconnect the ports to new cluster switch C2.
 - Disconnect cabling between ISL ports between CL1 and CL2, and then use supported break-out cabling to reconnect the ports from CL1 to C2.
 - Traffic on all cluster ports and LIFs connected to C2 on all nodes is reverted.
- The cluster switch CL2 to be replaced by C2 ([Steps 20 - 33](#))
 - Traffic on all cluster ports or LIFs on all nodes connected to CL1 are migrated onto the second cluster ports or LIFs connected to C2.
 - Disconnect cabling from all cluster port on all nodes connected to CL1 and reconnect, using supported break-out cabling, to new cluster switch C1.
 - Disconnect cabling between ISL ports between CL1 and C2, and reconnect using supported cabling, from C1 to C2.
 - Traffic on all cluster ports or LIFs connected to C1 on all nodes is reverted.
- Two FAS9000 nodes have been added to cluster with examples showing cluster details ([Steps 34 - 37](#)).

Steps

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

x is the duration of the maintenance window in hours.



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

2. Display information about the devices in your configuration:

```
network device-discovery show
```

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

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

Node	Local Port	Discovered Device	Interface	Platform
n1	/cdp			
	e0a	CL1	Ethernet1/1	N5K-C5596UP
	e0b	CL2	Ethernet1/1	N5K-C5596UP
	e0c	CL2	Ethernet1/2	N5K-C5596UP
	e0d	CL1	Ethernet1/2	N5K-C5596UP
n2	/cdp			
	e0a	CL1	Ethernet1/3	N5K-C5596UP
	e0b	CL2	Ethernet1/3	N5K-C5596UP
	e0c	CL2	Ethernet1/4	N5K-C5596UP
	e0d	CL1	Ethernet1/4	N5K-C5596UP

```
8 entries were displayed.
```

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

a. Display the network port attributes:

```
network port show
```

The following example displays the network port attributes on a system:

```

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

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

Node: n2

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

8 entries were displayed.

```

b. Display information about the logical interfaces:

```
network interface show
```

The following example displays the general information about all of the LIFs on your system:

```

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

```

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

Cluster				
	n1_clus1	up/up	10.10.0.1/24	n1
e0a	true			
	n1_clus2	up/up	10.10.0.2/24	n1
e0b	true			
	n1_clus3	up/up	10.10.0.3/24	n1
e0c	true			
	n1_clus4	up/up	10.10.0.4/24	n1
e0d	true			
	n2_clus1	up/up	10.10.0.5/24	n2
e0a	true			
	n2_clus2	up/up	10.10.0.6/24	n2
e0b	true			
	n2_clus3	up/up	10.10.0.7/24	n2
e0c	true			
	n2_clus4	up/up	10.10.0.8/24	n2
e0d	true			

8 entries were displayed.

c. Display information about the discovered cluster switches:

```
system cluster-switch show
```

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

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

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

2 entries were displayed.

4. Set the `-auto-revert` parameter to false on cluster LIFs `clus1` and `clus2` on both nodes:

```
network interface modify
```

```
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
```

5. Verify that the appropriate RCF and image are installed on the new 3132Q-V switches as necessary for your requirements, and make the 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, follow these

steps:

- a. Go to the [Cisco Ethernet Switches](#) page on the NetApp Support Site.
- b. Note your switch and the required software versions in the table on that page.
- c. Download the appropriate version of the RCF.
- d. Click **CONTINUE** on the **Description** page, accept the license agreement, and then follow the instructions on the **Download** page to download the RCF.
- e. Download the appropriate version of the image software.

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

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

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

```
network interface migrate
```

The following example shows n1 and n2, but LIF migration must be done on all of the nodes:

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

7. Verify the cluster's health:

```
network interface show
```

The following example shows the result of the previous `network interface migrate` command:

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

	Logical	Status	Network	Current	
Current Is					
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port
Home					
-----	-----	-----	-----	-----	
-----	-----				
Cluster					
	n1_clus1	up/up	10.10.0.1/24	n1	e0a
true					
	n1_clus2	up/up	10.10.0.2/24	n1	e0a
false					
	n1_clus3	up/up	10.10.0.3/24	n1	e0d
false					
	n1_clus4	up/up	10.10.0.4/24	n1	e0d
true					
	n2_clus1	up/up	10.10.0.5/24	n2	e0a
true					
	n2_clus2	up/up	10.10.0.6/24	n2	e0a
false					
	n2_clus3	up/up	10.10.0.7/24	n2	e0d
false					
	n2_clus4	up/up	10.10.0.8/24	n2	e0d
true					

8 entries were displayed.

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

```
network port modify
```

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

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

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

```
cluster ping-cluster
```

The following example shows how to ping the remote cluster interfaces:

```

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

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

```

10. Shut down the ISL ports 41 through 48 on the active Nexus 5596 switch CL1:

The following example shows how to shut down ISL ports 41 through 48 on the Nexus 5596 switch CL1:


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

If you are replacing a Nexus 5010 or 5020, specify the appropriate port numbers for ISL from page 1.

11. Build a temporary ISL between CL1 and C2.

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

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

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

With supported cabling, reconnect disconnected ports on all nodes to the Nexus 3132Q-V switch C2.

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

Attach the appropriate Cisco QSFP to SFP+ break-out cables connecting port 1/24 on the new Cisco 3132Q-V switch, C2, to ports 45 to 48 on existing Nexus 5596, CL1.

14. Verify that interfaces eth1/45-48 already have channel-group 1 mode active in their running configuration.

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

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

```

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

```

16. Verify that the ISLs are up on the Nexus 5596 switch CL1:

```
show port-channel summary
```

Ports eth1/45 through eth1/48 should indicate (P) meaning that the ISL ports are up in the port-channel:

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      Eth1/41 (D)  Eth1/42 (D)  Eth1/43 (D)
                                   Eth1/44 (D)  Eth1/45 (P)  Eth1/46 (P)
                                   Eth1/47 (P)  Eth1/48 (P)

```

17. Verify that the ISLs are up on the 3132Q-V switch C2:

```
show port-channel summary
```

Ports eth1/24/1, eth1/24/2, eth1/24/3, and eth1/24/4 should indicate (P) meaning that the 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 (D)  Eth1/32 (D)
2      Po2 (SU)      Eth    LACP      Eth1/24/1 (P) Eth1/24/2 (P)
Eth1/24/3 (P)
                                   Eth1/24/4 (P)
```

18. On all nodes, bring up all the cluster interconnect ports connected to the 3132Q-V switch C2:

```
network port modify
```

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

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

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

```
network interface revert
```

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

```
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
```

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

```
network interface show
```

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

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

Current Is	Logical	Status	Network	Current	
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port
Home					
-----	-----	-----	-----	-----	
-----	-----	-----	-----	-----	
Cluster					
	n1_clus1	up/up	10.10.0.1/24	n1	e0a
true					
	n1_clus2	up/up	10.10.0.2/24	n1	e0b
true					
	n1_clus3	up/up	10.10.0.3/24	n1	e0c
true					
	n1_clus4	up/up	10.10.0.4/24	n1	e0d
true					
	n2_clus1	up/up	10.10.0.5/24	n2	e0a
true					
	n2_clus2	up/up	10.10.0.6/24	n2	e0b
true					
	n2_clus3	up/up	10.10.0.7/24	n2	e0c
true					
	n2_clus4	up/up	10.10.0.8/24	n2	e0d
true					

8 entries were displayed.

21. Verify that the clustered ports are connected:

```
network port show
```

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

```

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

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

Node: n2

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

```

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

```
cluster ping-cluster
```

The following example shows how to ping the remote cluster interfaces:

```

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

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

```

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

```
network interface migrate
```

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

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

24. Verify the cluster status:

```
network interface show
```

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

```

(network interface show)

```

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

8 entries were displayed.

```

-----

```

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

```
network port modify
```

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

```

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

```

26. Shut down the ISL ports 24, 31, and 32 on the active 3132Q-V switch C2: shutdown

The following example shows how to shut down ISLs 24, 31, and 32:


```

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

```

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

With supported cabling, reconnect disconnected ports on all nodes to the Nexus 3132Q-V switch C1.

28. Remove the QSFP breakout cable from Nexus 3132Q-V C2 ports e1/24.

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

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

```

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

```

30. Bring up ISL ports 31 and 32 on C2, the active 3132Q-V switch: no shutdown

The following example shows how to bring up ISLs 31 and 32 on the 3132Q-V switch C2:

```

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

```

31. Verify that the ISL connections are up on the 3132Q-V switch C2: show port-channel summary

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

```

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

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

```

32. On all nodes, bring up all the cluster interconnect ports connected to the new 3132Q-V switch C1:

network port modify

The following example shows all the cluster interconnect ports being brought up for n1 and n2 on the 3132Q-V switch C1:

```

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

```

33. Verify the status of the cluster node port: network port show

The following example verifies that all cluster interconnect ports on all nodes on the new 3132Q-V switch C1 are up:

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

Ignore

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

Node: n2

Ignore

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

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

```
network interface revert
```

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

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

35. Verify that the interface is home:

```
network interface show
```

The following example shows the status of cluster interconnect interfaces is up and Is home for n1 and n2:

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

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

```
cluster ping-cluster
```

The following example shows how to ping the remote cluster interfaces:

```

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

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

```

37. Expand the cluster by adding nodes to the Nexus 3132Q-V cluster switches.
38. Display the information about the devices in your configuration:

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

The following examples show nodes n3 and n4 with 40 GbE cluster ports connected to ports e1/7 and e1/8, respectively on both the Nexus 3132Q-V cluster switches, and both nodes have joined the cluster. The 40 GbE cluster interconnect ports used are e4a and e4e.

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

Node	Local Port	Discovered 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
```

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

	e0a	Cluster	Cluster	up	9000 auto/10000	-	

```

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

Node: n2

Ignore

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

Node: n3

Ignore

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

Node: n4

Ignore

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

```

```

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

```

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


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

Switch	Type	Address	Model

C1	cluster-network	10.10.1.103	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	10.10.1.104	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			
CL1	cluster-network	10.10.1.101	NX5596
Serial Number: 01234567			
Is Monitored: true			
Reason:			
Software Version: Cisco Nexus Operating System (NX-OS) Software,			
Version			
7.1(1)N1(1)			
Version Source: CDP			
CL2	cluster-network	10.10.1.102	NX5596
Serial Number: 01234568			
Is Monitored: true			
Reason:			
Software Version: Cisco Nexus Operating System (NX-OS) Software,			
Version			
7.1(1)N1(1)			
Version Source: CDP			

4 entries were displayed.

39. Remove the replaced Nexus 5596 if they are not automatically removed: system cluster-switch delete

The following example shows how to remove the Nexus 5596:

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

40. Configure clusters clus1 and clus2 to auto revert on each node and confirm:

```
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
```

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

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

Switch	Type	Address	Model

C1	cluster-network	10.10.1.103	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	10.10.1.104	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.

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

```
system cluster-switch log setup-password  
  
system cluster-switch log enable-collection
```

```
cluster::*> system cluster-switch log setup-password  
Enter the switch name: <return>  
The switch name entered is not recognized.  
Choose from the following list:  
C1  
C2  
  
cluster::*> system cluster-switch log setup-password  
  
Enter the switch name: C1  
**RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc  
Do you want to continue? {y|n}::[n] y  
  
Enter the password: <enter switch password>  
Enter the password again: <enter switch password>  
  
cluster::*> system cluster-switch log setup-password  
  
Enter the switch name: C2  
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1  
Do you want to continue? {y|n}:: [n] y  
  
Enter the password: <enter switch password>  
Enter the password again: <enter switch password>  
  
cluster::*> system cluster-switch log enable-collection  
  
Do you want to enable cluster log collection for all nodes in the  
cluster?  
{y|n}: [n] y  
  
Enabling cluster switch log collection.  
  
cluster::*>
```



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

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

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

Related information

[Cisco Ethernet Switch description page](#)

[Hardware Universe](#)

Replace CN1610 cluster switches with Cisco Nexus 3132Q-V cluster switches

You must be aware of certain configuration information, port connections, and cabling requirements when you replace CN1610 cluster switches with Cisco Nexus 3132Q-V cluster switches.

- 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 (40/100 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 (40/100 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 40/100 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 40/100 Gb Ethernet or 4x 10 Gb Ethernet modes.

By default, there are 32 ports in the 40/100 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 40/100 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 40/100 GbE.

You can break out the first six ports into 4x 10 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 40/100 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 the [Cisco Ethernet Switches](#) page.
- The ONTAP and FASTPATH versions that are supported in this procedure are listed on the [NetApp CN1601 and CN1610 Switches](#) page.

How to replace CN1610 cluster switches with Cisco Nexus 3132Q-V cluster switches

To replace the existing CN1610 cluster switches in a cluster with Cisco Nexus 3132Q-V cluster switches, you must perform a specific sequence of tasks.

About this task

The examples in this procedure use four nodes: Two nodes use four 10 GbE cluster interconnect ports: e0a, e0b, e0c, and e0d. The other two nodes use two 40/100 GbE cluster interconnect fiber cables: e4a and e4e. The [Hardware Universe](#) has information about the cluster fiber cables on your platforms.

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

- The command outputs might vary depending on different releases of ONTAP software.
- The CN1610 switches to be replaced are CL1 and CL2.
- The Nexus 3132Q-V switches to replace the CN1610 switches are C1 and C2.
- n1_clus1 is the first cluster logical interface (LIF) that is connected to cluster switch 1 (CL1 or C1) for node n1.
- n1_clus2 is the first cluster LIF that is connected to cluster switch 2 (CL2 or C2) for node n1.

- n1_clus3 is the second LIF that is connected to cluster switch 2 (CL2 or C2) for node n1.
- n1_clus4 is the second LIF that is connected to cluster switch 1 (CL1 or C1) for node n1. The nodes are n1, n2, n3, and n4.
- 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.

This procedure covers the following scenario:

- The cluster starts with two nodes connected to two CN1610 cluster switches.
- Cluster switch CL2 to be replaced by C2 ([Steps 2 - 22](#))
 - Traffic on all cluster ports and LIFs on all nodes connected to CL2 are migrated onto the first cluster ports and LIFs connected to CL1.
 - Disconnect cabling from all cluster ports on all nodes connected to CL2, and then use supported breakout cabling to reconnect the ports to new cluster switch C2.
 - Disconnect cabling between ISL ports CL1 and CL2, and then use supported breakout cabling to reconnect the ports from CL1 to C2.
 - Traffic on all cluster ports and LIFs connected to C2 on all nodes is reverted.
- Cluster switch CL1 to be replaced by C1 ([Steps 23 - 43](#))
 - Traffic on all cluster ports and LIFs on all nodes connected to CL1 are migrated onto the second cluster ports and LIFs connected to C2.
 - Disconnect cabling from all cluster ports on all nodes connected to CL1, and then use supported breakout cabling to reconnect the ports to new cluster switch C1.
 - Disconnect cabling between ISL ports CL1 and C2, and then use supported breakout cabling to reconnect the ports from C1 to C2.
 - Traffic on all migrated cluster ports and LIFs connected to C1 on all nodes is reverted.



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

Steps

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

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

x is the duration of the maintenance window in hours.



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

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

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

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

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

8 entries were displayed.

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

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

The following example displays the network port attributes on a system:

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

Node: n1

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

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

8 entries were displayed.

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

The following example displays the general information about all of the LIFs on your system:


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

Vserver	Logical Interface	Status Admin/Oper	Network Address/Mask	Current Node	Current Port	Is Home
Cluster						
	n1_clus1	up/up	10.10.0.1/24	n1	e0a	true
	n1_clus2	up/up	10.10.0.2/24	n1	e0b	true
	n1_clus3	up/up	10.10.0.3/24	n1	e0c	true
	n1_clus4	up/up	10.10.0.4/24	n1	e0d	true
	n2_clus1	up/up	10.10.0.5/24	n2	e0a	true
	n2_clus2	up/up	10.10.0.6/24	n2	e0b	true
	n2_clus3	up/up	10.10.0.7/24	n2	e0c	true
	n2_clus4	up/up	10.10.0.8/24	n2	e0d	true

8 entries were displayed.

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

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

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

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

2 entries were displayed.

4. Set the `-auto-revert` parameter to false on cluster LIFs `clus1` and `clus4` on both nodes: `network interface modify`

```
cluster::*> network interface modify -vserver node1 -lif clus1 -auto
-revert false
cluster::*> network interface modify -vserver node1 -lif clus4 -auto
-revert false
cluster::*> network interface modify -vserver node2 -lif clus1 -auto
-revert false
cluster::*> network interface modify -vserver node2 -lif clus4 -auto
-revert false
```

5. Verify that the appropriate RCF 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, follow these steps:

- See the [Cisco Ethernet Switches](#) page on NetApp Support Site.
- Note your switch and the required software versions in the table on that page.
- Download the appropriate version of the RCF.
- Click **CONTINUE** on the **Description** page, accept the license agreement, and then follow the instructions on the **Download** page to download the RCF.
- Download the appropriate version of the image software.

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

6. Migrate the LIFs associated with the second CN1610 switch to be replaced: `network interface migrate`



You must migrate the cluster LIFs from a connection to the node, either through the service processor or node management interface, which owns the cluster LIF being migrated.

The following example shows `n1` and `n2`, but LIF migration must be done on all the nodes:

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

7. Verify the cluster's health: `network interface show`

The following example shows the result of the previous `network interface migrate` command:

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

Vserver	Logical Interface	Status Admin/Oper	Network Address/Mask	Current Node	Current Port	Is Home
Cluster	n1_clus1	up/up	10.10.0.1/24	n1	e0a	true
	n1_clus2	up/up	10.10.0.2/24	n1	e0a	false
	n1_clus3	up/up	10.10.0.3/24	n1	e0d	false
	n1_clus4	up/up	10.10.0.4/24	n1	e0d	true
	n2_clus1	up/up	10.10.0.5/24	n2	e0a	true
	n2_clus2	up/up	10.10.0.6/24	n2	e0a	false
	n2_clus3	up/up	10.10.0.7/24	n2	e0d	false
	n2_clus4	up/up	10.10.0.8/24	n2	e0d	true

8 entries were displayed.

8. Shut down the cluster interconnect ports that are physically connected to switch CL2: `network port modify`

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

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

9. Ping the remote cluster interfaces, and then perform a remote procedure call server check: `cluster ping-cluster`

The following example shows how to ping the remote cluster interfaces:

```

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

Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 16 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 1500 byte MTU on 16 path(s):
  Local 10.10.0.1 to Remote 10.10.0.5
  Local 10.10.0.1 to Remote 10.10.0.6
  Local 10.10.0.1 to Remote 10.10.0.7
  Local 10.10.0.1 to Remote 10.10.0.8
  Local 10.10.0.2 to Remote 10.10.0.5
  Local 10.10.0.2 to Remote 10.10.0.6
  Local 10.10.0.2 to Remote 10.10.0.7
  Local 10.10.0.2 to Remote 10.10.0.8
  Local 10.10.0.3 to Remote 10.10.0.5
  Local 10.10.0.3 to Remote 10.10.0.6
  Local 10.10.0.3 to Remote 10.10.0.7
  Local 10.10.0.3 to Remote 10.10.0.8
  Local 10.10.0.4 to Remote 10.10.0.5
  Local 10.10.0.4 to Remote 10.10.0.6
  Local 10.10.0.4 to Remote 10.10.0.7
  Local 10.10.0.4 to Remote 10.10.0.8

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

```

10. Shut down the ISL ports 13 through 16 on the active CN1610 switch CL1: shutdown

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

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

11. Build a temporary ISL between CL1 and C2:

The following example builds a temporary ISL between CL1 (ports 13-16) and C2 (ports e1/24/1-4):

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

12. On all nodes, remove the cables that are attached to the CN1610 switch CL2.

With supported cabling, you must reconnect the disconnected ports on all of the nodes to the Nexus 3132Q-V switch C2.

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

You must attach appropriate Cisco QSFP to SFP+ breakout cables connecting port 1/24 on the new Cisco 3132Q-V switch C2, to ports 13 to 16 on existing CN1610 switch CL1.



When reconnecting any cables to the new Cisco 3132Q-V switch, you must use either optical fiber or Cisco twinax cables.

14. To make the ISL dynamic, configure the ISL interface 3/1 on the active CN1610 switch to disable the static mode: `no port-channel static`

This configuration matches with the ISL configuration on the 3132Q-V switch C2 when the ISLs are brought up on both switches in step 11

The following example shows the configuration of the ISL interface 3/1 using the `no port-channel static` command to make the ISL dynamic:

```

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

```

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

The following example illustrates the process of bringing up ISL ports 13 through 16 on the port-channel interface 3/1:

```

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

```

16. Verify that the ISLs are up on the CN1610 switch CL1: show port-channel

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

```

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

```

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

17. Verify that the ISLs are up on the 3132Q-V switch C2: `show port-channel summary`

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

```
C2# show port-channel summary
```

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

```
-----
-----
Group Port-          Type      Protocol  Member Ports
      Channel
-----
-----
1      Po1(SU)        Eth       LACP      Eth1/31(D)  Eth1/32(D)
2      Po2(SU)        Eth       LACP      Eth1/24/1(P) Eth1/24/2(P)
Eth1/24/3(P)
                                   Eth1/24/4(P)
```

18. Bring up all of the cluster interconnect ports that are connected to the 3132Q-V switch C2 on all of the nodes: `network port modify`

The following example shows how to bring up the cluster interconnect ports connected to the 3132Q-V switch C2:

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

19. Revert all of the migrated cluster interconnect LIFs that are connected to C2 on all of the nodes: `network interface revert`

```
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
```

20. Verify that all of the cluster interconnect ports are reverted to their home ports: `network interface`

show

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

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

Vserver	Logical Interface	Status Admin/Oper	Network Address/Mask	Current Node	Current Port	Is Home
Cluster	n1_clus1	up/up	10.10.0.1/24	n1	e0a	true
	n1_clus2	up/up	10.10.0.2/24	n1	e0b	true
	n1_clus3	up/up	10.10.0.3/24	n1	e0c	true
	n1_clus4	up/up	10.10.0.4/24	n1	e0d	true
	n2_clus1	up/up	10.10.0.5/24	n2	e0a	true
	n2_clus2	up/up	10.10.0.6/24	n2	e0b	true
	n2_clus3	up/up	10.10.0.7/24	n2	e0c	true
	n2_clus4	up/up	10.10.0.8/24	n2	e0d	true

8 entries were displayed.

21. Verify that all of the cluster ports are connected: `network port show`

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


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

```
Node: n1
```

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

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

```
8 entries were displayed.
```

22. Ping the remote cluster interfaces and then perform a remote procedure call server check: `cluster ping-cluster`

The following example shows how to ping the remote cluster interfaces:

```

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

Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 16 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 1500 byte MTU on 16 path(s):
    Local 10.10.0.1 to Remote 10.10.0.5
    Local 10.10.0.1 to Remote 10.10.0.6
    Local 10.10.0.1 to Remote 10.10.0.7
    Local 10.10.0.1 to Remote 10.10.0.8
    Local 10.10.0.2 to Remote 10.10.0.5
    Local 10.10.0.2 to Remote 10.10.0.6
    Local 10.10.0.2 to Remote 10.10.0.7
    Local 10.10.0.2 to Remote 10.10.0.8
    Local 10.10.0.3 to Remote 10.10.0.5
    Local 10.10.0.3 to Remote 10.10.0.6
    Local 10.10.0.3 to Remote 10.10.0.7
    Local 10.10.0.3 to Remote 10.10.0.8
    Local 10.10.0.4 to Remote 10.10.0.5
    Local 10.10.0.4 to Remote 10.10.0.6
    Local 10.10.0.4 to Remote 10.10.0.7
    Local 10.10.0.4 to Remote 10.10.0.8

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

```

23. On each node in the cluster, migrate the interfaces that are associated with the first CN1610 switch CL1, to be replaced: network interface migrate

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

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

24. Verify the cluster status: network interface show

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

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

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

8 entries were displayed.

25. Shut down the node ports that are connected to CL1 on all of the nodes: network port modify

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

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

26. Shut down the ISL ports 24, 31, and 32 on the active 3132Q-V switch C2: shutdown

The following example shows how to shut down ISLs 24, 31, and 32 on the active 3132Q-V switch C2:

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

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

With supported cabling, you must reconnect the disconnected ports on all of the nodes to the Nexus 3132Q-V switch C1.

28. Remove the QSFP cables from Nexus 3132Q-V C2 port e1/24.

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

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

The following example copies the `running-configuration` file to the `startup-configuration` file:

```

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

```

30. Bring up ISL ports 31 and 32 on C2, the active 3132Q-V switch: no shutdown

The following example shows how to bring up ISLs 31 and 32 on the 3132Q-V switch C2:

```

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

```

31. Verify that the ISL connections are up on the 3132Q-V switch C2: show port-channel summary

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

```
C1# show port-channel summary
```

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

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

32. Bring up all of the cluster interconnect ports connected to the new 3132Q-V switch C1 on all of the nodes:
network port modify

The following example shows how to bring up all of the cluster interconnect ports connected to the new 3132Q-V switch C1:

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

33. Verify the status of the cluster node port: network port show

The following example verifies that all of the cluster interconnect ports on n1 and n2 on the new 3132Q-V switch C1 are up:

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

Node: n1

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

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

8 entries were displayed.

34. Revert all of the migrated cluster interconnect LIFs that were originally connected to C1 on all of the nodes:
network interface revert

The following example shows how to revert the migrated cluster LIFs to their home ports:

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

35. Verify that the interface is now home: network interface show

The following example shows the status of cluster interconnect interfaces is up and Is home for n1 and n2:

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

Vserver	Logical Interface	Status Admin/Oper	Network Address/Mask	Current Node	Current Port	Is Home
Cluster	n1_clus1	up/up	10.10.0.1/24	n1	e0a	true
	n1_clus2	up/up	10.10.0.2/24	n1	e0b	true
	n1_clus3	up/up	10.10.0.3/24	n1	e0c	true
	n1_clus4	up/up	10.10.0.4/24	n1	e0d	true
	n2_clus1	up/up	10.10.0.5/24	n2	e0a	true
	n2_clus2	up/up	10.10.0.6/24	n2	e0b	true
	n2_clus3	up/up	10.10.0.7/24	n2	e0c	true
	n2_clus4	up/up	10.10.0.8/24	n2	e0d	true

8 entries were displayed.

36. Ping the remote cluster interfaces and then perform a remote procedure call server check: `cluster ping-cluster`

The following example shows how to ping the remote cluster interfaces:


```

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

Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 16 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 1500 byte MTU on 16 path(s):
  Local 10.10.0.1 to Remote 10.10.0.5
  Local 10.10.0.1 to Remote 10.10.0.6
  Local 10.10.0.1 to Remote 10.10.0.7
  Local 10.10.0.1 to Remote 10.10.0.8
  Local 10.10.0.2 to Remote 10.10.0.5
  Local 10.10.0.2 to Remote 10.10.0.6
  Local 10.10.0.2 to Remote 10.10.0.7
  Local 10.10.0.2 to Remote 10.10.0.8
  Local 10.10.0.3 to Remote 10.10.0.5
  Local 10.10.0.3 to Remote 10.10.0.6
  Local 10.10.0.3 to Remote 10.10.0.7
  Local 10.10.0.3 to Remote 10.10.0.8
  Local 10.10.0.4 to Remote 10.10.0.5
  Local 10.10.0.4 to Remote 10.10.0.6
  Local 10.10.0.4 to Remote 10.10.0.7
  Local 10.10.0.4 to Remote 10.10.0.8

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

```

37. Expand the cluster by adding nodes to the Nexus 3132Q-V cluster switches.
38. Display the information about the devices in your configuration:

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

The following examples show nodes n3 and n4 with 40 GbE cluster ports connected to ports e1/7 and e1/8, respectively on both the Nexus 3132Q-V cluster switches, and both nodes have joined the cluster. The 40 GbE cluster interconnect ports used are e4a and e4e.

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

Node	Local Port	Discovered 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

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

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

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

Node: n4

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

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

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

12 entries were displayed.

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

Switch	Type	Address	Model
C1	cluster-network	10.10.1.103	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	10.10.1.104	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			
CL1	cluster-network	10.10.1.101	CN1610
Serial Number: 01234567			
Is Monitored: true			
Reason:			
Software Version: 1.2.0.7			
Version Source: ISDP			
CL2	cluster-network	10.10.1.102	CN1610
Serial Number: 01234568			
Is Monitored: true			
Reason:			
Software Version: 1.2.0.7			
Version Source: ISDP			

4 entries were displayed.

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

The following example shows how to remove the CN1610 switches:

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

40. Configure clusters clus1 and clus4 to -auto-revert on each node and confirm:

```
cluster::*> network interface modify -vserver node1 -lif clus1 -auto
-revert true
cluster::*> network interface modify -vserver node1 -lif clus4 -auto
-revert true
cluster::*> network interface modify -vserver node2 -lif clus1 -auto
-revert true
cluster::*> network interface modify -vserver node2 -lif clus4 -auto
-revert true
```

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

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

Switch	Type	Address	Model
C1	cluster-network	10.10.1.103	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	10.10.1.104	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.

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

```
system cluster-switch log setup-password

system cluster-switch log enable-collection
```

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

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

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

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

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

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

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

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

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

Enabling cluster switch log collection.

cluster::*>
```



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

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

Related information

[NetApp CN1601 and CN1610 description page](#)

[Cisco Ethernet Switch description page](#)

[Hardware Universe](#)

Cisco Nexus 3232C switches

Cisco Nexus 3232C switches

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

Overview

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

Available documentation

The following table lists the documentation available for the Cisco Nexus 3232C switches.

Title	Description
<i>Install a Cisco® Nexus 3232C cluster switch and pass-through panel in a NetApp® cabinet</i>	Describes how to install the pass-through panel in system cabinets where power connectors are at the front of the chassis and power distribution units are located in the rear of the chassis.
<i>Setup the Cisco® Nexus 3232C cluster switches</i>	Describes how to setup and configure your Cisco Nexus 3232C cluster switches.
<i>Install NX-OS and Reference Configuration Files (RCFs)</i>	Describes how to install NX-OS and reference configuration files (RCFs) on Nexus 3232C cluster switch.
<i>Migrate from a Cisco Nexus 5596 Switch to a Cisco Nexus 3232C Switch</i>	Describes how to migrate from environments that use older Cisco switches to environments that use Cisco 3232C switches.
<i>Migrate from a CN1610 Switch to a Cisco Nexus 3232C Switch</i>	Describes the procedure to replace a CN1610 switch with a Cisco Nexus 3232C cluster switch.
<i>Migrate from a two-node Switchless Cluster</i>	Describes how to migrate from a two-node switchless cluster environment to a two-node switched environment using Cisco Nexus 3232C cluster switches.

Replace a Cisco Nexus 3232C Cluster Switch	Describes the procedure to replace a defective Cisco Nexus 3232C switch in a cluster and download the switch operating system and reference configuration file.
Replace a Cisco Nexus 3232C Storage Switch	Describes the procedure to replace a defective Cisco Nexus 3232C storage switch and download the switch operating system and reference configuration file.

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

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

Before you begin

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

About this task

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



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

Steps

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

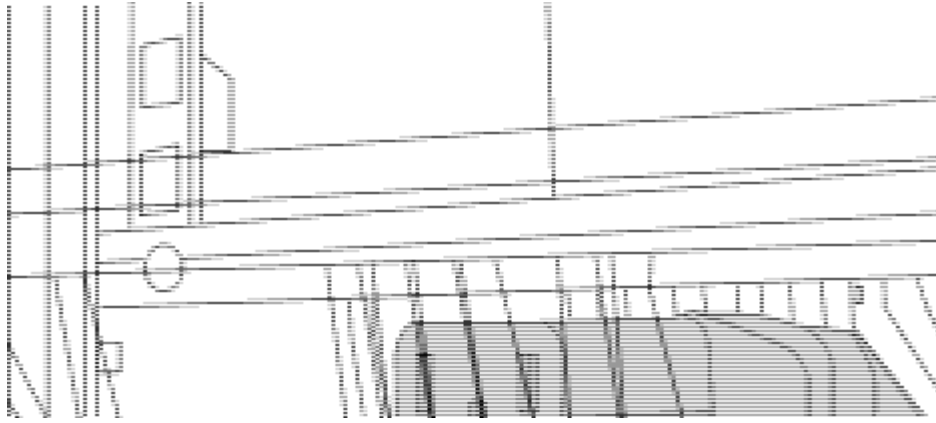
The pass-through panel kit is available from NetApp (part number X8784-R6).

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

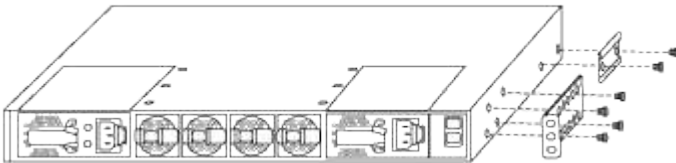
- One pass-through blanking panel
- Four 10-32 x .75 screws
- Four 10-32 clip nuts
 - a. Determine the vertical location of the switches and blanking panel in the cabinet.

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

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



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



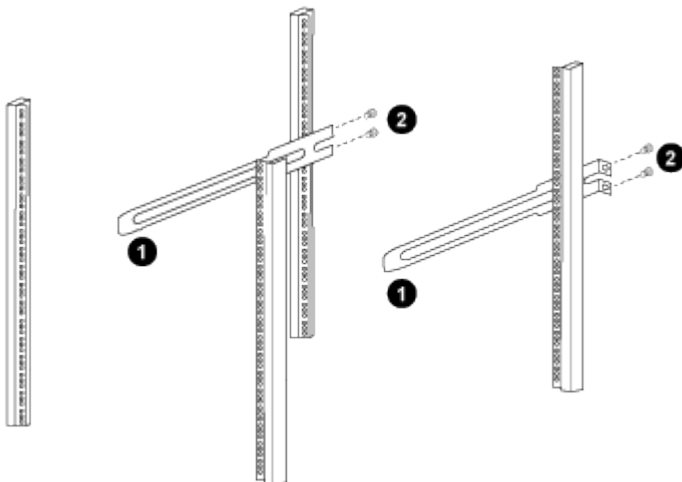
- b. Repeat step 2a with the other front rack-mount bracket on the other side of the switch.
 - c. Install the rear rack-mount bracket on the switch chassis.
 - d. Repeat step 2c with the other rear rack-mount bracket on the other side of the switch.
3. Install the clip nuts in the square hole locations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



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

4. Install the slider rails in the cabinet.

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



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

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

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

5. Install the switch in the cabinet.



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

a. Position the back of the switch at RU41.



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

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

b. Attach the switch to the cabinet.



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

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

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



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

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



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

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

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

Set up

Set up the switches

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

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

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

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

[NetApp documentation](#)

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



Due to the complexity that can result from illustrating layers of cabling, this guide does not provide cabling graphics. This guide does provide sample worksheets with recommended port assignments and blank worksheets that you can use to set up your cluster.



For more information refer to the [Hardware Universe](#).

- 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.



You must download the applicable NetApp cluster network and management network RCFs from the NetApp Support Site at mysupport.netapp.com for the switches that you receive.

- In addition, you might need to install the required configuration file to support the Cluster Switch Health Monitor (CSHM) for the 92300YC cluster switches. See [Installing the Cluster Switch Health Monitor \(CSHM\) configuration file for 92300YC switches](#) for details.

Steps

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

If you are installing your...	Then...
Cisco Nexus 9336C-FX2 in a NetApp system cabinet	See the <i>Installing a Cisco Nexus 9336C-FX2 cluster switch and pass-through panel in a NetApp cabinet</i> guide for instructions to install the switch in a NetApp cabinet.
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.
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.
Equipment in a Telco rack	See the procedures provided in the switch hardware installation guides and the NetApp installation and setup instructions.
Cisco Nexus 5596UP/5596T in a NetApp system cabinet	See the <i>Installing a Cisco Nexus 5596 cluster switch and pass-through panel in a NetApp cabinet</i> guide for instructions to install the switch in a NetApp cabinet.

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 based on information provided in [Required configuration information](#).
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.

If you download the NetApp-supported version of the software, then you must also download the *NetApp Cluster Network Switch Reference Configuration File* and merge it with the configuration you saved in Step 5. You can download the file and the instructions from the [Cisco Ethernet Switches](#) page.

7. Check the software version on the network switches and, if necessary, download the NetApp-supported version of the software to the switches. If you have your own switches, refer to the [Cisco site](#).

If you download the NetApp-supported version of the software, then you must also download the *NetApp Management Network Switch Reference Configuration File* and merge it with the configuration you saved in Step 5. You can download the file and instructions from the [Cisco Ethernet Switches](#) page.

Related information

[Required cluster configuration information](#)

[Required documentation](#)

[Sample and blank cabling worksheets](#)

Required cluster configuration information

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.

Required network information for all switches

You need the following network information for all switch configurations:

- IP subnet for management network traffic
- Host names and IP addresses for each of the storage system controllers and all applicable switches
- Most storage system controllers are managed through the e0M interface by connecting to the Ethernet service port (wrench icon). On AFF A800 and AFF A700 systems, the e0M interface uses a dedicated Ethernet port.

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

Required network information for Cisco Nexus 9336C-FX2, 92300YC, 3232C, 3132Q-V, and 5596UP/5596T switches

For the Cisco Nexus 9336C-FX2, 92300YC, 3232C, 3132Q-V, and 5596UP/5596T switches, you need to provide applicable responses to the following initial setup questions when you first boot the switch. Your site's security policy defines the responses and services to enable.

- 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.

- 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 Cluster 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).
- 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.

For more information about the initial configuration of your switch, see the following guides:

[Cisco Nexus 9336C-FX2 Installation and Upgrade Guides](#)

[Cisco Nexus 92300YC Installation and Upgrade Guides](#)

[Cisco Nexus 5000 Series Hardware Installation Guide](#)

[Cisco Nexus 3000 Series Hardware Installation Guide](#)

Install the Cluster Switch Health Monitor (CSHM) configuration file for 92300YC switches

You can use this procedure to install the applicable configuration file for cluster switch health monitoring of Nexus 92300YC cluster switches. In ONTAP releases 9.5P7 and earlier and 9.6P2 and earlier, you must download the cluster switch health monitor configuration file separately. In ONTAP releases 9.5P8 and later, 9.6P3 and later, and 9.7 and later, the cluster switch health monitor configuration file is bundled with ONTAP.

Before you setup the switch health monitor for 92300YC cluster switches, you must ensure that the ONTAP cluster is up and running.



It is advisable to enable SSH in order to use all features available in CSHM.

1. Download the cluster switch health monitor configuration zip file based on the corresponding ONTAP release version. This file is available from the [NetApp Software download](#) page.
 - a. On the Software download page, select **Switch Health Monitor Configuration Files**
 - b. Select Platform = **ONTAP** and click **Go!**
 - c. On the Switch Health Monitor Configuration Files for ONTAP page, click **View & Download**
 - d. On the Switch Health Monitor Configuration Files for ONTAP - Description page, click **Download** for the applicable cluster switch model, for example: **Cisco Nexus 92300YC**
 - e. On the End User License Agreement page, click **Accept**
 - f. On the Switch Health Monitor Configuration Files for ONTAP - Download page, select the applicable configuration file, for example, **Cisco_Nexus_92300YC.zip**
2. Upload the applicable zip file to your internal web server where the IP address is X.X.X.X.

For an internal web server IP address of 192.168.2.20 and assuming a /usr/download directory exists, you can upload your zip file to your web server using scp:

```
% scp Cisco_Nexus_92300YC.zip
admin@192.168.2.20:/usr/download/Cisco_Nexus_92300YC.zip
```

3. Access the advanced mode setting from one of the ONTAP systems in the cluster, using the command `set-privilege advanced`:

```
cluster1::> set -privilege advanced
```

4. Run the switch health monitor configure command `system cluster-switch configure-health-monitor -node * -package-url X.X.X/location_to_download_zip_file`:

```
cluster1::> system cluster-switch configure-health-monitor -node *
-package-url 192.168.2.20/usr/download/Cisco_Nexus_92300YC.zip
```

5. Verify that the command output contains the text string "downloaded package processed successfully". If an error occurs, contact NetApp support.
6. Run the command `system cluster-switch show` on the ONTAP system and ensure that the cluster switches are discovered with the monitored field set to "True".

```
cluster1::> system cluster-switch show
```



If at any time you revert to an earlier version of ONTAP, you will need to install the CSHM configuration file again to enable switch health monitoring of 92300YC cluster switches.

Required documentation

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

Required documentation for cluster network switches

To set up the Cisco Nexus 9336C-FX2 and 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.

Document title	Description
<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.

To set up the Cisco Nexus 3232C and 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.
<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.

Document title	Description
<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 (choose the notes for the NX-OS release installed on your switches)</i>	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.

To set up the Cisco Nexus 5596 switch, you need the following documents from [Cisco Nexus 5000 Series Switches Support](#) page:

Document title	Description
<i>Nexus 5000 Series Hardware Installation Guide</i>	Provides detailed information about site requirements, switch hardware details, and installation options.
<i>Cisco Nexus 5000 Series Switch Software Configuration Guide (choose the guide for the software you are using)</i>	Provides initial switch configuration information that you need before you can configure the switch for ONTAP operation.
<i>Cisco Nexus 5000 Series NX-OS Software Upgrade and Downgrade Guide</i>	Provides information about how to downgrade the switch to the supported ONTAP switch software, if necessary.
<i>Cisco Nexus 5000 Series NX-OS Command Reference Master Index</i>	Provides an alphabetical list of all the commands supported for a specific NX-OS release.
<i>Cisco Nexus 5000 and Nexus 2000 MIBs Reference</i>	Describes the Management Information Base (MIB) files for the Nexus 5000 switches.
<i>Nexus 5000 Series NX-OS System Message Reference</i>	Describes troubleshooting information.

Document title	Description
<i>Regulatory, Compliance, and Safety Information for the Cisco Nexus 6000 Series, Cisco Nexus 5000 Series, Cisco Nexus 3000 Series, and Cisco Nexus 2000 Series</i>	Provides international agency compliance, safety, and statutory information for the Nexus 5000 series switches.

Required documentation for supported ONTAP systems

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

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 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.
Installing a Cisco Nexus 3232C cluster switch and pass-through panel in a NetApp cabinet	Describes how to install a Cisco Nexus 3232C switch in a four-post NetApp cabinet.
Installing a Cisco Nexus 3132Q-V switch and pass-through panel in a NetApp Cabinet	Describes how to install a Cisco Nexus 3132Q-V switch in a four-post NetApp cabinet.
Installing a Cisco Nexus 5596 switch and pass-through panel in a NetApp Cabinet	Describes how to install a Cisco Nexus 5596 switch in a NetApp cabinet.

Considerations for using Smart Call Home

Smart Call Home monitors the hardware and software components on your network, to generate an email-based notification of critical system conditions. When an event occurs on your device, Smart Call Home raises an alert to all the recipients that are configured in your destination profile.

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

Before you can use Smart Call Home feature, you need to be aware of the following considerations:

- 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.

[Cisco support site](#)

Sample and blank cabling worksheets

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

Cisco Nexus 9336C-FX2 cabling worksheet

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

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 node 1	1	4x10GbE node 1
2	4x10GbE node 2	2	4x10GbE node 2
3	4x10GbE node 3	3	4x10GbE node 3
4	4x25GbE node 4	4	4x25GbE node 4
5	4x25GbE node 5	5	4x25GbE node 5
6	4x25GbE node 6	6	4x25GbE node 6

Cluster switch A		Cluster switch B	
7	4x100GbE node 7	7	4x100GbE node 7
8	4x100GbE node 8	8	4x100GbE node 8
9	4x100GbE node 9	9	4x100GbE node 9
10	4x100GbE node 10	10	4x100GbE node 10
11	4x100GbE node 11	11	4x100GbE node 11
12	4x100GbE node 12	12	4x100GbE node 12
13	4x100GbE node 13	13	4x100GbE node 13
14	4x100GbE node 14	14	4x100GbE node 14
15	4x100GbE node 15	15	4x100GbE node 15
16	4x100GbE node 16	16	4x100GbE node 16
17	4x100GbE node 17	17	4x100GbE node 17
18	4x100GbE node 18	18	4x100GbE node 18
19	4x100GbE node 19	19	4x100GbE node 19
20	4x100GbE node 20	20	4x100GbE node 20
21	4x100GbE node 21	21	4x100GbE node 21
22	4x100GbE node 22	22	4x100GbE node 22
23	4x100GbE node 23	23	4x100GbE node 23
24	4x100GbE node 24	24	4x100GbE node 24
25 through 34	Reserved	25 through 34	Reserved
35	100G ISL to switch B port 35	35	100G ISL to switch A port 35
36	100G ISL to switch B port 36	36	100G ISL to switch A port 36

Blank cabling worksheet

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

Cluster switch A		Cluster switch B	
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	

Cluster switch A		Cluster switch B	
20		20	
21		21	
22		22	
23		23	
24		24	
25 through 34	Reserved	25 through 34	Reserved
35	100G ISL to switch B port 35	35	100G ISL to switch A port 35
36	100G ISL to switch B port 36	36	100G ISL to switch A port 36

Cisco Nexus 92300YC cabling worksheet

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

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

Cluster switch A		Cluster switch B	
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
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

Cluster switch A		Cluster switch B	
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
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

Cluster switch A		Cluster switch B	
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
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	

Cluster switch A		Cluster switch B	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
16		16	
17		17	
18		18	
19		19	
20		20	
21		21	
22		22	
23		23	
24		24	

Cluster switch A		Cluster switch B	
25		25	
26		26	
27		27	
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	

Cluster switch A		Cluster switch B	
47		47	
48		48	
49		49	
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

Cisco Nexus 3232C cabling worksheet

If you want to document the supported platforms, you must complete the blank cabling

worksheet by using the completed sample cabling worksheet as a guide. 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	4x10G/40G/100G node	1	4x10G/40G/100G node
2	4x10G/40G/100G node	2	4x10G/40G/100G node
3	4x10G/40G/100G node	3	4x10G/40G/100G node
4	4x10G/40G/100G node	4	4x10G/40G/100G node
5	4x10G/40G/100G node	5	4x10G/40G/100G node
6	4x10G/40G/100G node	6	4x10G/40G/100G node
7	4x10G/40G/100G node	7	4x10G/40G/100G node
8	4x10G/40G/100G node	8	4x10G/40G/100G node
9	4x10G/40G/100G node	9	4x10G/40G/100G node
10	4x10G/40G/100G node	10	4x10G/40G/100G node
11	4x10G/40G/100G node	11	4x10G/40G/100G node
12	4x10G/40G/100G node	12	4x10G/40G/100G node
13	4x10G/40G/100G node	13	4x10G/40G/100G node
14	4x10G/40G/100G node	14	4x10G/40G/100G node
15	4x10G/40G/100G node	15	4x10G/40G/100G node
16	4x10G/40G/100G node	16	4x10G/40G/100G node
17	4x10G/40G/100G node	17	4x10G/40G/100G node
18	4x10G/40G/100G node	18	4x10G/40G/100G node

Cluster switch A		Cluster switch B	
19	40G/100G node 19	19	40G/100G node 19
20	40G/100G node 20	20	40G/100G node 20
21	40G/100G node 21	21	40G/100G node 21
22	40G/100G node 22	22	40G/100G node 22
23	40G/100G node 23	23	40G/100G node 23
24	40G/100G node 24	24	40G/100G node 24
25 through 30	Reserved	25 through 30	Reserved
31	100G ISL to switch B port 31	31	100G ISL to switch A port 31
32	100G ISL to switch B port 32	32	100G 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	

Cluster switch A		Cluster switch B	
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 through 30	Reserved	25 through 30	Reserved
31	100G ISL to switch B port 31	31	100G ISL to switch A port 31
32	100G ISL to switch B port 32	32	100G ISL to switch A port 32

Cisco Nexus 3132Q-V cabling worksheet

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

Cluster switch A		Cluster switch B	
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	

Cluster switch A		Cluster switch B	
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 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

Cisco Nexus 5596UP and 5596T cabling worksheet

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

Sample cabling worksheet

Some platforms support more than one 10GbE cluster port connection per cluster interconnect switch. To support additional cluster connections, you can use ports 25 through 40, as well as ports 49 through 80 when expansion modules are installed.

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	Node port 1	1	Node port 1
2	Node port 2	2	Node port 2
3	Node port 3	3	Node port 3
4	Node port 4	4	Node port 4
5	Node port 5	5	Node port 5
6	Node port 6	6	Node port 6
7	Node port 7	7	Node port 7
8	Node port 8	8	Node port 8
9	Node port 9	9	Node port 9
10	Node port 10	10	Node port 10
11	Node port 11	11	Node port 11
12	Node port 12	12	Node port 12
13	Node port 13	13	Node port 13
14	Node port 14	14	Node port 14
15	Node port 15	15	Node port 15
16	Node port 16	16	Node port 16
17	Node port 17	17	Node port 17
18	Node port 18	18	Node port 18

Cluster switch A		Cluster switch B	
19	Node port 19	19	Node port 19
20	Node port 20	20	Node port 20
21	Node port 21	21	Node port 21
22	Node port 22	22	Node port 22
23	Node port 23	23	Node port 23
24	Node port 24	24	Node port 24
25 through 40	Reserved	25 through 40	Reserved
41	ISL to switch B port 41	41	ISL to switch A port 41
42	ISL to switch B port 42	42	ISL to switch A port 42
43	ISL to switch B port 43	43	ISL to switch A port 43
44	ISL to switch B port 44	44	ISL to switch A port 44
45	ISL to switch B port 45	45	ISL to switch A port 45
46	ISL to switch B port 46	46	ISL to switch A port 46
47	ISL to switch B port 47	47	ISL to switch A port 47
48	ISL to switch B port 48	48	ISL to switch A port 48

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.



Switch ports 1 through 24 function as 10 GbE ports. Switch ports 41 through 48 are reserved for Inter-Switch Links (ISLs).

Cluster switch A		Cluster switch B	
Switch port	Node/port usage	Switch port	Node/port usage
1		1	

Cluster switch A		Cluster switch B	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
16		16	
17		17	
18		18	
19		19	
20		20	
21		21	
22		22	
23		23	

Cluster switch A		Cluster switch B	
24		24	
25 through 40	Reserved	25 through 40	Reserved
41	ISL to switch B port 41	41	ISL to switch A port 41
42	ISL to switch B port 42	42	ISL to switch A port 42
43	ISL to switch B port 43	43	ISL to switch A port 43
44	ISL to switch B port 44	44	ISL to switch A port 44
45	ISL to switch B port 45	45	ISL to switch A port 45
46	ISL to switch B port 46	46	ISL to switch A port 46
47	ISL to switch B port 47	47	ISL to switch A port 47
48	ISL to switch B port 48	48	ISL to switch A port 48

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

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

Before you begin

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

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

- You must have the current RCF.

About this task

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

See the [Hardware Universe](#) to verify the correct cluster ports on your platforms.



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

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

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



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

Steps

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

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

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



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

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

```
set -privilege advanced
```

The advanced prompt (`*>`) appears.

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

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

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

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

4 entries were displayed.

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

a. Display the network port attributes:

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

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

Node: cluster1-02

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

Node: cluster1-01

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

4 entries were displayed.

b. Display information about the LIFs:

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

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

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

Cluster				
	cluster1-01_clus1	up/up	169.254.209.69/16	
cluster1-01	e0a true			
	cluster1-01_clus2	up/up	169.254.49.125/16	
cluster1-01	e0b true			
	cluster1-02_clus1	up/up	169.254.47.194/16	
cluster1-02	e0a true			
	cluster1-02_clus2	up/up	169.254.19.183/16	
cluster1-02	e0b true			

4 entries were displayed.

5. Ping the remote cluster LIFs:

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

```

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

```

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

network interface show -vserver Cluster -fields auto-revert

```

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

```

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.

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

system switch ethernet log setup-password

system switch ethernet log enable-collection

```

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

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

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

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

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

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

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

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

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

Enabling cluster switch log collection.

cluster1::*>

```



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

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

```
system cluster-switch log setup-password
```

```
system cluster-switch log enable-collection
```

```

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

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

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

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

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

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

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

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

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

Enabling cluster switch log collection.

cluster1::*>

```



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

Install the NX-OS software

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

Steps

1. Connect the cluster switch to the management network.

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

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

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

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

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

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

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

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

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

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

```
cs2# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
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http://www.opensource.org/licenses/lgpl-2.1.php and
http://www.gnu.org/licenses/old-licenses/library.txt.

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

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

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

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

```

plugin
  Core Plugin, Ethernet Plugin

Active Package(s):

cs2#

```

5. Install the NX-OS image.

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

```

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

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

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

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

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

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

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

```

Compatibility check is done:

Module	bootable	Impact	Install-type	Reason
1	yes	disruptive	reset	default

upgrade is not hitless

Images will be upgraded according to following table:

Module	Image	Running-Version(pri:alt)	New-
Version	Upg-Required		
-----	-----	-----	-----
-----	-----	-----	-----

```

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

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

Install is in progress, please wait.

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

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

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

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

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

```

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

show version

```

cs2# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
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purpose.
Certain components of this software are licensed under
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```

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

Software

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

Hardware

```
cisco Nexus3000 C3232C Chassis (Nexus 9000 Series)  
Intel(R) Xeon(R) CPU E5-2403 v2 @ 1.80GHz with 8154432 kB of memory.  
Processor Board ID FO?????GD  
  
Device name: rtpnpi-mcc01-8200-ms-A1  
bootflash: 53298520 kB  
Kernel uptime is 0 day(s), 0 hour(s), 3 minute(s), 14 second(s)
```

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

plugin

```
Core Plugin, Ethernet Plugin
```

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

```
cs2#
```

7. Upgrade the EPLD image and reboot the switch.

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

EPLD Device	Version
MI FPGA	0x12
IO FPGA	0x11

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

Compatibility check:

Module	Type	Upgradable	Impact	Reason
1	SUP	Yes	disruptive	Module Upgradable

Retrieving EPLD versions.... Please wait.

Images will be upgraded according to following table:

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

The above modules require upgrade.

The switch will be reloaded at the end of the upgrade

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

Proceeding to upgrade Modules.

Starting Module 1 EPLD Upgrade

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

Module 1 EPLD upgrade is successful.

Module	Type	Upgrade-Result
1	SUP	Success

Module 1 EPLD upgrade is successful.

```
cs2#
```

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

```

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

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

Proceeding to upgrade Modules.

Starting Module 1 EPLD Upgrade

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

EPLDs upgraded.

Module 1 EPLD upgrade is successful.
cs2#

```

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

```

cs2# show version module 1 epld

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

```

Install the Reference Configuration File (RCF)

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

About this task

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

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



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

Steps

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

```
network device-discovery show
```

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

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

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

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



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

```
Node: cluster1-01
```

```
Ignore
```

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

```
Node: cluster1-02
```

```
Ignore
```

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

8 entries were displayed.

```
Node: cluster1-03
```

```
Ignore
```

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

```
Node: cluster1-04
```

```

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

```

- b. Verify that all the cluster interfaces (LIFs) are on the home port:
network interface show -role cluster

```

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

```

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

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

```
cluster1::*> system cluster-switch show -is-monitoring-enabled
-operational true
Switch                               Type                               Address                           Model
-----
cs1                                  cluster-network                   10.233.205.92
NX3232C
    Serial Number: 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
```

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

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

5. Verify that the cluster ports have migrated to the ports hosted on cluster switch cs1. This might take a few seconds.

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

```

cluster1::*> network interface show -role cluster

```

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

Cluster				
e0a	true	cluster1-01_clus1 up/up	169.254.3.4/23	cluster1-01
e0a	false	cluster1-01_clus2 up/up	169.254.3.5/23	cluster1-01
e0a	true	cluster1-02_clus1 up/up	169.254.3.8/23	cluster1-02
e0a	false	cluster1-02_clus2 up/up	169.254.3.9/23	cluster1-02
e0a	true	cluster1-03_clus1 up/up	169.254.1.3/23	cluster1-03
e0a	false	cluster1-03_clus2 up/up	169.254.1.1/23	cluster1-03
e0a	true	cluster1-04_clus1 up/up	169.254.1.6/23	cluster1-04
e0a	false	cluster1-04_clus2 up/up	169.254.1.7/23	cluster1-04

```

8 entries were displayed.
cluster1::*>

```

6. Verify that the cluster is healthy:

```
cluster show
```

```

cluster1::*> cluster show

```

Node	Health	Eligibility	Epsilon
cluster1-01	true	true	false
cluster1-02	true	true	false
cluster1-03	true	true	true
cluster1-04	true	true	false

```

4 entries were displayed.
cluster1::*>

```

7. Clean the configuration on switch cs2 and perform a basic setup.

- Clean the configuration. This step requires a console connection to the switch.

```

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

```

b. Perform a basic setup of the switch.

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

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

```

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

```

9. Apply the RCF previously downloaded to the bootflash.

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

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

```

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

```

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

```

cs2# show banner motd

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

```

```

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

```



When applying the RCF for the first time, the **ERROR: Failed to write VSH commands** message is expected and can be ignored.

1. 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

- The RCF banner
- The node and port settings
- Customizations

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

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

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

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

a. Verify that e0d ports are up and healthy across all nodes in the cluster:

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

Node: cluster1-01

Ignore

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

```

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

```

Node: cluster1-02

Ignore

```

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

```

```

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

```

Node: cluster1-03

Ignore

```

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

```

```

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

```

Node: cluster1-04

Ignore

```

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

```

```

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

```



```
e0d      Cluster      Cluster      up    9000  auto/100000
```

```
healthy false
```

```
8 entries were displayed.
```

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

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

```
Node/      Local  Discovered
```

```
Protocol   Port   Device (LLDP: ChassisID)  Interface
```

```
Platform
```

```
-----
-----
cluster1-01/cdp
      e0a    cs1                Ethernet1/7    N3K-
C3232C
      e0d    cs2                Ethernet1/7    N3K-
C3232C
cluster01-2/cdp
      e0a    cs1                Ethernet1/8    N3K-
C3232C
      e0d    cs2                Ethernet1/8    N3K-
C3232C
cluster01-3/cdp
      e0a    cs1                Ethernet1/1/1  N3K-
C3232C
      e0b    cs2                Ethernet1/1/1  N3K-
C3232C
cluster01-04/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: FOXXXXXXXGS
```

```
Is Monitored: true
```

```
Reason: None
```

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

```
9.3(4)
```

```
Version Source: CDP
```

```
2 entries were displayed.
```

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



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

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

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

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

7. Verify that the cluster LIFs have migrated to the ports hosted on switch cs2. This might take a few seconds.
network interface show -role cluster

```

cluster1::*> network interface show -role cluster

```

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

Cluster				
e0d	cluster1-01_clus1	up/up	169.254.3.4/23	cluster1-01
e0d	false			
e0d	cluster1-01_clus2	up/up	169.254.3.5/23	cluster1-01
e0d	true			
e0d	cluster1-02_clus1	up/up	169.254.3.8/23	cluster1-02
e0d	false			
e0d	cluster1-02_clus2	up/up	169.254.3.9/23	cluster1-02
e0d	true			
e0b	cluster1-03_clus1	up/up	169.254.1.3/23	cluster1-03
e0b	false			
e0b	cluster1-03_clus2	up/up	169.254.1.1/23	cluster1-03
e0b	true			
e0b	cluster1-04_clus1	up/up	169.254.1.6/23	cluster1-04
e0b	false			
e0b	cluster1-04_clus2	up/up	169.254.1.7/23	cluster1-04
e0b	true			

```

8 entries were displayed.
cluster1::*>

```

8. Verify that the cluster is healthy:

```
cluster show
```

```

cluster1::*> cluster show

```

Node	Health	Eligibility	Epsilon
cluster1-01	true	true	false
cluster1-02	true	true	false
cluster1-03	true	true	true
cluster1-04	true	true	false

```

4 entries were displayed.
cluster1::*>

```

9. Repeat Steps 7 to 14 on switch cs1.

10. Enable auto-revert on the cluster LIFs.

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

11. 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
```

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

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

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

```

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

```

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

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

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

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

Cluster				
e0d	cluster1-01_clus1	up/up	169.254.3.4/23	cluster1-01
e0d	cluster1-01_clus2	up/up	169.254.3.5/23	cluster1-01
e0d	cluster1-02_clus1	up/up	169.254.3.8/23	cluster1-02
e0d	cluster1-02_clus2	up/up	169.254.3.9/23	cluster1-02
e0d	cluster1-03_clus1	up/up	169.254.1.3/23	cluster1-03
e0b	cluster1-03_clus2	up/up	169.254.1.1/23	cluster1-03
e0b	cluster1-04_clus1	up/up	169.254.1.6/23	cluster1-04
e0b	cluster1-04_clus2	up/up	169.254.1.7/23	cluster1-04
e0b	true			

8 entries were displayed.

```
cluster1::*>
```

15. Verify that the cluster is healthy:

```
cluster show
```

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

Node	Health	Eligibility	Epsilon

cluster1-01	true	true	false
cluster1-02	true	true	false
cluster1-03	true	true	true
cluster1-04	true	true	false

4 entries were displayed.

```
cluster1::*>
```

16. Ping the remote cluster interfaces to verify connectivity:

```
cluster ping-cluster -node local
```

```

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

```

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

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

The cluster switches support the following node connections:

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

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

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



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

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

Stage	Description	Required cables
Initial	CN1610 to CN1610 (SFP+ to SFP+)	4 SFP+ optical fiber or copper direct-attach cables
Transition	CN1610 to 3232C (QSFP to SFP+)	1 QSFP and 4 SFP+ optical fiber or copper breakout cables
Final	3232C to 3232C (QSFP to QSFP)	2 QSFP optical fiber or copper direct-attach cables

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

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

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

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

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

About this task

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

- The nodes are n1, n2, n3, and n4.
- The command outputs might vary depending on different releases of ONTAP software.
- The CN1610 switches to be replaced are CL1 and CL2.
- The Nexus 3232C switches to replace the CN1610 switches are C1 and C2.
- n1_clus1 is the first cluster logical interface (LIF) that is connected to cluster switch 1 (CL1 or C1) for node

n1.

- n1_clus2 is the first cluster LIF that is connected to cluster switch 2 (CL2 or C2) for node n1.
- n1_clus3 is the second LIF that is connected to cluster switch 2 (CL2 or C2) for node n1.
- n1_clus4 is the second LIF that is connected to cluster switch 1 (CL1 or C1) for node n1.
- The number of 10 GbE and 40/100 GbE ports are defined in the reference configuration files (RCFs) available on the [Cisco® Cluster Network Switch Reference Configuration File Download](#) page.

Procedure summary

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

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

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



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

Steps

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

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

x is the duration of the maintenance window in hours.



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

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

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

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

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

8 entries were displayed.

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

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

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

Node: n1

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

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

8 entries were displayed.

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

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

Vserver	Logical Interface	Status Admin/Oper	Network Address/Mask	Current Node	Current Port	Is Home

Cluster						
	n1_clus1	up/up	10.10.0.1/24	n1	e0a	true
	n1_clus2	up/up	10.10.0.2/24	n1	e0b	true
	n1_clus3	up/up	10.10.0.3/24	n1	e0c	true
	n1_clus4	up/up	10.10.0.4/24	n1	e0d	true
	n2_clus1	up/up	10.10.0.5/24	n2	e0a	true
	n2_clus2	up/up	10.10.0.6/24	n2	e0b	true
	n2_clus3	up/up	10.10.0.7/24	n2	e0c	true
	n2_clus4	up/up	10.10.0.8/24	n2	e0d	true

8 entries were displayed.

c. Display information about the discovered cluster switches: `system cluster-switch show`

The following example displays the cluster switches that are known to the cluster along with their management IP addresses:

```
cluster::> system cluster-switch show
```

Switch	Type	Address	Model
CL1	cluster-network	10.10.1.101	CN1610
Serial Number: 01234567			
Is Monitored: true			
Reason:			
Software Version: 1.2.0.7			
Version Source: ISDP			
CL2	cluster-network	10.10.1.102	CN1610
Serial Number: 01234568			
Is Monitored: true			
Reason:			
Software Version: 1.2.0.7			
Version Source: ISDP			

2 entries displayed.

4. Verify that the appropriate RCF and image are installed on the new 3232C switches as necessary for your requirements, and make any essential site customizations.

You should prepare both switches at this time. If you need to upgrade the RCF and image, you must

complete the following procedure:

- a. See the [Cisco Ethernet Switch](#) page on the NetApp Support Site.
 - b. Note your switch and the required software versions in the table on that page.
 - c. Download the appropriate version of the RCF.
 - d. Click **CONTINUE** on the **Description** page, accept the license agreement, and then follow the instructions on the **Download** page to download the RCF.
 - e. Download the appropriate version of the image software at [Cisco® Cluster and Management Network Switch Reference Configuration File Download](#).
5. Migrate the LIFs associated with the second CN1610 switch that you plan to replace:
- ```
network interface migrate -vserver cluster -lif lif-name -source-node source-node-name destination-node destination-node-name -destination-port destination-port-name
```

You must migrate each LIF individually as shown in the following example:

```
cluster::*> network interface migrate -vserver cluster -lif n1_clus2
-source-node n1
-destination-node n1 -destination-port e0a
cluster::*> network interface migrate -vserver cluster -lif n1_clus3
-source-node n1
-destination-node n1 -destination-port e0d
cluster::*> network interface migrate -vserver cluster -lif n2_clus2
-source-node n2
-destination-node n2 -destination-port e0a
cluster::*> network interface migrate -vserver cluster -lif n2_clus3
-source-node n2
-destination-node n2 -destination-port e0d
```

6. Verify the cluster's health: `network interface show -role cluster`

```
cluster::*> network interface show -role cluster
(network interface show)
```

| Vserver | Logical Interface | Status Admin/Oper | Network Address/Mask | Current Node | Current Port | Is Home |
|---------|-------------------|-------------------|----------------------|--------------|--------------|---------|
| Cluster | n1_clus1          | up/up             | 10.10.0.1/24         | n1           | e0a          | true    |
|         | n1_clus2          | up/up             | 10.10.0.2/24         | n1           | e0a          | false   |
|         | n1_clus3          | up/up             | 10.10.0.3/24         | n1           | e0d          | false   |
|         | n1_clus4          | up/up             | 10.10.0.4/24         | n1           | e0d          | true    |
|         | n2_clus1          | up/up             | 10.10.0.5/24         | n2           | e0a          | true    |
|         | n2_clus2          | up/up             | 10.10.0.6/24         | n2           | e0a          | false   |
|         | n2_clus3          | up/up             | 10.10.0.7/24         | n2           | e0d          | false   |
|         | n2_clus4          | up/up             | 10.10.0.8/24         | n2           | e0d          | true    |

8 entries were displayed.

7. Shut down the cluster interconnect ports that are physically connected to switch CL2:

```
network port modify -node node-name -port port-name -up-admin false
```

The following example shows the four cluster interconnect ports being shut down for node n1 and node n2:

```
cluster::*> network port modify -node n1 -port e0b -up-admin false
cluster::*> network port modify -node n1 -port e0c -up-admin false
cluster::*> network port modify -node n2 -port e0b -up-admin false
cluster::*> network port modify -node n2 -port e0c -up-admin false
```

8. Ping the remote cluster interfaces, and then perform a remote procedure call server check:

```
cluster ping-cluster -node node-name
```

The following example shows node n1 being pinged and the RPC status indicated afterward:

```

cluster::*> cluster ping-cluster -node n1
Host is n1
Getting addresses from network interface table...
Cluster n1_clus1 n1 e0a 10.10.0.1
Cluster n1_clus2 n1 e0b 10.10.0.2
Cluster n1_clus3 n1 e0c 10.10.0.3
Cluster n1_clus4 n1 e0d 10.10.0.4
Cluster n2_clus1 n2 e0a 10.10.0.5
Cluster n2_clus2 n2 e0b 10.10.0.6
Cluster n2_clus3 n2 e0c 10.10.0.7
Cluster n2_clus4 n2 e0d 10.10.0.8
Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8
Cluster Vserver Id = 4294967293 Ping status:
....
Basic connectivity succeeds on 16 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 9000 byte MTU on 16 path(s):
 Local 10.10.0.1 to Remote 10.10.0.5
 Local 10.10.0.1 to Remote 10.10.0.6
 Local 10.10.0.1 to Remote 10.10.0.7
 Local 10.10.0.1 to Remote 10.10.0.8
 Local 10.10.0.2 to Remote 10.10.0.5
 Local 10.10.0.2 to Remote 10.10.0.6
 Local 10.10.0.2 to Remote 10.10.0.7
 Local 10.10.0.2 to Remote 10.10.0.8
 Local 10.10.0.3 to Remote 10.10.0.5
 Local 10.10.0.3 to Remote 10.10.0.6
 Local 10.10.0.3 to Remote 10.10.0.7
 Local 10.10.0.3 to Remote 10.10.0.8
 Local 10.10.0.4 to Remote 10.10.0.5
 Local 10.10.0.4 to Remote 10.10.0.6
 Local 10.10.0.4 to Remote 10.10.0.7
 Local 10.10.0.4 to Remote 10.10.0.8

Larger than PMTU communication succeeds on 16 path(s)
RPC status:
4 paths up, 0 paths down (tcp check)
4 paths up, 0 paths down (udp check)

```

9. Shut down the ISL ports 13 through 16 on the active CN1610 switch CL1 using the appropriate command.

For more information on Cisco commands, see the guides listed in the [Cisco Nexus 3000 Series NX-OS Command References](#).

The following example shows ISL ports 13 through 16 being shut down on the CN1610 switch CL1:

```
(CL1)# configure
(CL1)(Config)# interface 0/13-0/16
(CL1)(Interface 0/13-0/16)# shutdown (CL1)(Interface 0/13-0/16)# exit
(CL1)(Config)# exit
(CL1)#
```

10. Build a temporary ISL between CL1 and C2:

For more information on Cisco commands, see the guides listed in the [Cisco Nexus 3000 Series NX-OS Command References](#).

The following example shows a temporary ISL being built between CL1 (ports 13-16) and C2 (ports e1/24/1-4) using the Cisco switchport mode trunk command:

```
C2# configure
C2(config)# interface port-channel 2
C2(config-if)# switchport mode trunk
C2(config-if)# spanning-tree port type network
C2(config-if)# mtu 9216
C2(config-if)# interface breakout module 1 port 24 map 10g-4x
C2(config)# interface e1/24/1-4
C2(config-if-range)# switchport mode trunk
C2(config-if-range)# mtu 9216
C2(config-if-range)# channel-group 2 mode active
C2(config-if-range)# exit
C2(config-if)# exit
```

11. Remove the cables that are attached to the CN1610 switch CL2 on all the nodes.

Using supported cabling, you must reconnect the disconnected ports on all the nodes to the Nexus 3232C switch C2.

12. Remove four ISL cables from ports 13 to 16 on the CN1610 switch CL1.

You must attach the appropriate Cisco QSFP28 to SFP+ breakout cables connecting port 1/24 on the new Cisco 3232C switch C2 to ports 13 to 16 on the existing CN1610 switch CL1.



When reconnecting any cables to the new Cisco 3232C switch, the cables used must be either optical fiber or Cisco twinax cables.

13. Make the ISL dynamic by configuring the ISL interface 3/1 on the active CN1610 switch to disable the static mode.

This configuration matches with the ISL configuration on the 3232C switch C2 when the ISLs are brought up on both switches in Step 10.



For more information on Cisco commands, see the guides listed in the [Cisco Nexus 3000 Series NX-OS Command References](#).

The following example shows the ISL interface 3/1 being configured to make the ISL dynamic:

```
(CL1)# configure
(CL1)(Config)# interface 3/1
(CL1)(Interface 3/1)# no port-channel static
(CL1)(Interface 3/1)# exit
(CL1)(Config)# exit
(CL1)#
```

14. Bring up ISLs 13 through 16 on the active CN1610 switch CL1.

For more information on Cisco commands, see the guides listed in the [Cisco Nexus 3000 Series NX-OS Command References](#).

The following example shows ISL ports 13 through 16 being brought up on the port-channel interface 3/1:

```
(CL1)# configure
(CL1)(Config)# interface 0/13-0/16,3/1
(CL1)(Interface 0/13-0/16,3/1)# no shutdown
(CL1)(Interface 0/13-0/16,3/1)# exit
(CL1)(Config)# exit
(CL1)#
```

15. Verify that the ISLs are up on the CN1610 switch CL1.

The "Link State" should be Up, "Type" should be Dynamic, and the "Port Active" column should be True for ports 0/13 to 0/16.

The following example shows the ISLs being verified as up on the CN1610 switch CL1:

```
(CL1)# show port-channel 3/1
Local Interface..... 3/1
Channel Name..... ISL-LAG
Link State..... Up
Admin Mode..... Enabled
Type..... Dynamic
Load Balance Option..... 7
(Enhanced hashing mode)
```

| Mbr   | Device/<br>Ports | Port<br>Timeout | Port<br>Speed | Port<br>Active |              |
|-------|------------------|-----------------|---------------|----------------|--------------|
| ----- | -----            | -----           | -----         | -----          |              |
| 0/13  | actor/long       | 10 Gb Full      | True          |                |              |
|       | partner/long     |                 |               |                |              |
| 0/14  | actor/long       | 10 Gb Full      | True          |                |              |
|       | partner/long     |                 |               |                |              |
| 0/15  | actor/long       | 10 Gb Full      | True          |                |              |
|       | partner/long     |                 |               |                |              |
| 0/16  | actor/long       | 10 Gb Full      | True          |                | partner/long |

16. Verify that the ISLs are up on the 3232C switch C2: show port-channel summary

For more information on Cisco commands, see the guides listed in the [Cisco Nexus 3000 Series NX-OS Command References](#).

Ports Eth1/24/1 through Eth1/24/4 should indicate (P) , meaning that all four ISL ports are up in the port channel. Eth1/31 and Eth1/32 should indicate (D) as they are not connected.

The following example shows the ISLs being verified as up on the 3232C switch C2:

```
C2# show port-channel summary
```

```
Flags: D - Down P - Up in port-channel (members)
 I - Individual H - Hot-standby (LACP only)
 s - Suspended r - Module-removed
 S - Switched R - Routed
 U - Up (port-channel)
 M - Not in use. Min-links not met
```

```


Group Port- Type Protocol Member Ports
Channel

1 Po1 (SU) Eth LACP Eth1/31 (D) Eth1/32 (D)
2 Po2 (SU) Eth LACP Eth1/24/1 (P) Eth1/24/2 (P)
Eth1/24/3 (P)
 Eth1/24/4 (P)
```

17. Bring up all of the cluster interconnect ports that are connected to the 3232C switch C2 on all of the nodes: `network port modify -node node-name -port port-name -up-admin true`

The following example shows how to bring up the cluster interconnect ports connected to the 3232C switch C2:

```
cluster::*> network port modify -node n1 -port e0b -up-admin true
cluster::*> network port modify -node n1 -port e0c -up-admin true
cluster::*> network port modify -node n2 -port e0b -up-admin true
cluster::*> network port modify -node n2 -port e0c -up-admin true
```

18. Revert all of the migrated cluster interconnect LIFs that are connected to C2 on all of the nodes: `network interface revert -vserver cluster -lif lif-name`

```
cluster::*> network interface revert -vserver cluster -lif n1_clus2
cluster::*> network interface revert -vserver cluster -lif n1_clus3
cluster::*> network interface revert -vserver cluster -lif n2_clus2
cluster::*> network interface revert -vserver cluster -lif n2_clus3
```

19. Verify that all of the cluster interconnect ports are reverted to their home ports: `network interface show -role cluster`

The following example shows that the LIFs on clus2 are reverted to their home ports; the LIFs are successfully reverted if the ports in the "Current Port" column have a status of `true` in the "Is Home" column. If the "Is Home" value is `false`, then the LIF is not reverted.

```
cluster::*> network interface show -role cluster
```

```
(network interface show)
```

| Vserver | Logical<br>Interface | Status<br>Admin/Oper | Network<br>Address/Mask | Current<br>Node | Current<br>Port | Is<br>Home |
|---------|----------------------|----------------------|-------------------------|-----------------|-----------------|------------|
| -----   | -----                | -----                | -----                   | -----           | -----           | -----      |
| Cluster |                      |                      |                         |                 |                 |            |
|         | n1_clus1             | up/up                | 10.10.0.1/24            | n1              | e0a             | true       |
|         | n1_clus2             | up/up                | 10.10.0.2/24            | n1              | e0b             | true       |
|         | n1_clus3             | up/up                | 10.10.0.3/24            | n1              | e0c             | true       |
|         | n1_clus4             | up/up                | 10.10.0.4/24            | n1              | e0d             | true       |
|         | n2_clus1             | up/up                | 10.10.0.5/24            | n2              | e0a             | true       |
|         | n2_clus2             | up/up                | 10.10.0.6/24            | n2              | e0b             | true       |
|         | n2_clus3             | up/up                | 10.10.0.7/24            | n2              | e0c             | true       |
|         | n2_clus4             | up/up                | 10.10.0.8/24            | n2              | e0d             | true       |

```
8 entries were displayed.
```

20. Verify that all of the cluster ports are connected: `network port show -role cluster`

The following example shows the output verifying all of the cluster interconnects are up:

```
cluster::*> network port show -role cluster
(network port show)
```

```
Node: n1
```

| Port | IPspace | Broadcast Domain | Link | MTU  | Speed (Mbps)<br>Admin/Open | Health<br>Status | Ignore<br>Health |
|------|---------|------------------|------|------|----------------------------|------------------|------------------|
| 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
```

| Port | IPspace | Broadcast Domain | Link | MTU  | Speed (Mbps)<br>Admin/Open | Health<br>Status | Ignore<br>Health |
|------|---------|------------------|------|------|----------------------------|------------------|------------------|
| e0a  | cluster | cluster          | up   | 9000 | auto/10000                 | -                |                  |
| e0b  | cluster | cluster          | up   | 9000 | auto/10000                 | -                |                  |
| e0c  | cluster | cluster          | up   | 9000 | auto/10000                 | -                |                  |
| e0d  | cluster | cluster          | up   | 9000 | auto/10000                 | -                |                  |

```
8 entries were displayed.
```

21. Ping the remote cluster interfaces and then perform a remote procedure call server check: `cluster ping-cluster -node node-name`

The following example shows node n1 being pinged and the RPC status indicated afterward:

```

cluster::*> cluster ping-cluster -node n1
Host is n1
Getting addresses from network interface table...
Cluster n1_clus1 n1 e0a 10.10.0.1
Cluster n1_clus2 n1 e0b 10.10.0.2
Cluster n1_clus3 n1 e0c 10.10.0.3
Cluster n1_clus4 n1 e0d 10.10.0.4
Cluster n2_clus1 n2 e0a 10.10.0.5
Cluster n2_clus2 n2 e0b 10.10.0.6
Cluster n2_clus3 n2 e0c 10.10.0.7
Cluster n2_clus4 n2 e0d 10.10.0.8
Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 16 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 1500 byte MTU on 16 path(s):
 Local 10.10.0.1 to Remote 10.10.0.5
 Local 10.10.0.1 to Remote 10.10.0.6
 Local 10.10.0.1 to Remote 10.10.0.7
 Local 10.10.0.1 to Remote 10.10.0.8
 Local 10.10.0.2 to Remote 10.10.0.5
 Local 10.10.0.2 to Remote 10.10.0.6
 Local 10.10.0.2 to Remote 10.10.0.7
 Local 10.10.0.2 to Remote 10.10.0.8
 Local 10.10.0.3 to Remote 10.10.0.5
 Local 10.10.0.3 to Remote 10.10.0.6
 Local 10.10.0.3 to Remote 10.10.0.7
 Local 10.10.0.3 to Remote 10.10.0.8
 Local 10.10.0.4 to Remote 10.10.0.5
 Local 10.10.0.4 to Remote 10.10.0.6
 Local 10.10.0.4 to Remote 10.10.0.7
 Local 10.10.0.4 to Remote 10.10.0.8

Larger than PMTU communication succeeds on 16 path(s)
RPC status:
4 paths up, 0 paths down (tcp check)
4 paths up, 0 paths down (udp check)

```

22. Migrate the LIFs that are associated with the first CN1610 switch CL1: network interface migrate  
-vserver cluster -lif *lif-name* -source-node *node-name*

You must migrate each cluster LIF individually to the appropriate cluster ports hosted on cluster switch C2 as shown in the following example:

```
cluster::*> network interface migrate -vserver cluster -lif n1_clus1
-source-node n1
-destination-node n1 -destination-port e0b
cluster::*> network interface migrate -vserver cluster -lif n1_clus4
-source-node n1
-destination-node n1 -destination-port e0c
cluster::*> network interface migrate -vserver cluster -lif n2_clus1
-source-node n2
-destination-node n2 -destination-port e0b
cluster::*> network interface migrate -vserver cluster -lif n2_clus4
-source-node n2
-destination-node n2 -destination-port e0c
```

23. Verify the cluster's status: `network interface show -role cluster`

The following example shows that the required cluster LIFs have been migrated to the appropriate cluster ports hosted on cluster switch C2:

```
cluster::*> network interface show -role cluster
(network interface show)
 Logical Status Network Current Current Is
Vserver Interface Admin/Oper Address/Mask Node Port Home

Cluster
 n1_clus1 up/up 10.10.0.1/24 n1 e0b false
 n1_clus2 up/up 10.10.0.2/24 n1 e0b true
 n1_clus3 up/up 10.10.0.3/24 n1 e0c true
 n1_clus4 up/up 10.10.0.4/24 n1 e0c false
 n2_clus1 up/up 10.10.0.5/24 n2 e0b false
 n2_clus2 up/up 10.10.0.6/24 n2 e0b true
 n2_clus3 up/up 10.10.0.7/24 n2 e0c true
 n2_clus4 up/up 10.10.0.8/24 n2 e0c false

8 entries were displayed.
```

24. Shut down the node ports that are connected to CL1 on all of the nodes: `network port modify -node node-name -port port-name -up-admin false`

The following example shows specific ports being shut down on nodes n1 and n2:

```
cluster::*> network port modify -node n1 -port e0a -up-admin false
cluster::*> network port modify -node n1 -port e0d -up-admin false
cluster::*> network port modify -node n2 -port e0a -up-admin false
cluster::*> network port modify -node n2 -port e0d -up-admin false
```

25. Shut down the ISL ports 24, 31, and 32 on the active 3232C switch C2.

For more information on Cisco commands, see the guides listed in the [Cisco Nexus 3000 Series NX-OS Command References](#).

The following example shows ISLs 24, 31, and 32 being shut down on the active 3232C switch C2:

```
C2# configure
C2(config)# interface ethernet 1/24/1-4
C2(config-if-range)# shutdown
C2(config-if-range)# exit
C2(config)# interface ethernet 1/31-32
C2(config-if-range)# shutdown
C2(config-if-range)# exit
C2(config)# exit
C2#
```

26. Remove the cables that are attached to the CN1610 switch CL1 on all of the nodes.

Using the appropriate cabling, you must reconnect the disconnected ports on all the nodes to the Nexus 3232C switch C1.

27. Remove the QSFP28 cables from Nexus 3232C C2 port e1/24.

You must connect ports e1/31 and e1/32 on C1 to ports e1/31 and e1/32 on C2 using supported Cisco QSFP28 optical fiber or direct-attach cables.

28. Restore the configuration on port 24 and remove the temporary port-channel 2 on C2:

For more information on Cisco commands, see the guides listed in the [Cisco Nexus 3000 Series NX-OS Command References](#).

The following example shows the running-configuration file being copied to the startup-configuration file:



```

C2# configure
C2(config)# no interface breakout module 1 port 24 map 10g-4x
C2(config)# no interface port-channel 2
C2(config-if)# interface e1/24
C2(config-if)# description 100GbE/40GbE Node Port
C2(config-if)# spanning-tree port type edge
Edge port type (portfast) should only be enabled on ports connected to a
single
host. Connecting hubs, concentrators, switches, bridges, etc... to this
interface when edge port type (portfast) is enabled, can cause temporary
bridging loops.
Use with CAUTION

Edge Port Type (Portfast) has been configured on Ethernet 1/24 but will
only
have effect when the interface is in a non-trunking mode.

C2(config-if)# spanning-tree bpduguard enable
C2(config-if)# mtu 9216
C2(config-if-range)# exit
C2(config)# exit
C2# copy running-config startup-config
[#####] 100%
Copy Complete.

```

29. Bring up ISL ports 31 and 32 on C2, the active 3232C switch.

For more information on Cisco commands, see the guides listed in the [Cisco Nexus 3000 Series NX-OS Command References](#).

The following example shows ISLs 31 and 32 being brought upon the 3232C switch C2:

```

C2# configure
C2(config)# interface ethernet 1/31-32
C2(config-if-range)# no shutdown
C2(config-if-range)# exit
C2(config)# exit
C2# copy running-config startup-config
[#####] 100%
Copy Complete.

```

30. Verify that the ISL connections are up on the 3232C switch C2.

For more information on Cisco commands, see the guides listed in the [Cisco Nexus 3000 Series NX-OS Command References](#).

The following example shows the ISL connections being verified. Ports Eth1/31 and Eth1/32 indicate (P), meaning that both the ISL ports are up in the port-channel:

```
C1# show port-channel summary
Flags: D - Down P - Up in port-channel (members)
 I - Individual H - Hot-standby (LACP only)
 s - Suspended r - Module-removed
 S - Switched R - Routed
 U - Up (port-channel)
 M - Not in use. Min-links not met

Group Port- Type Protocol Member Ports
Channel

1 Po1 (SU) Eth LACP Eth1/31 (P) Eth1/32 (P)

C2# show port-channel summary
Flags: D - Down P - Up in port-channel (members)
 I - Individual H - Hot-standby (LACP only)
 s - Suspended r - Module-removed
 S - Switched R - Routed
 U - Up (port-channel)
 M - Not in use. Min-links not met

Group Port- Type Protocol Member Ports
Channel

1 Po1 (SU) Eth LACP Eth1/31 (P) Eth1/32 (P)
```

31. Bring up all of the cluster interconnect ports connected to the new 3232C switch C1 on all of the nodes:  
network port modify -node *node-name* -port *port-name* -up-admin true

The following example shows all of the cluster interconnect ports connected to the new 3232C switch C1 being brought up:

```
cluster::*> network port modify -node n1 -port e0a -up-admin true
cluster::*> network port modify -node n1 -port e0d -up-admin true
cluster::*> network port modify -node n2 -port e0a -up-admin true
cluster::*> network port modify -node n2 -port e0d -up-admin true
```

32. Verify the status of the cluster node port: network port show -role cluster

The following example shows output that verifies that the cluster interconnect ports on nodes n1 and n2 on the new 3232C switch C1 are up:

```
cluster::*> network port show -role cluster
(network port show)
```

Node: n1

| Port | IPspace | Broadcast Domain | Link | MTU  | Speed (Mbps)<br>Admin/Open | Health<br>Status | Ignore<br>Health |
|------|---------|------------------|------|------|----------------------------|------------------|------------------|
| 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

| Port | IPspace | Broadcast Domain | Link | MTU  | Speed (Mbps)<br>Admin/Open | Health<br>Status | Ignore<br>Health |
|------|---------|------------------|------|------|----------------------------|------------------|------------------|
| e0a  | cluster | cluster          | up   | 9000 | auto/10000                 | -                |                  |
| e0b  | cluster | cluster          | up   | 9000 | auto/10000                 | -                |                  |
| e0c  | cluster | cluster          | up   | 9000 | auto/10000                 | -                |                  |
| e0d  | cluster | cluster          | up   | 9000 | auto/10000                 | -                |                  |

8 entries were displayed.

33. Revert all of the migrated cluster interconnect LIFs that were originally connected to C1 on all of the nodes:  
`network interface revert -server cluster -lif lif-name`

You must migrate each LIF individually as shown in the following example:

```
cluster::*> network interface revert -vserver cluster -lif n1_clus1
cluster::*> network interface revert -vserver cluster -lif n1_clus4
cluster::*> network interface revert -vserver cluster -lif n2_clus1
cluster::*> network interface revert -vserver cluster -lif n2_clus4
```

34. Verify that the interface is now home: `network interface show -role cluster`

The following example shows the status of cluster interconnect interfaces is up and "Is Home" for nodes n1 and n2:

```
cluster::*> network interface show -role cluster
(network interface show)
```

| Vserver | Logical<br>Interface | Status<br>Admin/Oper | Network<br>Address/Mask | Current<br>Node | Current<br>Port | Is<br>Home |
|---------|----------------------|----------------------|-------------------------|-----------------|-----------------|------------|
| Cluster | n1_clus1             | up/up                | 10.10.0.1/24            | n1              | e0a             | true       |
|         | n1_clus2             | up/up                | 10.10.0.2/24            | n1              | e0b             | true       |
|         | n1_clus3             | up/up                | 10.10.0.3/24            | n1              | e0c             | true       |
|         | n1_clus4             | up/up                | 10.10.0.4/24            | n1              | e0d             | true       |
|         | n2_clus1             | up/up                | 10.10.0.5/24            | n2              | e0a             | true       |
|         | n2_clus2             | up/up                | 10.10.0.6/24            | n2              | e0b             | true       |
|         | n2_clus3             | up/up                | 10.10.0.7/24            | n2              | e0c             | true       |
|         | n2_clus4             | up/up                | 10.10.0.8/24            | n2              | e0d             | true       |

8 entries were displayed.

35. Ping the remote cluster interfaces and then perform a remote procedure call server check: `cluster ping-cluster -node host-name`

The following example shows node n1 being pinged and the RPC status indicated afterward:

```

cluster::*> cluster ping-cluster -node n1
Host is n1
Getting addresses from network interface table...
Cluster n1_clus1 n1 e0a 10.10.0.1
Cluster n1_clus2 n1 e0b 10.10.0.2
Cluster n1_clus3 n1 e0c 10.10.0.3
Cluster n1_clus4 n1 e0d 10.10.0.4
Cluster n2_clus1 n2 e0a 10.10.0.5
Cluster n2_clus2 n2 e0b 10.10.0.6
Cluster n2_clus3 n2 e0c 10.10.0.7
Cluster n2_clus4 n2 e0d 10.10.0.8
Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 16 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 9000 byte MTU on 16 path(s):
 Local 10.10.0.1 to Remote 10.10.0.5
 Local 10.10.0.1 to Remote 10.10.0.6
 Local 10.10.0.1 to Remote 10.10.0.7
 Local 10.10.0.1 to Remote 10.10.0.8
 Local 10.10.0.2 to Remote 10.10.0.5
 Local 10.10.0.2 to Remote 10.10.0.6
 Local 10.10.0.2 to Remote 10.10.0.7
 Local 10.10.0.2 to Remote 10.10.0.8
 Local 10.10.0.3 to Remote 10.10.0.5
 Local 10.10.0.3 to Remote 10.10.0.6
 Local 10.10.0.3 to Remote 10.10.0.7
 Local 10.10.0.3 to Remote 10.10.0.8
 Local 10.10.0.4 to Remote 10.10.0.5
 Local 10.10.0.4 to Remote 10.10.0.6
 Local 10.10.0.4 to Remote 10.10.0.7
 Local 10.10.0.4 to Remote 10.10.0.8

Larger than PMTU communication succeeds on 16 path(s)
RPC status:
4 paths up, 0 paths down (tcp check)
3 paths up, 0 paths down (udp check)

```

36. Expand the cluster by adding nodes to the Nexus 3232C cluster switches.
37. Display the information about the devices in your configuration:

- ° network device-discovery show
- ° network port show -role cluster
- ° network interface show -role cluster
- ° system cluster-switch show

The following examples show nodes n3 and n4 with 40 GbE cluster ports connected to ports e1/7 and e1/8, respectively, on both the Nexus 3232C cluster switches. Both nodes are joined to the cluster. The 40 GbE cluster interconnect ports used are e4a and e4e.

```
cluster::*> network device-discovery show
```

| 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 |
|       | e0d        | C1                | Ethernet1/1/2 | N3K-C3232C |
| n2    | /cdp       |                   |               |            |
|       | e0a        | C1                | Ethernet1/1/3 | N3K-C3232C |
|       | e0b        | C2                | Ethernet1/1/3 | N3K-C3232C |
|       | e0c        | C2                | Ethernet1/1/4 | N3K-C3232C |
|       | e0d        | C1                | Ethernet1/1/4 | N3K-C3232C |
| n3    | /cdp       |                   |               |            |
|       | e4a        | C1                | Ethernet1/7   | N3K-C3232C |
|       | e4e        | C2                | Ethernet1/7   | N3K-C3232C |
| n4    | /cdp       |                   |               |            |
|       | e4a        | C1                | Ethernet1/8   | N3K-C3232C |
|       | e4e        | C2                | Ethernet1/8   | N3K-C3232C |

12 entries were displayed.

```
cluster::*> network port show -role cluster
```

```
(network port show)
```

```
Node: n1
```

| Port  | IPspace | Broadcast Domain | Link | MTU  | Speed (Mbps)<br>Admin/Open | Health<br>Status | Ignore<br>Health |
|-------|---------|------------------|------|------|----------------------------|------------------|------------------|
| ----- |         |                  |      |      |                            |                  |                  |
| ----- |         |                  |      |      |                            |                  |                  |
| 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

| Port | IPspace | Broadcast Domain | Link | MTU | Speed (Mbps)<br>Admin/Open | Health<br>Status | Ignore<br>Health |
|------|---------|------------------|------|-----|----------------------------|------------------|------------------|
|------|---------|------------------|------|-----|----------------------------|------------------|------------------|

|     |         |         |    |      |            |   |   |
|-----|---------|---------|----|------|------------|---|---|
| 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

| Port | IPspace | Broadcast Domain | Link | MTU | Speed (Mbps)<br>Admin/Open | Health<br>Status | Ignore<br>Health |
|------|---------|------------------|------|-----|----------------------------|------------------|------------------|
|------|---------|------------------|------|-----|----------------------------|------------------|------------------|

|     |         |         |    |      |            |   |   |
|-----|---------|---------|----|------|------------|---|---|
| e4a | cluster | cluster | up | 9000 | auto/40000 | - |   |
| e4e | cluster | cluster | up | 9000 | auto/40000 | - | - |

Node: n4

| Port | IPspace | Broadcast Domain | Link | MTU | Speed (Mbps)<br>Admin/Open | Health<br>Status | Ignore<br>Health |
|------|---------|------------------|------|-----|----------------------------|------------------|------------------|
|------|---------|------------------|------|-----|----------------------------|------------------|------------------|

|     |         |         |    |      |            |   |  |
|-----|---------|---------|----|------|------------|---|--|
| 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)

| Vserver | Logical Interface | Status Admin/Oper | Network Address/Mask | Current Node | Current Port | Is Home |
|---------|-------------------|-------------------|----------------------|--------------|--------------|---------|
|---------|-------------------|-------------------|----------------------|--------------|--------------|---------|

|         |          |       |              |    |     |      |
|---------|----------|-------|--------------|----|-----|------|
| Cluster | n1_clus1 | up/up | 10.10.0.1/24 | n1 | e0a | true |
|         | n1_clus2 | up/up | 10.10.0.2/24 | n1 | e0b | true |
|         | n1_clus3 | up/up | 10.10.0.3/24 | n1 | e0c | true |
|         | n1_clus4 | up/up | 10.10.0.4/24 | n1 | e0d | true |
|         | n2_clus1 | up/up | 10.10.0.5/24 | n2 | e0a | true |
|         | n2_clus2 | up/up | 10.10.0.6/24 | n2 | e0b | true |
|         | n2_clus3 | up/up | 10.10.0.7/24 | n2 | e0c | true |

|          |       |               |    |     |      |
|----------|-------|---------------|----|-----|------|
| n2_clus4 | up/up | 10.10.0.8/24  | n2 | e0d | true |
| n3_clus1 | up/up | 10.10.0.9/24  | n3 | e4a | true |
| n3_clus2 | up/up | 10.10.0.10/24 | n3 | e4e | true |
| n4_clus1 | up/up | 10.10.0.11/24 | n4 | e4a | true |
| n4_clus2 | up/up | 10.10.0.12/24 | n4 | e4e | true |

12 entries were displayed.

cluster::> system cluster-switch show

| Switch | Type            | Address     | Model   |
|--------|-----------------|-------------|---------|
| C1     | cluster-network | 10.10.1.103 | NX3232C |

Serial Number: FOX000001

Is Monitored: true

Reason:

Software Version: Cisco Nexus Operating System (NX-OS) Software,  
Version

7.0(3)I6(1)

Version Source: CDP

|    |                 |             |         |
|----|-----------------|-------------|---------|
| C2 | cluster-network | 10.10.1.104 | NX3232C |
|----|-----------------|-------------|---------|

Serial Number: FOX000002

Is Monitored: true

Reason:

Software Version: Cisco Nexus Operating System (NX-OS) Software,  
Version

7.0(3)I6(1)

Version Source: CDP

|     |                 |             |        |
|-----|-----------------|-------------|--------|
| CL1 | cluster-network | 10.10.1.101 | CN1610 |
|-----|-----------------|-------------|--------|

Serial Number: 01234567

Is Monitored: true

Reason:

Software Version: 1.2.0.7

Version Source: ISDP

|     |                 |             |        |
|-----|-----------------|-------------|--------|
| CL2 | cluster-network | 10.10.1.102 | CN1610 |
|-----|-----------------|-------------|--------|

Serial Number: 01234568

Is Monitored: true

Reason:

Software Version: 1.2.0.7

Version Source: ISDP 4 entries were displayed.



38. Remove the replaced CN1610 switches if they are not automatically removed: `system cluster-switch delete -device switch-name`

You must delete both devices individually as shown in the following example:

```
cluster::> system cluster-switch delete -device CL1
cluster::> system cluster-switch delete -device CL2
```

39. Verify that the proper cluster switches are monitored: `system cluster-switch show`

The following example shows cluster switches C1 and C2 are being monitored:

```
cluster::> system cluster-switch show
```

| Switch                                                           | Type            | Address     | Model   |
|------------------------------------------------------------------|-----------------|-------------|---------|
| -----                                                            |                 |             |         |
| C1                                                               | cluster-network | 10.10.1.103 | NX3232C |
| Serial Number: FOX000001                                         |                 |             |         |
| Is Monitored: true                                               |                 |             |         |
| Reason:                                                          |                 |             |         |
| Software Version: Cisco Nexus Operating System (NX-OS) Software, |                 |             |         |
| Version                                                          |                 |             |         |
| 7.0(3)I6(1)                                                      |                 |             |         |
| Version Source: CDP                                              |                 |             |         |
| C2                                                               | cluster-network | 10.10.1.104 | NX3232C |
| Serial Number: FOX000002                                         |                 |             |         |
| Is Monitored: true                                               |                 |             |         |
| Reason:                                                          |                 |             |         |
| Software Version: Cisco Nexus Operating System (NX-OS) Software, |                 |             |         |
| Version                                                          |                 |             |         |
| 7.0(3)I6(1)                                                      |                 |             |         |
| Version Source: CDP                                              |                 |             |         |

2 entries were displayed.

40. Enable the cluster switch health monitor log collection feature for collecting switch-related log files:
- ```
system cluster-switch log setup-password

system cluster-switch log enable-collection
```

```

cluster::*> system cluster-switch log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
C1
C2

cluster::*> system cluster-switch log setup-password

Enter the switch name: C1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster::*> system cluster-switch log setup-password

Enter the switch name: C2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster::*> system cluster-switch log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster::*>

```



If any of these commands return an error, contact NetApp support.

41. If you suppressed automatic case creation, reenable it by invoking an AutoSupport message:
`system node autosupport invoke -node * -type all -message MAINT=END`

Related information

[NetApp CN1601 and CN1610 description page](#)

[Cisco Ethernet Switch description page](#)

[Hardware Universe](#)

Migrate from a Cisco Nexus 5596 switch to a Cisco Nexus 3232C switch

You must be aware of certain configuration information, port connections and cabling requirements when you are replacing Cisco Nexus 5596 cluster switches with Cisco Nexus 3232C cluster switches.

- The following cluster switches are used as examples in this procedure:
 - Nexus 5596
 - Nexus 3232C
- The cluster switches use the following ports for connections to nodes:
 - Ports e1/1-40 (10 GbE): Nexus 5596
 - Ports e1/1-30 (10/40/100 GbE): Nexus 3232C
- The cluster switches use the following Inter-Switch Link (ISL) ports:
 - Ports e1/41-48 (10 GbE): Nexus 5596
 - Ports e1/31-32 (40/100 GbE): Nexus 3232C
- The [Hardware Universe](#) contains information about supported cabling to Nexus 3232C switches:
 - Nodes with 10 GbE cluster connections require QSFP to SFP+ optical fiber breakout cables or QSFP to SFP+ copper breakout cables.
 - Nodes with 40/100 GbE cluster connections require supported QSFP/QSFP28 optical modules with fiber cables or QSFP/QSFP28 copper direct-attach cables.
- The cluster switches use the appropriate ISL cabling:
 - Beginning: Nexus 5596 (SFP+ to SFP+)
 - 8x SFP+ fiber or copper direct-attach cables
 - Interim: Nexus 5596 to Nexus 3232C (QSFP to 4xSFP+ break-out)
 - 1x QSFP to SFP+ fiber break-out or copper break-out cables
 - Final: Nexus 3232C to Nexus 3232C (QSFP28 to QSFP28)
 - 2x QSFP28 fiber or copper direct-attach cables
- On Nexus 3232C switches, you can operate QSFP/QSFP28 ports in either 40/100 Gigabit Ethernet or 4 x10 Gigabit Ethernet modes.

By default, there are 32 ports in the 40/100 Gigabit Ethernet mode. These 40 Gigabit Ethernet ports are numbered in a 2-tuple naming convention. For example, the second 40 Gigabit Ethernet port is numbered as 1/2. The process of changing the configuration from 40 Gigabit Ethernet to 10 Gigabit Ethernet is called *breakout* and the process of changing the configuration from 10 Gigabit Ethernet to 40 Gigabit Ethernet is called *breakin*. When you break out a 40/100 Gigabit Ethernet port into 10 Gigabit Ethernet ports, the resulting ports are numbered using a 3-tuple naming convention. For example, the break-out ports of the second 40/100 Gigabit Ethernet port are numbered as 1/2/1, 1/2/2, 1/2/3, and 1/2/4.

- On the left side of Nexus 3232C switches are 2 SFP+ ports, called 1/33 and 1/34.
- You have configured some of the ports on Nexus 3232C switches to run at 10 GbE or 40/100 GbE.



You can break out the first six ports into 4x10 GbE mode by using the `interface breakout module 1 port 1-6 map 10g-4x` command. Similarly, you can regroup the first six QSFP+ ports from breakout configuration by using the `no interface breakout module 1 port 1-6 map 10g-4x` command.

- You have done the planning, migration, and read the required documentation on 10 GbE and 40/100 GbE connectivity from nodes to Nexus 3232C cluster switches.
- The ONTAP and NX-OS versions supported in this procedure are on the [Cisco Ethernet Switches](#) page.

How to migrate from a Cisco Nexus 5596 cluster switch to a Cisco Nexus 3232C cluster switch

To replace existing Cisco Nexus 5596 cluster switches in a cluster with Nexus 3232C cluster switches, you must perform a specific sequence of tasks.

About this task

The examples in this procedure describe replacing Cisco Nexus 5596 switches with Cisco Nexus 3232C switches. You can use these steps (with modifications) for other older Cisco switches (for example, 3132Q-V). The procedure also uses the following switch and node nomenclature:

- The command outputs might vary depending on different releases of ONTAP.
- The Nexus 5596 switches to be replaced are CL1 and CL2.
- The Nexus 3232C switches to replace the Nexus 5596 switches are C1 and C2.
- n1_clus1 is the first cluster logical interface (LIF) connected to cluster switch 1 (CL1 or C1) for node n1.
- n1_clus2 is the first cluster LIF connected to cluster switch 2 (CL2 or C2) for node n1.
- n1_clus3 is the second LIF connected to cluster switch 2 (CL2 or C2) for node n1.
- n1_clus4 is the second LIF connected to cluster switch 1 (CL1 or C1) for node n1.-
- The number of 10 GbE and 40/100 GbE ports are defined in the reference configuration files (RCFs) available on the [Cisco® Cluster Network Switch Reference Configuration File Download](#) page.
- The nodes are n1, n2, n3, and n4.



The examples in this procedure use four nodes: Two nodes use four 10 GbE cluster interconnect ports: e0a, e0b, e0c, and e0d. The other two nodes use two 40 GbE cluster interconnect ports: e4a, e4e. The [Hardware Universe](#) lists the actual cluster ports on your platforms.

This procedure covers the following scenarios:

- The cluster starts with two nodes connected and functioning in a two Nexus 5596 cluster switches.
- The cluster switch CL2 to be replaced by C2 (steps 1 to 19):
 - Traffic on all cluster ports and LIFs on all nodes connected to CL2 are migrated onto the first cluster ports and LIFs connected to CL1.
 - Disconnect cabling from all cluster ports on all nodes connected to CL2, and then use supported break-out cabling to reconnect the ports to new cluster switch C2.
 - Disconnect cabling between ISL ports between CL1 and CL2, and then use supported break-out cabling to reconnect the ports from CL1 to C2.

- Traffic on all cluster ports and LIFs connected to C2 on all nodes is reverted.
- The cluster switch CL2 to be replaced by C2 (steps 20 to 33)
 - Traffic on all cluster ports or LIFs on all nodes connected to CL1 are migrated onto the second cluster ports or LIFs connected to C2.
 - Disconnect cabling from all cluster port on all nodes connected to CL1 and reconnect, using supported break-out cabling, to new cluster switch C1.
 - Disconnect cabling between ISL ports between CL1 and C2, and reconnect using supported cabling, from C1 to C2.
 - Traffic on all cluster ports or LIFs connected to C1 on all nodes is reverted.
- Two FAS9000 nodes have been added to cluster with examples showing cluster details (steps 34 to 37).



The procedure requires the use of both ONTAP commands and Cisco Nexus 3000 Series Switches commands; ONTAP commands are used unless otherwise indicated.

Steps

1. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all - message MAINT=xh
```

x is the duration of the maintenance window in hours.



The AutoSupport message notifies technical support of this maintenance task so that automatic case creation is suppressed during the maintenance window.

2. Display information about the devices in your configuration:

```
network device-discovery show
```

The following example shows how many cluster interconnect interfaces have been configured in each node for each cluster interconnect switch:

```
cluster::> network device-discovery show
```

Node	Local Port	Discovered Device	Interface	Platform
n1	/cdp			
	e0a	CL1	Ethernet1/1	N5K-C5596UP
	e0b	CL2	Ethernet1/1	N5K-C5596UP
	e0c	CL2	Ethernet1/2	N5K-C5596UP
	e0d	CL1	Ethernet1/2	N5K-C5596UP
n2	/cdp			
	e0a	CL1	Ethernet1/3	N5K-C5596UP
	e0b	CL2	Ethernet1/3	N5K-C5596UP
	e0c	CL2	Ethernet1/4	N5K-C5596UP
	e0d	CL1	Ethernet1/4	N5K-C5596UP

8 entries were displayed.

3. Determine the administrative or operational status for each cluster interface:

a. Display the network port attributes:

```
network port show -role cluster
```

The following example displays the network port attributes on nodes n1 and n2:

```

cluster::*> network port show -role cluster
(network port show)
Node: n1

Ignore

Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e0a        Cluster      Cluster      up    9000  auto/10000  -
-
e0b        Cluster      Cluster      up    9000  auto/10000  -
-
e0c        Cluster      Cluster      up    9000  auto/10000  -
-
e0d        Cluster      Cluster      up    9000  auto/10000  -
-

Node: n2

Ignore

Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e0a        Cluster      Cluster      up    9000  auto/10000  -
-
e0b        Cluster      Cluster      up    9000  auto/10000  -
-
e0c        Cluster      Cluster      up    9000  auto/10000  -
-
e0d        Cluster      Cluster      up    9000  auto/10000  -
-

8 entries were displayed.

```

b. Display information about the logical interfaces:

```
network interface show -role cluster
```

The following example displays the general information about all of the LIFs on the cluster, including their current ports:

```

cluster::*> network interface show -role cluster
(network interface show)

```

	Logical	Status	Network	Current
Current Is				
Vserver	Interface	Admin/Oper	Address/Mask	Node
Port	Home			

Cluster				
	n1_clus1	up/up	10.10.0.1/24	n1
e0a	true			
	n1_clus2	up/up	10.10.0.2/24	n1
e0b	true			
	n1_clus3	up/up	10.10.0.3/24	n1
e0c	true			
	n1_clus4	up/up	10.10.0.4/24	n1
e0d	true			
	n2_clus1	up/up	10.10.0.5/24	n2
e0a	true			
	n2_clus2	up/up	10.10.0.6/24	n2
e0b	true			
	n2_clus3	up/up	10.10.0.7/24	n2
e0c	true			
	n2_clus4	up/up	10.10.0.8/24	n2
e0d	true			

8 entries were displayed.

c. Display information about the discovered cluster switches:

```
system cluster-switch show
```

The following example shows the active cluster switches:


```
cluster::*> system cluster-switch show
```

Switch Model	Type	Address
CL1 NX5596	cluster-network	10.10.1.101
Serial Number: 01234567 Is Monitored: true Reason: Software Version: Cisco Nexus Operating System (NX-OS) Software, Version 7.1(1)N1(1) Version Source: CDP		
CL2 NX5596	cluster-network	10.10.1.102
Serial Number: 01234568 Is Monitored: true Reason: Software Version: Cisco Nexus Operating System (NX-OS) Software, Version 7.1(1)N1(1) Version Source: CDP		

2 entries were displayed.

4. Verify that the appropriate RCF and image are installed on the new 3232C switches as necessary for your requirements, and make the essential site customizations, such as users and passwords, network addresses, and other customizations.



You must prepare both switches at this time.

If you need to upgrade the RCF and image, you must complete the following steps:

- a. Go to the *Cisco Ethernet Switches* page on the NetApp Support Site.

[Cisco Ethernet Switches](#)

- b. Note your switch and the required software versions in the table on that page.
- c. Download the appropriate version of the RCF.
- d. Click **CONTINUE** on the **Description** page, accept the license agreement, and then follow the instructions on the **Download** page to download the RCF.
- e. Download the appropriate version of the image software.

See the *ONTAP 8.x or later Cluster and Management Network Switch Reference Configuration Files* Download page, and then click the appropriate version.

To find the correct version, see the *ONTAP 8.x or later Cluster Network Switch Download page*.

5. Migrate the LIFs associated with the second Nexus 5596 switch to be replaced:

```
network interface migrate -vserver Cluster -lif lif-name -source-node source-node-name - destination-node node-name -destination-port destination-port-name
```

The following example shows the LIFs being migrated for nodes n1 and n2; LIF migration must be done on all of the nodes:

```
cluster::*> network interface migrate -vserver Cluster -lif n1_clus2
-source-node n1 -
destination-node n1 -destination-port e0a
cluster::*> network interface migrate -vserver Cluster -lif n1_clus3
-source-node n1 -
destination-node n1 -destination-port e0d
cluster::*> network interface migrate -vserver Cluster -lif n2_clus2
-source-node n2 -
destination-node n2 -destination-port e0a
cluster::*> network interface migrate -vserver Cluster -lif n2_clus3
-source-node n2 -
destination-node n2 -destination-port e0d
```

6. Verify the cluster's health:

```
network interface show -role cluster
```

The following example shows the current status of each cluster:

```

cluster::*> network interface show -role cluster
(network interface show)

```

Current Is	Logical	Status	Network	Current	
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port
Home					
-----	-----	-----	-----	-----	-----
Cluster					
true	n1_clus1	up/up	10.10.0.1/24	n1	e0a
false	n1_clus2	up/up	10.10.0.2/24	n1	e0a
false	n1_clus3	up/up	10.10.0.3/24	n1	e0d
true	n1_clus4	up/up	10.10.0.4/24	n1	e0d
true	n2_clus1	up/up	10.10.0.5/24	n2	e0a
false	n2_clus2	up/up	10.10.0.6/24	n2	e0a
false	n2_clus3	up/up	10.10.0.7/24	n2	e0d
true	n2_clus4	up/up	10.10.0.8/24	n2	e0d

8 entries were displayed.

7. Shut down the cluster interconnect ports that are physically connected to switch CL2:

```
network port modify -node node-name -port port-name -up-admin false
```

The following commands shut down the specified ports on n1 and n2, but the ports must be shut down on all nodes:

```

cluster::*> network port modify -node n1 -port e0b -up-admin false
cluster::*> network port modify -node n1 -port e0c -up-admin false
cluster::*> network port modify -node n2 -port e0b -up-admin false
cluster::*> network port modify -node n2 -port e0c -up-admin false

```

8. Ping the remote cluster interfaces and perform an RPC server check:

```
cluster ping-cluster -node node-name
```

The following example shows node n1 being pinged and the RPC status indicated afterward:

```

cluster::*> cluster ping-cluster -node n1
Host is n1
Getting addresses from network interface table...
Cluster n1_clus1 n1      e0a 10.10.0.1
Cluster n1_clus2 n1      e0b 10.10.0.2
Cluster n1_clus3 n1      e0c 10.10.0.3
Cluster n1_clus4 n1      e0d 10.10.0.4
Cluster n2_clus1 n2      e0a 10.10.0.5
Cluster n2_clus2 n2      e0b 10.10.0.6
Cluster n2_clus3 n2      e0c 10.10.0.7
Cluster n2_clus4 n2      e0d 10.10.0.8

Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 16 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 1500 byte MTU on 16 path(s):
    Local 10.10.0.1 to Remote 10.10.0.5
    Local 10.10.0.1 to Remote 10.10.0.6
    Local 10.10.0.1 to Remote 10.10.0.7
    Local 10.10.0.1 to Remote 10.10.0.8
    Local 10.10.0.2 to Remote 10.10.0.5
    Local 10.10.0.2 to Remote 10.10.0.6
    Local 10.10.0.2 to Remote 10.10.0.7
    Local 10.10.0.2 to Remote 10.10.0.8
    Local 10.10.0.3 to Remote 10.10.0.5
    Local 10.10.0.3 to Remote 10.10.0.6
    Local 10.10.0.3 to Remote 10.10.0.7
    Local 10.10.0.3 to Remote 10.10.0.8
    Local 10.10.0.4 to Remote 10.10.0.5
    Local 10.10.0.4 to Remote 10.10.0.6
    Local 10.10.0.4 to Remote 10.10.0.7
    Local 10.10.0.4 to Remote 10.10.0.8
Larger than PMTU communication succeeds on 16 path(s)
RPC status:
4 paths up, 0 paths down (tcp check)
4 paths up, 0 paths down (udp check)

```

9. Shut down ISLs 41 through 48 on CL1, the active Nexus 5596 switch using the Cisco shutdown command.

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 3000 Series NX-OS Command References](#).

The following example shows ISLs 41 through 48 being shut down on the Nexus 5596 switch CL1:

```
(CL1)# configure
(CL1) (Config)# interface e1/41-48
(CL1) (config-if-range)# shutdown
(CL1) (config-if-range)# exit
(CL1) (Config)# exit
(CL1) #
```

10. Build a temporary ISL between CL1 and C2 using the appropriate Cisco commands.

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 3000 Series NX-OS Command References](#).

The following example shows a temporary ISL being set up between CL1 and C2:

```
C2# configure
C2(config)# interface port-channel 2
C2(config-if)# switchport mode trunk
C2(config-if)# spanning-tree port type network
C2(config-if)# mtu 9216
C2(config-if)# interface breakout module 1 port 24 map 10g-4x
C2(config)# interface e1/24/1-4
C2(config-if-range)# switchport mode trunk
C2(config-if-range)# mtu 9216
C2(config-if-range)# channel-group 2 mode active
C2(config-if-range)# exit
C2(config-if)# exit
```

11. On all nodes, remove all cables attached to the Nexus 5596 switch CL2.

With supported cabling, reconnect disconnected ports on all nodes to the Nexus 3232C switch C2.

12. Remove all the cables from the Nexus 5596 switch CL2.

Attach the appropriate Cisco QSFP to SFP+ break-out cables connecting port 1/24 on the new Cisco 3232C switch, C2, to ports 45 to 48 on existing Nexus 5596, CL1.

13. Bring up ISLs ports 45 through 48 on the active Nexus 5596 switch CL1.

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 3000 Series NX-OS Command References](#).

The following example shows ISLs ports 45 through 48 being brought up:

```
(CL1)# configure
(CL1) (Config)# interface e1/45-48
(CL1) (config-if-range)# no shutdown
(CL1) (config-if-range)# exit
(CL1) (Config)# exit
(CL1) #
```

14. Verify that the ISLs are up on the Nexus 5596 switch CL1.

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 3000 Series NX-OS Command References](#).

The following example shows Ports eth1/45 through eth1/48 indicating (P), meaning that the ISL ports are up in the port-channel.

```
CL1# show port-channel summary
Flags: D - Down          P - Up in port-channel (members)
      I - Individual      H - Hot-standby (LACP only)
      s - Suspended       r - Module-removed
      S - Switched        R - Routed
      U - Up (port-channel)
      M - Not in use. Min-links not met

-----
-----
Group Port-          Type   Protocol  Member Ports
      Channel
-----
-----
1      Po1 (SU)       Eth    LACP      Eth1/41 (D)  Eth1/42 (D)  Eth1/43 (D)
                                Eth1/44 (D)  Eth1/45 (P)  Eth1/46 (P)
                                Eth1/47 (P)  Eth1/48 (P)
```

15. Verify that interfaces eth1/45-48 already have `channel-group 1 mode active` in their running configuration.
16. On all nodes, bring up all the cluster interconnect ports connected to the 3232C switch C2:

```
network port modify -node node-name -port port-name -up-admin true
```

The following example shows the specified ports being brought up on nodes n1 and n2:

```
cluster::*> network port modify -node n1 -port e0b -up-admin true
cluster::*> network port modify -node n1 -port e0c -up-admin true
cluster::*> network port modify -node n2 -port e0b -up-admin true
cluster::*> network port modify -node n2 -port e0c -up-admin true
```

17. On all nodes, revert all of the migrated cluster interconnect LIFs connected to C2:

```
network interface revert -vserver Cluster -lif lif-name
```

The following example shows the migrated cluster LIFs being reverted to their home ports:

```
cluster::*> network interface revert -vserver Cluster -lif n1_clus2
cluster::*> network interface revert -vserver Cluster -lif n1_clus3
cluster::*> network interface revert -vserver Cluster -lif n2_clus2
cluster::*> network interface revert -vserver Cluster -lif n2_clus3
```

18. Verify all the cluster interconnect ports are now reverted to their home:

```
network interface show -role cluster
```

The following example shows that the LIFs on clus2 reverted to their home ports and shows that the LIFs are successfully reverted if the ports in the Current Port column have a status of true in the Is Home column. If the Is Home value is false, the LIF has not been reverted.

```
cluster::*> network interface show -role cluster
(network interface show)
```

Current Is	Logical	Status	Network	Current	
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port
Home					
Cluster					
true	n1_clus1	up/up	10.10.0.1/24	n1	e0a
true	n1_clus2	up/up	10.10.0.2/24	n1	e0b
true	n1_clus3	up/up	10.10.0.3/24	n1	e0c
true	n1_clus4	up/up	10.10.0.4/24	n1	e0d
true	n2_clus1	up/up	10.10.0.5/24	n2	e0a
true	n2_clus2	up/up	10.10.0.6/24	n2	e0b
true	n2_clus3	up/up	10.10.0.7/24	n2	e0c
true	n2_clus4	up/up	10.10.0.8/24	n2	e0d

8 entries were displayed.

19. Verify that the clustered ports are connected:

```
network port show -role cluster
```

The following example shows the result of the previous `network port modify` command, verifying that all the cluster interconnects are up:

```
cluster::*> network port show -role cluster
(network port show)
Node: n1

Ignore

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  -      -
8 entries were displayed.
```

20. Ping the remote cluster interfaces and perform an RPC server check:

```
cluster ping-cluster -node node-name
```

The following example shows node n1 being pinged and the RPC status indicated afterward:


```

cluster::*> cluster ping-cluster -node n1
Host is n1
Getting addresses from network interface table...
Cluster n1_clus1 n1      e0a 10.10.0.1
Cluster n1_clus2 n1      e0b 10.10.0.2
Cluster n1_clus3 n1      e0c 10.10.0.3
Cluster n1_clus4 n1      e0d 10.10.0.4
Cluster n2_clus1 n2      e0a 10.10.0.5
Cluster n2_clus2 n2      e0b 10.10.0.6
Cluster n2_clus3 n2      e0c 10.10.0.7
Cluster n2_clus4 n2      e0d 10.10.0.8

Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 16 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 1500 byte MTU on 16 path(s):
  Local 10.10.0.1 to Remote 10.10.0.5
  Local 10.10.0.1 to Remote 10.10.0.6
  Local 10.10.0.1 to Remote 10.10.0.7
  Local 10.10.0.1 to Remote 10.10.0.8
  Local 10.10.0.2 to Remote 10.10.0.5
  Local 10.10.0.2 to Remote 10.10.0.6
  Local 10.10.0.2 to Remote 10.10.0.7
  Local 10.10.0.2 to Remote 10.10.0.8
  Local 10.10.0.3 to Remote 10.10.0.5
  Local 10.10.0.3 to Remote 10.10.0.6
  Local 10.10.0.3 to Remote 10.10.0.7
  Local 10.10.0.3 to Remote 10.10.0.8
  Local 10.10.0.4 to Remote 10.10.0.5
  Local 10.10.0.4 to Remote 10.10.0.6
  Local 10.10.0.4 to Remote 10.10.0.7
  Local 10.10.0.4 to Remote 10.10.0.8
Larger than PMTU communication succeeds on 16 path(s)
RPC status:
4 paths up, 0 paths down (tcp check)
4 paths up, 0 paths down (udp check)

```

21. On each node in the cluster, migrate the interfaces associated with the first Nexus 5596 switch, CL1, to be replaced:

```
network interface migrate -vserver Cluster -lif lif-name -source-node source-  
node-name - destination-node destination-node-name -destination-port  
destination-port-name
```

The following example shows the ports or LIFs being migrated on nodes n1 and n2:

```
cluster::*> network interface migrate -vserver Cluster -lif n1_clus1  
-source-node n1 -  
destination-node n1 -destination-port e0b  
cluster::*> network interface migrate -vserver Cluster -lif n1_clus4  
-source-node n1 -  
destination-node n1 -destination-port e0c  
cluster::*> network interface migrate -vserver Cluster -lif n2_clus1  
-source-node n2 -  
destination-node n2 -destination-port e0b  
cluster::*> network interface migrate -vserver Cluster -lif n2_clus4  
-source-node n2 -  
destination-node n2 -destination-port e0c
```

22. Verify the cluster's status:

```
network interface show
```

The following example shows that the required cluster LIFs have been migrated to appropriate cluster ports hosted on cluster switch, C2:

```
cluster::*> network interface show
```

Current Is Vserver Home	Logical Interface	Status Admin/Oper	Network Address/Mask	Current Node	Port
Cluster	n1_clus1	up/up	10.10.0.1/24	n1	e0b
false	n1_clus2	up/up	10.10.0.2/24	n1	e0b
true	n1_clus3	up/up	10.10.0.3/24	n1	e0c
true	n1_clus4	up/up	10.10.0.4/24	n1	e0c
false	n2_clus1	up/up	10.10.0.5/24	n2	e0b
false	n2_clus2	up/up	10.10.0.6/24	n2	e0b
true	n2_clus3	up/up	10.10.0.7/24	n2	e0c
true	n2_clus4	up/up	10.10.0.8/24	n2	e0c
false					

8 entries were displayed.

23. On all the nodes, shut down the node ports that are connected to CL1:

```
network port modify -node node-name -port port-name -up-admin false
```

The following example shows the specified ports being shut down on nodes n1 and n2:

```
cluster::*> network port modify -node n1 -port e0a -up-admin false
cluster::*> network port modify -node n1 -port e0d -up-admin false
cluster::*> network port modify -node n2 -port e0a -up-admin false
cluster::*> network port modify -node n2 -port e0d -up-admin false
```

24. Shut down ISL 24, 31 and 32 on the active 3232C switch C2.

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 3000 Series NX-OS Command References](#).

The following example shows ISLs being shutdown:

```

C2# configure
C2(Config)# interface e1/24/1-4
C2(config-if-range)# shutdown
C2(config-if-range)# exit
C2(config)# interface 1/31-32
C2(config-if-range)# shutdown
C2(config-if-range)# exit
C2(config-if)# exit
C2#

```

25. On all nodes, remove all cables attached to the Nexus 5596 switch CL1.

With supported cabling, reconnect disconnected ports on all nodes to the Nexus 3232C switch C1.

26. Remove the QSFP breakout cable from Nexus 3232C C2 ports e1/24.

Connect ports e1/31 and e1/32 on C1 to ports e1/31 and e1/32 on C2 using supported Cisco QSFP optical fiber or direct-attach cables.

27. Restore the configuration on port 24 and remove the temporary Port Channel 2 on C2.

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 3000 Series NX-OS Command References](#).

The following example shows the configuration on port m24 being restored using the appropriate Cisco commands:

```

C2# configure
C2(config)# no interface breakout module 1 port 24 map 10g-4x
C2(config)# no interface port-channel 2
C2(config-if)# int e1/24
C2(config-if)# description 40GbE Node Port
C2(config-if)# spanning-tree port type edge
C2(config-if)# spanning-tree bpduguard enable
C2(config-if)# mtu 9216
C2(config-if-range)# exit
C2(config)# exit
C2# copy running-config startup-config
[#####] 100%
Copy Complete.

```

28. Bring up ISL ports 31 and 32 on C2, the active 3232C switch, by entering the following Cisco command: no shutdown

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 3000 Series NX-OS Command References](#).

The following example shows the Cisco commands `switchname configure` brought up on the 3232C switch C2:

```
C2# configure
C2(config)# interface ethernet 1/31-32
C2(config-if-range)# no shutdown
```

29. Verify that the ISL connections are up on the 3232C switch C2.

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 3000 Series NX-OS Command References](#).

Ports `eth1/31` and `eth1/32` should indicate (P) meaning that both ISL ports up in the port-channel

```
C1# show port-channel summary
Flags: D - Down          P - Up in port-channel (members)
       I - Individual    H - Hot-standby (LACP only)
       s - Suspended     r - Module-removed
       S - Switched      R - Routed
       U - Up (port-channel)
       M - Not in use. Min-links not met

-----
-----
Group Port-          Type   Protocol  Member Ports
      Channel
-----
-----
1      Po1 (SU)       Eth     LACP      Eth1/31 (P)  Eth1/32 (P)
```

30. On all nodes, bring up all the cluster interconnect ports connected to the new 3232C switch C1: `network port modify`

The following example shows all the cluster interconnect ports being brought up for `n1` and `n2` on the 3232C switch C1:

```
cluster::*> network port modify -node n1 -port e0a -up-admin true
cluster::*> network port modify -node n1 -port e0d -up-admin true
cluster::*> network port modify -node n2 -port e0a -up-admin true
cluster::*> network port modify -node n2 -port e0d -up-admin true
```

31. Verify the status of the cluster node port:

```
network port show
```

The following example shows verifies that all cluster interconnect ports on all nodes on the new 3232C switch C1 are up:

```
cluster::*> network port show -role cluster
(network port show)
Node: n1

Ignore

Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e0a        Cluster      Cluster      up    9000 auto/10000 -        -
e0b        Cluster      Cluster      up    9000 auto/10000 -        -
e0c        Cluster      Cluster      up    9000 auto/10000 -        -
e0d        Cluster      Cluster      up    9000 auto/10000 -        -

Node: n2

Ignore

Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e0a        Cluster      Cluster      up    9000 auto/10000 -        -
e0b        Cluster      Cluster      up    9000 auto/10000 -        -
e0c        Cluster      Cluster      up    9000 auto/10000 -        -
e0d        Cluster      Cluster      up    9000 auto/10000 -        -
8 entries were displayed.
```

32. On all nodes, revert the specific cluster LIFs to their home ports:

```
network interface revert -server Cluster -lif lif-name
```

The following example shows the specific cluster LIFs being reverted to their home ports on nodes n1 and n2:

```
cluster::*> network interface revert -vserver Cluster -lif n1_clus1
cluster::*> network interface revert -vserver Cluster -lif n1_clus4
cluster::*> network interface revert -vserver Cluster -lif n2_clus1
cluster::*> network interface revert -vserver Cluster -lif n2_clus4
```

33. Verify that the interface is home:

network interface show -role cluster

The following example shows the status of cluster interconnect interfaces are up and Is Home for n1 and n2:

```
cluster::*> network interface show -role cluster
(network interface show)
Current Is
Vserver   Logical   Status   Network   Current
Home      Interface Admin/Oper Address/Mask Node      Port
-----
Cluster
true      n1_clus1  up/up    10.10.0.1/24  n1      e0a
true      n1_clus2  up/up    10.10.0.2/24  n1      e0b
true      n1_clus3  up/up    10.10.0.3/24  n1      e0c
true      n1_clus4  up/up    10.10.0.4/24  n1      e0d
true      n2_clus1  up/up    10.10.0.5/24  n2      e0a
true      n2_clus2  up/up    10.10.0.6/24  n2      e0b
true      n2_clus3  up/up    10.10.0.7/24  n2      e0c
true      n2_clus4  up/up    10.10.0.8/24  n2      e0d
8 entries were displayed.
```

34. Ping the remote cluster interfaces and perform an RPC server check:

cluster ping-cluster -node node-name

The following example shows node n1 being pinged and the RPC status indicated afterward:

```

cluster::*> cluster ping-cluster -node n1
Host is n1
Getting addresses from network interface table...
Cluster n1_clus1 n1      e0a 10.10.0.1
Cluster n1_clus2 n1      e0b 10.10.0.2
Cluster n1_clus3 n1      e0c 10.10.0.3
Cluster n1_clus4 n1      e0d 10.10.0.4
Cluster n2_clus1 n2      e0a 10.10.0.5
Cluster n2_clus2 n2      e0b 10.10.0.6
Cluster n2_clus3 n2      e0c 10.10.0.7
Cluster n2_clus4 n2      e0d 10.10.0.8

Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 16 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 1500 byte MTU on 16 path(s):
  Local 10.10.0.1 to Remote 10.10.0.5
  Local 10.10.0.1 to Remote 10.10.0.6
  Local 10.10.0.1 to Remote 10.10.0.7
  Local 10.10.0.1 to Remote 10.10.0.8
  Local 10.10.0.2 to Remote 10.10.0.5
  Local 10.10.0.2 to Remote 10.10.0.6
  Local 10.10.0.2 to Remote 10.10.0.7
  Local 10.10.0.2 to Remote 10.10.0.8
  Local 10.10.0.3 to Remote 10.10.0.5
  Local 10.10.0.3 to Remote 10.10.0.6
  Local 10.10.0.3 to Remote 10.10.0.7
  Local 10.10.0.3 to Remote 10.10.0.8
  Local 10.10.0.4 to Remote 10.10.0.5
  Local 10.10.0.4 to Remote 10.10.0.6
  Local 10.10.0.4 to Remote 10.10.0.7
  Local 10.10.0.4 to Remote 10.10.0.8
Larger than PMTU communication succeeds on 16 path(s)
RPC status:
4 paths up, 0 paths down (tcp check)
4 paths up, 0 paths down (udp check)

```

35. Expand the cluster by adding nodes to the Nexus 3232C cluster switches.

The following examples show nodes n3 and n4 have 40 GbE cluster ports connected to ports e1/7 and e1/8 respectively on both the Nexus 3232C cluster switches, and both nodes have joined the cluster. The

40 GbE cluster interconnect ports used are e4a and e4e.

36. Display the information about the devices in your configuration:

- ° network device-discovery show
- ° network port show -role cluster
- ° network interface show -role cluster
- ° system cluster-switch show

```
cluster::> network device-discovery show
```

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
	e0d	C1	Ethernet1/1/2	N3K-C3232C
n2	/cdp			
	e0a	C1	Ethernet1/1/3	N3K-C3232C
	e0b	C2	Ethernet1/1/3	N3K-C3232C
	e0c	C2	Ethernet1/1/4	N3K-C3232C
	e0d	C1	Ethernet1/1/4	N3K-C3232C
n3	/cdp			
	e4a	C1	Ethernet1/7	N3K-C3232C
	e4e	C2	Ethernet1/7	N3K-C3232C
n4	/cdp			
	e4a	C1	Ethernet1/8	N3K-C3232C
	e4e	C2	Ethernet1/8	N3K-C3232C

12 entries were displayed.

```
cluster::*> network port show -role cluster
(network port show)
Node: n1

Ignore

Speed(Mbps) Health
Health
Port IPspace Broadcast Domain Link MTU Admin/Oper Status
Status
-----
-----
e0a Cluster Cluster up 9000 auto/10000 -
```

```

-
e0b      Cluster      Cluster      up    9000 auto/10000 -
-
e0c      Cluster      Cluster      up    9000 auto/10000 -
-
e0d      Cluster      Cluster      up    9000 auto/10000 -
-

Node: n2

Ignore

Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e0a      Cluster      Cluster      up    9000 auto/10000 -
-
e0b      Cluster      Cluster      up    9000 auto/10000 -
-
e0c      Cluster      Cluster      up    9000 auto/10000 -
-
e0d      Cluster      Cluster      up    9000 auto/10000 -
-

Node: n3

Ignore

Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e4a      Cluster      Cluster      up    9000 auto/40000 -
-
e4e      Cluster      Cluster      up    9000 auto/40000 -
-

Node: n4

Ignore

Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status

```

```

Status
-----
-----
e4a      Cluster      Cluster      up    9000 auto/40000  -
-
e4e      Cluster      Cluster      up    9000 auto/40000  -
-
12 entries were displayed.

```

```

cluster::*> network interface show -role cluster
(network interface show)

```

	Current Is	Logical	Status	Network	Current
Vserver	Interface	Admin/Oper	Address/Mask	Node	
Port	Home				

Cluster					
	n1_clus1	up/up	10.10.0.1/24	n1	
e0a	true				
	n1_clus2	up/up	10.10.0.2/24	n1	
e0b	true				
	n1_clus3	up/up	10.10.0.3/24	n1	
e0c	true				
	n1_clus4	up/up	10.10.0.4/24	n1	
e0d	true				
	n2_clus1	up/up	10.10.0.5/24	n2	
e0a	true				
	n2_clus2	up/up	10.10.0.6/24	n2	
e0b	true				
	n2_clus3	up/up	10.10.0.7/24	n2	
e0c	true				
	n2_clus4	up/up	10.10.0.8/24	n2	
e0d	true				
	n3_clus1	up/up	10.10.0.9/24	n3	
e4a	true				
	n3_clus2	up/up	10.10.0.10/24	n3	
e4e	true				
	n4_clus1	up/up	10.10.0.11/24	n4	
e4a	true				
	n4_clus2	up/up	10.10.0.12/24	n4	
e4e	true				

```

12 entries were displayed.

```

```
cluster::*> system cluster-switch show
```

Switch	Type	Address	Model

C1	cluster-network	10.10.1.103	NX3232C
Serial Number: FOX000001			
Is Monitored: true			
Reason:			
Software Version: Cisco Nexus Operating System (NX-OS) Software,			
Version			
7.0(3)I4(1)			
Version Source: CDP			
C2	cluster-network	10.10.1.104	NX3232C
Serial Number: FOX000002			
Is Monitored: true			
Reason:			
Software Version: Cisco Nexus Operating System (NX-OS) Software,			
Version			
7.0(3)I4(1)			
Version Source: CDP			
CL1	cluster-network	10.10.1.101	NX5596
Serial Number: 01234567			
Is Monitored: true			
Reason:			
Software Version: Cisco Nexus Operating System (NX-OS) Software,			
Version			
7.1(1)N1(1)			
Version Source: CDP			
CL2	cluster-network	10.10.1.102	NX5596
Serial Number: 01234568			
Is Monitored: true			
Reason:			
Software Version: Cisco Nexus Operating System (NX-OS) Software,			
Version			
7.1(1)N1(1)			
Version Source: CDP			

4 entries were displayed.

37. Remove the replaced Nexus 5596 by using the `system cluster-switch delete` command, if it is not automatically removed: `system cluster-switch delete -device switch-name`

```
cluster::> system cluster-switch delete -device CL1
cluster::> system cluster-switch delete -device CL2
```

38. Verify that the proper cluster switches are monitored: `system cluster-switch show`

```
cluster::> system cluster-switch show
```

Switch	Type	Address	Model
C1	cluster-network	10.10.1.103	NX3232C
Serial Number: FOX000001			
Is Monitored: true			
Reason:			
Software Version: Cisco Nexus Operating System (NX-OS) Software,			
Version			
7.0(3)I4(1)			
Version Source: CDP			
C2	cluster-network	10.10.1.104	NX3232C
Serial Number: FOX000002			
Is Monitored: true			
Reason:			
Software Version: Cisco Nexus Operating System (NX-OS) Software,			
Version			
7.0(3)I4(1)			
Version Source: CDP			

2 entries were displayed.

39. Enable the cluster switch health monitor log collection feature for collecting switch-related log files:

```
system cluster-switch log setup-password
system cluster-switch log enable-collection
```

```

cluster::*> system cluster-switch log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
C1
C2

cluster::*> system cluster-switch log setup-password

Enter the switch name: C1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log setup-password

Enter the switch name: C2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster::*> system cluster-switch log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster::*>

```



If any of these commands return an error, contact NetApp support.

40. If you suppressed automatic case creation, re-enable it by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all -message MAINT=END
```

Related information

[Cisco Ethernet Switch description page](#)

[Hardware Universe](#)

Migrate from a two-node switchless cluster to a cluster with Cisco Nexus 3232C cluster switches

You must be aware of certain configuration information, port connections, and cabling requirements when you migrate a two-node switchless cluster to a cluster with Cisco Nexus 3232C cluster switches.

The [Cisco Ethernet Switches](#) page has information about the ONTAP and NX-OS versions supported in this procedure.

You must have the following before you begin the migration process:

- Available ports for node connections

The cluster switches use the Inter-Switch Link (ISL) ports e1/31-32.

-

- Appropriate cables for cluster connections:
 - The nodes with 10 GbE cluster connections require QSFP optical modules with breakout fiber cables or QSFP to SFP+ copper breakout cables.
 - The nodes with 40/100 GbE cluster connections require 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.



See the [Hardware Universe](#) for further information on cabling systems with Nexus 3232C switches.

How to migrate from a two-node switchless cluster to a cluster with Cisco Nexus 3232C cluster switches

If you have a two-node switchless cluster, you can migrate nondisruptively to a two-node switched cluster that includes Cisco Nexus 3232C cluster network switches.

Before you begin

- The configurations must be properly set up and functioning.

The two nodes must be connected and functioning in a two-node switchless cluster setting.

- All cluster ports must be in the up state.
- The Cisco Nexus 3232C cluster switch must be supported.
- The existing cluster network configuration must have the following:
 - A redundant and fully functional Nexus 3232C cluster infrastructure on both switches
 - The latest RCF and NX-OS versions on your switches
 - Management connectivity on both switches
 - Console access to both switches

- All cluster logical interfaces (LIFs) in the up state without having been migrated
- Initial customization of the switch
- All ISL ports enabled and cabled

About this task

Procedure summary

- I. Display and migrate physical and logical ports (Steps 1-10)
- II. Shut down the reassigned LIFs and disconnect the cables (Steps 11-14)
- III. Enable the cluster ports (Steps 15-20)
- IV. Enable the reassigned LIFs (Steps 21-33)

The examples in this procedure use the following switch and node nomenclature:

- Nexus 3232C cluster switches, C1 and C2.
- The nodes are n1 and n2.



The examples in this procedure use two nodes, each utilizing two 40 GbE cluster interconnect ports e4a and e4e. The [Hardware Universe](#) has details about the cluster ports on your platforms.

- n1_clus1 is the first cluster logical interface (LIF) to be connected to cluster switch C1 for node n1.
- n1_clus2 is the first cluster LIF to be connected to cluster switch C2 for node n1.
- n2_clus1 is the first cluster LIF to be connected to cluster switch C1 for node n2.
- n2_clus2 is the second cluster LIF to be connected to cluster switch C2 for node n2.
- The number of 10 GbE and 40/100 GbE ports are defined in the reference configuration files (RCFs) available on the [Cisco® Cluster Network Switch Reference Configuration File Download](#) page.



The procedure requires the use of both ONTAP commands and Cisco Nexus 3000 Series Switches commands; ONTAP commands are used unless otherwise indicated.

Steps

1. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all - message MAINT=xh
```

x is the duration of the maintenance window in hours.



The AutoSupport message notifies technical support of this maintenance task so that automatic case creation is suppressed during the maintenance window.

2. Determine the administrative or operational status for each cluster interface:
 - a. Display the network port attributes:

```
network port show -role cluster
```



```

cluster::*> network port show -role cluster
(network port show)
Node: n1

Ignore
Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e4a       Cluster      Cluster      up    9000 auto/40000 -
e4e       Cluster      Cluster      up    9000 auto/40000 -
-
Node: n2

Ignore
Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e4a       Cluster      Cluster      up    9000 auto/40000 -
e4e       Cluster      Cluster      up    9000 auto/40000 -
4 entries were displayed.

```

b. Display information about the logical interfaces and their designated home nodes:

```
network interface show -role cluster
```

```
cluster::*> network interface show -role cluster
(network interface show)
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.
```

c. Verify that switchless cluster detection is enabled using the advanced privilege command:

```
network options detect-switchless-cluster show`
```

The output in the following example shows that switchless cluster detection is enabled:

```
cluster::*> network options detect-switchless-cluster show
Enable Switchless Cluster Detection: true
```

3. Verify that the appropriate RCFs and image are installed on the new 3232C switches and make any necessary site customizations such as adding users, passwords, and network addresses.

You must prepare both switches at this time. If you need to upgrade the RCF and image software, you must follow these steps:

- a. Go to the *Cisco Ethernet Switches* page on the NetApp Support Site.

[Cisco Ethernet Switches](#)

- b. Note your switch and the required software versions in the table on that page.
- c. Download the appropriate version of RCF.
- d. Click **CONTINUE** on the **Description** page, accept the license agreement, and then follow the instructions on the **Download** page to download the RCF.
- e. Download the appropriate version of the image software.

[Cisco Cluster and Management Network Switch Reference Configuration File download page](#)

4. Click **CONTINUE** on the **Description** page, accept the license agreement, and then follow the instructions on the **Download** page to download the RCF.
5. On Nexus 3232C switches C1 and C2, disable all node-facing ports C1 and C2, but do not disable the ISL ports e1/31-32.

For more information on Cisco commands, see the guides listed in the [Cisco Nexus 3000 Series NX-OS Command References](#).

The following example shows ports 1 through 30 being disabled on Nexus 3232C cluster switches C1 and C2 using a configuration supported in RCF NX3232_RCF_v1.0_24p10g_24p100g.txt:

```
C1# copy running-config startup-config
[#####] 100% Copy complete.
C1# configure
C1(config)# int e1/1/1-4,e1/2/1-4,e1/3/1-4,e1/4/1-4,e1/5/1-4,e1/6/1-4,e1/7-30
C1(config-if-range)# shutdown
C1(config-if-range)# exit
C1(config)# exit
C2# copy running-config startup-config
[#####] 100% Copy complete.
C2# configure
C2(config)# int e1/1/1-4,e1/2/1-4,e1/3/1-4,e1/4/1-4,e1/5/1-4,e1/6/1-4,e1/7-30
C2(config-if-range)# shutdown
C2(config-if-range)# exit
C2(config)# exit
```

6. Connect ports 1/31 and 1/32 on C1 to the same ports on C2 using supported cabling.
7. Verify that the ISL ports are operational on C1 and C2:

```
show port-channel summary
```

For more information on Cisco commands, see the guides listed in the [Cisco Nexus 3000 Series NX-OS Command References](#).

The following example shows the Cisco `show port-channel summary` command being used to verify the ISL ports are operational on C1 and C2:

```

C1# show port-channel summary
Flags: D - Down          P - Up in port-channel (members)
      I - Individual      H - Hot-standby (LACP only)      s - Suspended
r - Module-removed
      S - Switched        R - Routed
      U - Up (port-channel)
      M - Not in use. Min-links not met
-----
-----
      Port-
Group Channel          Type   Protocol  Member Ports
-----
-----
1      Po1 (SU)         Eth    LACP      Eth1/31 (P)  Eth1/32 (P)

C2# show port-channel summary
Flags: D - Down          P - Up in port-channel (members)
      I - Individual      H - Hot-standby (LACP only)      s - Suspended
r - Module-removed
      S - Switched        R - Routed
      U - Up (port-channel)
      M - Not in use. Min-links not met
-----
-----
Group Port-          Type   Protocol  Member Ports
  Channel
-----
-----
1      Po1 (SU)         Eth    LACP      Eth1/31 (P)  Eth1/32 (P)

```

8. Display the list of neighboring devices on the switch.

For more information on Cisco commands, see the guides listed in the [Cisco Nexus 3000 Series NX-OS Command References](#).

The following example shows the Cisco command `show cdp neighbors` being used to display the neighboring devices on the switch:

```

C1# show cdp neighbors
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater,
                  V - VoIP-Phone, D - Remotely-Managed-Device,
s - Supports-STP-Dispute
Device-ID          Local Intrfce  Hldtme Capability  Platform      Port
ID
C2                  Eth1/31      174    R S I s          N3K-C3232C    Eth1/31
C2                  Eth1/32      174    R S I s          N3K-C3232C    Eth1/32
Total entries displayed: 2
C2# show cdp neighbors
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater,
                  V - VoIP-Phone, D - Remotely-Managed-Device,
s - Supports-STP-Dispute
Device-ID          Local Intrfce  Hldtme Capability  Platform      Port
ID
C1                  Eth1/31      178    R S I s          N3K-C3232C    Eth1/31
C1                  Eth1/32      178    R S I s          N3K-C3232C    Eth1/32
Total entries displayed: 2

```

9. Display the cluster port connectivity on each node:

```
network device-discovery show
```

The following example shows the cluster port connectivity displayed for a two-node switchless cluster configuration:

```

cluster::*> network device-discovery show
      Local   Discovered
Node   Port   Device           Interface           Platform
-----
n1     /cdp
      e4a    n2               e4a                 FAS9000
      e4e    n2               e4e                 FAS9000
n2     /cdp
      e4a    n1               e4a                 FAS9000
      e4e    n1               e4e                 FAS9000

```

10. Migrate the n1_clus1 and n2_clus1 LIFs to the physical ports of their destination nodes:

```
network interface migrate -vserver cluster -lif lif-name source-node source-
node-name -destination-port destination-port-name
```

You must execute the command for each local node as shown in the following example:

```
cluster::*> network interface migrate -vserver cluster -lif n1_clus1
-source-node n1
-destination-node n1 -destination-port e4e
cluster::*> network interface migrate -vserver cluster -lif n2_clus1
-source-node n2
-destination-node n2 -destination-port e4e
```

11. Verify the cluster interfaces have successfully migrated:

```
network interface show -role cluster
```

The following example shows the "Is Home" status for the n1_clus1 and n2_clus1 LIFs has become "false" after the migration is completed:

```
cluster::*> network interface show -role cluster
(network interface show)
```

Current Is Home	Logical Interface	Status Admin/Oper	Network Address/Mask	Current Node	Port
Cluster	n1_clus1	up/up	10.10.0.1/24	n1	e4e
false	n1_clus2	up/up	10.10.0.2/24	n1	e4e
true	n2_clus1	up/up	10.10.0.3/24	n2	e4e
false	n2_clus2	up/up	10.10.0.4/24	n2	e4e
true					

4 entries were displayed.

12. Shut down cluster ports for the n1_clus1 and n2_clus1 LIFs, which were migrated in step 9:

```
network port modify -node node-name -port port-name -up-admin false
```

You must execute the command for each port as shown in the following example:

```
cluster::*> network port modify -node n1 -port e4a -up-admin false
cluster::*> network port modify -node n2 -port e4a -up-admin false
```

13. Ping the remote cluster interfaces and perform an RPC server check:

```
cluster ping-cluster -node node-name
```

The following example shows node n1 being pinged and the RPC status indicated afterward:

```
cluster::*> cluster ping-cluster -node n1

Host is n1 Getting addresses from network interface table...
Cluster n1_clus1 n1          e4a    10.10.0.1
Cluster n1_clus2 n1          e4e    10.10.0.2
Cluster n2_clus1 n2          e4a    10.10.0.3
Cluster n2_clus2 n2          e4e    10.10.0.4
Local = 10.10.0.1 10.10.0.2
Remote = 10.10.0.3 10.10.0.4
Cluster Vserver Id = 4294967293 Ping status:
....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s) .....
Detected 9000 byte MTU on 32 path(s):
    Local 10.10.0.1 to Remote 10.10.0.3
    Local 10.10.0.1 to Remote 10.10.0.4
    Local 10.10.0.2 to Remote 10.10.0.3
    Local 10.10.0.2 to Remote 10.10.0.4
Larger than PMTU communication succeeds on 4 path(s) RPC status:
1 paths up, 0 paths down (tcp check)
1 paths up, 0 paths down (ucp check)
```

14. Disconnect the cable from e4a on node n1.

You can refer to the running configuration and connect the first 40 GbE port on the switch C1 (port 1/7 in this example) to e4a on n1 using cabling supported for Nexus 3232C switches.

15. Disconnect the cable from e4a on node n2.

You can refer to the running configuration and connect e4a to the next available 40 GbE port on C1, port 1/8, using supported cabling.

16. Enable all node-facing ports on C1.

For more information on Cisco commands, see the guides listed in the [Cisco Nexus 3000 Series NX-OS Command References](#).

The following example shows ports 1 through 30 being enabled on Nexus 3232C cluster switches C1 and C2 using the configuration supported in RCF NX3232_RCF_v1.0_24p10g_26p100g.txt:

```
C1# configure
C1(config)# int e1/1/1-4,e1/2/1-4,e1/3/1-4,e1/4/1-4,e1/5/1-4,e1/6/1-4,e1/7-30
C1(config-if-range)# no shutdown
C1(config-if-range)# exit
C1(config)# exit
```

17. Enable the first cluster port, e4a, on each node:

```
network port modify -node node-name -port port-name -up-admin true
```

```
cluster::*> network port modify -node n1 -port e4a -up-admin true
cluster::*> network port modify -node n2 -port e4a -up-admin true
```

18. Verify that the clusters are up on both nodes:

```
network port show -role cluster
```



```
cluster::*> network port show -role cluster
(network port show)
Node: n1

Ignore

Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e4a       Cluster      Cluster      up    9000 auto/40000  -
e4e       Cluster      Cluster      up    9000 auto/40000  -

Node: n2

Ignore

Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e4a       Cluster      Cluster      up    9000 auto/40000  -
e4e       Cluster      Cluster      up    9000 auto/40000  -

4 entries were displayed.
```

19. For each node, revert all of the migrated cluster interconnect LIFs:

```
network interface revert -vserver cluster -lif lif-name
```

You must revert each LIF to its home port individually as shown in the following example:

```
cluster::*> network interface revert -vserver cluster -lif n1_clus1
cluster::*> network interface revert -vserver cluster -lif n2_clus1
```

20. Verify that all the LIFs are now reverted to their home ports:

```
network interface show -role cluster
```

The `Is Home` column should display a value of `true` for all of the ports listed in the `Current Port` column. If the displayed value is `false`, the port has not been reverted.

```

cluster::*> network interface show -role cluster
(network interface show)

```

Current Is	Logical	Status	Network	Current	
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port
Home					
-----	-----	-----	-----	-----	
Cluster					
true	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
4 entries were displayed.					

21. Display the cluster port connectivity on each node:

```
network device-discovery show
```

```

cluster::*> network device-discovery show

```

Node	Local Port	Discovered Device	Interface	Platform
n1	/cdp			
	e4a	C1	Ethernet1/7	N3K-C3232C
	e4e	n2	e4e	FAS9000
n2	/cdp			
	e4a	C1	Ethernet1/8	N3K-C3232C
	e4e	n1	e4e	FAS9000

22. Migrate clus2 to port e4a on the console of each node:

```

network interface migrate cluster -lif lif-name -source-node source-node-name
-destination-node destination-node-name -destination-port destination-port-
name

```

You must migrate each LIF to its home port individually as shown in the following example:

```
cluster::*> network interface migrate -vserver cluster -lif n1_clus2
-source-node n1
-destination-node n1 -destination-port e4a
cluster::*> network interface migrate -vserver cluster -lif n2_clus2
-source-node n2 -destination-node n2 -destination-port e4a
```

23. Shut down cluster ports clus2 LIF on both nodes:

```
network port modify
```

The following example shows the specified ports being set to `false`, shutting the ports down on both nodes:

```
cluster::*> network port modify -node n1 -port e4e -up-admin false
cluster::*> network port modify -node n2 -port e4e -up-admin false
```

24. Verify the cluster LIF status:

```
network interface show
```

```
cluster::*> network interface show -role cluster
(network interface show)
```

Current Is	Logical	Status	Network	Current	
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port
Home					
-----	-----	-----	-----	-----	
-----	-----				
Cluster					
	n1_clus1	up/up	10.10.0.1/24	n1	e4a
true					
	n1_clus2	up/up	10.10.0.2/24	n1	e4a
false					
	n2_clus1	up/up	10.10.0.3/24	n2	e4a
true					
	n2_clus2	up/up	10.10.0.4/24	n2	e4a
false					

4 entries were displayed.

25. Disconnect the cable from e4e on node n1.

You can refer to the running configuration and connect the first 40 GbE port on switch C2 (port 1/7 in this example) to e4e on node n1, using the appropriate cabling for the Nexus 3232C switch model.

26. Disconnect the cable from e4e on node n2.

You can refer to the running configuration and connect e4e to the next available 40 GbE port on C2, port 1/8, using the appropriate cabling for the Nexus 3232C switch model.

27. Enable all node-facing ports on C2.

The following example shows ports 1 through 30 being enabled on Nexus 3132Q-V cluster switches C1 and C2 using a configuration supported in RCF NX3232C_RCF_v1.0_24p10g_26p100g.txt:

```
C2# configure
C2(config)# int e1/1/1-4,e1/2/1-4,e1/3/1-4,e1/4/1-4,e1/5/1-4,e1/6/1-4,e1/7-30
C2(config-if-range)# no shutdown
C2(config-if-range)# exit
C2(config)# exit
```

28. Enable the second cluster port, e4e, on each node:

```
network port modify
```

The following example shows the second cluster port e4e being brought up on each node:

```
cluster::*> network port modify -node n1 -port e4e -up-admin true
cluster::*> network port modify -node n2 -port e4e -up-admin true
```

29. For each node, revert all of the migrated cluster interconnect LIFs: `network interface revert`

The following example shows the migrated LIFs being reverted to their home ports.

```
cluster::*> network interface revert -vserver Cluster -lif n1_clus2
cluster::*> network interface revert -vserver Cluster -lif n2_clus2
```

30. Verify that all of the cluster interconnect ports are now reverted to their home ports:

```
network interface show -role cluster
```

The `Is Home` column should display a value of `true` for all of the ports listed in the `Current Port` column. If the displayed value is `false`, the port has not been reverted.

```
cluster::*> network interface show -role cluster
(network interface show)
```

	Logical	Status	Network	Current	
Current Is					
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port
Home					
-----	-----	-----	-----	-----	
-----	-----				
Cluster					
	n1_clus1	up/up	10.10.0.1/24	n1	e4a
true					
	n1_clus2	up/up	10.10.0.2/24	n1	e4e
true					
	n2_clus1	up/up	10.10.0.3/24	n2	e4a
true					
	n2_clus2	up/up	10.10.0.4/24	n2	e4e
true					
4 entries were displayed.					

31. Verify that all of the cluster interconnect ports are in the up state:

```
network port show -role cluster
```

32. Display the cluster switch port numbers through which each cluster port is connected to each node:

```
network device-discovery show
```

```
cluster::*> network device-discovery show
```

	Local	Discovered		
Node	Port	Device	Interface	Platform
-----	-----	-----	-----	-----
n1	/cdp			
	e4a	C1	Ethernet1/7	N3K-C3232C
	e4e	C2	Ethernet1/7	N3K-C3232C
n2	/cdp			
	e4a	C1	Ethernet1/8	N3K-C3232C
	e4e	C2	Ethernet1/8	N3K-C3232C

33. Display discovered and monitored cluster switches:

```
system cluster-switch show
```

```
cluster::*> system cluster-switch show
```

Switch	Type	Address	Model

C1	cluster-network	10.10.1.101	NX3232CV
Serial Number: FOX000001			
Is Monitored: true			
Reason:			
Software Version: Cisco Nexus Operating System (NX-OS) Software, Version 7.0(3)I6(1)			
Version Source: CDP			
C2	cluster-network	10.10.1.102	NX3232CV
Serial Number: FOX000002			
Is Monitored: true			
Reason:			
Software Version: Cisco Nexus Operating System (NX-OS) Software, Version 7.0(3)I6(1)			
Version Source: CDP 2 entries were displayed.			

34. Verify that switchless cluster detection changed the switchless cluster option to disabled:

```
network options switchless-cluster show`
```

35. Ping the remote cluster interfaces and perform an RPC server check:

```
cluster ping-cluster -node node-name
```

```

cluster::*> cluster ping-cluster -node n1
Host is n1 Getting addresses from network interface table...
Cluster n1_clus1 n1          e4a    10.10.0.1
Cluster n1_clus2 n1          e4e    10.10.0.2
Cluster n2_clus1 n2          e4a    10.10.0.3
Cluster n2_clus2 n2          e4e    10.10.0.4
Local = 10.10.0.1 10.10.0.2
Remote = 10.10.0.3 10.10.0.4
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s) .....
Detected 9000 byte MTU on 32 path(s):
    Local 10.10.0.1 to Remote 10.10.0.3
    Local 10.10.0.1 to Remote 10.10.0.4
    Local 10.10.0.2 to Remote 10.10.0.3
    Local 10.10.0.2 to Remote 10.10.0.4
Larger than PMTU communication succeeds on 4 path(s) RPC status:
1 paths up, 0 paths down (tcp check)
1 paths up, 0 paths down (ucp check)

```

36. Enable the cluster switch health monitor log collection feature for collecting switch-related log files:

```
+system cluster-switch log setup-password
```

```
system cluster-switch log enable-collection
```

```

cluster::*> system cluster-switch log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
C1
C2

cluster::*> system cluster-switch log setup-password

Enter the switch name: C1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster::*> system cluster-switch log setup-password

Enter the switch name: C2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster::*> system cluster-switch log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster::*>

```



If any of these commands return an error, contact NetApp support.

37. If you suppressed automatic case creation, re-enable it by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all -message MAINT=END
```

Replace a Cisco Nexus 3232C cluster switch

You must be aware of certain configuration information, port connections and cabling requirements when you replace Cisco Nexus 3232C cluster switches.

You must verify the following conditions exist before installing the NX-OS software and RCFs on a Cisco Nexus cluster switch:

- Your system can support Cisco Nexus 3232C switches.
- The cluster must be fully functioning.
- You must have consulted the switch compatibility table on the Cisco Ethernet Switch page for the supported ONTAP, NX-OS, and RCF versions.



You should be aware there can be dependencies between command syntax in the RCF and NX-OS versions.

- You must have referred to the appropriate software and upgrade guides available on the Cisco web site for complete documentation on the Cisco switch upgrade and downgrade procedures.
- You must have downloaded the applicable RCFs.

How to replace a Cisco Nexus 3232C cluster switch

You can nondisruptively replace a defective Cisco Nexus 3232C switch in a cluster by performing a specific sequence of tasks.

Before you begin

The existing cluster and network configuration must have the following characteristics:

- The Nexus 3232C cluster infrastructure must be redundant and fully functional on both switches.

The Cisco Ethernet Switches page has the latest RCF and NX-OS versions on your switches.

- All cluster ports must be in the up state.
- Management connectivity must exist on both switches.
- All cluster logical interfaces (LIFs) must be in the up state and must not have been migrated.

The replacement Cisco Nexus 3232C switch must have the following characteristics:

- Management network connectivity must be functional.
- Console access to the replacement switch must be in place.
- The appropriate RCF and NX-OS operating system image must be loaded onto the switch.
- Initial customization of the switch must be complete.

About this task

Procedure summary

- **Display and migrate the cluster ports to switch C2 (Steps 1-7)**
- **Reconnect ISL cables from switch CL2 to switch C2, then migrate ISLs to switch CL1 and C2 (Steps 8-14)**
- **Revert all LIFs to originally assigned ports (Steps 15-18)**
- **Verify all ports and LIF are correctly migrated (Steps 19-21)**

This procedure replaces the second Nexus 3232C cluster switch CL2 with the new 3232C switch C2. The

examples in this procedure use the following switch and node nomenclature:

- The four nodes are n1, n2, n3, and n4.
- n1_clus1 is the first cluster logical interface (LIF) connected to cluster switch C1 for node n1.
- n1_clus2 is the first cluster LIF connected to cluster switch CL2 or C2 for node n1.
- n1_clus3 is the second LIF connected to cluster switch C2 for node n1.-
- n1_clus4 is the second LIF connected to cluster switch CL1, for node n1.

The number of 10 GbE and 40/100 GbE ports are defined in the reference configuration files (RCFs) available on the [Cisco® Cluster Network Switch Reference Configuration File Download](#) page.

The examples in this procedure use four nodes. Two of the nodes use four 10 GB cluster interconnect ports: e0a, e0b, e0c, and e0d. The other two nodes use two 40 GB cluster interconnect ports: e4a and e4e. See the [Hardware Universe](#) to verify the correct cluster ports for your platform.

This procedure describes the following scenario:

- The cluster initially has four nodes connected to two Nexus 3232C cluster switches, CL1 and CL2.
- You plan to replace cluster switch CL2 with C2 (steps 1 to 21):
 - On each node, you migrate the cluster LIFs connected to cluster switch CL2 to cluster ports connected to cluster switch CL1.
 - You disconnect the cabling from all ports on cluster switch CL2 and reconnect the cabling to the same ports on the replacement cluster switch C2.
 - You revert the migrated cluster LIFs on each node.

Steps

1. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all - message MAINT=xh
```

+

x is the duration of the maintenance window in hours.



The AutoSupport message notifies technical support of this maintenance task so that automatic case creation is suppressed during the maintenance window.

1. Display information about the devices in your configuration:

```
network device-discovery show
```

```
cluster::> network device-discovery show
```

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

12 entries were displayed

2. Determine the administrative or operational status for each cluster interface.

a. Display the network port attributes:

```
network port show -role cluster
```

```
cluster::*> network port show -role cluster
(network port show)
Node: n1

Ignore

Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
e0a       Cluster      Cluster      up    9000  auto/10000  -
e0b       Cluster      Cluster      up    9000  auto/10000  -
```

```

e0c      Cluster      Cluster      up    9000 auto/10000 -
e0d      Cluster      Cluster      up    9000 auto/10000 -
-

Node: n2

Ignore

Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e0a      Cluster      Cluster      up    9000 auto/10000 -
e0b      Cluster      Cluster      up    9000 auto/10000 -
e0c      Cluster      Cluster      up    9000 auto/10000 -
e0d      Cluster      Cluster      up    9000 auto/10000 -
-

Node: n3

Ignore

Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e4a      Cluster      Cluster      up    9000 auto/40000 -
-
e4e      Cluster      Cluster      up    9000 auto/40000 -
-

Node: n4

Ignore

Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e4a      Cluster      Cluster      up    9000 auto/40000 -
e4e      Cluster      Cluster      up    9000 auto/40000 -

12 entries were displayed.

```

b. Display information about the logical interfaces (LIFs):

```
network interface show -role cluster
```

```
cluster::*> network interface show -role cluster
```

	Logical	Status	Network	Current
Current Is				
Vserver	Interface	Admin/Oper	Address/Mask	Node
Port	Home			
-----	-----	-----	-----	-----
Cluster				
	n1_clus1	up/up	10.10.0.1/24	n1
e0a	true			
	n1_clus2	up/up	10.10.0.2/24	n1
e0b	true			
	n1_clus3	up/up	10.10.0.3/24	n1
e0c	true			
	n1_clus4	up/up	10.10.0.4/24	n1
e0d	true			
	n2_clus1	up/up	10.10.0.5/24	n2
e0a	true			
	n2_clus2	up/up	10.10.0.6/24	n2
e0b	true			
	n2_clus3	up/up	10.10.0.7/24	n2
e0c	true			
	n2_clus4	up/up	10.10.0.8/24	n2
e0d	true			
	n3_clus1	up/up	10.10.0.9/24	n3
e0a	true			
	n3_clus2	up/up	10.10.0.10/24	n3
e0e	true			
	n4_clus1	up/up	10.10.0.11/24	n4
e0a	true			
	n4_clus2	up/up	10.10.0.12/24	n4
e0e	true			

12 entries were displayed.

c. Display the discovered cluster switches:

```
system cluster-switch show
```

The following output example displays the cluster switches:

```
cluster::> system cluster-switch show
```

Switch	Type	Address	Model
CL1	cluster-network	10.10.1.101	NX3232C
Serial Number: FOX000001			
Is Monitored: true			
Reason:			
Software Version: Cisco Nexus Operating System (NX-OS) Software,			
Version			
7.0(3)I6(1)			
Version Source: CDP			
CL2	cluster-network	10.10.1.102	NX3232C
Serial Number: FOX000002			
Is Monitored: true			
Reason:			
Software Version: Cisco Nexus Operating System (NX-OS) Software,			
Version			
7.0(3)I6(1)			
Version Source: CDP			

2 entries were displayed.

3. Verify that the appropriate RCF and image are installed on the new Nexus 3232C switch and make any necessary site customizations.

- a. Go to the NetApp Support Site.

mysupport.netapp.com

- b. Go to the **Cisco Ethernet Switches** page and note the required software versions in the table.

[Cisco Ethernet Switches](#)

- c. Download the appropriate version of the RCF.
- d. Click **CONTINUE** on the **Description** page, accept the license agreement, and then navigate to the **Download** page.
- e. Download the correct version of the image software from the **Cisco® Cluster and Management Network Switch Reference Configuration File Download** page.

[Cisco® Cluster and Management Network Switch Reference Configuration File Download](#)

4. Migrate the cluster LIFs to the physical node ports connected to the replacement switch C2:

```
network interface migrate -vserver Cluster -lif lif-name -source-node node-
```

```
name -destination-node node-name -destination-port port-name
```

You must migrate all the cluster LIFs individually as shown in the following example:

```
cluster::*> network interface migrate -vserver Cluster -lif n1_clus2
-source-node n1 -destination-
node n1 -destination-port e0a
cluster::*> network interface migrate -vserver Cluster -lif n1_clus3
-source-node n1 -destination-
node n1 -destination-port e0d
cluster::*> network interface migrate -vserver Cluster -lif n2_clus2
-source-node n2 -destination-
node n2 -destination-port e0a
cluster::*> network interface migrate -vserver Cluster -lif n2_clus3
-source-node n2 -destination-
node n2 -destination-port e0d
cluster::*> network interface migrate -vserver Cluster -lif n3_clus2
-source-node n3 -destination-
node n3 -destination-port e4a
cluster::*> network interface migrate -vserver Cluster -lif n4_clus2
-source-node n4 -destinationnode
n4 -destination-port e4a
```

5. Verify the status of the cluster ports and their home designations:

```
network interface show -role cluster
```

```

cluster::*> network interface show -role cluster
(network interface show)

```

Current Is Vserver Home	Logical Interface	Status Admin/Oper	Network Address/Mask	Current Node	Port
Cluster	n1_clus1	up/up	10.10.0.1/24	n1	e0a
true	n1_clus2	up/up	10.10.0.2/24	n1	e0a
false	n1_clus3	up/up	10.10.0.3/24	n1	e0d
false	n1_clus4	up/up	10.10.0.4/24	n1	e0d
true	n2_clus1	up/up	10.10.0.5/24	n2	e0a
true	n2_clus2	up/up	10.10.0.6/24	n2	e0a
false	n2_clus3	up/up	10.10.0.7/24	n2	e0d
false	n2_clus4	up/up	10.10.0.8/24	n2	e0d
true	n3_clus1	up/up	10.10.0.9/24	n3	e4a
true	n3_clus2	up/up	10.10.0.10/24	n3	e4a
false	n4_clus1	up/up	10.10.0.11/24	n4	e4a
true	n4_clus2	up/up	10.10.0.12/24	n4	e4a
false					

12 entries were displayed.

6. Shut down the cluster interconnect ports that are physically connected to the original switch CL2: `network port modify -node node-name -port port-name -up-admin false`

The following example shows the cluster interconnect ports are shut down on all nodes:


```

cluster::*> network port modify -node n1 -port e0b -up-admin false
cluster::*> network port modify -node n1 -port e0c -up-admin false
cluster::*> network port modify -node n2 -port e0b -up-admin false
cluster::*> network port modify -node n2 -port e0c -up-admin false
cluster::*> network port modify -node n3 -port e4e -up-admin false
cluster::*> network port modify -node n4 -port e4e -up-admin false

```

7. Ping the remote cluster interfaces and perform an RPC server check:

```
cluster ping-cluster -node node-name
```

The following example shows node n1 being pinged and the RPC status indicated afterward:

```

cluster::*> cluster ping-cluster -node n1
Host is n1 Getting addresses from network interface table...
Cluster n1_clus1 n1      e0a      10.10.0.1
Cluster n1_clus2 n1      e0b      10.10.0.2
Cluster n1_clus3 n1      e0c      10.10.0.3
Cluster n1_clus4 n1      e0d      10.10.0.4
Cluster n2_clus1 n2      e0a      10.10.0.5
Cluster n2_clus2 n2      e0b      10.10.0.6
Cluster n2_clus3 n2      e0c      10.10.0.7
Cluster n2_clus4 n2      e0d      10.10.0.8
Cluster n3_clus1 n4      e0a      10.10.0.9
Cluster n3_clus2 n3      e0e      10.10.0.10
Cluster n4_clus1 n4      e0a      10.10.0.11
Cluster n4_clus2 n4      e0e      10.10.0.12
Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8 10.10.0.9 10.10.0.10
10.10.0.11
10.10.0.12 Cluster Vserver Id = 4294967293 Ping status:
....
Basic connectivity succeeds on 32 path(s)
Basic connectivity fails on 0 path(s) .....
Detected 9000 byte MTU on 32 path(s):
    Local 10.10.0.1 to Remote 10.10.0.5
    Local 10.10.0.1 to Remote 10.10.0.6
    Local 10.10.0.1 to Remote 10.10.0.7
    Local 10.10.0.1 to Remote 10.10.0.8
    Local 10.10.0.1 to Remote 10.10.0.9
    Local 10.10.0.1 to Remote 10.10.0.10
    Local 10.10.0.1 to Remote 10.10.0.11
    Local 10.10.0.1 to Remote 10.10.0.12
    Local 10.10.0.2 to Remote 10.10.0.5
    Local 10.10.0.2 to Remote 10.10.0.6

```

```
Local 10.10.0.2 to Remote 10.10.0.7
Local 10.10.0.2 to Remote 10.10.0.8
Local 10.10.0.2 to Remote 10.10.0.9
Local 10.10.0.2 to Remote 10.10.0.10
Local 10.10.0.2 to Remote 10.10.0.11
Local 10.10.0.2 to Remote 10.10.0.12
Local 10.10.0.3 to Remote 10.10.0.5
Local 10.10.0.3 to Remote 10.10.0.6
Local 10.10.0.3 to Remote 10.10.0.7
Local 10.10.0.3 to Remote 10.10.0.8
Local 10.10.0.3 to Remote 10.10.0.9
Local 10.10.0.3 to Remote 10.10.0.10
Local 10.10.0.3 to Remote 10.10.0.11
Local 10.10.0.3 to Remote 10.10.0.12
Local 10.10.0.4 to Remote 10.10.0.5
Local 10.10.0.4 to Remote 10.10.0.6
Local 10.10.0.4 to Remote 10.10.0.7
Local 10.10.0.4 to Remote 10.10.0.8
Local 10.10.0.4 to Remote 10.10.0.9
Local 10.10.0.4 to Remote 10.10.0.10
Local 10.10.0.4 to Remote 10.10.0.11
Local 10.10.0.4 to Remote 10.10.0.12
Larger than PMTU communication succeeds on 32 path(s) RPC status:
8 paths up, 0 paths down (tcp check)
8  paths up, 0 paths down (udp check)
```

8. Shut down the ports 1/31 and 1/32 on cluster switch CL1.

For more information on Cisco commands, see the guides listed in the [Cisco Nexus 3000 Series NX-OS Command References](#).

```
(CL1)# configure
(CL1)(Config)# interface e1/31-32
(CL1(config-if-range)# shutdown
(CL1(config-if-range)# exit
(CL1)(Config)# exit (CL1)#
```

9. Remove all the cables attached to the cluster switch CL2 and reconnect them to the replacement switch C2 for all the nodes.
10. Remove the inter-switch link (ISL) cables from ports e1/31 and e1/32 on cluster switch CL2 and reconnect them to the same ports on the replacement switch C2.
11. Bring up ISL ports 1/31 and 1/32 on the cluster switch CL1.

For more information on Cisco commands, see the guides listed in the [Cisco Nexus 3000 Series NX-OS Command References](#).

```
(CL1)# configure
(CL1) (Config)# interface e1/31-32
(CL1(config-if-range)# no shutdown
(CL1(config-if-range)# exit
(CL1) (Config)# exit
(CL1)#
```

12. Verify that the ISLs are up on CL1.

For more information on Cisco commands, see the guides listed in the [Cisco Nexus 3000 Series NX-OS Command References](#).

Ports Eth1/31 and Eth1/32 should indicate (P) , which means that the ISL ports are up in the port-channel:

```
CL1# show port-channel summary
Flags: D - Down          P - Up in port-channel (members)
      I - Individual     H - Hot-standby (LACP only)
      s - Suspended      r - Module-removed
      S - Switched       R - Routed
      U - Up (port-channel)
      M - Not in use. Min-links not met

-----
-----
Group Port-          Type   Protocol  Member Ports
      Channel
-----
-----
1      Po1 (SU)       Eth    LACP      Eth1/31 (P)  Eth1/32 (P)
```

13. Verify that the ISLs are up on cluster switch C2.

For more information on Cisco commands, see the guides listed in the [Cisco Nexus 3000 Series NX-OS Command References](#).

Ports Eth1/31 and Eth1/32 should indicate (P), which means that both ISL ports are up in the port-channel.

Example

C2# show port-channel summary

Flags: D - Down P - Up in port-channel (members)
 I - Individual H - Hot-standby (LACP only) s - Suspended
r - Module-removed
 S - Switched R - Routed
 U - Up (port-channel)
 M - Not in use. Min-links not met

```
-----  
-----  
Group Port-          Type   Protocol  Member Ports  
Channel  
-----  
-----  
1      Po1(SU)        Eth     LACP      Eth1/31(P)  Eth1/32(P)
```

14. On all nodes, bring up all the cluster interconnect ports connected to the replacement switch C2:

`network port modify -node node-name -port port-name -up-admin true`

```
cluster::*> network port modify -node n1 -port e0b -up-admin true  
cluster::*> network port modify -node n1 -port e0c -up-admin true  
cluster::*> network port modify -node n2 -port e0b -up-admin true  
cluster::*> network port modify -node n2 -port e0c -up-admin true  
cluster::*> network port modify -node n3 -port e4e -up-admin true  
cluster::*> network port modify -node n4 -port e4e -up-admin true
```

15. Revert all the migrated cluster interconnect LIFs on all the nodes:

`network interface revert -vserver cluster -lif lif-name`

You must revert all the cluster interconnect LIFs individually as shown in the following example:

```
cluster::*> network interface revert -vserver cluster -lif n1_clus2  
cluster::*> network interface revert -vserver cluster -lif n1_clus3  
cluster::*> network interface revert -vserver cluster -lif n2_clus2  
cluster::*> network interface revert -vserver cluster -lif n2_clus3  
Cluster::*> network interface revert -vserver cluster -lif n3_clus2  
Cluster::*> network interface revert -vserver cluster -lif n4_clus2
```

16. Verify that the cluster interconnect ports are now reverted to their home:

`network interface show`

The following example shows that all the LIFs have been successfully reverted because the ports listed under the `Current Port` column have a status of `true` in the `Is Home` column. If a port has a value of `false`, the LIF has not been reverted.

```
cluster::*> network interface show -role cluster
(network interface show)
```

	Logical	Status	Network	Current	
Current Is					
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port
Home					
-----	-----	-----	-----	-----	
-----	-----				
Cluster					
	n1_clus1	up/up	10.10.0.1/24	n1	e0a
true					
	n1_clus2	up/up	10.10.0.2/24	n1	e0b
true					
	n1_clus3	up/up	10.10.0.3/24	n1	e0c
true					
	n1_clus4	up/up	10.10.0.4/24	n1	e0d
true					
	n2_clus1	up/up	10.10.0.5/24	n2	e0a
true					
	n2_clus2	up/up	10.10.0.6/24	n2	e0b
true					
	n2_clus3	up/up	10.10.0.7/24	n2	e0c
true					
	n2_clus4	up/up	10.10.0.8/24	n2	e0d
true					
	n3_clus1	up/up	10.10.0.9/24	n3	e4a
true					
	n3_clus2	up/up	10.10.0.10/24	n3	e4e
true					
	n4_clus1	up/up	10.10.0.11/24	n4	e4a
true					
	n4_clus2	up/up	10.10.0.12/24	n4	e4e
true					

12 entries were displayed.

17. Verify that the cluster ports are connected:

```
network port show -role cluster
```

```
cluster::*> network port show -role cluster
(network port show)
```

Node: n1

Ignore

						Speed(Mbps)	Health
Health							
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							

-----	-----	-----	----	----	-----	-----	-----

e0a	Cluster	Cluster		up	9000	auto/10000	-
e0b	Cluster	Cluster		up	9000	auto/10000	-
e0c	Cluster	Cluster		up	9000	auto/10000	-
e0d	Cluster	Cluster		up	9000	auto/10000	-

Node: n2

Ignore

						Speed(Mbps)	Health
Health							
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							

-----	-----	-----	----	----	-----	-----	-----

e0a	Cluster	Cluster		up	9000	auto/10000	-
e0b	Cluster	Cluster		up	9000	auto/10000	-
e0c	Cluster	Cluster		up	9000	auto/10000	-
e0d	Cluster	Cluster		up	9000	auto/10000	-

Node: n3

Ignore

						Speed(Mbps)	Health
Health							
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							

-----	-----	-----	----	----	-----	-----	-----

e4a	Cluster	Cluster		up	9000	auto/40000	-
e4e	Cluster	Cluster		up	9000	auto/40000	-

Node: n4

Ignore

						Speed(Mbps)	Health
Health							
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							

```

-----
e4a      Cluster      Cluster      up    9000 auto/40000 -
e4e      Cluster      Cluster      up    9000 auto/40000 -
12 entries were displayed.

```

18. Ping the remote cluster interfaces and perform an RPC server check:

```
cluster ping-cluster -node node-name
```

The following example shows node n1 being pinged and the RPC status indicated afterward:

```

cluster::*> cluster ping-cluster -node n1
Host is n1 Getting addresses from network interface table...
Cluster n1_clus1 n1      e0a    10.10.0.1
Cluster n1_clus2 n1      e0b    10.10.0.2
Cluster n1_clus3 n1      e0c    10.10.0.3
Cluster n1_clus4 n1      e0d    10.10.0.4
Cluster n2_clus1 n2      e0a    10.10.0.5
Cluster n2_clus2 n2      e0b    10.10.0.6
Cluster n2_clus3 n2      e0c    10.10.0.7
Cluster n2_clus4 n2      e0d    10.10.0.8
Cluster n3_clus1 n3      e0a    10.10.0.9
Cluster n3_clus2 n3      e0e    10.10.0.10
Cluster n4_clus1 n4      e0a    10.10.0.11
Cluster n4_clus2 n4      e0e    10.10.0.12
Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8 10.10.0.9 10.10.0.10
10.10.0.11 10.10.0.12
Cluster Vserver Id = 4294967293 Ping status:
....
Basic connectivity succeeds on 32 path(s)
Basic connectivity fails on 0 path(s) .....
Detected 1500 byte MTU on 32 path(s):
  Local 10.10.0.1 to Remote 10.10.0.5
  Local 10.10.0.1 to Remote 10.10.0.6
  Local 10.10.0.1 to Remote 10.10.0.7
  Local 10.10.0.1 to Remote 10.10.0.8
  Local 10.10.0.1 to Remote 10.10.0.9
  Local 10.10.0.1 to Remote 10.10.0.10
  Local 10.10.0.1 to Remote 10.10.0.11
  Local 10.10.0.1 to Remote 10.10.0.12
  Local 10.10.0.2 to Remote 10.10.0.5
  Local 10.10.0.2 to Remote 10.10.0.6
  Local 10.10.0.2 to Remote 10.10.0.7
  Local 10.10.0.2 to Remote 10.10.0.8
  Local 10.10.0.2 to Remote 10.10.0.9

```

```
Local 10.10.0.2 to Remote 10.10.0.10
Local 10.10.0.2 to Remote 10.10.0.11
Local 10.10.0.2 to Remote 10.10.0.12
Local 10.10.0.3 to Remote 10.10.0.5
Local 10.10.0.3 to Remote 10.10.0.6
Local 10.10.0.3 to Remote 10.10.0.7
Local 10.10.0.3 to Remote 10.10.0.8
Local 10.10.0.3 to Remote 10.10.0.9
Local 10.10.0.3 to Remote 10.10.0.10
Local 10.10.0.3 to Remote 10.10.0.11
Local 10.10.0.3 to Remote 10.10.0.12
Local 10.10.0.4 to Remote 10.10.0.5
Local 10.10.0.4 to Remote 10.10.0.6
Local 10.10.0.4 to Remote 10.10.0.7
Local 10.10.0.4 to Remote 10.10.0.8
Local 10.10.0.4 to Remote 10.10.0.9
Local 10.10.0.4 to Remote 10.10.0.10
Local 10.10.0.4 to Remote 10.10.0.11
Local 10.10.0.4 to Remote 10.10.0.12
```

```
Larger than PMTU communication succeeds on 32 path(s) RPC status:
8 paths up, 0 paths down (tcp check)
8  paths up, 0 paths down (udp check)
```

19. Display the information about the devices in your configuration by entering the following commands:

You can execute the following commands in any order:

- ° network device-discovery show
- ° network port show -role cluster
- ° network interface show -role cluster
- ° system cluster-switch show


```
cluster::> network device-discovery show
```

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
	e0d	C1	Ethernet1/1/2	N3K-C3232C
n2	/cdp			
	e0a	C1	Ethernet1/1/3	N3K-C3232C
	e0b	C2	Ethernet1/1/3	N3K-C3232C
	e0c	C2	Ethernet1/1/4	N3K-C3232C
	e0d	C1	Ethernet1/1/4	N3K-C3232C
n3	/cdp			
	e4a	C1	Ethernet1/7	N3K-C3232C
	e4e	C2	Ethernet1/7	N3K-C3232C
n4	/cdp			
	e4a	C1	Ethernet1/8	N3K-C3232C
	e4e	C2	Ethernet1/8	N3K-C3232C

```
12 entries were displayed.
```

```
cluster::*> network port show -role cluster
```

```
(network port show)
```

```
Node: n1
```

```
Ignore
```

Health	Port	IPspace	Broadcast Domain	Link	MTU	Admin/Oper	Speed(Mbps)	Health
Status								Status
	e0a	Cluster	Cluster	up	9000	auto/10000	-	-
	e0b	Cluster	Cluster	up	9000	auto/10000	-	-
	e0c	Cluster	Cluster	up	9000	auto/10000	-	-
	e0d	Cluster	Cluster	up	9000	auto/10000	-	-
	-							

```
Node: n2
```

Ignore

						Speed(Mbps)	Health
Health							
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							
-----	-----	-----	-----	-----	-----	-----	-----
-----	-----						
e0a	Cluster	Cluster		up	9000	auto/10000	-
e0b	Cluster	Cluster		up	9000	auto/10000	-
e0c	Cluster	Cluster		up	9000	auto/10000	-
e0d	Cluster	Cluster		up	9000	auto/10000	-
-							

Node: n3

Ignore

						Speed(Mbps)	Health
Health							
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							
-----	-----	-----	-----	-----	-----	-----	-----
-----	-----						
e4a	Cluster	Cluster		up	9000	auto/40000	-
e4e	Cluster	Cluster		up	9000	auto/40000	-
-							

Node: n4

Ignore

						Speed(Mbps)	Health
Health							
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							
-----	-----	-----	-----	-----	-----	-----	-----
-----	-----						
e4a	Cluster	Cluster		up	9000	auto/40000	-
e4e	Cluster	Cluster		up	9000	auto/40000	-

12 entries were displayed.

```
cluster::*> network interface show -role cluster
```

	Logical	Status	Network	Current
Current Is				
Vserver	Interface	Admin/Oper	Address/Mask	Node
Port	Home			
-----	-----	-----	-----	-----
-----	----			
Cluster				
	nm1_clus1	up/up	10.10.0.1/24	n1
e0a	true			
	n1_clus2	up/up	10.10.0.2/24	n1
e0b	true			
	n1_clus3	up/up	10.10.0.3/24	n1
e0c	true			
	n1_clus4	up/up	10.10.0.4/24	n1
e0d	true			
	n2_clus1	up/up	10.10.0.5/24	n2
e0a	true			
	n2_clus2	up/up	10.10.0.6/24	n2
e0b	true			
	n2_clus3	up/up	10.10.0.7/24	n2
e0c	true			
	n2_clus4	up/up	10.10.0.8/24	n2
e0d	true			
	n3_clus1	up/up	10.10.0.9/24	n3
e4a	true			
	n3_clus2	up/up	10.10.0.10/24	n3
e4e	true			
	n4_clus1	up/up	10.10.0.11/24	n4
e4a	true			
	n4_clus2	up/up	10.10.0.12/24	n4
e4e	true			

12 entries were displayed.

```
cluster::*> system cluster-switch show
```

Switch	Type	Address	Model
CL1	cluster-network	10.10.1.101	NX3232C
Serial Number: FOX000001			
Is Monitored: true			
Reason:			
Software Version: Cisco Nexus Operating System (NX-OS) Software, Version 7.0(3)I6(1)			
Version Source: CDP			
CL2	cluster-network	10.10.1.102	NX3232C
Serial Number: FOX000002			
Is Monitored: true			
Reason:			
Software Version: Cisco Nexus Operating System (NX-OS) Software, Version 7.0(3)I6(1)			
Version Source: CDP			
C2	cluster-network	10.10.1.103	NX3232C
Serial Number: FOX000003			
Is Monitored: true			
Reason:			
Software Version: Cisco Nexus Operating System (NX-OS) Software, Version 7.0(3)I6(1)			
Version Source: CDP 3 entries were displayed.			

20. Delete the replaced cluster switch CL2 if it has not been removed automatically:

```
system cluster-switch delete -device cluster-switch-name
```

21. Verify that the proper cluster switches are monitored: `system cluster-switch show`

The following example shows the cluster switches are monitored because the `Is Monitored` state is `true`.

```

cluster::> system cluster-switch show
Switch                               Type                               Address                               Model
-----                               -
CL1                                  cluster-network                    10.10.1.101                          NX3232C
Serial Number: FOX000001
Is Monitored: true
Reason:
Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
7.0(3)I6(1)
Version Source: CDP

C2                                    cluster-network                    10.10.1.103                          NX3232C
Serial Number: FOX000002
Is Monitored: true
Reason:
Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
7.0(3)I6(1)
Version Source: CDP
2 entries were displayed.

```

22. Enable the cluster switch health monitor log collection feature for collecting switch-related log files:

```

system cluster-switch log setup-password

system cluster-switch log enable-collection

```

```

cluster::*> system cluster-switch log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
CL1
C2

cluster::*> system cluster-switch log setup-password

Enter the switch name: CL1
**RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster::*> system cluster-switch log setup-password

Enter the switch name: C2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster::*> system cluster-switch log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster::*>

```



If any of these commands return an error, contact NetApp support.

23. If you suppressed automatic case creation, re-enable it by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all -message MAINT=END
```

Related information

[Cisco Ethernet Switch description page](#)

[Hardware Universe](#)

Replace a Cisco Nexus 3232C storage switch

You must be aware of certain configuration information, port connections and cabling requirements when you replace Cisco Nexus 3232C storage switches.

You must verify the following conditions exist before installing the NX-OS software and RCFs on a Cisco Nexus storage switch:

- Your system can support Cisco Nexus 3232C storage switches.
- You must have consulted the switch compatibility table on the Cisco Ethernet Switch page for the supported ONTAP, NX-OS, and RCF versions.



You should be aware there can be dependencies between command syntax in the RCF and NX-OS versions.

- You must have referred to the appropriate software and upgrade guides available on the Cisco web site for complete documentation on the Cisco switch upgrade and downgrade procedures at [Cisco Nexus 3000 Series Switches](#).
- You must have downloaded the applicable RCFs.

Steps to replace a Cisco Nexus 3232C storage switch

You can nondisruptively replace a defective Cisco Nexus 3232C storage switch by performing a specific sequence of tasks.

Before you begin

The existing network configuration must have the following characteristics:

- The Cisco Ethernet Switches page has the latest RCF and NX-OS versions on your switches.
- Management connectivity must exist on both switches.



Make sure that all troubleshooting steps have been completed to confirm that your switch needs replacing.

The replacement Cisco Nexus 3232C switch must have the following characteristics:

- Management network connectivity must be functional.
- Console access to the replacement switch must be in place.
- The appropriate RCF and NX-OS operating system image must be loaded onto the switch.
- Initial customization of the switch must be complete.

Procedure summary:

- **Confirm the switch to be replaced is S2 (Steps 1-5)**
- **Disconnect the cables from switch S2 (Step 6)**
- **Reconnect the cables to switch NS2 (Step 7)**
- **Verify all device configurations on switch NS2 (Steps 8-10)**

- This procedure replaces the second Nexus 3232C storage switch S2 with the new 3232C switch NS2.
- The two nodes are node1 and node2.

Steps

1. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all - message MAINT=xh
```

x is the duration of the maintenance window in hours.



The AutoSupport message notifies technical support of this maintenance task so that automatic case creation is suppressed during the maintenance window.

2. Check on the health status of the storage node ports to make sure that there is connection to storage switch S1:

```
storage port show -port-type ENET
```

```
storage::*> storage port show -port-type ENET
```

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
```



```

storage::*> network device-discovery show
Node/      Local  Discovered
Protocol   Port   Device (LLDP: ChassisID)  Interface      Platform
-----
node1/cdp
           e3a    S1                        Ethernet1/1     NX3232C
           e4a    node2                    e4a             AFF-A700
           e4e    node2                    e4e             AFF-A700
node1/lldp
           e3a    S1                        Ethernet1/1     -
           e4a    node2                    e4a             -
           e4e    node2                    e4e             -
node2/cdp
           e3a    S1                        Ethernet1/2     NX3232C
           e4a    node1                    e4a             AFF-A700
           e4e    node1                    e4e             AFF-A700
node2/lldp
           e3a    S1                        Ethernet1/2     -
           e4a    node1                    e4a             -
           e4e    node1                    e4e             -

```

4. Run the `show lldp neighbors` command on the working switch to confirm that you can see both nodes and all shelves:

```
show lldp neighbors
```

```

S1# show lldp neighbors
Capability codes:
  (R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device
  (W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other
Device ID           Local Intf      Hold-time  Capability  Port ID
node1                Eth1/1         121        S           e3a
node2                Eth1/2         121        S           e3a
SHFGD2008000011     Eth1/5         121        S           e0a
SHFGD2008000011     Eth1/6         120        S           e0a
SHFGD2008000022     Eth1/7         120        S           e0a
SHFGD2008000022     Eth1/8         120        S           e0a

```

5. Verify the shelf ports in the storage system:

```
storage shelf port show -fields remote-device,remote-port
```

```
storage::*> storage shelf port show -fields remote-device,remote-port
```

shelf	id	remote-port	remote-device
-----	--	-----	-----
3.20	0	Ethernet1/5	S1
3.20	1	-	-
3.20	2	Ethernet1/6	S1
3.20	3	-	-
3.30	0	Ethernet1/7	S1
3.20	1	-	-
3.30	2	Ethernet1/8	S1
3.20	3	-	-

6. Remove all cables attached to storage switch S2.
7. Reconnect all cables to the replacement switch NS2.
8. Recheck the health status of the storage node ports:

```
storage port show -port-type ENET
```

```
storage::*> storage port show -port-type ENET
```

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	100	enabled	online	30
node2							
	e3a	ENET	storage	100	enabled	online	30
	e3b	ENET	storage	0	enabled	offline	30
	e7a	ENET	storage	0	enabled	offline	30
	e7b	ENET	storage	100	enabled	online	30

9. Verify that both switches are available:

```
network device-discovery show
```

```

storage::*> network device-discovery show
Node/      Local   Discovered
Protocol   Port    Device (LLDP: ChassisID)  Interface      Platform
-----
node1/cdp
          e3a     S1                      Ethernet1/1     NX3232C
          e4a     node2                   e4a             AFF-A700
          e4e     node2                   e4e             AFF-A700
          e7b     NS2                     Ethernet1/1     NX3232C
node1/lldp
          e3a     S1                      Ethernet1/1     -
          e4a     node2                   e4a             -
          e4e     node2                   e4e             -
          e7b     NS2                     Ethernet1/1     -
node2/cdp
          e3a     S1                      Ethernet1/2     NX3232C
          e4a     node1                   e4a             AFF-A700
          e4e     node1                   e4e             AFF-A700
          e7b     NS2                     Ethernet1/2     NX3232C
node2/lldp
          e3a     S1                      Ethernet1/2     -
          e4a     node1                   e4a             -
          e4e     node1                   e4e             -
          e7b     NS2                     Ethernet1/2     -

```

10. Verify the shelf ports in the storage system:

```
storage shelf port show -fields remote-device,remote-port
```

```

storage::*> storage shelf port show -fields remote-device,remote-port
shelf id remote-port remote-device
-----
3.20  0  Ethernet1/5 S1
3.20  1  Ethernet1/5 NS2
3.20  2  Ethernet1/6 S1
3.20  3  Ethernet1/6 NS2
3.30  0  Ethernet1/7 S1
3.20  1  Ethernet1/7 NS2
3.30  2  Ethernet1/8 S1
3.20  3  Ethernet1/8 NS2

```

11. If you suppressed automatic case creation, re-enable it by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all -message MAINT=END
```

Upgrade a Cisco Nexus 3232C storage switch

The Cisco NX-OS software and reference configuration files (RCFs) can be upgraded on Cisco Nexus 3232C storage switches.

Before you begin

The following conditions must exist before you upgrade the NX-OS software and RCFs on the storage switch:

- The switch must be fully functioning (there should be no errors in the logs or similar issues).
- You must have checked or set your desired boot variables in the RCF to reflect the desired boot images if you are installing only NX-OS and keeping your current RCF version.

If you need to change the boot variables to reflect the current boot images, you must do so before reapplying the RCF so that the correct version is instantiated on future reboots.

- You must have referred to the appropriate software and upgrade guides available on the [Cisco Nexus 3000 Series Switches](#) page for complete documentation on the Cisco storage upgrade and downgrade procedures.
- The number of 10 GbE and 40/100 GbE ports are defined in the reference configuration files (RCFs) available on the [Cisco® Ethernet Switches](#) page.

Procedure summary:

- I. Check the health status of switches and ports ([Steps 1 - 4](#))
- II. Copy the RCF to Cisco switch S2 ([Steps 5 - 8](#))
- III. Download the NX-OS image to Cisco switch S2 and reboot ([Steps 9 - 12](#))
- IV. Recheck the health status of switches and ports ([Steps 13 - 15](#))
- V. Repeat [Steps 1 - 17](#) for Cisco switch S1.

The examples in this procedure use two nodes; node1 with two storage ports and node2 with two storage ports. See the [Hardware Universe](#) to verify the correct storage ports on your platforms.



The command outputs might vary depending on different releases of ONTAP.

The examples in this procedure use the following switch and node nomenclature:

- The names of the two storage switches are S1 and S2.
- The nodes are node1 and node2.



The procedure requires the use of both ONTAP commands and Cisco Nexus 3000 Series Switches commands; ONTAP commands are used unless otherwise indicated.

Steps

1. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all - message MAINT=xh
```

x is the duration of the maintenance window in hours.



The AutoSupport message notifies technical support of this maintenance task so that automatic case creation is suppressed during the maintenance window.

2. Check that the storage switches are available:

system switch ethernet show

```
storage::*> system switch ethernet show
Switch                               Type                Address             Model
-----
S1
                                storage-network    172.17.227.5       NX3232C
    Serial Number: FOC221206C2
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                                9.3(3)
    Version Source: CDP

S2
                                storage-network    172.17.227.6       NX3232C
    Serial Number: FOC220443LZ
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                                9.3(3)
    Version Source: CDP

2 entries were displayed.
storage::*>
```

3. Verify that the node ports are healthy and operational:

storage port show -port-type ENET

```
storage::*> storage port show -port-type ENET
```

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	100	enabled	online	30
node2	e3a	ENET	storage	100	enabled	online	30
	e3b	ENET	storage	0	enabled	offline	30
	e7a	ENET	storage	0	enabled	offline	30
	e7b	ENET	storage	100	enabled	online	30

4. Check that there are no storage switch or cabling issues with the cluster:

```
system health alert show -instance
```

```
storage::*> system health alert show -instance
There are no entries matching your query.
```

5. Copy the RCF on switch S2 to the switch bootflash using one of the following transfer protocols: FTP, HTTP, TFTP, SFTP, or SCP.

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 3000 Series NX-OS Command References](#).

The following example shows HTTP being used to copy an RCF to the bootflash on switch S2:

```
S2# copy http://172.16.10.1//cfg/Nexus_3232C_RCF_v1.6-Storage.txt
bootflash: vrf management
% Total      % Received % Xferd  Average   Speed    Time     Time       Time
Current                                  Dload    Upload  Total   Spent    Left
Speed
 100          3254      100    3254      0        0      8175      0 --:
--:-- --:--:-- --:--:--      8301
Copy complete, now saving to disk (please wait)...
Copy complete.
S2#
```

6. Apply the RCF previously downloaded to the bootflash:

```
copy bootflash:
```

The following example shows the RCF file `Nexus_3232C_RCF_v1.6-Storage.txt` being installed on switch S2:

```
S2# copy Nexus_3232C_RCF_v1.6-Storage.txt running-config echo-commands
```

7. Verify that the RCF file is the correct newer version:

```
show running-config
```

When you check the output to verify you have the correct RCF, make sure that the following information is correct:

- The RCF banner
- The node and port settings
- Customizations

The output varies according to your site configuration. Check the port settings and refer to the release notes for any changes specific to the RCF that you have installed.



In the banner output from the `show banner motd` command, you must read and follow the instructions in the **IMPORTANT NOTES** section to ensure the proper configuration and operation of the switch.

```
S2# show banner motd
```

```
*****
*****
* NetApp Reference Configuration File (RCF)
*
* Switch    : Cisco Nexus 3232C
* Filename  : Nexus_3232C_RCF_v1.6-Storage.txt
* Date      : Oct-20-2020
* Version   : v1.6
*
* Port Usage : Storage configuration
* Ports 1-32: Controller and Shelf Storage Ports
* Ports 33-34: Disabled
*
* IMPORTANT NOTES*
* - This RCF utilizes QoS and requires TCAM re-configuration, requiring
RCF
*   to be loaded twice with the Storage Switch rebooted in between.
*
* - Perform the following 4 steps to ensure proper RCF installation:
*
*   (1) Apply RCF first time, expect following messages:
*       - Please save config and reload the system...
*       - Edge port type (portfast) should only be enabled on ports...
*       - TCAM region is not configured for feature QoS class IPv4
ingress...
*
*   (2) Save running-configuration and reboot Cluster Switch
*
*   (3) After reboot, apply same RCF second time and expect following
messages:
*       - % Invalid command at '^' marker
*       - Syntax error while parsing...
*
*   (4) Save running-configuration again
*****
*****
S2#
```



When applying the RCF for the first time, the **ERROR: Failed to write VSH commands** message is expected and can be ignored.

8. After you verify that the software versions and switch settings are correct, copy the running-config file to the startup-config file on switch S2.

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 3000 Series NX-OS Command References](#).

The following example shows the running-config file successfully copied to the startup-config file:

```
S2# copy running-config startup-config
[#####] 100% Copy complete.
```

9. Download the NX-OS image to switch S2.
10. Install the system image so that the new version will be loaded the next time switch S2 is rebooted.

The switch will be reboot in 10 seconds with the new image as shown in the following output:

```
S2# install all nxos bootflash:nxos.9.3.4.bin
Installer will perform compatibility check first. Please wait.
Installer is forced disruptive

Verifying image bootflash:/nxos.9.3.4.bin for boot variable "nxos".
[#####] 100% -- SUCCESS

Verifying image type.
[[#####] 100% -- SUCCESS

Preparing "nxos" version info using image bootflash:/nxos.9.3.4.bin.
[#####] 100% -- SUCCESS

Preparing "bios" version info using image bootflash:/nxos.9.3.4.bin.
[#####] 100% -- SUCCESS

Performing module support checks.
[#####] 100% -- SUCCESS

Notifying services about system upgrade.
[#####] 100% -- SUCCESS

Compatibility check is done:
Module  bootable          Impact  Install-type  Reason
-----  -
      1      yes      disruptive      reset  default upgrade is not
hitless

Images will be upgraded according to following table:
Module      Image                      Running-Version(pri:alt)
New-Version  Upg-Required
```

```

-----
-----
1          nxos          9.3(3)
9.3(4)      yes
1          bios          v08.37(01/28/2020):v08.23(09/23/2015)
v08.38(05/29/2020)      no

```

```

Switch will be reloaded for disruptive upgrade.
Do you want to continue with the installation (y/n)? [n] y
input string too long
Do you want to continue with the installation (y/n)? [n] y

```

Install is in progress, please wait.

```

Performing runtime checks.
[#####] 100% -- SUCCESS

```

```

Setting boot variables.
[#####] 100% -- SUCCESS

```

```

Performing configuration copy.
[#####] 100% -- SUCCESS

```

```

Module 1: Refreshing compact flash and upgrading bios/loader/bootrom.
Warning: please do not remove or power off the module at this time.
[#####] 100% -- SUCCESS

```

```

Finishing the upgrade, switch will reboot in 10 seconds.
S2#

```

11. Save the configuration.

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 3000 Series NX-OS Command References](#).

You are prompted to reboot the system as shown in the following example:

```

S2# copy running-config startup-config
[#####] 100% Copy complete.
S2# reload
This command will reboot the system. (y/n)? [n] y

```

12. Confirm that the new NX-OS version number is on the switch:

```
S2# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
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 08.38
  NXOS: version 9.3(4)
  BIOS compile time: 05/29/2020
  NXOS image file is: bootflash:///nxos.9.3.4.bin
  NXOS compile time: 4/28/2020 21:00:00 [04/29/2020 02:28:31]

Hardware
  cisco Nexus3000 C3232C Chassis (Nexus 9000 Series)
  Intel(R) Xeon(R) CPU E5-2403 v2 @ 1.80GHz with 8154432 kB of memory.
  Processor Board ID FOC20291J6K

  Device name: S2
  bootflash: 53298520 kB
  Kernel uptime is 0 day(s), 0 hour(s), 3 minute(s), 42 second(s)

  Last reset at 157524 usecs after Mon Nov 2 18:32:06 2020
  Reason: Reset due to upgrade
  System version: 9.3(3)
  Service:
```

```
plugin
  Core Plugin, Ethernet Plugin

Active Package(s):

S2#
```

13. Recheck that the storage switches are available after the reboot:

system switch ethernet show

```
storage::*> system switch ethernet show
Switch                               Type                Address             Model
-----
S1
                                storage-network    172.17.227.5       NX3232C
  Serial Number: FOC221206C2
    Is Monitored: true
      Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                        9.3(4)
  Version Source: CDP

S2
                                storage-network    172.17.227.6       NX3232C
  Serial Number: FOC220443LZ
    Is Monitored: true
      Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                        9.3(4)
  Version Source: CDP

2 entries were displayed.
storage::*>
```

14. Verify that the switch ports are healthy and operational after the reboot:

storage port show -port-type ENET

```
storage::*> storage port show -port-type ENET
```

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	100	enabled	online	30
node2	e3a	ENET	storage	100	enabled	online	30
	e3b	ENET	storage	0	enabled	offline	30
	e7a	ENET	storage	0	enabled	offline	30
	e7b	ENET	storage	100	enabled	online	30

15. Recheck that there are no storage switch or cabling issues with the cluster:

```
system health alert show -instance
```

```
storage::*> system health alert show -instance
There are no entries matching your query.
```

16. Repeat the procedure to upgrade the NX-OS software and RCF on switch S1.
17. If you suppressed automatic case creation, re-enable it by invoking an AutoSupport message:
- ```
system node autosupport invoke -node * -type all -message MAINT=END
```

# Cisco Nexus 9336C-FX2 switches

## Cisco 9336C-FX2 switch overview

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.

You can install the Cisco Nexus 9336C-FX2 switch (X190200/X190210) in a NetApp system cabinet or third-party cabinet with the standard brackets that are included with the switch.

The following table lists the part number and description for the 9336C-FX2 switch, fans, and power supplies:

| Part number         | Description                                        |
|---------------------|----------------------------------------------------|
| X190200-CS-PE       | N9K-9336C-FX2, CS, PTSX, 36PT10/25/40/100GQSFP28   |
| X190200-CS-PI       | N9K-9336C-FX2, CS, PSIN, 36PT10/25/40/100GQSFP28   |
| X190210-FE-PE       | N9K-9336C, FTE, PTSX, 36PT10/25/40/100GQSFP28      |
| X190210-FE-PI       | N9K-9336C, FTE, PSIN, 36PT10/25/40/100GQSFP28      |
| X190002             | Accessory Kit X190001/X190003                      |
| X-NXA-PAC-1100W-PE2 | N9K-9336C AC 1100W PSU - Port side exhaust airflow |
| X-NXA-PAC-1100W-PI2 | N9K-9336C AC 1100W PSU - Port side Intake airflow  |
| X-NXA-FAN-65CFM-PE  | N9K-9336C 65CFM, Port side exhaust airflow         |
| X-NXA-FAN-65CFM-PI  | N9K-9336C 65CFM, Port side intake airflow          |

## Other supported switches

- Nexus 3232C

You can install the Cisco Nexus 3232C switch (X190100) NetApp system cabinet with the custom brackets that come with the switch, or you can install it in a rack with the standard brackets that are also included with the switch.

- Nexus 3132Q-V

You can install the Cisco Nexus 3132Q-V switch (X190001) in a NetApp system cabinet or third-party cabinet with the standard brackets that are included with the switch.

The following cluster switches are no longer available from NetApp, but will be supported by Cisco for a limited time:

- Nexus 5596UP/5596T

You can install the Cisco Nexus 5596UP switch (X1967-R6) or 5596T (X1989-R6) in a NetApp system cabinet with the custom brackets that come with the switch, or you can install it in a rack with the standard brackets that are also included with the switch.

The Nexus 5596UP switch also supports one or two 16-port expansion modules (X1988-R6).

The Nexus 5596T switch is only supported as a cluster interconnect switch for the FAS2520 and is intended to be used for performing nondisruptive hardware upgrades.

[End of Availability](#) details.

## Install a Cisco Nexus 9336C-FX2 switch and pass-through panel in a NetApp cabinet

You can install the Cisco Nexus 9336C-FX2 switch and pass-through panel in a NetApp cabinet with the standard brackets that are included with the switch.

### About this task

You must have reviewed the initial preparation requirements, kit contents, and safety precautions.

[Cisco Nexus 9000 Series Hardware Installation Guide](#)

- For each switch, you must supply the eight 10-32 or 12-24 screws and clip nuts to mount the brackets and slider rails to the front and rear cabinet posts.
- You must use the Cisco standard rail kit to install the switch in a NetApp cabinet.



The jumper cords are not included with the pass-through kit and should be included with your switches. If they were not shipped with the switches, you can order them from NetApp (part number X1558A-R6).

### Steps

1. Install the pass-through blanking panel in the NetApp cabinet.

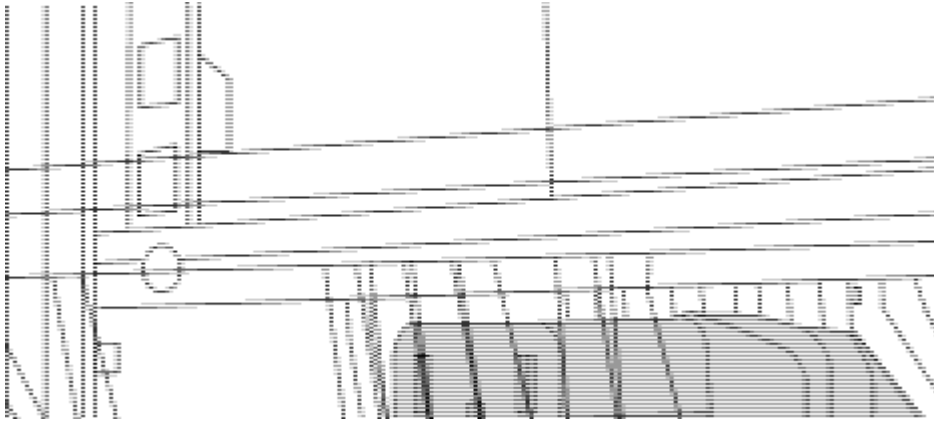
The pass-through panel kit is available from NetApp (part number X8784-R6).

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.

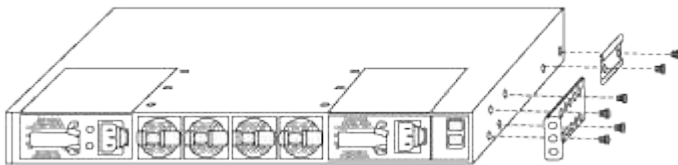
- d. Insert the female connectors of both 48-inch jumper cords from the rear of the panel and through the brush assembly.



- i. Female connector of the jumper cord.

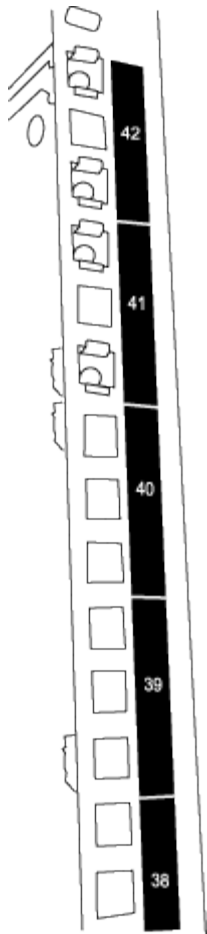
2. Install the rack-mount brackets on the Nexus 9336C-FX2 switch chassis.

- a. Position a front rack-mount bracket on one side of the switch chassis so that the mounting ear is aligned with the chassis faceplate (on the PSU or fan side), and then use four M4 screws to attach the bracket to the chassis.



- b. Repeat step [2a](#) with the other front rack-mount bracket on the other side of the switch.
  - c. Install the rear rack-mount bracket on the switch chassis.
  - d. Repeat step [2c](#) with the other rear rack-mount bracket on the other side of the switch.
3. Install the clip nuts in the square hole locations for all four IEA posts.

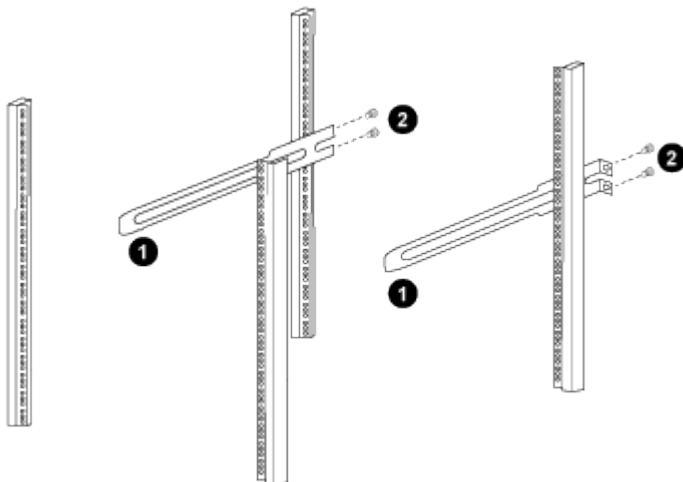




The two 9336C-FX2 switches will always be mounted in the top 2U of the cabinet RU41 and 42.

4. Install the slider rails in the cabinet.

- a. Position the first slider rail at the RU42 mark on the back side of the rear left post, insert screws with the matching thread type, and then tighten the screws with your fingers.



- i. As you gently slide the slider rail, align it to the screw holes in the rack.
  - ii. Tighten the screws of the slider rails to the cabinet posts.
- b. Repeat step [4a](#) for the right side rear post.

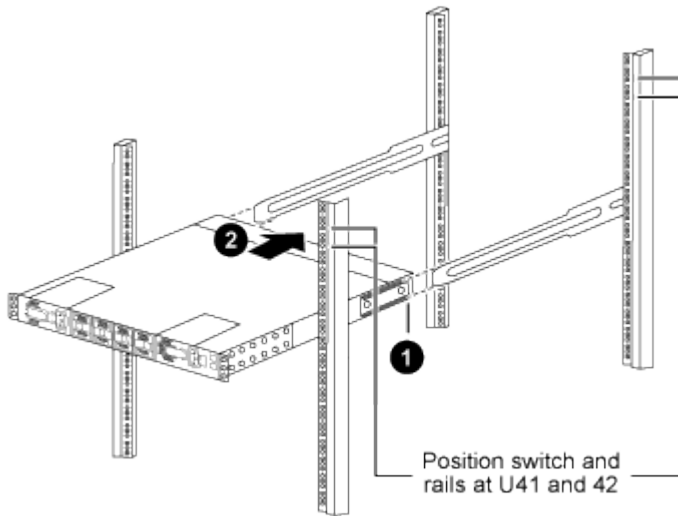
c. Repeat steps [4a](#) and [4b](#) at the RU41 locations on the cabinet.

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.

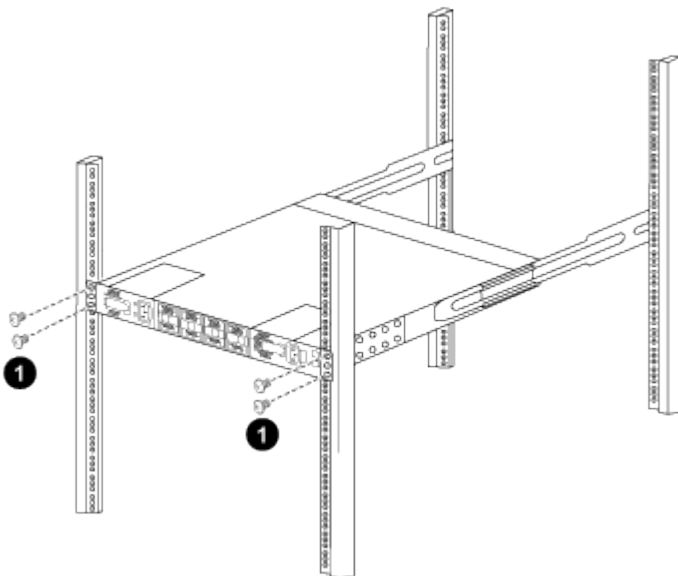
a. Position the back of the switch at RU41.



i. As the chassis is pushed toward the rear posts, align the two rear rack-mount guides with the slider rails.

ii. Gently slide the switch until the front rack-mount brackets are flush with the front posts.

b. Attach the switch to the cabinet.



i. With one person holding the front of the chassis level, the other person should fully tighten the four rear screws to the cabinet posts.

c. With the chassis now supported without assistance, fully tighten the front screws to the posts.

d. Repeat steps [5a](#) through [5c](#) for the second switch at the RU42 location.



By using the fully installed switch as a support, it is not necessary to hold the front of the second switch during the installation process.

6. When the switches are installed, connect the jumper cords to the switch power inlets.
7. Connect the male plugs of both jumper cords to the closest available PDU outlets.



To maintain redundancy, the two cords must be connected to different PDUs.

8. Connect the management port on each 9336C-FX2 switch to either of the management switches (if ordered) or connect them directly to your management network.

The management port is the upper-right port located on the PSU side of the switch. The CAT6 cable for each switch needs to be routed through the pass-through panel after the switches are installed to connect to the management switches or management network.

## Set up

### Set up the switches

If you do not already have the required configuration information and documentation, you need to gather that information before setting up your cluster and management network switches.

- You must have access to an HTTP, FTP or TFTP server at the installation site to download the applicable NX-OS and reference configuration file (RCF) releases.
- You must have the required cluster network and management network switch documentation.

See [Required documentation](#) for more information.

- You must have the required controller documentation and ONTAP documentation.

[NetApp documentation](#)

- You must have the applicable licenses, network and configuration information, and cables.
- You must have the completed cabling worksheets.



Due to the complexity that can result from illustrating layers of cabling, this guide does not provide cabling graphics. This guide does provide sample worksheets with recommended port assignments and blank worksheets that you can use to set up your cluster.



For more information refer to the [Hardware Universe](#).

- 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.



You must download the applicable NetApp cluster network and management network RCFs from the NetApp Support Site at [mysupport.netapp.com](https://mysupport.netapp.com) for the switches that you receive.

- In addition, you might need to install the required configuration file to support the Cluster Switch Health Monitor (CSHM) for the 92300YC cluster switches. See [Installing the Cluster Switch Health Monitor \(CSHM\) configuration file for 92300YC switches](#) for details.

## Steps

1. Rack the cluster network and management network switches and controllers.

| If you are installing your...                       | Then...                                                                                                                                                                       |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cisco Nexus 9336C-FX2 in a NetApp system cabinet    | See the <i>Installing a Cisco Nexus 9336C-FX2 cluster switch and pass-through panel in a NetApp cabinet</i> guide for instructions to install the switch in a NetApp cabinet. |
| 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.     |
| 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.   |
| Equipment in a Telco rack                           | See the procedures provided in the switch hardware installation guides and the NetApp installation and setup instructions.                                                    |
| Cisco Nexus 5596UP/5596T in a NetApp system cabinet | See the <i>Installing a Cisco Nexus 5596 cluster switch and pass-through panel in a NetApp cabinet</i> guide for instructions to install the switch in a NetApp cabinet.      |

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 based on information provided in [Required configuration information](#).
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.

If you download the NetApp-supported version of the software, then you must also download the *NetApp Cluster Network Switch Reference Configuration File* and merge it with the configuration you saved in Step 5. You can download the file and the instructions from the [Cisco Ethernet Switches](#) page.

7. Check the software version on the network switches and, if necessary, download the NetApp-supported version of the software to the switches. If you have your own switches, refer to the [Cisco site](#).

If you download the NetApp-supported version of the software, then you must also download the *NetApp Management Network Switch Reference Configuration File* and merge it with the configuration you saved in Step 5. You can download the file and instructions from the [Cisco Ethernet Switches](#) page.

## Related information

[Required cluster configuration information](#)

[Required documentation](#)

[Sample and blank cabling worksheets](#)

## Required cluster configuration information

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.

### Required network information for all switches

You need the following network information for all switch configurations:

- IP subnet for management network traffic
- Host names and IP addresses for each of the storage system controllers and all applicable switches
- Most storage system controllers are managed through the e0M interface by connecting to the Ethernet service port (wrench icon). On AFF A800 and AFF A700 systems, the e0M interface uses a dedicated Ethernet port.

Refer to the [Hardware Universe](#) for latest information.

### Required network information for Cisco Nexus 9336C-FX2, 92300YC, 3232C, 3132Q-V, and 5596UP/5596T switches

For the Cisco Nexus 9336C-FX2, 92300YC, 3232C, 3132Q-V, and 5596UP/5596T switches, you need to provide applicable responses to the following initial setup questions when you first boot the switch. Your site's security policy defines the responses and services to enable.

- 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.

- 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 Cluster 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).
- 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.

For more information about the initial configuration of your switch, see the following guides:

[Cisco Nexus 9336C-FX2 Installation and Upgrade Guides](#)

[Cisco Nexus 92300YC Installation and Upgrade Guides](#)

[Cisco Nexus 5000 Series Hardware Installation Guide](#)

[Cisco Nexus 3000 Series Hardware Installation Guide](#)

### Install the Cluster Switch Health Monitor (CSHM) configuration file for 92300YC switches

You can use this procedure to install the applicable configuration file for cluster switch health monitoring of Nexus 92300YC cluster switches. In ONTAP releases 9.5P7 and earlier and 9.6P2 and earlier, you must download the cluster switch health monitor configuration file separately. In ONTAP releases 9.5P8 and later, 9.6P3 and later, and 9.7 and later, the cluster switch health monitor configuration file is bundled with ONTAP.

Before you setup the switch health monitor for 92300YC cluster switches, you must ensure that the ONTAP cluster is up and running.



It is advisable to enable SSH in order to use all features available in CSHM.

1. Download the cluster switch health monitor configuration zip file based on the corresponding ONTAP release version. This file is available from the [NetApp Software download](#) page.
  - a. On the Software download page, select **Switch Health Monitor Configuration Files**
  - b. Select Platform = **ONTAP** and click **Go!**
  - c. On the Switch Health Monitor Configuration Files for ONTAP page, click **View & Download**
  - d. On the Switch Health Monitor Configuration Files for ONTAP - Description page, click **Download** for the applicable cluster switch model, for example: **Cisco Nexus 92300YC**
  - e. On the End User License Agreement page, click **Accept**
  - f. On the Switch Health Monitor Configuration Files for ONTAP - Download page, select the applicable configuration file, for example, **Cisco\_Nexus\_92300YC.zip**
2. Upload the applicable zip file to your internal web server where the IP address is X.X.X.X.

For an internal web server IP address of 192.168.2.20 and assuming a /usr/download directory exists, you can upload your zip file to your web server using scp:

```
% scp Cisco_Nexus_92300YC.zip
admin@192.168.2.20:/usr/download/Cisco_Nexus_92300YC.zip
```

3. Access the advanced mode setting from one of the ONTAP systems in the cluster, using the command `set-privilege advanced`:

```
cluster1::> set -privilege advanced
```

4. Run the switch health monitor configure command `system cluster-switch configure-health-monitor -node * -package-url X.X.X/location_to_download_zip_file`:

```
cluster1::> system cluster-switch configure-health-monitor -node *
-package-url 192.168.2.20/usr/download/Cisco_Nexus_92300YC.zip
```

5. Verify that the command output contains the text string "downloaded package processed successfully". If an error occurs, contact NetApp support.
6. Run the command `system cluster-switch show` on the ONTAP system and ensure that the cluster switches are discovered with the monitored field set to "True".

```
cluster1::> system cluster-switch show
```



If at any time you revert to an earlier version of ONTAP, you will need to install the CSHM configuration file again to enable switch health monitoring of 92300YC cluster switches.

## Required documentation

You need specific switch and controller documentation to set up your ONTAP cluster.

### Required documentation for cluster network switches

To set up the Cisco Nexus 9336C-FX2 and 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. |



| Document title                                                                                                                                | Description                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <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.                                                                                       |

To set up the Cisco Nexus 3232C and 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.                |
| <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.                                                      |

| Document title                                                                                                                                         | Description                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <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 (choose the notes for the NX-OS release installed on your switches)</i>                                 | 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.                                                                                       |

To set up the Cisco Nexus 5596 switch, you need the following documents from [Cisco Nexus 5000 Series Switches Support](#) page:

| Document title                                                                                                       | Description                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <i>Nexus 5000 Series Hardware Installation Guide</i>                                                                 | Provides detailed information about site requirements, switch hardware details, and installation options.                |
| <i>Cisco Nexus 5000 Series Switch Software Configuration Guide (choose the guide for the software you are using)</i> | Provides initial switch configuration information that you need before you can configure the switch for ONTAP operation. |
| <i>Cisco Nexus 5000 Series NX-OS Software Upgrade and Downgrade Guide</i>                                            | Provides information about how to downgrade the switch to the supported ONTAP switch software, if necessary.             |
| <i>Cisco Nexus 5000 Series NX-OS Command Reference Master Index</i>                                                  | Provides an alphabetical list of all the commands supported for a specific NX-OS release.                                |
| <i>Cisco Nexus 5000 and Nexus 2000 MIBs Reference</i>                                                                | Describes the Management Information Base (MIB) files for the Nexus 5000 switches.                                       |
| <i>Nexus 5000 Series NX-OS System Message Reference</i>                                                              | Describes troubleshooting information.                                                                                   |

| Document title                                                                                                                                                       | Description                                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <i>Regulatory, Compliance, and Safety Information for the Cisco Nexus 6000 Series, Cisco Nexus 5000 Series, Cisco Nexus 3000 Series, and Cisco Nexus 2000 Series</i> | Provides international agency compliance, safety, and statutory information for the Nexus 5000 series switches. |

### Required documentation for supported ONTAP systems

To set up an ONTAP system, you need the following documents for your version of the operating system from the [ONTAP 9 Documentation Center](#).

| 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. |
| <a href="#">Hardware Universe</a>                              | Provides NetApp hardware configuration and compatibility information.  |

### Rail kit and cabinet documentation

To install a Cisco switch in a NetApp cabinet, see the following hardware documentation:

| Name                                                                                                     | Description                                                                                                           |
|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <a href="#">42U System Cabinet, Deep Guide</a>                                                           | Describes the FRUs associated with the 42U system cabinet, and provides maintenance and FRU replacement instructions. |
| <a href="#">Installing a Cisco Nexus 3232C cluster switch and pass-through panel in a NetApp cabinet</a> | Describes how to install a Cisco Nexus 3232C switch in a four-post NetApp cabinet.                                    |
| <a href="#">Installing a Cisco Nexus 3132Q-V switch and pass-through panel in a NetApp Cabinet</a>       | Describes how to install a Cisco Nexus 3132Q-V switch in a four-post NetApp cabinet.                                  |
| <a href="#">Installing a Cisco Nexus 5596 switch and pass-through panel in a NetApp Cabinet</a>          | Describes how to install a Cisco Nexus 5596 switch in a NetApp cabinet.                                               |

## Considerations for using Smart Call Home

Smart Call Home monitors the hardware and software components on your network, to generate an email-based notification of critical system conditions. When an event occurs on your device, Smart Call Home raises an alert to all the recipients that are configured in your destination profile.

You must configure a cluster network switch to communicate using email with the Smart Call Home system. You can optionally set up your cluster network switch to take advantage of Cisco's embedded Smart Call Home support feature.

Before you can use Smart Call Home feature, you need to be aware of the following considerations:

- 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.

[Cisco support site](#)

## Sample and blank cabling worksheets

The sample cabling worksheets provide examples of recommended port assignments from the switches to the controllers. The blank worksheets provide a template that you can use in setting up your cluster.

### Cisco Nexus 9336C-FX2 cabling worksheet

If you want to document the supported platforms, you must complete the blank cabling worksheet by using the completed sample cabling worksheet as a guide.

#### 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 node 1      | 1                | 4x10GbE node 1      |
| 2                | 4x10GbE node 2      | 2                | 4x10GbE node 2      |
| 3                | 4x10GbE node 3      | 3                | 4x10GbE node 3      |
| 4                | 4x25GbE node 4      | 4                | 4x25GbE node 4      |
| 5                | 4x25GbE node 5      | 5                | 4x25GbE node 5      |
| 6                | 4x25GbE node 6      | 6                | 4x25GbE node 6      |

| Cluster switch A |                              | Cluster switch B |                              |
|------------------|------------------------------|------------------|------------------------------|
| 7                | 4x100GbE node 7              | 7                | 4x100GbE node 7              |
| 8                | 4x100GbE node 8              | 8                | 4x100GbE node 8              |
| 9                | 4x100GbE node 9              | 9                | 4x100GbE node 9              |
| 10               | 4x100GbE node 10             | 10               | 4x100GbE node 10             |
| 11               | 4x100GbE node 11             | 11               | 4x100GbE node 11             |
| 12               | 4x100GbE node 12             | 12               | 4x100GbE node 12             |
| 13               | 4x100GbE node 13             | 13               | 4x100GbE node 13             |
| 14               | 4x100GbE node 14             | 14               | 4x100GbE node 14             |
| 15               | 4x100GbE node 15             | 15               | 4x100GbE node 15             |
| 16               | 4x100GbE node 16             | 16               | 4x100GbE node 16             |
| 17               | 4x100GbE node 17             | 17               | 4x100GbE node 17             |
| 18               | 4x100GbE node 18             | 18               | 4x100GbE node 18             |
| 19               | 4x100GbE node 19             | 19               | 4x100GbE node 19             |
| 20               | 4x100GbE node 20             | 20               | 4x100GbE node 20             |
| 21               | 4x100GbE node 21             | 21               | 4x100GbE node 21             |
| 22               | 4x100GbE node 22             | 22               | 4x100GbE node 22             |
| 23               | 4x100GbE node 23             | 23               | 4x100GbE node 23             |
| 24               | 4x100GbE node 24             | 24               | 4x100GbE node 24             |
| 25 through 34    | Reserved                     | 25 through 34    | Reserved                     |
| 35               | 100G ISL to switch B port 35 | 35               | 100G ISL to switch A port 35 |
| 36               | 100G ISL to switch B port 36 | 36               | 100G ISL to switch A port 36 |

## Blank cabling worksheet

You can use the blank cabling worksheet to document the platforms that are supported as nodes in a cluster. The *Supported Cluster Connections* section of the *Hardware Universe* defines the cluster ports used by the platform.

| Cluster switch A |  | Cluster switch B |  |
|------------------|--|------------------|--|
| 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               |  |

| Cluster switch A |                              | Cluster switch B |                              |
|------------------|------------------------------|------------------|------------------------------|
| 20               |                              | 20               |                              |
| 21               |                              | 21               |                              |
| 22               |                              | 22               |                              |
| 23               |                              | 23               |                              |
| 24               |                              | 24               |                              |
| 25 through 34    | Reserved                     | 25 through 34    | Reserved                     |
| 35               | 100G ISL to switch B port 35 | 35               | 100G ISL to switch A port 35 |
| 36               | 100G ISL to switch B port 36 | 36               | 100G ISL to switch A port 36 |

### Cisco Nexus 92300YC cabling worksheet

If you want to document the supported platforms, you must complete the blank cabling worksheet by using the completed sample cabling worksheet as a guide.

#### 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      |

| Cluster switch A |                | Cluster switch B |                |
|------------------|----------------|------------------|----------------|
| 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 |
| 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 |



| Cluster switch A |                 | Cluster switch B |                 |
|------------------|-----------------|------------------|-----------------|
| 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  |
| 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 |

| Cluster switch A |                                 | Cluster switch B |                                 |
|------------------|---------------------------------|------------------|---------------------------------|
| 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                 |
| 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                |                 |

| Cluster switch A |  | Cluster switch B |  |
|------------------|--|------------------|--|
| 3                |  | 3                |  |
| 4                |  | 4                |  |
| 5                |  | 5                |  |
| 6                |  | 6                |  |
| 7                |  | 7                |  |
| 8                |  | 8                |  |
| 9                |  | 9                |  |
| 10               |  | 10               |  |
| 11               |  | 11               |  |
| 12               |  | 12               |  |
| 13               |  | 13               |  |
| 14               |  | 14               |  |
| 15               |  | 15               |  |
| 16               |  | 16               |  |
| 17               |  | 17               |  |
| 18               |  | 18               |  |
| 19               |  | 19               |  |
| 20               |  | 20               |  |
| 21               |  | 21               |  |
| 22               |  | 22               |  |
| 23               |  | 23               |  |
| 24               |  | 24               |  |

| Cluster switch A |  | Cluster switch B |  |
|------------------|--|------------------|--|
| 25               |  | 25               |  |
| 26               |  | 26               |  |
| 27               |  | 27               |  |
| 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               |  |

| Cluster switch A |                         | Cluster switch B |                         |
|------------------|-------------------------|------------------|-------------------------|
| 47               |                         | 47               |                         |
| 48               |                         | 48               |                         |
| 49               |                         | 49               |                         |
| 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 |

### Cisco Nexus 3232C cabling worksheet

If you want to document the supported platforms, you must complete the blank cabling

worksheet by using the completed sample cabling worksheet as a guide. 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                | 4x10G/40G/100G node | 1                | 4x10G/40G/100G node |
| 2                | 4x10G/40G/100G node | 2                | 4x10G/40G/100G node |
| 3                | 4x10G/40G/100G node | 3                | 4x10G/40G/100G node |
| 4                | 4x10G/40G/100G node | 4                | 4x10G/40G/100G node |
| 5                | 4x10G/40G/100G node | 5                | 4x10G/40G/100G node |
| 6                | 4x10G/40G/100G node | 6                | 4x10G/40G/100G node |
| 7                | 4x10G/40G/100G node | 7                | 4x10G/40G/100G node |
| 8                | 4x10G/40G/100G node | 8                | 4x10G/40G/100G node |
| 9                | 4x10G/40G/100G node | 9                | 4x10G/40G/100G node |
| 10               | 4x10G/40G/100G node | 10               | 4x10G/40G/100G node |
| 11               | 4x10G/40G/100G node | 11               | 4x10G/40G/100G node |
| 12               | 4x10G/40G/100G node | 12               | 4x10G/40G/100G node |
| 13               | 4x10G/40G/100G node | 13               | 4x10G/40G/100G node |
| 14               | 4x10G/40G/100G node | 14               | 4x10G/40G/100G node |
| 15               | 4x10G/40G/100G node | 15               | 4x10G/40G/100G node |
| 16               | 4x10G/40G/100G node | 16               | 4x10G/40G/100G node |
| 17               | 4x10G/40G/100G node | 17               | 4x10G/40G/100G node |
| 18               | 4x10G/40G/100G node | 18               | 4x10G/40G/100G node |

| Cluster switch A |                              | Cluster switch B |                              |
|------------------|------------------------------|------------------|------------------------------|
| 19               | 40G/100G node 19             | 19               | 40G/100G node 19             |
| 20               | 40G/100G node 20             | 20               | 40G/100G node 20             |
| 21               | 40G/100G node 21             | 21               | 40G/100G node 21             |
| 22               | 40G/100G node 22             | 22               | 40G/100G node 22             |
| 23               | 40G/100G node 23             | 23               | 40G/100G node 23             |
| 24               | 40G/100G node 24             | 24               | 40G/100G node 24             |
| 25 through 30    | Reserved                     | 25 through 30    | Reserved                     |
| 31               | 100G ISL to switch B port 31 | 31               | 100G ISL to switch A port 31 |
| 32               | 100G ISL to switch B port 32 | 32               | 100G 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                |                 |

| Cluster switch A |                              | Cluster switch B |                              |
|------------------|------------------------------|------------------|------------------------------|
| 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 through 30    | Reserved                     | 25 through 30    | Reserved                     |
| 31               | 100G ISL to switch B port 31 | 31               | 100G ISL to switch A port 31 |
| 32               | 100G ISL to switch B port 32 | 32               | 100G ISL to switch A port 32 |

### Cisco Nexus 3132Q-V cabling worksheet

If you want to document the supported platforms, you must complete the blank cabling worksheet by using the completed sample cabling worksheet as a guide. 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      |
| 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         |

| Cluster switch A |                             | Cluster switch B |                             |
|------------------|-----------------------------|------------------|-----------------------------|
| 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                |                 |

| Cluster switch A |                             | Cluster switch B |                             |
|------------------|-----------------------------|------------------|-----------------------------|
| 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 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 |

### Cisco Nexus 5596UP and 5596T cabling worksheet

If you want to document the supported platforms, you must complete the blank cabling worksheet by using the completed sample cabling worksheet as a guide.

### Sample cabling worksheet

Some platforms support more than one 10GbE cluster port connection per cluster interconnect switch. To support additional cluster connections, you can use ports 25 through 40, as well as ports 49 through 80 when expansion modules are installed.

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                | Node port 1         | 1                | Node port 1         |
| 2                | Node port 2         | 2                | Node port 2         |
| 3                | Node port 3         | 3                | Node port 3         |
| 4                | Node port 4         | 4                | Node port 4         |
| 5                | Node port 5         | 5                | Node port 5         |
| 6                | Node port 6         | 6                | Node port 6         |
| 7                | Node port 7         | 7                | Node port 7         |
| 8                | Node port 8         | 8                | Node port 8         |
| 9                | Node port 9         | 9                | Node port 9         |
| 10               | Node port 10        | 10               | Node port 10        |
| 11               | Node port 11        | 11               | Node port 11        |
| 12               | Node port 12        | 12               | Node port 12        |
| 13               | Node port 13        | 13               | Node port 13        |
| 14               | Node port 14        | 14               | Node port 14        |
| 15               | Node port 15        | 15               | Node port 15        |
| 16               | Node port 16        | 16               | Node port 16        |
| 17               | Node port 17        | 17               | Node port 17        |
| 18               | Node port 18        | 18               | Node port 18        |

| Cluster switch A |                         | Cluster switch B |                         |
|------------------|-------------------------|------------------|-------------------------|
| 19               | Node port 19            | 19               | Node port 19            |
| 20               | Node port 20            | 20               | Node port 20            |
| 21               | Node port 21            | 21               | Node port 21            |
| 22               | Node port 22            | 22               | Node port 22            |
| 23               | Node port 23            | 23               | Node port 23            |
| 24               | Node port 24            | 24               | Node port 24            |
| 25 through 40    | Reserved                | 25 through 40    | Reserved                |
| 41               | ISL to switch B port 41 | 41               | ISL to switch A port 41 |
| 42               | ISL to switch B port 42 | 42               | ISL to switch A port 42 |
| 43               | ISL to switch B port 43 | 43               | ISL to switch A port 43 |
| 44               | ISL to switch B port 44 | 44               | ISL to switch A port 44 |
| 45               | ISL to switch B port 45 | 45               | ISL to switch A port 45 |
| 46               | ISL to switch B port 46 | 46               | ISL to switch A port 46 |
| 47               | ISL to switch B port 47 | 47               | ISL to switch A port 47 |
| 48               | ISL to switch B port 48 | 48               | ISL to switch A port 48 |

#### 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.



Switch ports 1 through 24 function as 10 GbE ports. Switch ports 41 through 48 are reserved for Inter-Switch Links (ISLs).

| Cluster switch A |                 | Cluster switch B |                 |
|------------------|-----------------|------------------|-----------------|
| Switch port      | Node/port usage | Switch port      | Node/port usage |
| 1                |                 | 1                |                 |

| Cluster switch A |  | Cluster switch B |  |
|------------------|--|------------------|--|
| 2                |  | 2                |  |
| 3                |  | 3                |  |
| 4                |  | 4                |  |
| 5                |  | 5                |  |
| 6                |  | 6                |  |
| 7                |  | 7                |  |
| 8                |  | 8                |  |
| 9                |  | 9                |  |
| 10               |  | 10               |  |
| 11               |  | 11               |  |
| 12               |  | 12               |  |
| 13               |  | 13               |  |
| 14               |  | 14               |  |
| 15               |  | 15               |  |
| 16               |  | 16               |  |
| 17               |  | 17               |  |
| 18               |  | 18               |  |
| 19               |  | 19               |  |
| 20               |  | 20               |  |
| 21               |  | 21               |  |
| 22               |  | 22               |  |
| 23               |  | 23               |  |

| Cluster switch A |                         | Cluster switch B |                         |
|------------------|-------------------------|------------------|-------------------------|
| 24               |                         | 24               |                         |
| 25 through 40    | Reserved                | 25 through 40    | Reserved                |
| 41               | ISL to switch B port 41 | 41               | ISL to switch A port 41 |
| 42               | ISL to switch B port 42 | 42               | ISL to switch A port 42 |
| 43               | ISL to switch B port 43 | 43               | ISL to switch A port 43 |
| 44               | ISL to switch B port 44 | 44               | ISL to switch A port 44 |
| 45               | ISL to switch B port 45 | 45               | ISL to switch A port 45 |
| 46               | ISL to switch B port 46 | 46               | ISL to switch A port 46 |
| 47               | ISL to switch B port 47 | 47               | ISL to switch A port 47 |
| 48               | ISL to switch B port 48 | 48               | ISL to switch A port 48 |

## Install NX-OS software and RCFs on Cisco Nexus 9336C-FX2 cluster switches

### Install NX-OS software and RCFs on Cisco Nexus 9336C-FX2 cluster switches

The Cisco NX-OS software and reference configuration files (RCFs) must be installed on Cisco Nexus 9336C-FX2 cluster switches.

The following conditions must exist before you install the NX-OS software and Reference Configurations Files (RCFs) on the cluster switch:

- The cluster must be fully functioning (there should be no errors in the logs or similar issues).
- You must have checked or set your desired boot configuration in the RCF to reflect the desired boot images if you are installing only NX-OS and keeping your current RCF version.
- If you need to change the boot configuration to reflect the current boot images, you must do so before reapplying the RCF so that the correct version is instantiated on future reboots.
- You must have a console connection to the switch, required when installing the RCF.
- You must have consulted the switch compatibility table on the [Cisco Ethernet switch](#) page for the supported ONTAP, NX-OS, and RCF versions.
- There can be command dependencies between the command syntax in the RCF and that found in versions of NX-OS.
- You must have referred to the appropriate software and upgrade guides available on the Cisco web site for complete documentation on the Cisco switch upgrade and downgrade procedures on **Cisco Nexus 9000**

## Series Switches.

### Cisco Nexus 9000 Series Switches

- You must have the current RCF.



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. This task resets the configuration of the management network.

The examples in this procedure use two nodes. These nodes use two 10GbE cluster interconnect ports e0a and e0b.

See the [Hardware Universe](#) to verify the correct cluster ports on your platforms.



The command outputs might vary depending on different releases of ONTAP.

The examples in this procedure use the following switch and node nomenclature:

- The names of the two Cisco switches are cs1 and cs2.
- The node names are cluster1-01 and cluster1-02.
- The cluster LIF names are cluster1-01\_clus1 and cluster1-01\_clus2 for cluster1-01 and cluster1-02\_clus1 and cluster1-02\_clus2 for cluster1-02.
- The `cluster1::*>` prompt indicates the name of the cluster.



The procedure requires the use of both ONTAP commands and Cisco Nexus 9000 Series Switches commands; ONTAP commands are used unless otherwise indicated.

1. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport message: `system node autosupport invoke -node * -type all -message MAINT=x h`

where x is the duration of the maintenance window in hours.



The AutoSupport message notifies technical support of this maintenance task so that automatic case creation is suppressed during the maintenance window.

2. Change the privilege level to advanced, entering **y** when prompted to continue:

```
set -privilege advanced
```

The advanced prompt (`*>`) appears.

3. Display how many cluster interconnect interfaces are configured in each node for each cluster interconnect switch: `network device-discovery show -protocol cdp`



```
cluster1::*> network device-discovery show -protocol cdp
```

| Node/<br>Protocol | Local<br>Port | Discovered<br>Device (LLDP: ChassisID) | Interface | Platform |
|-------------------|---------------|----------------------------------------|-----------|----------|
| cluster1-02/cdp   | e0a           | cs1                                    | Eth1/2    | N9K-     |
| C9336C            | e0b           | cs2                                    | Eth1/2    | N9K-     |
| C9336C            |               |                                        |           |          |
| cluster1-01/cdp   | e0a           | cs1                                    | Eth1/1    | N9K-     |
| C9336C            | e0b           | cs2                                    | Eth1/1    | N9K-     |
| C9336C            |               |                                        |           |          |

4 entries were displayed.

#### 4. Check the administrative or operational status of each cluster interface.

##### a. Display the network port attributes: network port show -ipspace Cluster

```
cluster1::*> network port show -ipspace Cluster
```

Node: cluster1-02

| Port | IPspace | Broadcast Domain | Link | MTU  | Speed(Mbps) |         | Health |
|------|---------|------------------|------|------|-------------|---------|--------|
|      |         |                  |      |      | Admin/Oper  | Status  |        |
| e0a  | Cluster | Cluster          | up   | 9000 | auto/10000  | healthy |        |
| e0b  | Cluster | Cluster          | up   | 9000 | auto/10000  | healthy |        |

Node: cluster1-01

| Port | IPspace | Broadcast Domain | Link | MTU  | Speed(Mbps) |         | Health |
|------|---------|------------------|------|------|-------------|---------|--------|
|      |         |                  |      |      | Admin/Oper  | Status  |        |
| e0a  | Cluster | Cluster          | up   | 9000 | auto/10000  | healthy |        |
| e0b  | Cluster | Cluster          | up   | 9000 | auto/10000  | healthy |        |

4 entries were displayed.

##### b. Display information about the LIFs: network interface show -vserver Cluster

```
cluster1::*> network interface show -vserver Cluster
```

| Current Is  | Logical           | Status     | Network           | Current |
|-------------|-------------------|------------|-------------------|---------|
| Vserver     | Interface         | Admin/Oper | Address/Mask      | Node    |
| Port        | Home              |            |                   |         |
| -----       |                   |            |                   |         |
| -----       |                   |            |                   |         |
| Cluster     |                   |            |                   |         |
|             | cluster1-01_clus1 | up/up      | 169.254.209.69/16 |         |
| cluster1-01 | e0a true          |            |                   |         |
|             | cluster1-01_clus2 | up/up      | 169.254.49.125/16 |         |
| cluster1-01 | e0b true          |            |                   |         |
|             | cluster1-02_clus1 | up/up      | 169.254.47.194/16 |         |
| cluster1-02 | e0a true          |            |                   |         |
|             | cluster1-02_clus2 | up/up      | 169.254.19.183/16 |         |
| cluster1-02 | e0b true          |            |                   |         |

4 entries were displayed.

5. Ping the remote cluster LIFs: `cluster ping-cluster -node node-name`

```

cluster1::*> cluster ping-cluster -node cluster1-02
Host is cluster1-02
Getting addresses from network interface table...
Cluster cluster1-01_clus1 169.254.209.69 cluster1-01 e0a
Cluster cluster1-01_clus2 169.254.49.125 cluster1-01 e0b
Cluster cluster1-02_clus1 169.254.47.194 cluster1-02 e0a
Cluster cluster1-02_clus2 169.254.19.183 cluster1-02 e0b
Local = 169.254.47.194 169.254.19.183
Remote = 169.254.209.69 169.254.49.125
Cluster Vserver Id = 4294967293
Ping status:

Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s)

Detected 9000 byte MTU on 4 path(s):
 Local 169.254.19.183 to Remote 169.254.209.69
 Local 169.254.19.183 to Remote 169.254.49.125
 Local 169.254.47.194 to Remote 169.254.209.69
 Local 169.254.47.194 to Remote 169.254.49.125
Larger than PMTU communication succeeds on 4 path(s)
RPC status:
2 paths up, 0 paths down (tcp check)
2 paths up, 0 paths down (udp check)

```

6. Verify that the auto-revert command is enabled on all cluster LIFs: network interface show -vserver Cluster -fields auto-revert

```

cluster1::*> network interface show -vserver Cluster -fields auto-revert

```

| 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.

7. For ONTAP 9.8 and later, enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the commands: system switch ethernet log setup-password and system switch ethernet log enable-collection

```

cluster1::*> system switch ethernet log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
cs1
cs2

cluster1::*> system switch ethernet log setup-password

Enter the switch name: cs1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system switch ethernet log setup-password

Enter the switch name: cs2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system switch ethernet log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster1::*>

```



If any of these commands return an error, contact NetApp support.

8. For ONTAP releases 9.5P16, 9.6P12, and 9.7P10 and later patch releases, enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the commands: `system cluster-switch log setup-password` and `system cluster-switch log enable-collection`

```

cluster1::*> system cluster-switch log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
cs1
cs2

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster1::*>

```



If any of these commands return an error, contact NetApp support.

## Install the NX-OS software

You can use this procedure to install the NX-OS software on the Nexus 9336C-FX2 cluster switch.

### Steps

1. Connect the cluster switch to the management network.

2. Use the ping command to verify connectivity to the server hosting the NX-OS software and the RCF.

This example verifies that the switch can reach the server at IP address 172.19.2.1:

```
cs2# ping 172.19.2.1
Pinging 172.19.2.1 with 0 bytes of data:

Reply From 172.19.2.1: icmp_seq = 0. time= 5910 usec.
```

3. Copy the NX-OS software and EPLD images to the Nexus 9336C-FX2 switch.

```
cs2# copy sftp: bootflash: vrf management
Enter source filename: /code/nxos.9.3.5.bin
Enter hostname for the sftp server: 172.19.2.1
Enter username: user1

Outbound-ReKey for 172.19.2.1:22
Inbound-ReKey for 172.19.2.1:22
user1@172.19.2.1's password:
sftp> progress
Progress meter enabled
sftp> get /code/nxos.9.3.5.bin /bootflash/nxos.9.3.5.bin
/code/nxos.9.3.5.bin 100% 1261MB 9.3MB/s 02:15
sftp> exit
Copy complete, now saving to disk (please wait)...
Copy complete.

cs2# copy sftp: bootflash: vrf management

Enter source filename: /code/n9000-epld.9.3.5.img
Enter hostname for the sftp server: 172.19.2.1
Enter username: user1

Outbound-ReKey for 172.19.2.1:22
Inbound-ReKey for 172.19.2.1:22
user1@172.19.2.1's password:
sftp> progress
Progress meter enabled
sftp> get /code/n9000-epld.9.3.5.img /bootflash/n9000-epld.9.3.5.img
/code/n9000-epld.9.3.5.img 100% 161MB 9.5MB/s 00:16
sftp> exit
Copy complete, now saving to disk (please wait)...
Copy complete.
```

#### 4. Verify the running version of the NX-OS software:

```
cs2# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
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http://opensource.org/licenses/gpl-3.0.html and
http://www.opensource.org/licenses/lgpl-2.1.php and
http://www.gnu.org/licenses/old-licenses/library.txt.

Software
 BIOS: version 08.38
 NXOS: version 9.3(4)
 BIOS compile time: 05/29/2020
 NXOS image file is: bootflash:///nxos.9.3.4.bin
 NXOS compile time: 4/28/2020 21:00:00 [04/29/2020 02:28:31]

Hardware
 cisco Nexus9000 C9336C-FX2 Chassis
 Intel(R) Xeon(R) CPU E5-2403 v2 @ 1.80GHz with 8154432 kB of memory.
 Processor Board ID FOC20291J6K

 Device name: cs2
 bootflash: 53298520 kB
 Kernel uptime is 0 day(s), 0 hour(s), 3 minute(s), 42 second(s)

 Last reset at 157524 usecs after Mon Nov 2 18:32:06 2020
 Reason: Reset Requested by CLI command reload
```

System version: 9.3(4)

Service:

plugin

Core Plugin, Ethernet Plugin

Active Package(s):

cs2#

## 5. Install the NX-OS image.

Installing the image file causes it to be loaded every time the switch is rebooted.

```
cs2# install all nxos bootflash:nxos.9.3.5.bin
```

Installer will perform compatibility check first. Please wait.

Installer is forced disruptive

Verifying image bootflash:/nxos.9.3.5.bin for boot variable "nxos".

[#####] 100% -- SUCCESS

Verifying image type.

[#####] 100% -- SUCCESS

Preparing "nxos" version info using image bootflash:/nxos.9.3.5.bin.

[#####] 100% -- SUCCESS

Preparing "bios" version info using image bootflash:/nxos.9.3.5.bin.

[#####] 100% -- SUCCESS

Performing module support checks.

[#####] 100% -- SUCCESS

Notifying services about system upgrade.

[#####] 100% -- SUCCESS

Compatibility check is done:

| Module | bootable | Impact     | Install-type | Reason                         |
|--------|----------|------------|--------------|--------------------------------|
| 1      | yes      | disruptive | reset        | default upgrade is not hitless |



Images will be upgraded according to following table:

| Module             | Image | Running-Version(pri:alt)              | New-Version |
|--------------------|-------|---------------------------------------|-------------|
| Upg-Required       |       |                                       |             |
| -----              | ----- | -----                                 | -----       |
| 1                  | nxos  | 9.3(4)                                | 9.3(5)      |
| yes                |       |                                       |             |
| 1                  | bios  | v08.37(01/28/2020):v08.23(09/23/2015) |             |
| v08.38(05/29/2020) |       | yes                                   |             |

Switch will be reloaded for disruptive upgrade.

Do you want to continue with the installation (y/n)? [n] y

Install is in progress, please wait.

Performing runtime checks.

[#####] 100% -- SUCCESS

Setting boot variables.

[#####] 100% -- SUCCESS

Performing configuration copy.

[#####] 100% -- SUCCESS

Module 1: Refreshing compact flash and upgrading bios/loader/bootrom.

Warning: please do not remove or power off the module at this time.

[#####] 100% -- SUCCESS

Finishing the upgrade, switch will reboot in 10 seconds.

## 6. Verify the new version of NX-OS software after the switch has rebooted: show version

```
cs2# show version
```

Cisco Nexus Operating System (NX-OS) Software

TAC support: <http://www.cisco.com/tac>

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<http://www.opensource.org/licenses/lgpl-2.1.php> and  
<http://www.gnu.org/licenses/old-licenses/library.txt>.

#### Software

BIOS: version 05.33  
NXOS: version 9.3(5)  
BIOS compile time: 09/08/2018  
NXOS image file is: bootflash:///nxos.9.3.5.bin  
NXOS compile time: 11/4/2018 21:00:00 [11/05/2018 06:11:06]

#### Hardware

cisco Nexus9000 C9336C-FX2 Chassis  
Intel(R) Xeon(R) CPU E5-2403 v2 @ 1.80GHz with 8154432 kB of memory.  
Processor Board ID FOC20291J6K

Device name: cs2  
bootflash: 53298520 kB

Kernel uptime is 0 day(s), 0 hour(s), 3 minute(s), 42 second(s)

Last reset at 277524 usecs after Mon Nov 2 22:45:12 2020

Reason: Reset due to upgrade  
System version: 9.3(4)  
Service:

#### plugin

Core Plugin, Ethernet Plugin

Active Package(s):

### 7. Upgrade the EPLD image and reboot the switch.

```
cs2# show version module 1 epld
```

| EPLD Device | Version |
|-------------|---------|
| MI FPGA     | 0x7     |
| IO FPGA     | 0x17    |
| MI FPGA2    | 0x2     |
| GEM FPGA    | 0x2     |
| GEM FPGA    | 0x2     |
| GEM FPGA    | 0x2     |
| GEM FPGA    | 0x2     |

```
cs2# install epld bootflash:n9000-epld.9.3.5.img module 1
```

Compatibility check:

| Module | Type | Upgradable | Impact     | Reason            |
|--------|------|------------|------------|-------------------|
| 1      | SUP  | Yes        | disruptive | Module Upgradable |

Retrieving EPLD versions.... Please wait.

Images will be upgraded according to following table:

| Module | Type | EPLD     | Running-Version | New-Version | Upg-Required |
|--------|------|----------|-----------------|-------------|--------------|
| 1      | SUP  | MI FPGA  | 0x07            | 0x07        | No           |
| 1      | SUP  | IO FPGA  | 0x17            | 0x19        | Yes          |
| 1      | SUP  | MI FPGA2 | 0x02            | 0x02        | No           |

The above modules require upgrade.

The switch will be reloaded at the end of the upgrade

Do you want to continue (y/n) ? [n] y

Proceeding to upgrade Modules.

Starting Module 1 EPLD Upgrade

Module 1 : IO FPGA [Programming] : 100.00% ( 64 of 64 sectors)

Module 1 EPLD upgrade is successful.

| Module | Type | Upgrade-Result |
|--------|------|----------------|
| 1      | SUP  | Success        |

EPLDs upgraded.

Module 1 EPLD upgrade is successful.

8. After the switch reboot, log in again and verify that the new version of EPLD loaded successfully.

```
cs2# show version module 1 epld
```

| EPLD Device | Version |
|-------------|---------|
| MI FPGA     | 0x7     |
| IO FPGA     | 0x19    |
| MI FPGA2    | 0x2     |
| GEM FPGA    | 0x2     |
| GEM FPGA    | 0x2     |
| GEM FPGA    | 0x2     |
| GEM FPGA    | 0x2     |

## Install the Reference Configuration File (RCF)

You can install the RCF after setting up the Nexus 9336C-FX2 switch for the first time. You can also use this procedure to upgrade your RCF version.

The examples in this procedure use the following switch and node nomenclature:

- The names of the two Cisco switches are cs1 and cs2.
- The node names are cluster1-01, cluster1-02, cluster1-03, and cluster1-04.
- The cluster LIF names are cluster1-01\_clus1, cluster1-01\_clus2, cluster1-02\_clus1, cluster1-02\_clus2, cluster1-03\_clus1, cluster1-03\_clus2, cluster1-04\_clus1, and cluster1-04\_clus2.
- The `cluster1::*>` prompt indicates the name of the cluster.



The procedure requires the use of both ONTAP commands and Cisco Nexus 9000 Series Switches commands; ONTAP commands are used unless otherwise indicated.

### Steps

1. Display the cluster ports on each node that are connected to the cluster switches: `network device-discovery show`

```

cluster1::*> network device-discovery show
Node/ Local Discovered
Protocol Port Device (LLDP: ChassisID) Interface Platform

cluster1-01/cdp
 e0a cs1 Ethernet1/7 N9K-
C9336C
 e0d cs2 Ethernet1/7 N9K-
C9336C
cluster1-02/cdp
 e0a cs1 Ethernet1/8 N9K-
C9336C
 e0d cs2 Ethernet1/8 N9K-
C9336C
cluster1-03/cdp
 e0a cs1 Ethernet1/1/1 N9K-
C9336C
 e0b cs2 Ethernet1/1/1 N9K-
C9336C
cluster1-04/cdp
 e0a cs1 Ethernet1/1/2 N9K-
C9336C
 e0b cs2 Ethernet1/1/2 N9K-
C9336C
cluster1::*>

```

## 2. Check the administrative and operational status of each cluster port.

- a. Verify that all the cluster ports are up with a healthy status: `network port show -role cluster`

```

cluster1::*> network port show -role cluster

Node: cluster1-01

Ignore

Health
Port IPspace Broadcast Domain Link MTU Admin/Oper Status
Status

e0a Cluster Cluster up 9000 auto/100000
healthy false
e0d Cluster Cluster up 9000 auto/100000
healthy false

```

Node: cluster1-02

Ignore

|         |         |           |        |      |      | Speed(Mbps) | Health |
|---------|---------|-----------|--------|------|------|-------------|--------|
| Health  |         |           |        |      |      |             |        |
| Port    | IPspace | Broadcast | Domain | Link | MTU  | Admin/Oper  | Status |
| Status  |         |           |        |      |      |             |        |
| -----   | -----   | -----     |        | ---- | ---- | -----       |        |
| -----   | -----   |           |        |      |      |             |        |
| e0a     | Cluster | Cluster   |        | up   | 9000 | auto/100000 |        |
| healthy | false   |           |        |      |      |             |        |
| e0d     | Cluster | Cluster   |        | up   | 9000 | auto/100000 |        |
| healthy | false   |           |        |      |      |             |        |

8 entries were displayed.

Node: cluster1-03

Ignore

|        |         |           |        |      |      | Speed(Mbps) | Health  |
|--------|---------|-----------|--------|------|------|-------------|---------|
| Health |         |           |        |      |      |             |         |
| Port   | IPspace | Broadcast | Domain | Link | MTU  | Admin/Oper  | Status  |
| Status |         |           |        |      |      |             |         |
| -----  | -----   | -----     |        | ---- | ---- | -----       |         |
| -----  | -----   |           |        |      |      |             |         |
| e0a    | Cluster | Cluster   |        | up   | 9000 | auto/10000  | healthy |
| false  |         |           |        |      |      |             |         |
| e0b    | Cluster | Cluster   |        | up   | 9000 | auto/10000  | healthy |
| false  |         |           |        |      |      |             |         |

Node: cluster1-04

Ignore

|        |         |           |        |      |      | Speed(Mbps) | Health  |
|--------|---------|-----------|--------|------|------|-------------|---------|
| Health |         |           |        |      |      |             |         |
| Port   | IPspace | Broadcast | Domain | Link | MTU  | Admin/Oper  | Status  |
| Status |         |           |        |      |      |             |         |
| -----  | -----   | -----     |        | ---- | ---- | -----       |         |
| -----  | -----   |           |        |      |      |             |         |
| e0a    | Cluster | Cluster   |        | up   | 9000 | auto/10000  | healthy |
| false  |         |           |        |      |      |             |         |
| e0b    | Cluster | Cluster   |        | up   | 9000 | auto/10000  | healthy |
| false  |         |           |        |      |      |             |         |

cluster1::\*>

b. Verify that all the cluster interfaces (LIFs) are on the home port: `network interface show -role`

cluster

```
cluster1::*> network interface show -role cluster
```

|            |           | Logical                   | Status     | Network        | Current   |
|------------|-----------|---------------------------|------------|----------------|-----------|
| Current Is |           |                           |            |                |           |
| Vserver    | Interface |                           | Admin/Oper | Address/Mask   | Node      |
| Port       | Home      |                           |            |                |           |
| -----      |           |                           |            |                |           |
| -----      |           |                           |            |                |           |
| Cluster    |           |                           |            |                |           |
| 01         | e0a       | cluster1-01_clus1<br>true | up/up      | 169.254.3.4/23 | cluster1- |
| 01         | e0d       | cluster1-01_clus2<br>true | up/up      | 169.254.3.5/23 | cluster1- |
| 02         | e0a       | cluster1-02_clus1<br>true | up/up      | 169.254.3.8/23 | cluster1- |
| 02         | e0d       | cluster1-02_clus2<br>true | up/up      | 169.254.3.9/23 | cluster1- |
| 03         | e0a       | cluster1-03_clus1<br>true | up/up      | 169.254.1.3/23 | cluster1- |
| 03         | e0b       | cluster1-03_clus2<br>true | up/up      | 169.254.1.1/23 | cluster1- |
| 04         | e0a       | cluster1-04_clus1<br>true | up/up      | 169.254.1.6/23 | cluster1- |
| 04         | e0b       | cluster1-04_clus2<br>true | up/up      | 169.254.1.7/23 | cluster1- |

8 entries were displayed.  
cluster1::\*>

- c. Verify that the cluster displays information for both cluster switches: `system cluster-switch show -is-monitoring-enabled-operational true`

```
cluster1::*> system cluster-switch show -is-monitoring-enabled
-operational true
```

| Switch                                                                                                                                                                        | Type            | Address       | Model      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------------|------------|
| cs1                                                                                                                                                                           | cluster-network | 10.233.205.90 | N9K-C9336C |
| Serial Number: FOCXXXXXXGD<br>Is Monitored: true<br>Reason: None<br>Software Version: Cisco Nexus Operating System (NX-OS) Software,<br>Version 9.3(5)<br>Version Source: CDP |                 |               |            |
| cs2                                                                                                                                                                           | cluster-network | 10.233.205.91 | N9K-C9336C |
| Serial Number: FOCXXXXXXGS<br>Is Monitored: true<br>Reason: None<br>Software Version: Cisco Nexus Operating System (NX-OS) Software,<br>Version 9.3(5)<br>Version Source: CDP |                 |               |            |

```
cluster1::*>
```

### 3. Disable auto-revert on the cluster LIFs.

```
cluster1::*> network interface modify -vserver Cluster -lif * -auto
-revert false
```

### 4. On cluster switch cs2, shut down the ports connected to the cluster ports of the nodes.

```
cs2(config)# interface eth1/1/1-2,eth1/7-8
cs2(config-if-range)# shutdown
```

### 5. Verify that the cluster LIFs have migrated to the ports hosted on cluster switch cs1. This might take a few seconds.

```
network interface show -role cluster
```



```

cluster1::*> network interface show -role cluster

```

| Current Is | Logical   | Status                  | Network        | Current     |
|------------|-----------|-------------------------|----------------|-------------|
| Vserver    | Interface | Admin/Oper              | Address/Mask   | Node        |
| Port       | Home      |                         |                |             |
| -----      |           |                         |                |             |
| Cluster    |           |                         |                |             |
| e0a        | true      | cluster1-01_clus1 up/up | 169.254.3.4/23 | cluster1-01 |
| e0a        | false     | cluster1-01_clus2 up/up | 169.254.3.5/23 | cluster1-01 |
| e0a        | true      | cluster1-02_clus1 up/up | 169.254.3.8/23 | cluster1-02 |
| e0a        | false     | cluster1-02_clus2 up/up | 169.254.3.9/23 | cluster1-02 |
| e0a        | true      | cluster1-03_clus1 up/up | 169.254.1.3/23 | cluster1-03 |
| e0a        | false     | cluster1-03_clus2 up/up | 169.254.1.1/23 | cluster1-03 |
| e0a        | true      | cluster1-04_clus1 up/up | 169.254.1.6/23 | cluster1-04 |
| e0a        | false     | cluster1-04_clus2 up/up | 169.254.1.7/23 | cluster1-04 |

```

8 entries were displayed.
cluster1::*>

```

## 6. Verify that the cluster is healthy: cluster show

```

cluster1::*> cluster show

```

| Node        | Health | Eligibility | Epsilon |
|-------------|--------|-------------|---------|
| cluster1-01 | true   | true        | false   |
| cluster1-02 | true   | true        | false   |
| cluster1-03 | true   | true        | true    |
| cluster1-04 | true   | true        | false   |

```

4 entries were displayed.
cluster1::*>

```

## 7. Clean the configuration on switch cs2 and perform a basic setup.



When updating or applying a new RCF, you must erase the switch settings and perform basic configuration. You must be connected to the switch using the serial console to erase switch settings.

- a. Clean the configuration. This step requires a console connection to the switch.

```
cs2# write erase
Warning: This command will erase the startup-configuration.
Do you wish to proceed anyway? (y/n) [n] y
cs2# reload
This command will reboot the system. (y/n)? [n] y
cs2#
```

- b. Perform a basic setup of the switch.

8. Copy the RCF to the bootflash of switch cs2 using one of the following transfer protocols: FTP, TFTP, SFTP, or SCP. For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 9000 Series NX-OS Command Reference](#) guides.

This example shows TFTP being used to copy an RCF to the bootflash on switch cs2:

```
cs2# copy tftp: bootflash: vrf management
Enter source filename: Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt
Enter hostname for the tftp server: 172.22.201.50
Trying to connect to tftp server.....Connection to Server Established.
TFTP get operation was successful
Copy complete, now saving to disk (please wait)...
```

9. Apply the RCF previously downloaded to the bootflash.

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 9000 Series NX-OS Command Reference](#) guides.

This example shows the RCF file `Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt` being installed on switch cs2:

```
cs2# copy Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt running-config
echo-commands
```

10. Examine the banner output from the `show banner motd` command. You must read and follow these instructions to ensure the proper configuration and operation of the switch.

```
cs2# show banner motd
```

```


* NetApp Reference Configuration File (RCF)
*
* Switch : Nexus N9K-C9336C-FX2
* Filename : Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt
* Date : 10-23-2020
* Version : v1.6
*
* Port Usage:
* Ports 1- 3: Breakout mode (4x10G) Intra-Cluster Ports, int e1/1/1-4,
e1/2/1-4
, e1/3/1-4
* Ports 4- 6: Breakout mode (4x25G) Intra-Cluster/HA Ports, int e1/4/1-
4, e1/5/
1-4, e1/6/1-4
* Ports 7-34: 40/100GbE Intra-Cluster/HA Ports, int e1/7-34
* Ports 35-36: Intra-Cluster ISL Ports, int e1/35-36
*
* Dynamic breakout commands:
* 10G: interface breakout module 1 port <range> map 10g-4x
* 25G: interface breakout module 1 port <range> map 25g-4x
*
* Undo breakout commands and return interfaces to 40/100G configuration
in confi
g mode:
* no interface breakout module 1 port <range> map 10g-4x
* no interface breakout module 1 port <range> map 25g-4x
* interface Ethernet <interfaces taken out of breakout mode>
* inherit port-profile 40-100G
* priority-flow-control mode auto
* service-policy input HA
* exit
*


```

11. Verify that the RCF file is the correct newer version: `show running-config`

When you check the output to verify you have the correct RCF, make sure that the following information is correct:

- The RCF banner

- Customizations

The output varies according to your site configuration. Check the port settings and refer to the release notes for any changes specific to the RCF that you have installed.

12. After you verify the RCF versions and switch settings are correct, copy the running-config file to the startup-config file.

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 9000 Series NX-OS Command Reference](#) guides.

```
cs2# copy running-config startup-config
\[#####
#####
#####\] 100% Copy complete
```

13. Reboot switch cs2. You can ignore the “cluster ports down” events reported on the nodes while the switch reboots.

```
cs2# reload
This command will reboot the system. (y/n)? [n] y
```

14. Verify the health of cluster ports on the cluster.

- a. Verify that e0d ports are up and healthy across all nodes in the cluster: `network port show -role cluster`

```
cluster1::*> network port show -role cluster
```

Node: cluster1-01

Ignore

|        |         |           |        |      |       | Speed (Mbps) | Health  |
|--------|---------|-----------|--------|------|-------|--------------|---------|
| Health |         |           |        |      |       |              |         |
| Port   | IPspace | Broadcast | Domain | Link | MTU   | Admin/Oper   | Status  |
| Status |         |           |        |      |       |              |         |
| -----  | -----   | -----     |        | ---- | ----- | -----        |         |
| -----  | -----   |           |        |      |       |              |         |
| e0a    | Cluster | Cluster   |        | up   | 9000  | auto/10000   | healthy |
| false  |         |           |        |      |       |              |         |
| e0b    | Cluster | Cluster   |        | up   | 9000  | auto/10000   | healthy |
| false  |         |           |        |      |       |              |         |

Node: cluster1-02

Ignore

Speed (Mbps) Health

```

Health
Port IPspace Broadcast Domain Link MTU Admin/Oper Status
Status

e0a Cluster Cluster up 9000 auto/10000 healthy
false
e0b Cluster Cluster up 9000 auto/10000 healthy
false

Node: cluster1-03

Ignore

Speed(Mbps) Health
Health
Port IPspace Broadcast Domain Link MTU Admin/Oper Status
Status

e0a Cluster Cluster up 9000 auto/100000
healthy false
e0d Cluster Cluster up 9000 auto/100000
healthy false

Node: cluster1-04

Ignore

Speed(Mbps) Health
Health
Port IPspace Broadcast Domain Link MTU Admin/Oper Status
Status

e0a Cluster Cluster up 9000 auto/100000
healthy false
e0d Cluster Cluster up 9000 auto/100000
healthy false
8 entries were displayed.

```

- b. Verify the switch health from the cluster (this might not show switch cs2, since LIFs are not homed on e0d).

```

cluster1::*> network device-discovery show -protocol cdp
Node/ Local Discovered
Protocol Port Device (LLDP: ChassisID) Interface
Platform

```

```

cluster1-01/cdp
 e0a cs1 Ethernet1/7 N9K-
C9336C
 e0d cs2 Ethernet1/7 N9K-
C9336C
cluster01-2/cdp
 e0a cs1 Ethernet1/8 N9K-
C9336C
 e0d cs2 Ethernet1/8 N9K-
C9336C
cluster01-3/cdp
 e0a cs1 Ethernet1/1/1 N9K-
C9336C
 e0b cs2 Ethernet1/1/1 N9K-
C9336C
cluster1-04/cdp
 e0a cs1 Ethernet1/1/2 N9K-
C9336C
 e0b cs2 Ethernet1/1/2 N9K-
C9336C

```

```

cluster1::*> system cluster-switch show -is-monitoring-enabled
-operational true

```

| Switch                                                           | Type            | Address       | Model |
|------------------------------------------------------------------|-----------------|---------------|-------|
| cs1                                                              | cluster-network | 10.233.205.90 | NX9-  |
| C9336C                                                           |                 |               |       |
| Serial Number: FOCXXXXXXGD                                       |                 |               |       |
| Is Monitored: true                                               |                 |               |       |
| Reason: None                                                     |                 |               |       |
| Software Version: Cisco Nexus Operating System (NX-OS) Software, |                 |               |       |
| Version                                                          |                 |               |       |
| 9.3(5)                                                           |                 |               |       |
| Version Source: CDP                                              |                 |               |       |
| cs2                                                              | cluster-network | 10.233.205.91 | NX9-  |
| C9336C                                                           |                 |               |       |
| Serial Number: FOCXXXXXXGS                                       |                 |               |       |
| Is Monitored: true                                               |                 |               |       |
| Reason: None                                                     |                 |               |       |
| Software Version: Cisco Nexus Operating System (NX-OS) Software, |                 |               |       |
| Version                                                          |                 |               |       |
| 9.3(5)                                                           |                 |               |       |
| Version Source: CDP                                              |                 |               |       |

2 entries were displayed.



You might observe the following output on the cs1 switch console depending on the RCF version previously loaded on the switch:

```
2020 Nov 17 16:07:18 cs1 %$ VDC-1 %$ %STP-2-UNBLOCK_CONSIST_PORT:
Unblocking port port-channel1 on VLAN0092. Port consistency restored.
2020 Nov 17 16:07:23 cs1 %$ VDC-1 %$ %STP-2-BLOCK_PVID_PEER: Blocking
port-channel1 on VLAN0001. Inconsistent peer vlan.
2020 Nov 17 16:07:23 cs1 %$ VDC-1 %$ %STP-2-BLOCK_PVID_LOCAL: Blocking
port-channel1 on VLAN0092. Inconsistent local vlan.
```

15. On cluster switch cs1, shut down the ports connected to the cluster ports of the nodes.

The following example uses the interface example output from step 1:

```
cs1(config)# interface eth1/1/1-2,eth1/7-8
cs1(config-if-range)# shutdown
```

16. Verify that the cluster LIFs have migrated to the ports hosted on switch cs2. This might take a few seconds.  
`network interface show -role cluster`

```

cluster1::*> network interface show -role cluster

```

|            | Logical           | Status     | Network        | Current     |
|------------|-------------------|------------|----------------|-------------|
| Current Is |                   |            |                |             |
| Vserver    | Interface         | Admin/Oper | Address/Mask   | Node        |
| Port       | Home              |            |                |             |
| -----      |                   |            |                |             |
| Cluster    |                   |            |                |             |
|            | cluster1-01_clus1 | up/up      | 169.254.3.4/23 | cluster1-01 |
| e0d        | false             |            |                |             |
|            | cluster1-01_clus2 | up/up      | 169.254.3.5/23 | cluster1-01 |
| e0d        | true              |            |                |             |
|            | cluster1-02_clus1 | up/up      | 169.254.3.8/23 | cluster1-02 |
| e0d        | false             |            |                |             |
|            | cluster1-02_clus2 | up/up      | 169.254.3.9/23 | cluster1-02 |
| e0d        | true              |            |                |             |
|            | cluster1-03_clus1 | up/up      | 169.254.1.3/23 | cluster1-03 |
| e0b        | false             |            |                |             |
|            | cluster1-03_clus2 | up/up      | 169.254.1.1/23 | cluster1-03 |
| e0b        | true              |            |                |             |
|            | cluster1-04_clus1 | up/up      | 169.254.1.6/23 | cluster1-04 |
| e0b        | false             |            |                |             |
|            | cluster1-04_clus2 | up/up      | 169.254.1.7/23 | cluster1-04 |
| e0b        | true              |            |                |             |

```

8 entries were displayed.
cluster1::*>

```

17. Verify that the cluster is healthy: cluster show

```

cluster1::*> cluster show

```

| Node        | Health | Eligibility | Epsilon |
|-------------|--------|-------------|---------|
| cluster1-01 | true   | true        | false   |
| cluster1-02 | true   | true        | false   |
| cluster1-03 | true   | true        | true    |
| cluster1-04 | true   | true        | false   |

```

4 entries were displayed.
cluster1::*>

```

18. Repeat Steps 7 to 14 on switch cs1.

19. Enable auto-revert on the cluster LIFs.



```
cluster1::*> network interface modify -vserver Cluster -lif * -auto
-revert True
```

20. 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
```

21. Verify that the switch ports connected to the cluster ports are up.

```
cs1# show interface brief \| grep up
.
.
Eth1/1/1 1 eth access up none 10G(D)
--
Eth1/1/2 1 eth access up none 10G(D)
--
Eth1/7 1 eth trunk up none 100G(D)
--
Eth1/8 1 eth trunk up none 100G(D)
--
.
.
```

22. Verify that the ISL between cs1 and cs2 is functional: `show port-channel summary`

```
cs1# show port-channel summary
```

```
Flags: D - Down P - Up in port-channel (members)
 I - Individual H - Hot-standby (LACP only)
 s - Suspended r - Module-removed
 b - BFD Session Wait
 S - Switched R - Routed
 U - Up (port-channel)
 p - Up in delay-lACP mode (member)
 M - Not in use. Min-links not met
```

```


Group Port- Type Protocol Member Ports Channel

1 Po1 (SU) Eth LACP Eth1/35 (P) Eth1/36 (P)
cs1#
```

23. Verify that the cluster LIFs have reverted to their home port: `network interface show -role cluster`

```

cluster1::*> network interface show -role cluster

```

|            | Logical           | Status     | Network        | Current     |
|------------|-------------------|------------|----------------|-------------|
| Current Is |                   |            |                |             |
| Vserver    | Interface         | Admin/Oper | Address/Mask   | Node        |
| Port       | Home              |            |                |             |
| -----      |                   |            |                |             |
| Cluster    |                   |            |                |             |
|            | cluster1-01_clus1 | up/up      | 169.254.3.4/23 | cluster1-01 |
| e0d        | true              |            |                |             |
|            | cluster1-01_clus2 | up/up      | 169.254.3.5/23 | cluster1-01 |
| e0d        | true              |            |                |             |
|            | cluster1-02_clus1 | up/up      | 169.254.3.8/23 | cluster1-02 |
| e0d        | true              |            |                |             |
|            | cluster1-02_clus2 | up/up      | 169.254.3.9/23 | cluster1-02 |
| e0d        | true              |            |                |             |
|            | cluster1-03_clus1 | up/up      | 169.254.1.3/23 | cluster1-03 |
| e0b        | true              |            |                |             |
|            | cluster1-03_clus2 | up/up      | 169.254.1.1/23 | cluster1-03 |
| e0b        | true              |            |                |             |
|            | cluster1-04_clus1 | up/up      | 169.254.1.6/23 | cluster1-04 |
| e0b        | true              |            |                |             |
|            | cluster1-04_clus2 | up/up      | 169.254.1.7/23 | cluster1-04 |
| e0b        | true              |            |                |             |

```

8 entries were displayed.
cluster1::*>

```

24. Verify that the cluster is healthy: `cluster show`

```

cluster1::*> cluster show

```

| Node        | Health | Eligibility | Epsilon |
|-------------|--------|-------------|---------|
| cluster1-01 | true   | true        | false   |
| cluster1-02 | true   | true        | false   |
| cluster1-03 | true   | true        | true    |
| cluster1-04 | true   | true        | false   |

```

4 entries were displayed.
cluster1::*>

```

25. Ping the remote cluster interfaces to verify connectivity: `cluster ping-cluster -node local`

```

cluster1::*> cluster ping-cluster -node local
Host is cluster1-03
Getting addresses from network interface table...
Cluster cluster1-03_clus1 169.254.1.3 cluster1-03 e0a
Cluster cluster1-03_clus2 169.254.1.1 cluster1-03 e0b
Cluster cluster1-04_clus1 169.254.1.6 cluster1-04 e0a
Cluster cluster1-04_clus2 169.254.1.7 cluster1-04 e0b
Cluster cluster1-01_clus1 169.254.3.4 cluster1-01 e0a
Cluster cluster1-01_clus2 169.254.3.5 cluster1-01 e0d
Cluster cluster1-02_clus1 169.254.3.8 cluster1-02 e0a
Cluster cluster1-02_clus2 169.254.3.9 cluster1-02 e0d
Local = 169.254.1.3 169.254.1.1
Remote = 169.254.1.6 169.254.1.7 169.254.3.4 169.254.3.5 169.254.3.8
169.254.3.9
Cluster Vserver Id = 4294967293
Ping status:
.....
Basic connectivity succeeds on 12 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 9000 byte MTU on 12 path(s):
 Local 169.254.1.3 to Remote 169.254.1.6
 Local 169.254.1.3 to Remote 169.254.1.7
 Local 169.254.1.3 to Remote 169.254.3.4
 Local 169.254.1.3 to Remote 169.254.3.5
 Local 169.254.1.3 to Remote 169.254.3.8
 Local 169.254.1.3 to Remote 169.254.3.9
 Local 169.254.1.1 to Remote 169.254.1.6
 Local 169.254.1.1 to Remote 169.254.1.7
 Local 169.254.1.1 to Remote 169.254.3.4
 Local 169.254.1.1 to Remote 169.254.3.5
 Local 169.254.1.1 to Remote 169.254.3.8
 Local 169.254.1.1 to Remote 169.254.3.9
Larger than PMTU communication succeeds on 12 path(s)
RPC status:
6 paths up, 0 paths down (tcp check)
6 paths up, 0 paths down (udp check)

```

## Migrate from a Cisco switch to a Cisco Nexus 9336C-FX2 cluster switch

### Migrate from a Cisco switch to a Cisco Nexus 9336C-FX2 cluster switch

You must be aware of certain configuration information, port connections and cabling

requirements when you are replacing some older Cisco Nexus cluster switches with Cisco Nexus 9336C-FX2 cluster switches.

- The following cluster switches are supported:
  - Nexus 9336C-FX2
  - Nexus 92300YC
  - Nexus 5596UP
  - Nexus 3232C
  - Nexus 3132Q-V
- See the [Hardware Universe](#) for full details of supported ports and their configurations.
- You have configured some of the ports on Nexus 9336C-FX2 switches to run at 10 GbE or 40 GbE.
- You have planned, migrated, and documented 10 GbE and 40 GbE connectivity from nodes to Nexus 9336C-FX2 cluster switches.
- The ONTAP and NX-OS versions supported in this procedure are on the [Cisco Ethernet Switches](#) page.

## How to migrate from a Cisco switch to a Cisco Nexus 9336C-FX2 cluster switch

You can migrate nondisruptively older Cisco cluster switches for an ONTAP cluster to Cisco Nexus 9336C-FX2 cluster network switches.

- The existing cluster must be properly set up and functioning.
- All cluster ports must be in the up state to ensure nondisruptive operations.
- The Nexus 9336C-FX2 cluster switches must be configured and operating under the proper version of NX-OS installed and reference configuration file (RCF) applied.
- The existing cluster network configuration must have the following:
  - A redundant and fully functional NetApp cluster using both older Cisco switches.
  - Management connectivity and console access to both the older Cisco switches and the new switches.
  - All cluster LIFs in the up state with the cluster LIFs are on their home ports.
  - ISL ports enabled and cabled between the older Cisco switches and between the new switches.

The examples in this procedure use the following switch and node nomenclature:

- The existing Cisco Nexus 5596UP cluster switches are c1 and c2.
- The new Nexus 9336C-FX2 cluster switches are cs1 and cs2.
- The nodes are node1 and node2.
- The cluster LIFs are node1\_clus1 and node1\_clus2 on node 1, and node2\_clus1 and node2\_clus2 on node 2 respectively.
- Switch c2 is replaced by switch cs2 first and then switch c1 is replaced by switch cs1.
  - A temporary ISL is built on cs2 connecting c2 to cs2.
  - Cabling between the nodes and c2 are then disconnected from c2 and reconnected to cs2.
  - Cabling between the nodes and c1 are then disconnected from c1 and reconnected to cs1.
  - The temporary ISL between c2 and cs2 is then removed.

## 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. Verify that auto-revert is enabled on all cluster LIFs: `network interface show -vserver Cluster -fields auto-revert`

```
cluster1::*> network interface show -vserver Cluster -fields auto-revert
```

|         | Logical     |             |
|---------|-------------|-------------|
| Vserver | Interface   | Auto-revert |
| -----   | -----       | -----       |
| Cluster |             |             |
|         | node1_clus1 | true        |
|         | node1_clus2 | true        |
|         | node2_clus1 | true        |
|         | node2_clus2 | true        |

```
4 entries were displayed.
```

4. Determine the administrative or operational status for each cluster interface:

Each port should display up for Link and healthy for Health Status.

- a. Display the network port attributes: `network port show -ipspace Cluster`

```
cluster1::*> network port show -ipspace Cluster
```

```
Node: node1
```

```
Ignore
```

|        |         |           |        |      |      | Speed(Mbps) | Health  |
|--------|---------|-----------|--------|------|------|-------------|---------|
| Health |         |           |        |      |      |             |         |
| Port   | IPspace | Broadcast | Domain | Link | MTU  | Admin/Oper  | Status  |
| Status |         |           |        |      |      |             |         |
| -----  | -----   | -----     | -----  | ---- | ---- | -----       |         |
| -----  | -----   |           |        |      |      |             |         |
| 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.
```

- b. Display information about the logical interfaces and their designated home nodes: `network interface show -vserver Cluster`

Each LIF should display up/up for Status Admin/Oper and true for Is Home.

```
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        | node1_clus2 | up/up      | 169.254.49.125/16 | node1   |
| e0a        | node2_clus1 | up/up      | 169.254.47.194/16 | node2   |
| e0b        | node2_clus2 | up/up      | 169.254.19.183/16 | node2   |

4 entries were displayed.

5. The cluster ports on each node are connected to existing cluster switches in the following way (from the nodes' perspective) using the command: `network device-discovery show -protocol cdp`

```
cluster1::*> network device-discovery show -protocol cdp
```

| Node/    | Local | Discovered               |           |          |
|----------|-------|--------------------------|-----------|----------|
| Protocol | Port  | Device (LLDP: ChassisID) | Interface | Platform |
| node1    | /cdp  |                          |           |          |
|          | e0a   | c1                       | 0/1       | N5K-     |
| C5596UP  |       |                          |           |          |
|          | e0b   | c2                       | 0/1       | N5K-     |
| C5596UP  |       |                          |           |          |
| node2    | /cdp  |                          |           |          |
|          | e0a   | c1                       | 0/2       | N5K-     |
| C5596UP  |       |                          |           |          |
|          | e0b   | c2                       | 0/2       | N5K-     |
| C5596UP  |       |                          |           |          |

6. The cluster ports and switches are connected in the following way (from the switches' perspective) using the command: `show cdp neighbors`

```
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<br>Port ID | Local Intrfce | Hldtme | Capability | Platform    |
|----------------------|---------------|--------|------------|-------------|
| node1<br>e0a         | Eth1/1        | 124    | H          | FAS2750     |
| node2<br>e0a         | Eth1/2        | 124    | H          | FAS2750     |
| c2<br>Eth1/41        | Eth1/41       | 179    | S I s      | N5K-C5596UP |
| c2<br>Eth1/42        | Eth1/42       | 175    | S I s      | N5K-C5596UP |
| c2<br>Eth1/43        | Eth1/43       | 179    | S I s      | N5K-C5596UP |
| c2<br>Eth1/44        | Eth1/44       | 175    | S I s      | N5K-C5596UP |
| c2<br>Eth1/45        | Eth1/45       | 179    | S I s      | N5K-C5596UP |
| c2<br>Eth1/46        | Eth1/46       | 179    | S I s      | N5K-C5596UP |
| c2<br>Eth1/47        | Eth1/47       | 175    | S I s      | N5K-C5596UP |
| c2<br>Eth1/48        | Eth1/48       | 179    | S I s      | N5K-C5596UP |

Total entries displayed: 10

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<br>Port ID | Local Intrfce | Hldtme | Capability | Platform    |
|----------------------|---------------|--------|------------|-------------|
| node1<br>e0b         | Eth1/1        | 124    | H          | FAS2750     |
| node2<br>e0b         | Eth1/2        | 124    | H          | FAS2750     |
| c1<br>Eth1/41        | Eth1/41       | 175    | S I s      | N5K-C5596UP |

|         |         |     |       |             |
|---------|---------|-----|-------|-------------|
| c1      | Eth1/42 | 175 | S I s | N5K-C5596UP |
| Eth1/42 |         |     |       |             |
| c1      | Eth1/43 | 175 | S I s | N5K-C5596UP |
| Eth1/43 |         |     |       |             |
| c1      | Eth1/44 | 175 | S I s | N5K-C5596UP |
| Eth1/44 |         |     |       |             |
| c1      | Eth1/45 | 175 | S I s | N5K-C5596UP |
| Eth1/45 |         |     |       |             |
| c1      | Eth1/46 | 175 | S I s | N5K-C5596UP |
| Eth1/46 |         |     |       |             |
| c1      | Eth1/47 | 176 | S I s | N5K-C5596UP |
| Eth1/47 |         |     |       |             |
| c1      | Eth1/48 | 176 | S I s | N5K-C5596UP |
| Eth1/48 |         |     |       |             |

7. Ensure that the cluster network has full connectivity using the command: `cluster ping-cluster -node node-name`

```
cluster1::*> cluster ping-cluster -node node2

Host is node2
Getting addresses from network interface table...
Cluster node1_clus1 169.254.209.69 node1 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)
```

8. Configure a temporary ISL on cs1 on ports e1/33-34, between c1 and cs1.

The following example shows how the new ISL is configured on c1 and cs1:

```
cs2# configure
Enter configuration commands, one per line. End with CNTL/Z.
cs2(config)# interface e1/33-34
cs2(config-if-range)# description temporary ISL between Nexus 5596UP and
Nexus 9336C
cs2(config-if-range)# no lldp transmit
cs2(config-if-range)# no lldp receive
cs2(config-if-range)# switchport mode trunk
cs2(config-if-range)# no spanning-tree bpduguard enable
cs2(config-if-range)# channel-group 101 mode active
cs2(config-if-range)# exit
cs2(config)# interface port-channel 101
cs2(config-if)# switchport mode trunk
cs2(config-if)# spanning-tree port type network
cs2(config-if)# exit
cs2(config)# exit
```

9. Remove ISL cables from ports e1/33-34 from c2 and connect the cables to ports e1/33-34 on cs2.
10. Verify that the ISL ports and port-channel are operational connecting c2 and cs2: `show port-channel summary`

The following example shows the Cisco `show port-channel summary` command being used to verify the ISL ports are operational on c2 and cs2:

```
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
 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 Eth1/41(P) Eth1/42(P)
Eth1/43(P)
 Eth1/44(P) Eth1/45(P)
Eth1/46(P)
 Eth1/47(P) Eth1/48(P)
```

```
cs2# show port-channel summary
```

```
Flags: D - Down P - Up in port-channel (members)
 I - Individual H - Hot-standby (LACP only)
 s - Suspended r - Module-removed
 b - BFD Session Wait
 S - Switched R - Routed
 U - Up (port-channel)
 p - Up in delay-lACP mode (member)
 M - Not in use. Min-links not met
```

```


Group Port- Type Protocol Member Ports
Channel
```

```

1 Po1(SU) Eth LACP Eth1/35(P) Eth1/36(P)
101 Po101(SU) Eth LACP Eth1/41(P) Eth1/42(P)
Eth1/43(P)
 Eth1/44(P) Eth1/45(P)
Eth1/46(P)
 Eth1/47(P) Eth1/48(P)
```

11. For node1, disconnect the cable from e1/1 on c2, and then connect the cable to e1/1 on cs2, using

appropriate cabling supported by Nexus 9336C-FX2.

12. For node2, disconnect the cable from e1/2 on c2, and then connect the cable to e1/2 on cs2, using appropriate cabling supported by Nexus 9336C-FX2.
13. The cluster ports on each node are now connected to cluster switches in the following way, from the nodes' perspective: `network device-discovery show -protocol cdp`

```
cluster1::*> network device-discovery show -protocol cdp
```

| Node/<br>Protocol | Local<br>Port | Discovered<br>Device (LLDP: ChassisID) | Interface | Platform |
|-------------------|---------------|----------------------------------------|-----------|----------|
| node1             | /cdp          |                                        |           |          |
|                   | e0a           | c1                                     | 0/1       | N5K-     |
| C5596UP           |               |                                        |           |          |
|                   | e0b           | cs2                                    | 0/1       | N9K-     |
| C9336C            |               |                                        |           |          |
| node2             | /cdp          |                                        |           |          |
|                   | e0a           | c1                                     | 0/2       | N5K-     |
| C5596UP           |               |                                        |           |          |
|                   | e0b           | cs2                                    | 0/2       | N9K-     |
| C9336C            |               |                                        |           |          |

14. For node1, disconnect the cable from e1/1 on c1, and then connect the cable to e1/1 on cs1, using appropriate cabling supported by Nexus 9336C-FX2.
15. For node2, disconnect the cable from e1/2 on c1, and then connect the cable to e1/2 on cs1, using appropriate cabling supported by Nexus 9336C-FX2.
16. The cluster ports on each node are now connected to cluster switches in the following way, from the nodes' perspective: `network device-discovery show -protocol cdp`

```
cluster1::*> network device-discovery show -protocol cdp
```

| Node/<br>Protocol | Local<br>Port | Discovered<br>Device (LLDP: ChassisID) | Interface | Platform |
|-------------------|---------------|----------------------------------------|-----------|----------|
| node1             | /cdp          |                                        |           |          |
|                   | e0a           | cs1                                    | 0/1       | N9K-     |
| C9336C            |               |                                        |           |          |
|                   | e0b           | cs2                                    | 0/1       | N9K-     |
| C9336C            |               |                                        |           |          |
| node2             | /cdp          |                                        |           |          |
|                   | e0a           | cs1                                    | 0/2       | N9K-     |
| C9336C            |               |                                        |           |          |
|                   | e0b           | cs2                                    | 0/2       | N9K-     |
| C9336C            |               |                                        |           |          |

17. Delete the temporary ISL between cs1 and c1.

```
cs1(config)# no interface port-channel 101
cs1(config)# interface e1/33-34
cs1(config-if-range)# lldp transmit
cs1(config-if-range)# lldp receive
cs1(config-if-range)# no switchport mode trunk
cs1(config-if-range)# no channel-group
cs1(config-if-range)# description 10GbE Node Port
cs1(config-if-range)# spanning-tree bpduguard enable
cs1(config-if-range)# exit
cs1(config)# exit
```

18. Verify the final configuration of the cluster: network port show -ipspace Cluster

Each port should display up for Link and healthy for Health Status.

```
cluster1::*> network port show -ipspace Cluster
```

| Node: node1 |         |           |        |      | Ignore |            | 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

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/<br>Protocol | Local<br>Port | Discovered<br>Device (LLDP: ChassisID) | Interface | Platform |
|-------------------|---------------|----------------------------------------|-----------|----------|
| node2             | /cdp          |                                        |           |          |
|                   | e0a           | cs1                                    | 0/2       | N9K-     |
| C9336C            |               |                                        |           |          |
|                   | e0b           | cs2                                    | 0/2       | N9K-     |
| C9336C            |               |                                        |           |          |
| node1             | /cdp          |                                        |           |          |
|                   | e0a           | cs1                                    | 0/1       | N9K-     |
| C9336C            |               |                                        |           |          |
|                   | e0b           | cs2                                    | 0/1       | N9K-     |
| C9336C            |               |                                        |           |          |

4 entries were displayed.

19. Verify that both nodes each have one connection to each switch: `show cdp neighbors`

The following example shows the appropriate results for both switches:



```
cs1# show cdp neighbors
```

```
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
S - Switch, H - Host, I - IGMP, r - Repeater,
V - VoIP-Phone, D - Remotely-Managed-Device,
s - Supports-STP-Dispute
```

| Device-ID<br>ID | Local Intrfce | Hldtme | Capability | Platform   | Port |
|-----------------|---------------|--------|------------|------------|------|
| node1           | Eth1/1        | 124    | H          | FAS2750    | e0a  |
| node2           | Eth1/2        | 124    | H          | FAS2750    | e0a  |
| cs2             | Eth1/35       | 179    | R S I s    | N9K-C9336C |      |
| Eth1/35         |               |        |            |            |      |
| cs2             | Eth1/36       | 179    | R S I s    | N9K-C9336C |      |
| Eth1/36         |               |        |            |            |      |

```
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<br>ID | Local Intrfce | Hldtme | Capability | Platform   | Port |
|-----------------|---------------|--------|------------|------------|------|
| node1           | Eth1/1        | 124    | H          | FAS2750    | e0b  |
| node2           | Eth1/2        | 124    | H          | FAS2750    | e0b  |
| cs1             | Eth1/35       | 179    | R S I s    | N9K-C9336C |      |
| Eth1/35         |               |        |            |            |      |
| cs1             | Eth1/36       | 179    | R S I s    | N9K-C9336C |      |
| Eth1/36         |               |        |            |            |      |

```
Total entries displayed: 4
```

20. Ensure that the cluster network has full connectivity: `cluster ping-cluster -node node-name`

```
cluster1::*> set -priv advanced
```

Warning: These advanced commands are potentially dangerous; use them only when

directed to do so by NetApp personnel.

Do you want to continue? {y|n}: **y**

```
cluster1::*> cluster ping-cluster -node node2
```

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)

```
cluster1::*> set -privilege admin
```

```
cluster1::*>
```

21. For ONTAP 9.8 and later, enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the following two commands: `system switch ethernet log setup-password` and `system switch ethernet log enable-collection`

Enter: `system switch ethernet log setup-password`

```
cluster1::*> system switch ethernet log setup-password
```

```
Enter the switch name: <return>
```

```
The switch name entered is not recognized.
```

```
Choose from the following list:
```

```
cs1
```

```
cs2
```

```
cluster1::*> system switch ethernet log setup-password
```

```
Enter the switch name: cs1
```

```
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
```

```
Do you want to continue? {y|n}::[n] y
```

```
Enter the password: <enter switch password>
```

```
Enter the password again: <enter switch password>
```

```
cluster1::*> system switch ethernet log setup-password
```

```
Enter the switch name: cs2
```

```
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
```

```
Do you want to continue? {y|n}:: [n] y
```

```
Enter the password: <enter switch password>
```

```
Enter the password again: <enter switch password>
```

Followed by: `system switch ethernet log enable-collection`

```
cluster1::*> system switch ethernet log enable-collection
```

```
Do you want to enable cluster log collection for all nodes in the
cluster?
```

```
{y|n}: [n] y
```

```
Enabling cluster switch log collection.
```

```
cluster1::*>
```



If any of these commands return an error, contact NetApp support.

22. For ONTAP releases 9.5P16, 9.6P12, and 9.7P10 and later patch releases, enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the commands: `system cluster-switch log setup-password` and `system cluster-switch log enable-collection`

Enter: `system cluster-switch log setup-password`

```

cluster1::*> system cluster-switch log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
cs1
cs2

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

```

Followed by: `system cluster-switch log enable-collection`

```

cluster1::*> system cluster-switch log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster1::*>

```



If any of these commands return an error, contact NetApp support.

23. If you suppressed automatic case creation, reenable it by invoking an AutoSupport message: `system node autosupport invoke -node * -type all -message MAINT=END`

# Migrate to a two-node switched cluster with Cisco Nexus 9336C-FX2 cluster switches

## Migrate to a two-node switched cluster with Cisco Nexus 9336C-FX2 cluster switches

You must be aware of certain configuration information, port connections, and cabling requirements when you migrate a two-node switchless cluster, non-disruptively, to a cluster with Cisco Nexus 9336C-FX2 cluster switches. The procedure you use depends on whether you have two dedicated cluster-network ports on each controller or a single cluster port on each controller. The process documented works for all nodes using optical or Twinax ports but is not supported on this switch if nodes are using onboard 10Gb BASE-T RJ45 ports for the cluster-network ports.

Most systems require two dedicated cluster-network ports on each controller. See [Cisco Ethernet switches](#)

## How to migrate to a switched NetApp cluster environment with Cisco Nexus 9336C-FX2 cluster switches

If you have an existing two-node switchless cluster environment, you can migrate to a two-node switched cluster environment using Cisco Nexus 9336C-FX2 switches to enable you to scale beyond two nodes in the cluster.

Two-node switchless configuration:

- The two-node switchless configuration must be properly set up and functioning.
- The nodes must be running ONTAP 9.8 and later.
- All cluster ports must be in the up state.
- All cluster logical interfaces (LIFs) must be in the up state and on their home ports.

Cisco Nexus 9336C-FX2 switch configuration:

- Both switches must have management network connectivity.
- There must be console access to the cluster switches.
- Nexus 9336C-FX2 node-to-node switch and switch-to-switch connections must use Twinax or fiber cables.

The [Hardware Universe - Switches](#) contains more information about cabling.

### [Hardware Universe - Switches](#)

- Inter-Switch Link (ISL) cables must be connected to ports 1/35 and 1/36 on both 9336C-FX2 switches.
- Initial customization of both the 9336C-FX2 switches must be completed. So that the:
  - 9336C-FX2 switches are running the latest version of software
  - Reference Configuration Files (RCFs) have been applied to the switchesAny site customization, such as SMTP, SNMP, and SSH must be configured on the new switches.

The examples in this procedure use the following cluster switch and node nomenclature:

- The names of the 9336C-FX2 switches are cs1 and cs2.
- The names of the cluster SVMs are node1 and node2.
- The names of the LIFs are node1\_clus1 and node1\_clus2 on node 1, and node2\_clus1 and node2\_clus2 on node 2 respectively.
- The `cluster1::*>` prompt indicates the name of the cluster.
- The cluster ports used in this procedure are e0a and e0b.

The [Hardware Universe](#) contains the latest information about the actual cluster ports for your platforms.

## Steps

1. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport message: `system node autosupport invoke -node * -type all -message MAINT=xh`

where x is the duration of the maintenance window in hours.



The AutoSupport message notifies technical support of this maintenance task so that automatic case creation is suppressed during the maintenance window.

2. Change the privilege level to advanced, entering y when prompted to continue: `set -privilege advanced`

The advanced prompt (`*>`) appears.

3. Disable all node-facing ports (not ISL ports) on both the new cluster switches cs1 and cs2.

You must not disable the ISL ports.

The following example shows that node-facing ports 1 through 34 are disabled on switch cs1:

```
cs1# config
Enter configuration commands, one per line. End with CNTL/Z.
cs1(config)# interface e/1-34
cs1(config-if-range)# shutdown
```

4. Verify that the ISL and the physical ports on the ISL between the two 9336C-FX2 switches cs1 and cs2 are up on ports 1/35 and 1/36: `show port-channel summary`

The following example shows that the ISL ports are up on switch cs1:

```
cs1# show port-channel summary
```

```
Flags: D - Down P - Up in port-channel (members)
 I - Individual H - Hot-standby (LACP only)
 s - Suspended r - Module-removed
 b - BFD Session Wait
 S - Switched R - Routed
 U - Up (port-channel)
 p - Up in delay-lacp mode (member)
 M - Not in use. Min-links not met
```

```


Group Port- Type Protocol Member Ports
Channel

1 Po1 (SU) Eth LACP Eth1/35 (P) Eth1/36 (P)
```

The following example shows that the ISL ports are up on switch cs2 :

```
(cs2)# show port-channel summary
```

```
Flags: D - Down P - Up in port-channel (members)
 I - Individual H - Hot-standby (LACP only)
 s - Suspended r - Module-removed
 b - BFD Session Wait
 S - Switched R - Routed
 U - Up (port-channel)
 p - Up in delay-lacp mode (member)
 M - Not in use. Min-links not met
```

```


Group Port- Type Protocol Member Ports
Channel

1 Po1 (SU) Eth LACP Eth1/35 (P) Eth1/36 (P)
```

##### 5. Display the list of neighboring devices: show cdp neighbors

This command provides information about the devices that are connected to the system.

The following example lists the neighboring devices on switch cs1:

```
cs1# show cdp neighbors
```

Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge  
S - Switch, H - Host, I - IGMP, r - Repeater,  
V - VoIP-Phone, D - Remotely-Managed-Device,  
s - Supports-STP-Dispute

| Device-ID<br>ID | Local Intrfce | Hldtme | Capability | Platform   | Port |
|-----------------|---------------|--------|------------|------------|------|
| cs2             | Eth1/35       | 175    | R S I s    | N9K-C9336C |      |
| Eth1/35         |               |        |            |            |      |
| cs2             | Eth1/36       | 175    | R S I s    | N9K-C9336C |      |
| Eth1/36         |               |        |            |            |      |

Total entries displayed: 2

The following example lists the neighboring devices on switch cs2:

```
cs2# show cdp neighbors
```

Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge  
S - Switch, H - Host, I - IGMP, r - Repeater,  
V - VoIP-Phone, D - Remotely-Managed-Device,  
s - Supports-STP-Dispute

| Device-ID<br>ID | Local Intrfce | Hldtme | Capability | Platform   | Port |
|-----------------|---------------|--------|------------|------------|------|
| cs1             | Eth1/35       | 177    | R S I s    | N9K-C9336C |      |
| Eth1/35         |               |        |            |            |      |
| cs1             | Eth1/36       | 177    | R S I s    | N9K-C9336C |      |
| Eth1/36         |               |        |            |            |      |

Total entries displayed: 2

6. Verify that all cluster ports are up: `network port show -ip space Cluster`

Each port should display up for Link and healthy for Health Status.



```
cluster1::*> network port show -ipspace Cluster
```

Node: node1

| Port | IPspace | Broadcast Domain | Link | MTU  | Speed(Mbps)<br>Admin/Oper | Health<br>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)<br>Admin/Oper | Health<br>Status |
|------|---------|------------------|------|------|---------------------------|------------------|
| e0a  | Cluster | Cluster          | up   | 9000 | auto/10000                | healthy          |
| e0b  | Cluster | Cluster          | up   | 9000 | auto/10000                | healthy          |

4 entries were displayed.

7. Verify that all cluster LIFs are up and operational: network interface show -vserver Cluster

Each cluster LIF should display true for Is Home and have a Status Admin/Oper of up/up

```
cluster1::*> network interface show -vserver Cluster
```

| Current Is | Logical Interface | Status Admin/Oper | Network Address/Mask | Current Node | Port |
|------------|-------------------|-------------------|----------------------|--------------|------|
| Vserver    |                   |                   |                      |              |      |
| 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.

8. Verify that auto-revert is enabled on all cluster LIFs: network interface show -vserver Cluster

-fields auto-revert

```
cluster1::*> network interface show -vserver Cluster -fields auto-revert
```

| Vserver | Logical Interface | Auto-revert |
|---------|-------------------|-------------|
| Cluster | node1_clus1       | true        |
|         | node1_clus2       | true        |
|         | node2_clus1       | true        |
|         | node2_clus2       | true        |

4 entries were displayed.

9. Disconnect the cable from cluster port e0a on node1, and then connect e0a to port 1 on cluster switch cs1, using the appropriate cabling supported by the 9336C-FX2 switches.

The [Hardware Universe - Switches](#) contains more information about cabling.

#### [Hardware Universe - Switches](#)

10. 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 9336C-FX2 switches.
11. Enable all node-facing ports on cluster switch cs1.

The following example shows that ports 1/1 through 1/34 are enabled on switch cs1:

```
cs1# config
Enter configuration commands, one per line. End with CNTL/Z.
cs1(config)# interface e1/1-34
cs1(config-if-range)# no shutdown
```

12. Verify that all cluster LIFs are up, operational, and display as true for Is Home:network interface show -vserver Cluster

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
```

| Is      | Logical     | Status     | Network           | Current | 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     |
| true    |             |            |                   |         |         |

```
4 entries were displayed.
```

13. Display information about the status of the nodes in the cluster: `cluster show`

The following example displays information about the health and eligibility of the nodes in the cluster:

```
cluster1::*> cluster show
```

| Node  | Health | Eligibility | Epsilon |
|-------|--------|-------------|---------|
| ----- | -----  | -----       | -----   |
| node1 | true   | true        | false   |
| node2 | true   | true        | false   |

```
2 entries were displayed.
```

14. Disconnect the cable from cluster port e0b on node1, and then connect e0b to port 1 on cluster switch cs2, using the appropriate cabling supported by the 9336C-FX2 switches.
15. 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 9336C-FX2 switches.
16. Enable all node-facing ports on cluster switch cs2.

The following example shows that ports 1/1 through 1/34 are enabled on switch cs2:

```
cs2# config
Enter configuration commands, one per line. End with CNTL/Z.
cs2(config)# interface e1/1-34
cs2(config-if-range)# no shutdown
```

#### 17. Verify that all cluster ports are up: `network port show -ipspace Cluster`

The following example shows that all of the cluster ports are up on node1 and node2:

```
cluster1::*> network port show -ipspace Cluster

Node: node1

Ignore
Speed(Mbps) Health
Health
Port IPspace Broadcast Domain Link MTU Admin/Oper Status
Status

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.
```

#### 18. Verify that all interfaces display true for Is Home: `network interface show -vserver Cluster`



This might take several minutes to complete.

The following example shows that all LIFs are up on node1 and node2 and that Is Home results are true:

```
cluster1::*> network interface show -vserver Cluster
```

| Is      | Logical     | Status     | Network           | Current | 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.

19. Verify that both nodes each have one connection to each switch: show cdp neighbors

The following example shows the appropriate results for both switches:

```
(cs1)# show cdp neighbors
```

Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge  
S - Switch, H - Host, I - IGMP, r - Repeater,  
V - VoIP-Phone, D - Remotely-Managed-Device,  
s - Supports-STP-Dispute

| Device-ID<br>ID | Local Intrfce | Hldtme | Capability | Platform   | Port |
|-----------------|---------------|--------|------------|------------|------|
| node1           | Eth1/1        | 133    | H          | FAS2980    | e0a  |
| node2           | Eth1/2        | 133    | H          | FAS2980    | e0a  |
| cs2             | Eth1/35       | 175    | R S I s    | N9K-C9336C |      |
| Eth1/35         |               |        |            |            |      |
| cs2             | Eth1/36       | 175    | R S I s    | N9K-C9336C |      |
| Eth1/36         |               |        |            |            |      |

Total entries displayed: 4

```
(cs2)# show cdp neighbors
```

Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge  
S - Switch, H - Host, I - IGMP, r - Repeater,  
V - VoIP-Phone, D - Remotely-Managed-Device,  
s - Supports-STP-Dispute

| Device-ID<br>ID | Local Intrfce | Hldtme | Capability | Platform   | Port |
|-----------------|---------------|--------|------------|------------|------|
| node1           | Eth1/1        | 133    | H          | FAS2980    | e0b  |
| node2           | Eth1/2        | 133    | H          | FAS2980    | e0b  |
| cs1             | Eth1/35       | 175    | R S I s    | N9K-C9336C |      |
| Eth1/35         |               |        |            |            |      |
| cs1             | Eth1/36       | 175    | R S I s    | N9K-C9336C |      |
| Eth1/36         |               |        |            |            |      |

Total entries displayed: 4

20. Display information about the discovered network devices in your cluster: network device-discovery  
show -protocol cdp

```
cluster1::*> network device-discovery show -protocol cdp
```

| Node/<br>Protocol | Local<br>Port | Discovered<br>Device (LLDP: ChassisID) | Interface | Platform |
|-------------------|---------------|----------------------------------------|-----------|----------|
| node2             | /cdp          |                                        |           |          |
|                   | e0a           | cs1                                    | 0/2       | N9K-     |
| C9336C            |               |                                        |           |          |
|                   | e0b           | cs2                                    | 0/2       | N9K-     |
| C9336C            |               |                                        |           |          |
| node1             | /cdp          |                                        |           |          |
|                   | e0a           | cs1                                    | 0/1       | N9K-     |
| C9336C            |               |                                        |           |          |
|                   | e0b           | cs2                                    | 0/1       | N9K-     |
| C9336C            |               |                                        |           |          |

4 entries were displayed.

21. Verify that the settings are disabled: `network options switchless-cluster show`



It might take several minutes for the command to complete. Wait for the '3 minute lifetime to expire' announcement.

The false output in the following example shows that the configuration settings are disabled:

```
cluster1::*> network options switchless-cluster show
Enable Switchless Cluster: false
```

22. Verify the status of the node members in the cluster: `cluster show`

The following example shows information about the health and eligibility of the nodes in the cluster:

```
cluster1::*> cluster show
```

| Node  | Health | Eligibility | Epsilon |
|-------|--------|-------------|---------|
| node1 | true   | true        | false   |
| node2 | true   | true        | false   |

23. Ensure that the cluster network has full connectivity: `cluster ping-cluster -node node-name`

```

cluster1::*> cluster ping-cluster -node node2
Host is node2
Getting addresses from network interface table...
Cluster node1_clus1 169.254.209.69 node1 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)

```

24. Change the privilege level back to admin: `set -privilege admin`
25. For ONTAP 9.8 and later, enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the commands: `system switch ethernet log setup-password` and `system switch ethernet log enable-collection`



```

cluster1::*> system switch ethernet log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
cs1
cs2

cluster1::*> system switch ethernet log setup-password

Enter the switch name: cs1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system switch ethernet log setup-password

Enter the switch name: cs2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system switch ethernet log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster1::*>

```



If any of these commands return an error, contact NetApp support.

26. For ONTAP releases 9.5P16, 9.6P12, and 9.7P10 and later patch releases, enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the commands: `system cluster-switch log setup-password` and `system cluster-switch log enable-collection`

```

cluster1::*> system cluster-switch log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
cs1
cs2

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster1::*>

```



If any of these commands return an error, contact NetApp support.

27. If you suppressed automatic case creation, reenable it by invoking an AutoSupport message: `system node autosupport invoke -node * -type all -message MAINT=END`

## Configure a Cisco Nexus 9336C-FX2 cluster switch

### Configure a Cisco Nexus 9336C-FX2 cluster switch

You can configure a new Nexus 9336C-FX2 switch by completing the steps detailed in

this chapter.

Installing the Nexus 9336C-FX2 switch on systems running ONTAP 9.8 and later, starts with setting up an IP address and configuration to allow the switch to communicate through the management interface. You can then install the NX-OS software and reference configuration file (RCF). This procedure is intended for preparing the Nexus 9336C-FX2 switch before controllers are added.

The examples in this procedure use the following switch and node nomenclature:

- The Nexus 9336C-FX2 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.

- The node connections supported for the Nexus 9336C-FX2 switches are ports 1/1 through 1/34.
- The Inter-Switch Links (ISLs) supported for the Nexus 9336C-FX2 switches are ports 1/35 and 1/36.
- The examples in this procedure use two nodes, but you can have up to 24 nodes in a cluster.

## Initial installation of the Nexus 9336C-FX2 cluster switch

You can use this procedure to perform the initial installation of the Cisco Nexus 9336C-FX2 switch.

You can download the applicable NetApp Cisco NX-OS software for your switches from the NetApp Support Site at [mysupport.netapp.com](https://mysupport.netapp.com).

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.

This procedure provides a summary of the process to install your switches and get them running.

### Steps

1. Connect the serial port to the host or serial port of your choice.
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. Booting for the first time or rebooting after erasing the running configuration, the Nexus 9336C-FX2 switch

loops in a boot cycle. Interrupt this cycle by typing **yes** to abort Power on Auto Provisioning. You are then presented with the System Admin Account setup:

```
$ 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]: yes
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 ----
```

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. Enter the Basic System Configuration dialog:

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.
```

17. For ONTAP 9.8 and later, enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the commands: `system switch ethernet log setup-password` and `system switch ethernet log enable-collection`

```

cluster1::*> system switch ethernet log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
cs1
cs2

cluster1::*> system switch ethernet log setup-password

Enter the switch name: cs1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system switch ethernet log setup-password

Enter the switch name: cs2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system switch ethernet log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster1::*>

```



If any of these commands return an error, contact NetApp support.

18. For ONTAP releases 9.5P16, 9.6P12, and 9.7P10 and later patch releases, enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the commands: `system cluster-switch log setup-password` and `system cluster-switch log enable-collection`

```

cluster1::*> system cluster-switch log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
cs1
cs2

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster1::*>

```



If any of these commands return an error, contact NetApp support.

## Install the NX-OS software

You can use this procedure to install the NX-OS software on the Nexus 9336C-FX2 cluster switch.

### Steps

1. Connect the cluster switch to the management network.



2. Use the ping command to verify connectivity to the server hosting the NX-OS software and the RCF.

This example verifies that the switch can reach the server at IP address 172.19.2.1:

```
cs2# ping 172.19.2.1
Pinging 172.19.2.1 with 0 bytes of data:

Reply From 172.19.2.1: icmp_seq = 0. time= 5910 usec.
```

3. Copy the NX-OS software and EPLD images to the Nexus 9336C-FX2 switch.

```
cs2# copy sftp: bootflash: vrf management
Enter source filename: /code/nxos.9.3.5.bin
Enter hostname for the sftp server: 172.19.2.1
Enter username: user1

Outbound-ReKey for 172.19.2.1:22
Inbound-ReKey for 172.19.2.1:22
user1@172.19.2.1's password:
sftp> progress
Progress meter enabled
sftp> get /code/nxos.9.3.5.bin /bootflash/nxos.9.3.5.bin
/code/nxos.9.3.5.bin 100% 1261MB 9.3MB/s 02:15
sftp> exit
Copy complete, now saving to disk (please wait)...
Copy complete.

cs2# copy sftp: bootflash: vrf management
Enter source filename: /code/n9000-epld.9.3.5.img
Enter hostname for the sftp server: 172.19.2.1
Enter username: user1

Outbound-ReKey for 172.19.2.1:22
Inbound-ReKey for 172.19.2.1:22
user1@172.19.2.1's password:
sftp> progress
Progress meter enabled
sftp> get /code/n9000-epld.9.3.5.img /bootflash/n9000-epld.9.3.5.img
/code/n9000-epld.9.3.5.img 100% 161MB 9.5MB/s 00:16
sftp> exit
Copy complete, now saving to disk (please wait)...
Copy complete.
```

4. Verify the running version of the NX-OS software:

```
cs2# show version
```

```
Cisco Nexus Operating System (NX-OS) Software
```

```
TAC support: http://www.cisco.com/tac
```

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```

#### Software

```
BIOS: version 08.38
```

```
NXOS: version 9.3(4)
```

```
BIOS compile time: 05/29/2020
```

```
NXOS image file is: bootflash:///nxos.9.3.4.bin
```

```
NXOS compile time: 4/28/2020 21:00:00 [04/29/2020 02:28:31]
```

#### Hardware

```
cisco Nexus9000 C9336C-FX2 Chassis
```

```
Intel(R) Xeon(R) CPU E5-2403 v2 @ 1.80GHz with 8154432 kB of memory.
```

```
Processor Board ID FOC20291J6K
```

```
Device name: cs2
```

```
bootflash: 53298520 kB
```

```
Kernel uptime is 0 day(s), 0 hour(s), 3 minute(s), 42 second(s)
```

```
Last reset at 157524 usecs after Mon Nov 2 18:32:06 2020
```

```
Reason: Reset Requested by CLI command reload
```

```
System version: 9.3(4)
```

```
Service:
```

```
plugin
 Core Plugin, Ethernet Plugin
```

```
Active Package(s):
```

```
cs2#
```

## 5. Install the NX-OS image.

Installing the image file causes it to be loaded every time the switch is rebooted.

```
cs2# install all nxos bootflash:nxos.9.3.5.bin
```

```
Installer will perform compatibility check first. Please wait.
Installer is forced disruptive
```

```
Verifying image bootflash:/nxos.9.3.5.bin for boot variable "nxos".
[#####] 100% -- SUCCESS
```

```
Verifying image type.
[#####] 100% -- SUCCESS
```

```
Preparing "nxos" version info using image bootflash:/nxos.9.3.5.bin.
[#####] 100% -- SUCCESS
```

```
Preparing "bios" version info using image bootflash:/nxos.9.3.5.bin.
[#####] 100% -- SUCCESS
```

```
Performing module support checks.
[#####] 100% -- SUCCESS
```

```
Notifying services about system upgrade.
[#####] 100% -- SUCCESS
```

```
Compatibility check is done:
```

| Module | bootable | Impact     | Install-type | Reason                         |
|--------|----------|------------|--------------|--------------------------------|
| -----  | -----    | -----      | -----        | -----                          |
| 1      | yes      | disruptive | reset        | default upgrade is not hitless |

Images will be upgraded according to following table:

| Module             | Image | Running-Version(pri:alt)              | New-Version |
|--------------------|-------|---------------------------------------|-------------|
| Upg-Required       |       |                                       |             |
| 1                  | nxos  | 9.3(4)                                | 9.3(5)      |
| yes                |       |                                       |             |
| 1                  | bios  | v08.37(01/28/2020):v08.23(09/23/2015) |             |
| v08.38(05/29/2020) |       | yes                                   |             |

Switch will be reloaded for disruptive upgrade.

Do you want to continue with the installation (y/n)? [n] y

Install is in progress, please wait.

Performing runtime checks.

[#####] 100% -- SUCCESS

Setting boot variables.

[#####] 100% -- SUCCESS

Performing configuration copy.

[#####] 100% -- SUCCESS

Module 1: Refreshing compact flash and upgrading bios/loader/bootrom.

Warning: please do not remove or power off the module at this time.

[#####] 100% -- SUCCESS

Finishing the upgrade, switch will reboot in 10 seconds.

## 6. Verify the new version of NX-OS software after the switch has rebooted: show version

```
cs2# show version
```

Cisco Nexus Operating System (NX-OS) Software

TAC support: <http://www.cisco.com/tac>

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#### Software

BIOS: version 05.33  
NXOS: version 9.3(5)  
BIOS compile time: 09/08/2018  
NXOS image file is: bootflash:///nxos.9.3.5.bin  
NXOS compile time: 11/4/2018 21:00:00 [11/05/2018 06:11:06]

#### Hardware

cisco Nexus9000 C9336C-FX2 Chassis  
Intel(R) Xeon(R) CPU E5-2403 v2 @ 1.80GHz with 8154432 kB of memory.  
Processor Board ID FOC20291J6K

Device name: cs2  
bootflash: 53298520 kB

Kernel uptime is 0 day(s), 0 hour(s), 3 minute(s), 42 second(s)

Last reset at 277524 usecs after Mon Nov 2 22:45:12 2020

Reason: Reset due to upgrade

System version: 9.3(4)

Service:

#### plugin

Core Plugin, Ethernet Plugin

Active Package(s):

### 7. Upgrade the EPLD image and reboot the switch.

```
cs2# show version module 1 epld
```

| EPLD Device | Version |
|-------------|---------|
| MI FPGA     | 0x7     |
| IO FPGA     | 0x17    |
| MI FPGA2    | 0x2     |
| GEM FPGA    | 0x2     |
| GEM FPGA    | 0x2     |
| GEM FPGA    | 0x2     |
| GEM FPGA    | 0x2     |

```
cs2# install epld bootflash:n9000-epld.9.3.5.img module 1
```

Compatibility check:

| Module | Type | Upgradable | Impact     | Reason            |
|--------|------|------------|------------|-------------------|
| 1      | SUP  | Yes        | disruptive | Module Upgradable |

Retrieving EPLD versions.... Please wait.

Images will be upgraded according to following table:

| Module | Type | EPLD     | Running-Version | New-Version | Upg-Required |
|--------|------|----------|-----------------|-------------|--------------|
| 1      | SUP  | MI FPGA  | 0x07            | 0x07        | No           |
| 1      | SUP  | IO FPGA  | 0x17            | 0x19        | Yes          |
| 1      | SUP  | MI FPGA2 | 0x02            | 0x02        | No           |

The above modules require upgrade.

The switch will be reloaded at the end of the upgrade

Do you want to continue (y/n) ? [n] y

Proceeding to upgrade Modules.

Starting Module 1 EPLD Upgrade

Module 1 : IO FPGA [Programming] : 100.00% ( 64 of 64 sectors)

Module 1 EPLD upgrade is successful.

| Module | Type | Upgrade-Result |
|--------|------|----------------|
| 1      | SUP  | Success        |

EPLDs upgraded.

Module 1 EPLD upgrade is successful.

8. After the switch reboot, log in again and verify that the new version of EPLD loaded successfully.

```
cs2# show version module 1 epld
```

| EPLD Device | Version |
|-------------|---------|
| MI FPGA     | 0x7     |
| IO FPGA     | 0x19    |
| MI FPGA2    | 0x2     |
| GEM FPGA    | 0x2     |
| GEM FPGA    | 0x2     |
| GEM FPGA    | 0x2     |
| GEM FPGA    | 0x2     |

## Install the Reference Configuration File (RCF)

You can install the RCF after setting up the Nexus 9336C-FX2 switch for the first time. You can also use this procedure to upgrade your RCF version.

The examples in this procedure use the following switch and node nomenclature:

- The names of the two Cisco switches are cs1 and cs2.
- The node names are cluster1-01, cluster1-02, cluster1-03, and cluster1-04.
- The cluster LIF names are cluster1-01\_clus1, cluster1-01\_clus2, cluster1-02\_clus1, cluster1-02\_clus2, cluster1-03\_clus1, cluster1-03\_clus2, cluster1-04\_clus1, and cluster1-04\_clus2.
- The `cluster1::*>` prompt indicates the name of the cluster.



The procedure requires the use of both ONTAP commands and Cisco Nexus 9000 Series Switches commands; ONTAP commands are used unless otherwise indicated.

### Steps

1. Display the cluster ports on each node that are connected to the cluster switches: `network device-discovery show`

```

cluster1::*> network device-discovery show
Node/ Local Discovered
Protocol Port Device (LLDP: ChassisID) Interface Platform

cluster1-01/cdp
 e0a cs1 Ethernet1/7 N9K-
C9336C
 e0d cs2 Ethernet1/7 N9K-
C9336C
cluster1-02/cdp
 e0a cs1 Ethernet1/8 N9K-
C9336C
 e0d cs2 Ethernet1/8 N9K-
C9336C
cluster1-03/cdp
 e0a cs1 Ethernet1/1/1 N9K-
C9336C
 e0b cs2 Ethernet1/1/1 N9K-
C9336C
cluster1-04/cdp
 e0a cs1 Ethernet1/1/2 N9K-
C9336C
 e0b cs2 Ethernet1/1/2 N9K-
C9336C
cluster1::*>

```

## 2. Check the administrative and operational status of each cluster port.

- a. Verify that all the cluster ports are up with a healthy status: `network port show -role cluster`

```

cluster1::*> network port show -role cluster

Node: cluster1-01

Ignore

Health
Port IPspace Broadcast Domain Link MTU Admin/Oper Status
Status

e0a Cluster Cluster up 9000 auto/100000
healthy false
e0d Cluster Cluster up 9000 auto/100000
healthy false

```



Node: cluster1-02

Ignore

|         |         |           |        |      |      | Speed(Mbps) | Health |
|---------|---------|-----------|--------|------|------|-------------|--------|
| Health  |         |           |        |      |      |             |        |
| Port    | IPspace | Broadcast | Domain | Link | MTU  | Admin/Oper  | Status |
| Status  |         |           |        |      |      |             |        |
| -----   | -----   | -----     |        | ---- | ---- | -----       |        |
| -----   | -----   |           |        |      |      |             |        |
| e0a     | Cluster | Cluster   |        | up   | 9000 | auto/100000 |        |
| healthy | false   |           |        |      |      |             |        |
| e0d     | Cluster | Cluster   |        | up   | 9000 | auto/100000 |        |
| healthy | false   |           |        |      |      |             |        |

8 entries were displayed.

Node: cluster1-03

Ignore

|        |         |           |        |      |      | Speed(Mbps) | Health  |
|--------|---------|-----------|--------|------|------|-------------|---------|
| Health |         |           |        |      |      |             |         |
| Port   | IPspace | Broadcast | Domain | Link | MTU  | Admin/Oper  | Status  |
| Status |         |           |        |      |      |             |         |
| -----  | -----   | -----     |        | ---- | ---- | -----       |         |
| -----  | -----   |           |        |      |      |             |         |
| e0a    | Cluster | Cluster   |        | up   | 9000 | auto/10000  | healthy |
| false  |         |           |        |      |      |             |         |
| e0b    | Cluster | Cluster   |        | up   | 9000 | auto/10000  | healthy |
| false  |         |           |        |      |      |             |         |

Node: cluster1-04

Ignore

|        |         |           |        |      |      | Speed(Mbps) | Health  |
|--------|---------|-----------|--------|------|------|-------------|---------|
| Health |         |           |        |      |      |             |         |
| Port   | IPspace | Broadcast | Domain | Link | MTU  | Admin/Oper  | Status  |
| Status |         |           |        |      |      |             |         |
| -----  | -----   | -----     |        | ---- | ---- | -----       |         |
| -----  | -----   |           |        |      |      |             |         |
| e0a    | Cluster | Cluster   |        | up   | 9000 | auto/10000  | healthy |
| false  |         |           |        |      |      |             |         |
| e0b    | Cluster | Cluster   |        | up   | 9000 | auto/10000  | healthy |
| false  |         |           |        |      |      |             |         |

cluster1::\*>

b. Verify that all the cluster interfaces (LIFs) are on the home port: `network interface show -role`

cluster

```
cluster1::*> network interface show -role cluster
```

|            |           | Logical                   | Status     | Network        | Current   |
|------------|-----------|---------------------------|------------|----------------|-----------|
| Current Is |           |                           |            |                |           |
| Vserver    | Interface |                           | Admin/Oper | Address/Mask   | Node      |
| Port       | Home      |                           |            |                |           |
| -----      |           |                           |            |                |           |
| -----      |           |                           |            |                |           |
| Cluster    |           |                           |            |                |           |
| 01         | e0a       | cluster1-01_clus1<br>true | up/up      | 169.254.3.4/23 | cluster1- |
| 01         | e0d       | cluster1-01_clus2<br>true | up/up      | 169.254.3.5/23 | cluster1- |
| 02         | e0a       | cluster1-02_clus1<br>true | up/up      | 169.254.3.8/23 | cluster1- |
| 02         | e0d       | cluster1-02_clus2<br>true | up/up      | 169.254.3.9/23 | cluster1- |
| 03         | e0a       | cluster1-03_clus1<br>true | up/up      | 169.254.1.3/23 | cluster1- |
| 03         | e0b       | cluster1-03_clus2<br>true | up/up      | 169.254.1.1/23 | cluster1- |
| 04         | e0a       | cluster1-04_clus1<br>true | up/up      | 169.254.1.6/23 | cluster1- |
| 04         | e0b       | cluster1-04_clus2<br>true | up/up      | 169.254.1.7/23 | cluster1- |

8 entries were displayed.  
cluster1::\*>

- c. Verify that the cluster displays information for both cluster switches: `system cluster-switch show -is-monitoring-enabled-operational true`

```
cluster1::*> system cluster-switch show -is-monitoring-enabled
-operational true
```

| Switch                                                                                                                                                                        | Type            | Address       | Model      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------------|------------|
| cs1                                                                                                                                                                           | cluster-network | 10.233.205.90 | N9K-C9336C |
| Serial Number: FOCXXXXXXGD<br>Is Monitored: true<br>Reason: None<br>Software Version: Cisco Nexus Operating System (NX-OS) Software,<br>Version 9.3(5)<br>Version Source: CDP |                 |               |            |
| cs2                                                                                                                                                                           | cluster-network | 10.233.205.91 | N9K-C9336C |
| Serial Number: FOCXXXXXXGS<br>Is Monitored: true<br>Reason: None<br>Software Version: Cisco Nexus Operating System (NX-OS) Software,<br>Version 9.3(5)<br>Version Source: CDP |                 |               |            |

```
cluster1::*>
```

### 3. Disable auto-revert on the cluster LIFs.

```
cluster1::*> network interface modify -vserver Cluster -lif * -auto
-revert false
```

### 4. On cluster switch cs2, shut down the ports connected to the cluster ports of the nodes.

```
cs2(config)# interface eth1/1/1-2,eth1/7-8
cs2(config-if-range)# shutdown
```

### 5. Verify that the cluster ports have migrated to the ports hosted on cluster switch cs1. This might take a few seconds.

```
network interface show -role cluster
```

```

cluster1::*> network interface show -role cluster

```

| Current Is | Logical   | Status                  | Network        | Current     |
|------------|-----------|-------------------------|----------------|-------------|
| Vserver    | Interface | Admin/Oper              | Address/Mask   | Node        |
| Port       | Home      |                         |                |             |
| -----      |           |                         |                |             |
| Cluster    |           |                         |                |             |
| e0a        | true      | cluster1-01_clus1 up/up | 169.254.3.4/23 | cluster1-01 |
| e0a        | false     | cluster1-01_clus2 up/up | 169.254.3.5/23 | cluster1-01 |
| e0a        | true      | cluster1-02_clus1 up/up | 169.254.3.8/23 | cluster1-02 |
| e0a        | false     | cluster1-02_clus2 up/up | 169.254.3.9/23 | cluster1-02 |
| e0a        | true      | cluster1-03_clus1 up/up | 169.254.1.3/23 | cluster1-03 |
| e0a        | false     | cluster1-03_clus2 up/up | 169.254.1.1/23 | cluster1-03 |
| e0a        | true      | cluster1-04_clus1 up/up | 169.254.1.6/23 | cluster1-04 |
| e0a        | false     | cluster1-04_clus2 up/up | 169.254.1.7/23 | cluster1-04 |

```

8 entries were displayed.
cluster1::*>

```

6. Verify that the cluster is healthy: `cluster show`

```

cluster1::*> cluster show

```

| Node        | Health | Eligibility | Epsilon |
|-------------|--------|-------------|---------|
| cluster1-01 | true   | true        | false   |
| cluster1-02 | true   | true        | false   |
| cluster1-03 | true   | true        | true    |
| cluster1-04 | true   | true        | false   |

```

4 entries were displayed.
cluster1::*>

```

7. Clean the configuration on switch cs2 and perform a basic setup.

- a. Clean the configuration. This step requires a console connection to the switch.

```
cs2# write erase
Warning: This command will erase the startup-configuration.
Do you wish to proceed anyway? (y/n) [n] y
cs2# reload
This command will reboot the system. (y/n)? [n] y
cs2#
```

b. Perform a basic setup of the switch.

8. Copy the RCF to the bootflash of switch cs2 using one of the following transfer protocols: FTP, TFTP, SFTP, or SCP. For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 9000 Series NX-OS Command Reference](#) guides.

This example shows TFTP being used to copy an RCF to the bootflash on switch cs2:

```
cs2# copy tftp: bootflash: vrf management
Enter source filename: Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt
Enter hostname for the tftp server: 172.22.201.50
Trying to connect to tftp server.....Connection to Server Established.
TFTP get operation was successful
Copy complete, now saving to disk (please wait)...
```

9. Apply the RCF previously downloaded to the bootflash.

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 9000 Series NX-OS Command Reference](#) guides.

This example shows the RCF file `Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt` being installed on switch cs2:

```
cs2# copy Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt running-config
echo-commands
```

10. Examine the banner output from the `show banner motd` command. You must read and follow these instructions to ensure the proper configuration and operation of the switch.

```
cs2# show banner motd
```

```


* NetApp Reference Configuration File (RCF)
*
* Switch : Nexus N9K-C9336C-FX2
* Filename : Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt
* Date : 10-23-2020
* Version : v1.6
*
* Port Usage:
* Ports 1- 3: Breakout mode (4x10G) Intra-Cluster Ports, int e1/1/1-4,
e1/2/1-4
, e1/3/1-4
* Ports 4- 6: Breakout mode (4x25G) Intra-Cluster/HA Ports, int e1/4/1-
4, e1/5/
1-4, e1/6/1-4
* Ports 7-34: 40/100GbE Intra-Cluster/HA Ports, int e1/7-34
* Ports 35-36: Intra-Cluster ISL Ports, int e1/35-36
*
* Dynamic breakout commands:
* 10G: interface breakout module 1 port <range> map 10g-4x
* 25G: interface breakout module 1 port <range> map 25g-4x
*
* Undo breakout commands and return interfaces to 40/100G configuration
in confi
g mode:
* no interface breakout module 1 port <range> map 10g-4x
* no interface breakout module 1 port <range> map 25g-4x
* interface Ethernet <interfaces taken out of breakout mode>
* inherit port-profile 40-100G
* priority-flow-control mode auto
* service-policy input HA
* exit
*


```

11. Verify that the RCF file is the correct newer version: `show running-config`

When you check the output to verify you have the correct RCF, make sure that the following information is correct:

- The RCF banner

- Customizations

12. After you verify the RCF versions and switch settings are correct, copy the running-config file to the startup-config file.

[illegible]

- ```
cs2# reload
This command will reboot the system. (y/n)? [n] y
```

- a. Verify that e0d ports are up and healthy across all nodes in the cluster: `network port show -role cluster`

						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							

Speed (Mbps) Health

```

Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e0a      Cluster      Cluster      up    9000  auto/10000 healthy
false
e0b      Cluster      Cluster      up    9000  auto/10000 healthy
false

Node: cluster1-03

Ignore

Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e0a      Cluster      Cluster      up    9000  auto/100000
healthy false
e0d      Cluster      Cluster      up    9000  auto/100000
healthy false

Node: cluster1-04

Ignore

Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e0a      Cluster      Cluster      up    9000  auto/100000
healthy false
e0d      Cluster      Cluster      up    9000  auto/100000
healthy false
8 entries were displayed.

```

- b. Verify the switch health from the cluster (this might not show switch cs2, since LIFs are not homed on e0d).

```

cluster1::*> network device-discovery show -protocol cdp
Node/      Local  Discovered
Protocol   Port   Device (LLDP: ChassisID)  Interface
Platform

```



```

-----
cluster1-01/cdp
      e0a      cs1      Ethernet1/7      N9K-
C9336C
      e0d      cs2      Ethernet1/7      N9K-
C9336C
cluster01-2/cdp
      e0a      cs1      Ethernet1/8      N9K-
C9336C
      e0d      cs2      Ethernet1/8      N9K-
C9336C
cluster01-3/cdp
      e0a      cs1      Ethernet1/1/1      N9K-
C9336C
      e0b      cs2      Ethernet1/1/1      N9K-
C9336C
cluster1-04/cdp
      e0a      cs1      Ethernet1/1/2      N9K-
C9336C
      e0b      cs2      Ethernet1/1/2      N9K-
C9336C

```

```

cluster1::*> system cluster-switch show -is-monitoring-enabled
-operational true

```

Switch	Type	Address	Model
cs1	cluster-network	10.233.205.90	NX9-
C9336C			
Serial Number: FOCXXXXXXGD			
Is Monitored: true			
Reason: None			
Software Version: Cisco Nexus Operating System (NX-OS) Software,			
Version			
9.3(5)			
Version Source: CDP			
cs2	cluster-network	10.233.205.91	NX9-
C9336C			
Serial Number: FOCXXXXXXGS			
Is Monitored: true			
Reason: None			
Software Version: Cisco Nexus Operating System (NX-OS) Software,			
Version			
9.3(5)			
Version Source: CDP			

2 entries were displayed.



You might observe the following output on the cs1 switch console depending on the RCF version previously loaded on the switch:

```
2020 Nov 17 16:07:18 cs1 %$ VDC-1 %$ %STP-2-UNBLOCK_CONSIST_PORT:
Unblocking port port-channel1 on VLAN0092. Port consistency restored.
2020 Nov 17 16:07:23 cs1 %$ VDC-1 %$ %STP-2-BLOCK_PVID_PEER: Blocking
port-channel1 on VLAN0001. Inconsistent peer vlan.
2020 Nov 17 16:07:23 cs1 %$ VDC-1 %$ %STP-2-BLOCK_PVID_LOCAL: Blocking
port-channel1 on VLAN0092. Inconsistent local vlan.
```

15. On cluster switch cs1, shut down the ports connected to the cluster ports of the nodes.

The following example uses the interface example output from step 1:

```
cs1(config)# interface eth1/1/1-2,eth1/7-8
cs1(config-if-range)# shutdown
```

16. Verify that the cluster LIFs have migrated to the ports hosted on switch cs2. This might take a few seconds.
`network interface show -role cluster`

```

cluster1::*> network interface show -role cluster

```

	Logical	Status	Network	Current
Current Is				
Vserver	Interface	Admin/Oper	Address/Mask	Node
Port	Home			

Cluster				
	cluster1-01_clus1	up/up	169.254.3.4/23	cluster1-01
e0d	false			
	cluster1-01_clus2	up/up	169.254.3.5/23	cluster1-01
e0d	true			
	cluster1-02_clus1	up/up	169.254.3.8/23	cluster1-02
e0d	false			
	cluster1-02_clus2	up/up	169.254.3.9/23	cluster1-02
e0d	true			
	cluster1-03_clus1	up/up	169.254.1.3/23	cluster1-03
e0b	false			
	cluster1-03_clus2	up/up	169.254.1.1/23	cluster1-03
e0b	true			
	cluster1-04_clus1	up/up	169.254.1.6/23	cluster1-04
e0b	false			
	cluster1-04_clus2	up/up	169.254.1.7/23	cluster1-04
e0b	true			

```

8 entries were displayed.
cluster1::*>

```

17. Verify that the cluster is healthy: cluster show

```

cluster1::*> cluster show

```

Node	Health	Eligibility	Epsilon
cluster1-01	true	true	false
cluster1-02	true	true	false
cluster1-03	true	true	true
cluster1-04	true	true	false

```

4 entries were displayed.
cluster1::*>

```

18. Repeat Steps 7 to 14 on switch cs1.

19. Enable auto-revert on the cluster LIFs.

```
cluster1::*> network interface modify -vserver Cluster -lif * -auto
-revert True
```

20. 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
```

21. Verify that the switch ports connected to the cluster ports are up.

```
cs1# show interface brief \ | grep up
.
.
Eth1/1/1      1      eth  access up      none      10G(D)
--
Eth1/1/2      1      eth  access up      none      10G(D)
--
Eth1/7        1      eth  trunk  up      none      100G(D)
--
Eth1/8        1      eth  trunk  up      none      100G(D)
--
.
.
```

22. Verify that the ISL between cs1 and cs2 is functional: `show port-channel summary`

```
cs1# show port-channel summary
```

```
Flags:  D - Down          P - Up in port-channel (members)
        I - Individual    H - Hot-standby (LACP only)
        s - Suspended     r - Module-removed
        b - BFD Session Wait
        S - Switched      R - Routed
        U - Up (port-channel)
        p - Up in delay-lACP mode (member)
        M - Not in use. Min-links not met
```

```
-----
-----
Group Port-          Type      Protocol  Member Ports      Channel
-----
-----
1      Po1 (SU)      Eth      LACP      Eth1/35 (P)      Eth1/36 (P)
cs1#
```

23. Verify that the cluster LIFs have reverted to their home port: `network interface show -role cluster`

```

cluster1::*> network interface show -role cluster

```

Current Is	Logical	Status	Network	Current
Vserver	Interface	Admin/Oper	Address/Mask	Node
Port	Home			

Cluster				
e0d	cluster1-01_clus1	up/up	169.254.3.4/23	cluster1-01
e0d	cluster1-01_clus2	up/up	169.254.3.5/23	cluster1-01
e0d	cluster1-02_clus1	up/up	169.254.3.8/23	cluster1-02
e0d	cluster1-02_clus2	up/up	169.254.3.9/23	cluster1-02
e0b	cluster1-03_clus1	up/up	169.254.1.3/23	cluster1-03
e0b	cluster1-03_clus2	up/up	169.254.1.1/23	cluster1-03
e0b	cluster1-04_clus1	up/up	169.254.1.6/23	cluster1-04
e0b	cluster1-04_clus2	up/up	169.254.1.7/23	cluster1-04

```

8 entries were displayed.
cluster1::*>

```

24. Verify that the cluster is healthy: cluster show

```

cluster1::*> cluster show

```

Node	Health	Eligibility	Epsilon
cluster1-01	true	true	false
cluster1-02	true	true	false
cluster1-03	true	true	true
cluster1-04	true	true	false

```

4 entries were displayed.
cluster1::*>

```

25. Ping the remote cluster interfaces to verify connectivity: cluster ping-cluster -node local

```

cluster1::*> cluster ping-cluster -node local
Host is cluster1-03
Getting addresses from network interface table...
Cluster cluster1-03_clus1 169.254.1.3 cluster1-03 e0a
Cluster cluster1-03_clus2 169.254.1.1 cluster1-03 e0b
Cluster cluster1-04_clus1 169.254.1.6 cluster1-04 e0a
Cluster cluster1-04_clus2 169.254.1.7 cluster1-04 e0b
Cluster cluster1-01_clus1 169.254.3.4 cluster1-01 e0a
Cluster cluster1-01_clus2 169.254.3.5 cluster1-01 e0d
Cluster cluster1-02_clus1 169.254.3.8 cluster1-02 e0a
Cluster cluster1-02_clus2 169.254.3.9 cluster1-02 e0d
Local = 169.254.1.3 169.254.1.1
Remote = 169.254.1.6 169.254.1.7 169.254.3.4 169.254.3.5 169.254.3.8
169.254.3.9
Cluster Vserver Id = 4294967293
Ping status:
.....
Basic connectivity succeeds on 12 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 9000 byte MTU on 12 path(s):
    Local 169.254.1.3 to Remote 169.254.1.6
    Local 169.254.1.3 to Remote 169.254.1.7
    Local 169.254.1.3 to Remote 169.254.3.4
    Local 169.254.1.3 to Remote 169.254.3.5
    Local 169.254.1.3 to Remote 169.254.3.8
    Local 169.254.1.3 to Remote 169.254.3.9
    Local 169.254.1.1 to Remote 169.254.1.6
    Local 169.254.1.1 to Remote 169.254.1.7
    Local 169.254.1.1 to Remote 169.254.3.4
    Local 169.254.1.1 to Remote 169.254.3.5
    Local 169.254.1.1 to Remote 169.254.3.8
    Local 169.254.1.1 to Remote 169.254.3.9
Larger than PMTU communication succeeds on 12 path(s)
RPC status:
6 paths up, 0 paths down (tcp check)
6 paths up, 0 paths down (udp check)

```

Replace a Cisco Nexus 9336C-FX2 cluster switch

Replacing a defective Nexus 9336C-FX2 switch in a cluster network is a nondisruptive procedure (NDU).

Before you begin

The following conditions must exist before performing the switch replacement in the current environment and on the replacement switch.

- Existing cluster and network infrastructure:
 - The existing cluster must be verified as completely functional, with at least one fully connected cluster switch.
 - All cluster ports must be up.
 - All cluster logical interfaces (LIFs) must be up and on their home ports.
 - The ONTAP cluster ping-cluster -node node1 command must indicate that basic connectivity and larger than PMTU communication are successful on all paths.
- Nexus 9336C-FX2 replacement switch:
 - Management network connectivity on the replacement switch must be functional.
 - Console access to the replacement switch must be in place.
 - The node connections are ports 1/1 through 1/34.
 - All Inter-Switch Link (ISL) ports must be disabled on ports 1/35 and 1/36.
 - The desired reference configuration file (RCF) and NX-OS operating system image switch must be loaded onto the switch.
 - Initial customization of the switch must be complete, as detailed in:

[Configuring a new Cisco Nexus 9336C-FX2 switch](#)

Any previous site customizations, such as STP, SNMP, and SSH, should be copied to the new switch.

You must execute the command for migrating a cluster LIF from the node where the cluster LIF is hosted.

The examples in this procedure use the following switch and node nomenclature:

- The names of the existing Nexus 9336C-FX2 switches are cs1 and cs2.
- The name of the new Nexus 9336C-FX2 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::*>



The following procedure is based on the following cluster network topology:

```
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
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/	Local	Discovered		
Protocol	Port	Device (LLDP: ChassisID)	Interface	Platform
node2	/cdp			
	e0a	cs1	Eth1/2	N9K-C9336C
	e0b	cs2	Eth1/2	N9K-C9336C
node1	/cdp			
	e0a	cs1	Eth1/1	N9K-C9336C
	e0b	cs2	Eth1/1	N9K-C9336C

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
cs2	Eth1/35	176	R S I s	N9K-C9336C	Eth1/35
cs2 (FDO220329V5)	Eth1/36	176	R S I s	N9K-C9336C	Eth1/36

Total entries displayed: 4

```
cs2# show cdp neighbors
```

Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
 S - Switch, H - Host, I - IGMP, r - Repeater,
 V - VoIP-Phone, D - Remotely-Managed-Device,
 s - Supports-STP-Dispute

Device-ID	Local Intrfce	Hldtme	Capability	Platform	Port ID
node1	Eth1/1	139	H	FAS2980	e0b
node2	Eth1/2	124	H	FAS2980	e0b
cs1	Eth1/35	178	R S I s	N9K-C9336C	Eth1/35
cs1	Eth1/36	178	R S I s	N9K-C9336C	Eth1/36

Total entries displayed: 4

Steps

1. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport message: `system node autosupport invoke -node * -type all -message MAINT=xh`

where x is the duration of the maintenance window in hours.



The AutoSupport message notifies technical support of this maintenance task so that automatic case creation is suppressed during the maintenance window.

2. 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.
3. 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 1/34).

If the switch that you are replacing is not functional and is powered down, go to Step 4. The LIFs on the cluster nodes should have already failed over to the other cluster port for each node.

```
newcs2# config
Enter configuration commands, one per line. End with CNTL/Z.
newcs2(config)# interface e1/1-34
newcs2(config-if-range)# shutdown
```

4. Verify that all cluster LIFs have auto-revert enabled: `network interface show -vserver Cluster -fields auto-revert`

```
cluster1::> network interface show -vserver Cluster -fields auto-revert
```

Vserver	Logical Interface	Auto-revert
Cluster	node1_clus1	true
Cluster	node1_clus2	true
Cluster	node2_clus1	true
Cluster	node2_clus2	true

4 entries were displayed.

5. Verify that all the cluster LIFs can communicate: `cluster ping-cluster`

```
cluster1::*> cluster ping-cluster node1
```

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. Shut down the ISL ports 1/35 and 1/36 on the Nexus 9336C-FX2 switch cs1:

```

cs1# configure
Enter configuration commands, one per line. End with CNTL/Z.
cs1(config)# interface e1/35-36
cs1(config-if-range)# shutdown
cs1(config-if-range)#

```

7. Remove all of the cables from the Nexus 9336C-FX2 cs2 switch, and then connect them to the same ports on the Nexus C9336C-FX2 newcs2 switch.
8. Bring up the ISLs ports 1/35 and 1/36 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 Eth1/35(P) and Eth1/36(P).

This example enables ISL ports 1/35 and 1/36 and displays the port channel summary on switch cs1:

```

cs1# configure
Enter configuration commands, one per line. End with CNTL/Z.
cs1(config)# int e1/35-36
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      Eth1/35 (P)  Eth1/36 (P)

cs1(config-if-range)#

```

9. Verify that port e0b is up on all nodes: `network port show ipspace Cluster`

The output should be similar to the following:

```
cluster1::*> network port show -ipspace Cluster
```

```
Node: node1
```

```
Ignore
```

						Speed(Mbps)	Health
Health							
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							
-----	-----	-----	-----	-----	-----	-----	-----
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/auto	-
false							

```
4 entries were displayed.
```

10. On the same node you used in the previous step, revert the cluster LIF associated with the port in the previous step by using the network interface revert command.

In this example, LIF node1_clus2 on node1 is successfully reverted if the Home value is true and the port is e0b.

The following commands return LIF node1_clus2 on node1 to home port e0a and displays information about the LIFs on both nodes. Bringing up the first node is successful if the Is Home column is true for both cluster interfaces and they show the correct port assignments, in this example e0a and e0b on node1.

```
cluster1::*> network interface show -vserver Cluster
```

Current Is Vserver Home	Logical Interface	Status Admin/Oper	Network Address/Mask	Current Node	Port
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	e0a
false					

4 entries were displayed.

11. Display information about the nodes in a cluster: `cluster show`

This example shows that the node health for node1 and node2 in this cluster is true:

```
cluster1::*> cluster show
```

Node	Health	Eligibility
node1	false	true
node2	true	true

12. Verify that all physical cluster ports are up: `network port show ipspace Cluster`

```
cluster1::*> network port show -ipspace Cluster
```

```
Node node1
```

```
Ignore
```

						Speed(Mbps)	Health
Health	Port	IPspace	Broadcast Domain	Link	MTU	Admin/Oper	Status
-----	-----	-----	-----	-----	-----	-----	-----
-----	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.
```

13. Verify that all the cluster LIFs can communicate: `cluster ping-cluster`


```

cluster1::*> cluster ping-cluster -node node2
Host is node2
Getting addresses from network interface table...
Cluster node1_clus1 169.254.209.69 node1 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)

```

14. Confirm the following cluster network configuration: network port show

```

cluster1::*> network port show -ipspace Cluster
Node: node1

Ignore
Speed (Mbps)
Health
Port IPspace Broadcast Domain Link MTU Admin/Oper Status
Status
-----
-----
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
false						healthy
e0b	Cluster	Cluster		up	9000	auto/10000
false						healthy

4 entries were displayed.

cluster1::*> network interface show -vserver Cluster

		Logical	Status	Network	Current	
Current Is						
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port	

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-
C9336C				
	e0b	newcs2	0/2	N9K-
C9336C				

```

node1      /cdp
           e0a      cs1                        0/1                N9K-
C9336C
           e0b      newcs2                    0/1                N9K-
C9336C

```

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 Port ID	Local Intrfce	Hldtme	Capability	Platform	
node1	Eth1/1	144	H	FAS2980	e0a
node2	Eth1/2	145	H	FAS2980	e0a
newcs2 Eth1/35	Eth1/35	176	R S I s	N9K-C9336C	
newcs2 Eth1/36	Eth1/36	176	R S I s	N9K-C9336C	

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 Eth1/35	Eth1/35	178	R S I s	N9K-C9336C	
cs1 Eth1/36	Eth1/36	178	R S I s	N9K-C9336C	

Total entries displayed: 4

15. For ONTAP 9.8 and later, enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the commands: `system switch ethernet log setup-password` and `system switch ethernet log enable-collection`

```
cluster1::*> system switch ethernet log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
cs1
cs2

cluster1::*> system switch ethernet log setup-password

Enter the switch name: cs1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system switch ethernet log setup-password

Enter the switch name: cs2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system switch ethernet log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster1::*>
```



If any of these commands return an error, contact NetApp support.

16. For ONTAP releases 9.5P16, 9.6P12, and 9.7P10 and later patch releases, enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the commands: `system cluster-switch log setup-password` and `system cluster-switch log enable-collection`

```

cluster1::*> system cluster-switch log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
cs1
cs2

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster1::*>

```



If any of these commands return an error, contact NetApp support.

17. If you suppressed automatic case creation, re-enable it by invoking an AutoSupport message: `system node autosupport invoke -node * -type all -message MAINT=END`

Replace a Cisco Nexus 9336C-FX2 storage switch

You must be aware of certain configuration information, port connections and cabling requirements when you replace Cisco Nexus 9336C-FX2 storage switches.

Before you begin

You must verify that the following conditions exist before installing the NX-OS software and RCFs on a Cisco Nexus 9336C-FX2 storage switch:

- Your system can support Cisco Nexus 9336C-FX2 storage switches.
- You must have consulted the switch compatibility table on the Cisco Ethernet Switch page for the supported ONTAP, NX-OS, and RCF versions.



You should be aware that there can be dependencies between command syntax in the RCF and NX-OS versions.

- You must have referred to the appropriate software and upgrade guides available on the Cisco web site for complete documentation on the Cisco switch upgrade and downgrade procedures.
Cisco Nexus 3000 Series Switches
- You must have downloaded the applicable RCFs.

About this task

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 9336C-FX2 switch must have the following characteristics:

- Management network connectivity must be functional.
- Console access to the replacement switch must be in place.
- The appropriate RCF and NX-OS operating system image must be loaded onto the switch.
- Initial customization of the switch must be complete.

Procedure summary

This procedure replaces the second Nexus 9336C-FX2 storage switch S2 with the new 9336C-FX2 switch NS2. The two nodes are node1 and node2.

Steps to complete:

- Confirm the switch to be replaced is S2.
- Disconnect the cables from switch S2.
- Reconnect the cables to switch NS2.
- Verify all device configurations on switch NS2.

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.

2. Check on the health status of the storage node ports to make sure that there is connection to storage switch S1:

```
storage port show -port-type ENET
```

```
storage::*> storage port show -port-type ENET
```

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

```
storage::*>
```

3. Verify that storage switch S1 is available:

```
network device-discovery show
```

```

storage::*> network device-discovery show
Node/      Local Discovered
Protocol   Port   Device (LLDP: ChassisID)  Interface  Platform
-----
node1/cdp
          e3a    S1                        Ethernet1/1 NX9336C
          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 NX9336C
          e4a    node1                    e4a         AFF-A700
          e4e    node1                    e4e         AFF-A700
node2/lldp
          e3a    S1                        Ethernet1/2 -
          e4a    node1                    e4a         -
          e4e    node1                    e4e         -
storage::*>

```

- Run the `show lldp neighbors` command on the working switch to confirm that you can see both nodes and all shelves:

```
show lldp neighbors
```

```

S1# show lldp neighbors
Capability codes:
  (R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device
  (W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other
Device ID      Local Intf  Hold-time  Capability  Port ID
node1          Eth1/1     121        S           e3a
node2          Eth1/2     121        S           e3a
SHFGD2008000011 Eth1/5     121        S           e0a
SHFGD2008000011 Eth1/6     120        S           e0a
SHFGD2008000022 Eth1/7     120        S           e0a
SHFGD2008000022 Eth1/8     120        S           e0a

```

- Verify the shelf ports in the storage system:

```
storage shelf port show -fields remote-device,remote-port
```



```
storage::*> storage shelf port show -fields remote-device,remote-port
shelf    id  remote-port  remote-device
-----  --  -
3.20     0  Ethernet1/5  S1
3.20     1  -            -
3.20     2  Ethernet1/6  S1
3.20     3  -            -
3.30     0  Ethernet1/7  S1
3.20     1  -            -
3.30     2  Ethernet1/8  S1
3.20     3  -            -
storage::*>
```

6. Remove all cables attached to storage switch S2.
7. Reconnect all cables to the replacement switch NS2.
8. Recheck the health status of the storage node ports:

```
storage port show -port-type ENET
```

```
storage::*> storage port show -port-type ENET
```

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

```
storage::*>
```

9. Verify that both switches are available:
- ```
network device-discovery show
```

```

storage::*> network device-discovery show
Node/ Local Discovered
Protocol Port Device (LLDP: ChassisID) Interface Platform

node1/cdp
 e3a S1 Ethernet1/1 NX9336C
 e4a node2 e4a AFF-A700
 e4e node2 e4e AFF-A700
 e7b NS2 Ethernet1/1 NX9336C
node1/lldp
 e3a S1 Ethernet1/1 -
 e4a node2 e4a -
 e4e node2 e4e -
 e7b NS2 Ethernet1/1 -
node2/cdp
 e3a S1 Ethernet1/2 NX9336C
 e4a node1 e4a AFF-A700
 e4e node1 e4e AFF-A700
 e7b NS2 Ethernet1/2 NX9336C
node2/lldp
 e3a S1 Ethernet1/2 -
 e4a node1 e4a -
 e4e node1 e4e -
 e7b NS2 Ethernet1/2 -
storage::*>

```

10. Verify the shelf ports in the storage system:

```
storage shelf port show -fields remote-device,remote-port
```

```

storage::*> storage shelf port show -fields remote-device,remote-port
shelf id remote-port remote-device

3.20 0 Ethernet1/5 S1
3.20 1 Ethernet1/5 NS2
3.20 2 Ethernet1/6 S1
3.20 3 Ethernet1/6 NS2
3.30 0 Ethernet1/7 S1
3.20 1 Ethernet1/7 NS2
3.30 2 Ethernet1/8 S1
3.20 3 Ethernet1/8 NS2
storage::*>

```

11. If you suppressed automatic case creation, re-enable it by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all -message MAINT=END
```

# Cisco 9336C-FX2 shared switch overview

From ONTAP 9.9.1, you can use Cisco Nexus 9336C-FX2 switches to combine storage and cluster functionality into a shared switch scenario.

## Setup and configuration guide for Cisco shared switches

### Switches supported by ONTAP

From ONTAP 9.9.1, you can use Cisco Nexus 9336C-FX2 switches to combine storage and cluster functionality into a shared switch configuration. If you want to build ONTAP clusters with more than two nodes, you need two supported network switches.

The following Cisco shared network switches are supported.

#### Nexus 9336C-FX2

You can install the Cisco Nexus 9336C-FX2 switch (X190200/X190210) in a NetApp system cabinet or third-party cabinet with the standard brackets that are included with the switch.

The following table lists the part number and description for the 9336C-FX2 switch, fans, and power supplies:

| Part number         | Description                                        |
|---------------------|----------------------------------------------------|
| X190200-CS-PE       | N9K-9336C-FX2, CS, PTSX, 36PT10/25/40/100GQSFP28   |
| X190200-CS-PI       | N9K-9336C-FX2, CS, PSIN, 36PT10/25/40/100GQSFP28   |
| X190002             | Accessory Kit X190001/X190003                      |
| X-NXA-PAC-1100W-PE2 | N9K-9336C AC 1100W PSU - Port side exhaust airflow |
| X-NXA-PAC-1100W-PI2 | N9K-9336C AC 1100W PSU - Port side Intake airflow  |
| X-NXA-FAN-65CFM-PE  | N9K-9336C 65CFM, Port side exhaust airflow         |
| X-NXA-FAN-65CFM-PI  | N9K-9336C 65CFM, Port side intake airflow          |

### Setup the switches

If you do not already have the required configuration information and documentation, you need to gather that information before setting up your shared switches.

#### Before you begin

- You must have access to an HTTP, FTP or TFTP server at the installation site to download the applicable NX-OS and reference configuration file (RCF) releases.
- You must have the required shared switch documentation.

See [Required documentation for shared switches](#) for more information.

- You must have the required controller documentation and ONTAP documentation.

See [NetApp ONTAP documentation](#).

- You must have the applicable licenses, network and configuration information, and cables.
- You must have the completed cabling worksheets.



In addition to cabling graphics, this guide does provide sample worksheets with recommended port assignments and blank worksheets that you can use to set up your network. For more information, refer to the [Hardware Universe](#).

### About this task

All Cisco shared switches arrive with the standard Cisco factory-default configuration. These switches also have the current version of the NX-OS software but do not have the RCFs loaded.



You must download the applicable NetApp RCFs from the [NetApp Support Site](#) for the switches that you receive.

### Procedure

1. Rack the switches, controllers and NS224 NVMe storage shelves. See the [Installing a Cisco Nexus 9336C-FX2 cluster switch and pass-through panel in a NetApp cabinet](#) guide for instructions to install the switch in a NetApp cabinet.
2. Power on the switches, controllers and NS224 NVMe storage shelves.
3. Perform an initial configuration of the switches based on information provided in [Required configuration information](#).
4. Verify the configuration choices you made in the display that appears at the end of the setup, and make sure that you save the configuration.
5. Check the software version on the switches, and if necessary, download the NetApp-supported version of the software to the switches.

If you download the NetApp-supported version of the software, then you must also download the NetApp Network Switch Reference Configuration File and merge it with the configuration you saved in [Step 3](#). You can download the file and the instructions from the [Cisco Ethernet Switches](#) page.

If you have your own switches, refer to the [Cisco](#) site.

### Required configuration information

For configuration, you need the appropriate number and type of cables and cable connectors for your switches. Depending on the type of switch you are initially configuring, you need to connect to the switch console port with the included console cable; you also need to provide specific network information.

### Required network information for all switches

- You need the following network information for all switch configurations:
  - IP subnet for management network traffic
  - Host names and IP addresses for each of the storage system controllers and all applicable switches
  - Most storage system controllers are managed through the e0M interface by connecting to the Ethernet service port (wrench icon). On AFF A800 and AFF A700s systems, the e0M interface uses a dedicated Ethernet port.

- Refer to the [Hardware Universe](#) for the latest information.

## Required network information for Cisco Nexus 9336C-FX2 switches

For the Cisco Nexus 9336C-FX2 switch, you need to provide applicable responses to the following initial setup questions when you first boot the switch. Your site's security policy defines the responses and services to enable:

1. Abort Auto Provisioning and continue with normal setup? (yes/no)

Respond with **yes**. The default is no.

2. Do you want to enforce secure password standard? (yes/no)

Respond with **yes**. The default is yes.

3. Enter the password for admin.

The default password is admin; you must create a new, strong password.

A weak password can be rejected.

4. Would you like to enter the basic configuration dialog? (yes/no)

Respond with **yes** at the initial configuration of the switch.

5. Create another login account? (yes/no)

Your answer depends on your site's policies on alternate administrators. The default is no.

6. Configure read-only SNMP community string? (yes/no)

Respond with **no**. The default is no.

7. Configure read-write SNMP community string? (yes/no)

Respond with **no**. The default is no.

8. Enter the switch name.

The switch name is limited to 63 alphanumeric characters.

9. Continue with out-of-band (mgmt0) management configuration? (yes/no)

Respond with **yes** (the default) at that prompt. At the mgmt0 IPv4 address: prompt, enter your IP address: ip\_address

10. Configure the default-gateway? (yes/no)

Respond with **yes**. At the IPv4 address of the default-gateway: prompt, enter your default\_gateway.

11. Configure advanced IP options? (yes/no)

Respond with **no**. The default is no.

12. Enable the telnet service? (yes/no)

Respond with **no**. The default is no.

13. Enable SSH service? (yes/no)

Respond with **yes**. The default is yes.



SSH is recommended when using Cluster Switch Health Monitor (CSHM) for its log collection features. SSHv2 is also recommended for enhanced security.

14. Enter the type of SSH key you want to generate (dsa/rsa/rsa1). The default is rsa.

15. Enter the number of key bits (1024- 2048).

16. Configure the NTP server? (yes/no)

Respond with **no**. The default is no.

17. Configure default interface layer (L3/L2):

Respond with **L2**. The default is L2.

18. Configure default switch port interface state (shut/noshut):

Respond with **noshut**. The default is noshut.

19. Configure CoPP system profile (strict/moderate/lenient/dense):

Respond with **strict**. The default is strict.

20. Would you like to edit the configuration? (yes/no)

You should see the new configuration at this point. Review and make any necessary changes to the configuration you just entered. Respond with no at the prompt if you are satisfied with the configuration. Respond with **yes** if you want to edit your configuration settings.

21. Use this configuration and save it? (yes/no)

Respond with **yes** to save the configuration. This automatically updates the kickstart and system images.



If you do not save the configuration at this stage, none of the changes will be in effect the next time you reboot the switch.

For more information about the initial configuration of your switch, see the following guide: [Cisco Nexus 9336C-FX2 Installation and Upgrade Guide](#).

### Required documentation for shared switches

You need specific switch and controller documentation to set up your ONTAP network.

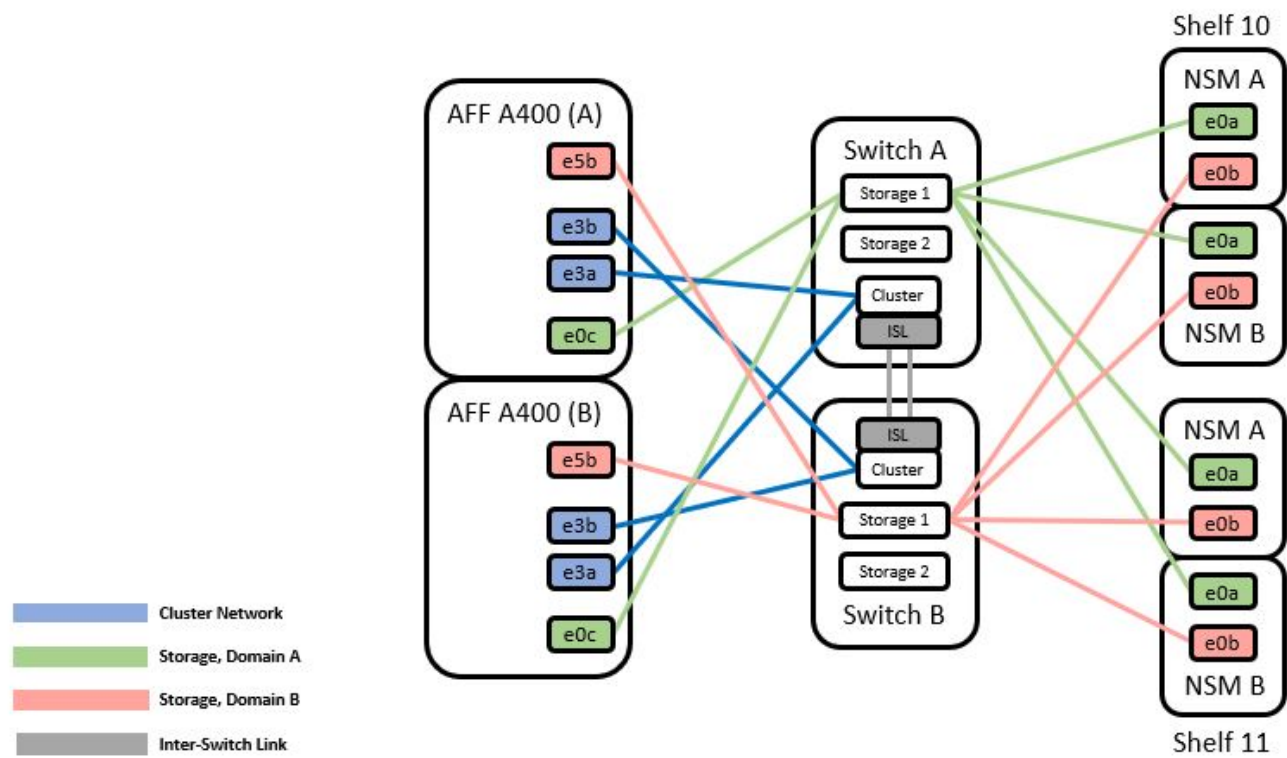
To set up the Cisco Nexus 9336C-FX2 shared switches, see the [Cisco Nexus 9000 Series Switches Support](#) page.

| Document title                                                                                                                                         | Description                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Nexus 9000 Series Hardware Installation Guide</a>                                                                                          | Provides detailed information about site requirements, switch hardware details, and installation options.                                                                                             |
| <a href="#">Cisco Nexus 9000 Series Switch Software Configuration Guides</a> (choose the guide for the NX-OS release installed on your switches)       | Provides initial switch configuration information that you need before you can configure the switch for ONTAP operation.                                                                              |
| <a href="#">Cisco Nexus 9000 Series NX-OS Software Upgrade and Downgrade Guide</a> (choose the guide for the NX-OS release installed on your switches) | Provides information on how to downgrade the switch to ONTAP supported switch software, if necessary.                                                                                                 |
| <a href="#">Cisco Nexus 9000 Series NX-OS Command Reference Master Index</a>                                                                           | Provides links to the various command references provided by Cisco.                                                                                                                                   |
| <a href="#">Cisco Nexus 9000 MIBs Reference</a>                                                                                                        | Describes the Management Information Base (MIB) files for the Nexus 9000 switches.                                                                                                                    |
| <a href="#">Nexus 9000 Series NX-OS System Message Reference</a>                                                                                       | Describes the system messages for Cisco Nexus 9000 series switches, those that are informational, and others that might help diagnose problems with links, internal hardware, or the system software. |
| <a href="#">Cisco Nexus 9000 Series NX-OS Release Notes</a> (choose the notes for the NX-OS release installed on your switches)                        | Describes the features, bugs, and limitations for the Cisco Nexus 9000 Series.                                                                                                                        |
| <a href="#">Regulatory Compliance and Safety Information for Cisco Nexus 9000 Series</a>                                                               | Provides international agency compliance, safety, and statutory information for the Nexus 9000 series switches.                                                                                       |

## Cisco Nexus 9336C-FX2 cabling details

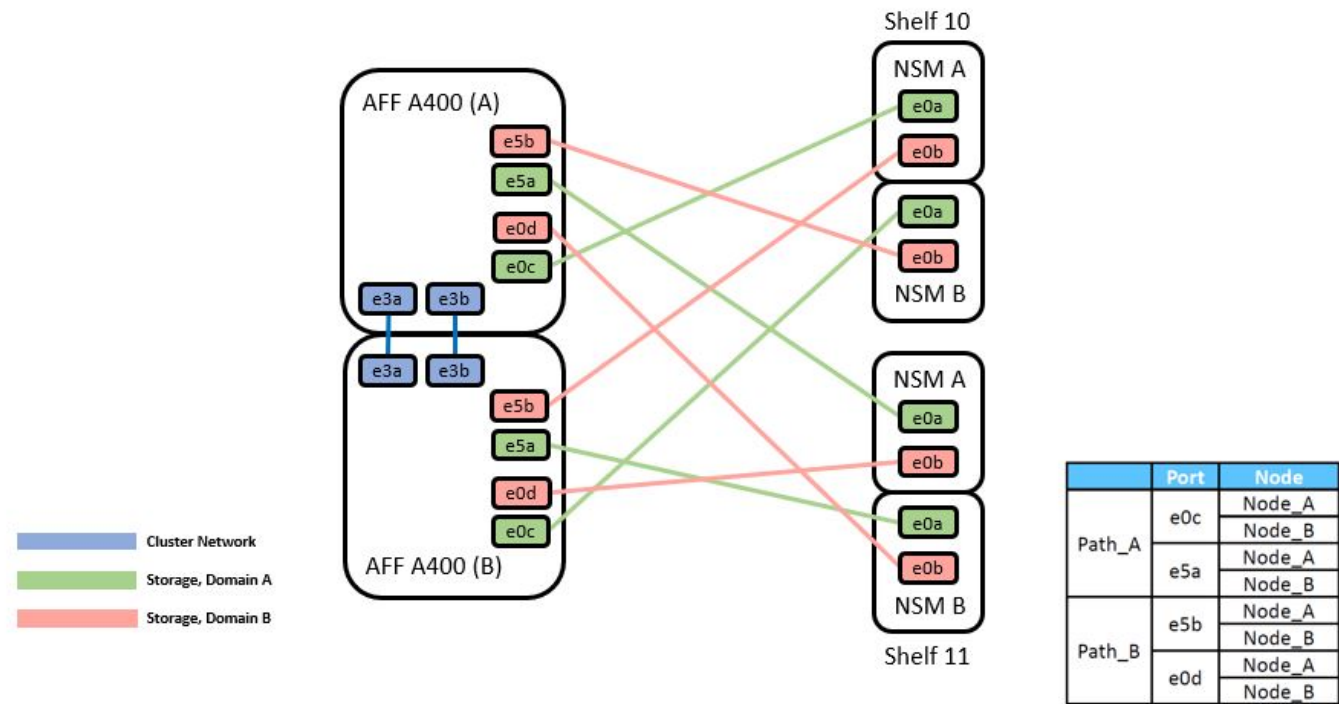
You can use the following cabling images to complete the cabling between the controllers and the switches. If you want to cable NS224 storage as switch-attached, follow the switch-attached diagram:

Switch Attached



If you want to cable NS224 storage as direct-attached instead of using the shared switch storage ports, follow the direct-attached diagram:

Direct Attached





## Cisco Nexus 9336C-FX2 cabling worksheet

If you want to document the supported platforms, you must complete the blank cabling worksheet by using completed sample cabling worksheet as a guide.

The sample port definition on each pair of switches is as follows:

| Switch A    |           |                      | Switch B    |           |                      |
|-------------|-----------|----------------------|-------------|-----------|----------------------|
| Switch Port | Port Role | Port Usage           | Switch Port | Port Role | Port Usage           |
| 1           | Cluster   | 40/100GbE            | 1           | Cluster   | 40/100GbE            |
| 2           | Cluster   | 40/100GbE            | 2           | Cluster   | 40/100GbE            |
| 3           | Cluster   | 40/100GbE            | 3           | Cluster   | 40/100GbE            |
| 4           | Cluster   | 40/100GbE            | 4           | Cluster   | 40/100GbE            |
| 5           | Cluster   | 40/100GbE            | 5           | Cluster   | 40/100GbE            |
| 6           | Cluster   | 40/100GbE            | 6           | Cluster   | 40/100GbE            |
| 7           | Cluster   | 40/100GbE            | 7           | Cluster   | 40/100GbE            |
| 8           | Cluster   | 40/100GbE            | 8           | Cluster   | 40/100GbE            |
| 9           | Cluster   | 40GbE w/4x10GbE b/o  | 9           | Cluster   | 40GbE w/4x10GbE b/o  |
| 10          | Cluster   | 100GbE w/4x25GbE b/o | 10          | Cluster   | 100GbE w/4x25GbE b/o |
| 11          | Storage   | 100GbE               | 11          | Storage   | 100GbE               |
| 12          | Storage   | 100GbE               | 12          | Storage   | 100GbE               |
| 13          | Storage   | 100GbE               | 13          | Storage   | 100GbE               |
| 14          | Storage   | 100GbE               | 14          | Storage   | 100GbE               |
| 15          | Storage   | 100GbE               | 15          | Storage   | 100GbE               |
| 16          | Storage   | 100GbE               | 16          | Storage   | 100GbE               |
| 17          | Storage   | 100GbE               | 17          | Storage   | 100GbE               |
| 18          | Storage   | 100GbE               | 18          | Storage   | 100GbE               |
| 19          | Storage   | 100GbE               | 19          | Storage   | 100GbE               |
| 20          | Storage   | 100GbE               | 20          | Storage   | 100GbE               |
| 21          | Storage   | 100GbE               | 21          | Storage   | 100GbE               |
| 22          | Storage   | 100GbE               | 22          | Storage   | 100GbE               |
| 23          | Storage   | 100GbE               | 23          | Storage   | 100GbE               |
| 24          | Storage   | 100GbE               | 24          | Storage   | 100GbE               |
| 25          | Storage   | 100GbE               | 25          | Storage   | 100GbE               |
| 26          | Storage   | 100GbE               | 26          | Storage   | 100GbE               |
| 27          | Storage   | 100GbE               | 27          | Storage   | 100GbE               |
| 28          | Storage   | 100GbE               | 28          | Storage   | 100GbE               |
| 29          | Storage   | 100GbE               | 29          | Storage   | 100GbE               |
| 30          | Storage   | 100GbE               | 30          | Storage   | 100GbE               |
| 31          | Storage   | 100GbE               | 31          | Storage   | 100GbE               |
| 32          | Storage   | 100GbE               | 32          | Storage   | 100GbE               |
| 33          | Storage   | 100GbE               | 33          | Storage   | 100GbE               |
| 34          | Storage   | 100GbE               | 34          | Storage   | 100GbE               |
| 35          | ISL       | 100GbE               | 35          | ISL       | 100GbE               |
| 36          | ISL       | 100GbE               | 36          | ISL       | 100GbE               |

Where:

- 100G ISL to switch A port 35
- 100G ISL to switch A port 36
- 100G ISL to switch B port 35
- 100G ISL to switch B port 36

Blank cabling worksheet

You can use the blank cabling worksheet to document the platforms that are supported as nodes in a cluster. The Supported Cluster Connections table of the Hardware Universe defines the cluster ports used by the platform.

| Switch Port | Switch A<br>Port Role | Port Usage | Switch Port | Switch B<br>Port Role | Port Usage |
|-------------|-----------------------|------------|-------------|-----------------------|------------|
| 1           |                       |            | 1           |                       |            |
| 2           |                       |            | 2           |                       |            |
| 3           |                       |            | 3           |                       |            |
| 4           |                       |            | 4           |                       |            |
| 5           |                       |            | 5           |                       |            |
| 6           |                       |            | 6           |                       |            |
| 7           |                       |            | 7           |                       |            |
| 8           |                       |            | 8           |                       |            |
| 9           |                       |            | 9           |                       |            |
| 10          |                       |            | 10          |                       |            |
| 11          |                       |            | 11          |                       |            |
| 12          |                       |            | 12          |                       |            |
| 13          |                       |            | 13          |                       |            |
| 14          |                       |            | 14          |                       |            |
| 15          |                       |            | 15          |                       |            |
| 16          |                       |            | 16          |                       |            |
| 17          |                       |            | 17          |                       |            |
| 18          |                       |            | 18          |                       |            |
| 19          |                       |            | 19          |                       |            |
| 20          |                       |            | 20          |                       |            |
| 21          |                       |            | 21          |                       |            |
| 22          |                       |            | 22          |                       |            |
| 23          |                       |            | 23          |                       |            |
| 24          |                       |            | 24          |                       |            |
| 25          |                       |            | 25          |                       |            |
| 26          |                       |            | 26          |                       |            |
| 27          |                       |            | 27          |                       |            |
| 28          |                       |            | 28          |                       |            |
| 29          |                       |            | 29          |                       |            |
| 30          |                       |            | 30          |                       |            |
| 31          |                       |            | 31          |                       |            |
| 32          |                       |            | 32          |                       |            |
| 33          |                       |            | 33          |                       |            |
| 34          |                       |            | 34          |                       |            |
| 35          |                       |            | 35          |                       |            |
| 36          |                       |            | 36          |                       |            |

Where:

- 100G ISL to switch A port 35
- 100G ISL to switch A port 36
- 100G ISL to switch B port 35
- 100G ISL to switch B port 36

# Install NX-OS software and RCFs

## Install NX-OS software and RCFs on Cisco Nexus 9336C-FX2 switches

The Cisco NX-OS software and reference configuration file (RCF) must be installed on Cisco Nexus 9336C-FX2 cluster switches.

### Before you begin

The following conditions must exist before you install the NX-OS software and RCF on the cluster switch:

- The cluster must be fully functioning (there should be no errors in the logs or similar issues).
- You must have checked or set your desired boot configuration in the RCF to reflect the desired boot images if you are installing only NX-OS and keeping your current RCF version.
- If you need to change the boot configuration to reflect the current boot images, you must do so before reapplying the RCF so that the correct version is instantiated on future reboots.
- You must have a console connection to the switch, required when installing the RCF.
- You must have consulted the switch compatibility table on the Cisco Ethernet switch page for the supported ONTAP, NX-OS, and RCF versions.  
See [Cisco Ethernet Switches](#) for more information.
- There can be command dependencies between the command syntax in the RCF and that found in versions of NX-OS.
- You must have referred to the appropriate software and upgrade guides available on the Cisco web site for complete documentation on the Cisco switch upgrade and downgrade procedures on Cisco Nexus 9000 Series Switches.  
See [Cisco Nexus 9000 Series Switches](#) for more information.
- You must have the current RCF.

### Initial setup

The examples in this procedure use two nodes. These nodes use two 100GbE cluster interconnect ports e3a and e3b, as per the A400 controller.

See the [Hardware Universe](#) to verify the correct cluster ports on your platforms.



The command outputs might vary depending on different releases of ONTAP.

The examples in this procedure use the following switch and node nomenclature:

- The names of the two Cisco switches are *cs1* and *cs2*.
- The node names are *cluster1-01* and *cluster1-02*.
- The cluster LIF names are *cluster1-01\_clus1* and *cluster1-01\_clus2* for cluster1-01 and *cluster1-02\_clus1* and *cluster1-02\_clus2* for cluster1-02.
- The *cluster1::\*>* prompt indicates the name of the cluster.



The procedure requires the use of both ONTAP commands and Cisco Nexus 9000 Series Switches commands; ONTAP commands are used unless otherwise indicated.

### Steps

1. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport

```
message: system node autosupport invoke -node * -type all -message MAINT=x h
```

Where x is the duration of the maintenance window in hours.

2. Change the privilege level to advanced, entering y when prompted to continue:

```
set -privilege advanced
```

The advanced prompt (\*>) appears.

3. Display how many cluster interconnect interfaces are configured in each node for each cluster interconnect switch:

```
network device-discovery show -protocol cdp
```

```
cluster1:: network device-discovery show -protocol cdp
Node/ Local Discovered
Protocol Port Device (LLDP: ChassisID) Interface Platform

cluster1-02/cdp
 e3a cs1 Eth1/2 N9K-C9336C
 e3b cs2 Eth1/2 N9K-C9336C
cluster1-01/cdp
 e3a cs1 Eth1/1 N9K-C9336C
 e3b cs2 Eth1/1 N9K-C9336C
4 entries were displayed.
```

4. Check the administrative or operational status of each cluster interface:

- a. Display the network port attributes:

```
network port show -ipspace Cluster
```

```
cluster1::*> network port show -ipspace Cluster
Node: cluster1-02

Port IPspace Broadcast Domain Link MTU Speed(Mbps) Health

e3a Cluster Cluster up 9000 auto/100000 healthy
e3b Cluster Cluster up 9000 auto/100000 healthy

Node: cluster1-01

Port IPspace Broadcast Domain Link MTU Speed(Mbps) Health

e3a Cluster Cluster up 9000 auto/100000 healthy
e3b Cluster Cluster up 9000 auto/100000 healthy
4 entries were displayed.
```

b. Display information about the LIFs:

```
network interface show - vserver Cluster
```

```
cluster1::*> network interface show -vserver Cluster
```

| Current | Logical           | Status     | Network           | Current     |      |
|---------|-------------------|------------|-------------------|-------------|------|
| Is      |                   |            |                   |             |      |
| Vserver | Interface         | Admin/Oper | Address/Mask      | Node        | Port |
| Home    |                   |            |                   |             |      |
|         | -----             | -----      | -----             | -----       |      |
|         | -----             | -----      |                   |             |      |
| Cluster |                   |            |                   |             |      |
|         | cluster1-01_clus1 | up/up      | 169.254.209.69/16 | cluster1-01 | e3a  |
| true    |                   |            |                   |             |      |
|         | cluster1-01_clus2 | up/up      | 169.254.49.125/16 | cluster1-01 | e3b  |
| true    |                   |            |                   |             |      |
|         | cluster1-02_clus1 | up/up      | 169.254.47.194/16 | cluster1-02 | e3a  |
| true    |                   |            |                   |             |      |
|         | cluster1-02_clus2 | up/up      | 169.254.19.183/16 | cluster1-02 | e3b  |
| true    |                   |            |                   |             |      |

4 entries were displayed.

5. Ping the remote cluster LIFs:

```
cluster ping-cluster -node node-name
```

```

cluster1::*> cluster ping-cluster -node cluster1-02
Host is cluster1-02
Getting addresses from network interface table...
Cluster cluster1-01_clus1 169.254.209.69 cluster1-01 e3a
Cluster cluster1-01_clus2 169.254.49.125 cluster1-01 e3b
Cluster cluster1-02_clus1 169.254.47.194 cluster1-02 e3a
Cluster cluster1-02_clus2 169.254.19.183 cluster1-02 e3b
Local = 169.254.47.194 169.254.19.183
Remote = 169.254.209.69 169.254.49.125
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 9000 byte MTU on 4 path(s):
 Local 169.254.19.183 to Remote 169.254.209.69
 Local 169.254.19.183 to Remote 169.254.49.125
 Local 169.254.47.194 to Remote 169.254.209.69
 Local 169.254.47.194 to Remote 169.254.49.125
Larger than PMTU communication succeeds on 4 path(s)
RPC status:
2 paths up, 0 paths down (tcp check)
2 paths up, 0 paths down (udp check)

```

6. Verify that the auto-revert command is enabled on all cluster LIFs:

```
network interface show - vserver Cluster -fields auto-revert
```

```

cluster1::*> network interface show -vserver Cluster -fields auto-revert
 Logical
Vserver Interface Auto-revert
----- -
Cluster
 cluster1-01_clus1 true
 cluster1-01_clus2 true
 cluster1-02_clus1 true
 cluster1-02_clus2 true
4 entries were displayed.

```

7. Enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the following commands:

- ° system switch ethernet log setup-password
- ° system switch ethernet log enable-collection

```

cluster1::*> system switch ethernet log setup password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
cs1
cs2
cluster1::*> system switch ethernet log setup-password
Enter the switch name: cs1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y
Enter the password: <enter switch password>
Enter the password again: <enter switch password>
cluster1::*> system switch ethernet log setup-password
Enter the switch name: cs2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y
Enter the password: <enter switch password>
Enter the password again: <enter switch password>
cluster1::*> system switch ethernet log enable-collection
Do you want to enable cluster log collection for all nodes in the cluster?
{y|n}: [n] y
Enabling cluster switch log collection.
cluster1::*>

```



If any of these commands return an error, contact NetApp support.

### Install the NX-OS software on a Cisco Nexus 9336C- FX2 cluster switch

You can use this procedure to install the NX-OS software on the Cisco Nexus 9336C-FX2 cluster switch.

#### Steps

1. Connect the cluster switch to the management network.
2. Use the `ping` command to verify connectivity to the server hosting the NX-OS software and the RCF.

This example verifies that the switch can reach the server at IP address 172.19.2.1:

```

cs2# ping 172.19.2.1
Pinging 172.19.2.1 with 0 bytes of data:
Reply From 172.19.2.1: icmp_seq = 0. time= 5910 usec.

```

3. Copy the NX-OS software and EPLD images to the Nexus 9336C-FX2 switch.

```
cs2# copy sftp: bootflash: vrf management
Enter source filename: /code/nxos.9.3.5.bin
Enter hostname for the sftp server: 172.19.2.1
Enter username: user1
Outbound-ReKey for 172.19.2.1:22
Inbound-ReKey for 172.19.2.1:22
user1@172.19.2.1's password:
sftp> progress
Progress meter enabled
sftp> get /code/nxos.9.3.5.bin /bootflash/nxos.9.3.5.bin
/code/nxos.9.3.5.bin 100% 1261MB 9.3MB/s 02:15
sftp> exit
Copy complete, now saving to disk (please wait)...
Copy complete.
cs2# copy sftp: bootflash: vrf management
Enter source filename: /code/n9000-epld.9.3.5.img
Enter hostname for the sftp server: 172.19.2.1
Enter username: user1
Outbound-ReKey for 172.19.2.1:22
Inbound-ReKey for 172.19.2.1:22
user1@172.19.2.1's password:
sftp> progress
Progress meter enabled
sftp> get /code/n9000-epld.9.3.5.img /bootflash/n9000-epld.9.3.5.img
/code/n9000-epld.9.3.5.img 100% 161MB 9.5MB/s 00:16
sftp> exit
Copy complete, now saving to disk (please wait)...
Copy complete.
```

4. Verify the running version of the NX-OS software:

```
show version
```



```
cs2# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
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http://opensource.org/licenses/gpl-3.0.html and
http://www.opensource.org/licenses/lgpl-2.1.php and
http://www.gnu.org/licenses/old-licenses/library.txt.
Software
 BIOS: version 08.38
 NXOS: version 9.3(4)
 BIOS compile time: 05/29/2020
 NXOS image file is: bootflash:///nxos.9.3.4.bin
 NXOS compile time: 4/28/2020 21:00:00 [04/29/2020 02:28:31]
Hardware
 cisco Nexus9000 C9336C-FX2 Chassis
 Intel(R) Xeon(R) CPU E5-2403 v2 @ 1.80GHz with 8154432 kB of memory.
 Processor Board ID FOC20291J6K
 Device name: cs2
 bootflash: 53298520 kB
Kernel uptime is 0 day(s), 0 hour(s), 3 minute(s), 42 second(s)
Last reset at 157524 usecs after Mon Nov 2 18:32:06 2020
 Reason: Reset Requested by CLI command reload
 System version: 9.3(4)
 Service:
plugin
 Core Plugin, Ethernet Plugin
Active Package(s):

cs2#
```

5. Install the NX-OS image.



Installing the image file causes it to be loaded every time the switch is rebooted.

```

cs2# install all nxos bootflash:nxos.9.3.5.bin
Installer will perform compatibility check first. Please wait.
Installer is forced disruptive
Verifying image bootflash:/nxos.9.3.5.bin for boot variable "nxos".
[#####] 100% -- SUCCESS
Verifying image type.
[#####] 100% -- SUCCESS
Preparing "nxos" version info using image bootflash:/nxos.9.3.5.bin.
[#####] 100% -- SUCCESS
Preparing "bios" version info using image bootflash:/nxos.9.3.5.bin.
[#####] 100% -- SUCCESS
Performing module support checks.
[#####] 100% -- SUCCESS
Notifying services about system upgrade.
[#####] 100% -- SUCCESS
Compatibility check is done:
Module bootable Impact Install-type Reason
----- -
1 yes disruptive reset default upgrade is not
hitless
Images will be upgraded according to following table:
Module Image Running-Version(pri:alt New-Version
Upg-
Required

1 nxos 9.3(4) 9.3(5)
yes
1 bios v08.37(01/28/2020):v08.23(09/23/2015)
v08.38(05/29/2020) yes
Switch will be reloaded for disruptive upgrade.
Do you want to continue with the installation (y/n)? [n] y
Install is in progress, please wait.
Performing runtime checks.
[#####] 100% -- SUCCESS
Setting boot variables.
[#####] 100% -- SUCCESS
Performing configuration copy.
[#####] 100% -- SUCCESS
Module 1: Refreshing compact flash and upgrading bios/loader/bootrom.
Warning: please do not remove or power off the module at this time.
[#####] 100% -- SUCCESS
Finishing the upgrade, switch will reboot in 10 seconds.

```

6. Verify the new version of NX-OS software after the switch has rebooted:

```
show version
```

```
cs2# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
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http://opensource.org/licenses/gpl-3.0.html and
http://www.opensource.org/licenses/lgpl-2.1.php and
http://www.gnu.org/licenses/old-licenses/library.txt.
Software
 BIOS: version 05.33
 NXOS: version 9.3(5)
 BIOS compile time: 09/08/2018
 NXOS image file is: bootflash:///nxos.9.3.5.bin
 NXOS compile time: 11/4/2018 21:00:00 [11/05/2018 06:11:06]
Hardware
 cisco Nexus9000 C9336C-FX2 Chassis
 Intel(R) Xeon(R) CPU E5-2403 v2 @ 1.80GHz with 8154432 kB of memory.
 Processor Board ID FOC20291J6K
 Device name: cs2
 bootflash: 53298520 kB
Kernel uptime is 0 day(s), 0 hour(s), 3 minute(s), 42 second(s)
Last reset at 277524 usecs after Mon Nov 2 22:45:12 2020
 Reason: Reset due to upgrade
 System version: 9.3(4)
 Service:
plugin
 Core Plugin, Ethernet Plugin
Active Package(s):
```

## 7. Upgrade the EPLD image and reboot the switch.

```

cs2# show version module 1 epld
EPLD Device Version

MI FPGA 0x7
IO FPGA 0x17
MI FPGA2 0x2
GEM FPGA 0x2
GEM FPGA 0x2
GEM FPGA 0x2
GEM FPGA 0x2

cs2# install epld bootflash:n9000-epld.9.3.5.img module 1
Compatibility check:
Module Type Upgradable Impact Reason

1 SUP Yes disruptive Module Upgradable
Retrieving EPLD versions.... Please wait.
Images will be upgraded according to following table:
Module Type EPLD Running-Version New-Version Upg-
Required

1 SUP MI FPGA 0x07 0x07 No
1 SUP IO FPGA 0x17 0x19 Yes
1 SUP MI FPGA2 0x02 0x02 No

The above modules require upgrade.
The switch will be reloaded at the end of the upgrade
Do you want to continue (y/n) ? [n] y
Proceeding to upgrade Modules.
Starting Module 1 EPLD Upgrade
Module 1 : IO FPGA [Programming] : 100.00% (64 of 64 sectors)
Module 1 EPLD upgrade is successful.
Module Type Upgrade-Result

1 SUP Success
EPLDs upgraded.
Module 1 EPLD upgrade is successful.

```

8. After the switch reboot, log in again and verify that the new version of EPLD loaded successfully.

```
cs2# show version module 1 epld
EPLD Device Version

MI FPGA 0x7
IO FPGA 0x19
MI FPGA2 0x2
GEM FPGA 0x2
GEM FPGA 0x2
GEM FPGA 0x2
GEM FPGA 0x2
```

## Install the RCF on a Cisco Nexus 9336C- FX2 cluster switch

You can install the RCF after setting up the Nexus 9336C-FX2 cluster switch for the first time. You can also use this procedure to upgrade your RCF version on your cluster switch.

### About this task

The examples in this procedure use the following switch and node nomenclature:

- The names of the two Cisco switches are `cs1` and `cs2`.
- The node names are `cluster1-01`, `cluster1-02`, `cluster1-03`, and `cluster1-04`.
- The cluster LIF names are `cluster1-01_clus1`, `cluster1-01_clus2`, `cluster1-02_clus1`, `cluster1-02_clus2`, `cluster1-03_clus1`, `cluster1-03_clus2`, `cluster1-04_clus1`, and `cluster1-04_clus2`.
- The `cluster1::*>` prompt indicates the name of the cluster.



The procedure requires the use of both ONTAP commands and Cisco Nexus 9000 Series Switches commands; ONTAP commands are used unless otherwise indicated.

### Steps

1. Display the cluster ports on each node that are connected to the cluster switches:  
`network device-discovery show`

```

cluster1::*> network device-discovery show
Node/ Local Discovered
Protocol Port Device (LLDP: ChassisID) Interface Platform

cluster1-01/cdp
 e3a cs1 Ethernet1/7 N9K-C9336C
 e0d cs2 Ethernet1/7 N9K-C9336C
cluster1-02/cdp
 e3a cs1 Ethernet1/8 N9K-C9336C
 e0d cs2 Ethernet1/8 N9K-C9336C
cluster1-03/cdp
 e3a cs1 Ethernet1/1/1 N9K-C9336C
 e3b cs2 Ethernet1/1/1 N9K-C9336C
cluster1-04/cdp
 e3a cs1 Ethernet1/1/2 N9K-C9336C
 e3b cs2 Ethernet1/1/2 N9K-C9336C
cluster1::*>

```

2. Check the administrative and operational status of each cluster port.
3. Verify that all the cluster ports are up with a healthy status:  

```
network port show -role cluster
```

```

cluster1::*> network port show -role cluster
Node: cluster1-01

Ignore
Speed(Mbps) Health
Health
Port IPspace Broadcast Domain Link MTU Admin/Oper Status
Status

e3a Cluster Cluster up 9000 auto/100000 healthy
false
e0d Cluster Cluster up 9000 auto/100000 healthy
false
Node: cluster1-02

Ignore
Speed(Mbps) Health
Health
Port IPspace Broadcast Domain Link MTU Admin/Oper Status
Status

```



```

e3a Cluster Cluster up 9000 auto/100000 healthy
false
e0d Cluster Cluster up 9000 auto/100000 healthy
false
8 entries were displayed.
Node: cluster1-03

Ignore

Speed(Mbps) Health
Health
Port IPspace Broadcast Domain Link MTU Admin/Oper Status
Status

e3a Cluster Cluster up 9000 auto/100000 healthy
false
e3b Cluster Cluster up 9000 auto/100000 healthy
false
Node: cluster1-04

Ignore

Speed(Mbps) Health
Health
Port IPspace Broadcast Domain Link MTU Admin/Oper Status
Status

e0a Cluster Cluster up 9000 auto/100000 healthy
false
e0b Cluster Cluster up 9000 auto/100000 healthy
false
cluster1::*>

```

#### 4. Verify that all the cluster interfaces (LIFs) are on the home port:

```
network interface show -role cluster
```

```

cluster1::*> network interface show -role cluster
 Logical Status Network Current Current
Is Vserver Interface Admin/Oper Address/Mask Node Port
Home

Cluster
true cluster1-01_clus1 up/up 169.254.3.4/23 cluster1-01 e3a
true cluster1-01_clus2 up/up 169.254.3.5/23 cluster1-01 e0d
true cluster1-02_clus1 up/up 169.254.3.8/23 cluster1-02 e3a
true cluster1-02_clus2 up/up 169.254.3.9/23 cluster1-02 e0d
true cluster1-03_clus1 up/up 169.254.1.3/23 cluster1-03 e3a
true cluster1-03_clus2 up/up 169.254.1.1/23 cluster1-03 e3b
true cluster1-04_clus1 up/up 169.254.1.6/23 cluster1-04 e3a
true cluster1-04_clus2 up/up 169.254.1.7/23 cluster1-04 e3b
true
8 entries were displayed.
cluster1::*>

```

5. Verify that the cluster displays information for both cluster switches:

```
system cluster-switch show -is-monitoring-enabled-operational true
```

```
cluster1::*> system cluster-switch show -is-monitoring-enabled-operational
true
Switch Type Address Model

cs1 cluster-network 10.233.205.90 N9K-C9336C
 Serial Number: FOCXXXXXXGD
 Is Monitored: true
 Reason: None
 Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
 9.3(5)
 Version Source: CDP
cs2 cluster-network 10.233.205.91 N9K-C9336C
 Serial Number: FOCXXXXXXGS
 Is Monitored: true
 Reason: None
 Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
 9.3(5)
 Version Source: CDP
cluster1::*>
```

6. Disable auto-revert on the cluster LIFs.

```
cluster1::*> network interface modify -vserver Cluster -lif * -auto-revert
false
```

7. On cluster switch cs2, shut down the ports connected to the cluster ports of the nodes.

```
cs2(config)# interface eth1/1/1-2,eth1/7-8
cs2(config-if-range)# shutdown
```

8. Verify that the cluster LIFs have migrated to the ports hosted on cluster switch cs1. This might take a few seconds:

```
network interface show -role cluster
```

```
cluster1::*> network interface show -role cluster
```

| Logical              | Status     | Network        | Current     | Current |
|----------------------|------------|----------------|-------------|---------|
| Is Vserver Interface | Admin/Oper | Address/Mask   | Node        | Port    |
| Home                 |            |                |             |         |
| -----                | -----      | -----          | -----       | -----   |
| Cluster              |            |                |             |         |
| cluster1-01_clus1    | up/up      | 169.254.3.4/23 | cluster1-01 | e3a     |
| true                 |            |                |             |         |
| cluster1-01_clus2    | up/up      | 169.254.3.5/23 | cluster1-01 | e3a     |
| false                |            |                |             |         |
| cluster1-02_clus1    | up/up      | 169.254.3.8/23 | cluster1-02 | e3a     |
| true                 |            |                |             |         |
| cluster1-02_clus2    | up/up      | 169.254.3.9/23 | cluster1-02 | e3a     |
| false                |            |                |             |         |
| cluster1-03_clus1    | up/up      | 169.254.1.3/23 | cluster1-03 | e3a     |
| true                 |            |                |             |         |
| cluster1-03_clus2    | up/up      | 169.254.1.1/23 | cluster1-03 | e3a     |
| false                |            |                |             |         |
| cluster1-04_clus1    | up/up      | 169.254.1.6/23 | cluster1-04 | e3a     |
| true                 |            |                |             |         |
| cluster1-04_clus2    | up/up      | 169.254.1.7/23 | cluster1-04 | e3a     |
| false                |            |                |             |         |

8 entries were displayed.  
cluster1::\*>

9. Verify that the cluster is healthy:

```
cluster show
```

```
cluster1::*> cluster show
```

| Node        | Health | Eligibility | Epsilon |
|-------------|--------|-------------|---------|
| cluster1-01 | true   | true        | false   |
| cluster1-02 | true   | true        | false   |
| cluster1-03 | true   | true        | true    |
| cluster1-04 | true   | true        | false   |

4 entries were displayed.  
cluster1::\*>

10. Clean the configuration on switch cs2 and perform a basic setup.

- Clean the configuration. This step requires a console connection to the switch.

```
cs2# write erase
Warning: This command will erase the startup-configuration.
Do you wish to proceed anyway? (y/n) [n] y
cs2# reload
This command will reboot the system. (y/n)? [n] y
cs2#
```

b. Perform a basic setup of the switch.

11. Copy the RCF to the bootflash of switch cs2 using one of the following transfer protocols: FTP, TFTP, SFTP, or SCP. For more information about Cisco commands, see the appropriate guide in the [Cisco Nexus 9000 Series NX-OS Command Reference guides](#).

This example shows TFTP being used to copy an RCF to the bootflash on switch cs2.

```
cs2# copy tftp: bootflash: vrf management
Enter source filename: Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt
Enter hostname for the tftp server: 172.22.201.50
Trying to connect to tftp server.....Connection to Server Established.
TFTP get operation was successful
Copy complete, now saving to disk (please wait)...
```

12. Apply the RCF previously downloaded to the bootflash.  
For more information about Cisco commands, see the appropriate guide in the [Cisco Nexus 9000 Series NX-OS Command Reference guides](#).

This example shows the RCF file `Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt` being installed on switch cs2.

```
cs2# copy Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt running-config
echo-commands
```

13. Examine the banner output from the `show banner motd` command. You must read and follow these instructions to ensure the proper configuration and operation of the switch.

```

cs2# show banner motd

*
* NetApp Reference Configuration File (RCF)
*
* Switch : Nexus N9K-C9336C-FX2
* Filename : Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt
* Date : 10-23-2020
* Version : v1.6
*
* Port Usage:
* Ports 1- 3: Breakout mode (4x10G) Intra-Cluster Ports, int e1/1/1-4,
* e1/2/1-4, e1/3/1-4
* Ports 4- 6: Breakout mode (4x25G) Intra-Cluster/HA Ports, int e1/4/1-4,
* e1/5/1-4, e1/6/1-4
* Ports 7-34: 40/100GbE Intra-Cluster/HA Ports, int e1/7-34
* Ports 35-36: Intra-Cluster ISL Ports, int e1/35-36
*
* Dynamic breakout commands:
* 10G: interface breakout module 1 port <range> map 10g-4x
* 25G: interface breakout module 1 port <range> map 25g-4x
*
* Undo breakout commands and return interfaces to 40/100G configuration in
* config mode:
* no interface breakout module 1 port <range> map 10g-4x
* no interface breakout module 1 port <range> map 25g-4x
* interface Ethernet <interfaces taken out of breakout mode>
* inherit port-profile 40-100G
* priority-flow-control mode auto
* service-policy input HA
* exit
*

*

```

14. Verify that the RCF file is the correct newer version:

```
show running-config
```

When you check the output to verify you have the correct RCF, make sure that the following information is correct:

- The RCF banner
- The node and port settings
- Customizations

The output varies according to your site configuration. Check the port settings and refer to the release

notes for any changes specific to the RCF that you have installed.

15. After you verify the RCF versions and switch settings are correct, copy the running-config file to the startup-config file.

For more information about Cisco commands, see the appropriate guide in the [Cisco Nexus 9000 Series NX-OS Command Reference guides](#).

```
cs2# copy running-config startup-config
[#####] 100% Copy complete
```

16. Reboot switch cs2. You can ignore the “cluster ports down” events reported on the nodes while the switch reboots.

```
cs2# reload
This command will reboot the system. (y/n)? [n] y
```

17. Apply the same RCF and save the running configuration for a second time.

```
cs2# copy Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt running-config
echo-commands
cs2# copy running-config startup-config
[#####] 100% Copy complete
```

18. Verify the health of cluster ports on the cluster.

- a. Verify that e0d ports are up and healthy across all nodes in the cluster:  
network port show -role cluster

```
cluster1::*> network port show -role cluster
```

```
Node: cluster1-01
```

| Port | IPspace | Broadcast Domain | Link | MTU  | Speed (Mbps)<br>Admin/Oper | Health<br>Status | Ignore<br>Health<br>Status |
|------|---------|------------------|------|------|----------------------------|------------------|----------------------------|
| e3a  | Cluster | Cluster          | up   | 9000 | auto/100000                | healthy          | false                      |
| e3b  | Cluster | Cluster          | up   | 9000 | auto/100000                | healthy          | false                      |

```
Node: cluster1-02
```

| Port | IPspace | Broadcast Domain | Link | MTU  | Speed (Mbps)<br>Admin/Oper | Health<br>Status | Ignore<br>Health<br>Status |
|------|---------|------------------|------|------|----------------------------|------------------|----------------------------|
| e3a  | Cluster | Cluster          | up   | 9000 | auto/100000                | healthy          | false                      |
| e3b  | Cluster | Cluster          | up   | 9000 | auto/100000                | healthy          | false                      |

```
Node: cluster1-03
```

| Port | IPspace | Broadcast Domain | Link | MTU  | Speed (Mbps)<br>Admin/Oper | Health<br>Status | Ignore<br>Health<br>Status |
|------|---------|------------------|------|------|----------------------------|------------------|----------------------------|
| e3a  | Cluster | Cluster          | up   | 9000 | auto/100000                | healthy          | false                      |
| e0d  | Cluster | Cluster          | up   | 9000 | auto/100000                | healthy          | false                      |

```
Node: cluster1-04
```

| Port | IPspace | Broadcast Domain | Link | MTU  | Speed (Mbps)<br>Admin/Oper | Health<br>Status | Ignore<br>Health<br>Status |
|------|---------|------------------|------|------|----------------------------|------------------|----------------------------|
| e3a  | Cluster | Cluster          | up   | 9000 | auto/100000                | healthy          | false                      |
| e0d  | Cluster | Cluster          | up   | 9000 | auto/100000                | healthy          | false                      |

```
8 entries were displayed.
```

b. Verify the switch health from the cluster (this might not show switch cs2, since LIFs are not homed on e0d).



```

cluster1::*> network device-discovery show -protocol cdp
Node/ Local Discovered
Protocol Port Device (LLDP: ChassisID) Interface Platform

cluster1-01/cdp
 e3a cs1 Ethernet1/7 N9K-C9336C
 e0d cs2 Ethernet1/7 N9K-C9336C
cluster01-2/cdp
 e3a cs1 Ethernet1/8 N9K-C9336C
 e0d cs2 Ethernet1/8 N9K-C9336C
cluster01-3/cdp
 e3a cs1 Ethernet1/1/1 N9K-C9336C
 e3b cs2 Ethernet1/1/1 N9K-C9336C
cluster1-04/cdp
 e3a cs1 Ethernet1/1/2 N9K-C9336C
 e3b cs2 Ethernet1/1/2 N9K-C9336C
cluster1::*> system cluster-switch show -is-monitoring-enabled-operational
true
Switch Type Address Model

cs1 cluster-network 10.233.205.90 NX9-C9336C
 Serial Number: FOCXXXXXXGD
 Is Monitored: true
 Reason: None
 Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
 9.3(5)
 Version Source: CDP
cs2 cluster-network 10.233.205.91 NX9-C9336C
 Serial Number: FOCXXXXXXGS
 Is Monitored: true
 Reason: None
 Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
 9.3(5)
 Version Source: CDP
2 entries were displayed.

```



You might observe the following output on the cs1 switch console depending on the RCF version previously loaded on the switch.

```

2020 Nov 17 16:07:18 cs1 %$ VDC-1 %$ %STP-2-UNBLOCK_CONSIST_PORT:
Unblocking port port-channel1 on VLAN0092. Port consistency restored.
2020 Nov 17 16:07:23 cs1 %$ VDC-1 %$ %STP-2-BLOCK_PVID_PEER: Blocking
port-channel1 on VLAN0001. Inconsistent peer vlan.
2020 Nov 17 16:07:23 cs1 %$ VDC-1 %$ %STP-2-BLOCK_PVID_LOCAL: Blocking
port-channel1 on VLAN0092. Inconsistent local vlan.

```

19. On cluster switch cs1, shut down the ports connected to the cluster ports of the nodes. The following example uses the interface example output from step 1:

```

cs1(config)# interface eth1/1/1-2,eth1/7-8
cs1(config-if-range)# shutdown

```

20. Verify that the cluster LIFs have migrated to the ports hosted on switch cs2. This might take a few seconds:

```

network interface show -role cluster

```

```

cluster1::*> network interface show -role cluster

```

| Logical           | Status            | Network      | Current        |                 |
|-------------------|-------------------|--------------|----------------|-----------------|
| Current Is        |                   |              |                |                 |
| Vserver Interface | Admin/Oper        | Address/Mask | Node           | Port            |
| Home              |                   |              |                |                 |
| -----             | -----             | -----        | -----          | -----           |
| -----             | ----              |              |                |                 |
| Cluster           |                   |              |                |                 |
| false             | cluster1-01_clus1 | up/up        | 169.254.3.4/23 | cluster1-01 e0d |
| true              | cluster1-01_clus2 | up/up        | 169.254.3.5/23 | cluster1-01 e0d |
| false             | cluster1-02_clus1 | up/up        | 169.254.3.8/23 | cluster1-02 e0d |
| true              | cluster1-02_clus2 | up/up        | 169.254.3.9/23 | cluster1-02 e0d |
| false             | cluster1-03_clus1 | up/up        | 169.254.1.3/23 | cluster1-03 e3b |
| true              | cluster1-03_clus2 | up/up        | 169.254.1.1/23 | cluster1-03 e3b |
| false             | cluster1-04_clus1 | up/up        | 169.254.1.6/23 | cluster1-04 e3b |
| true              | cluster1-04_clus2 | up/up        | 169.254.1.7/23 | cluster1-04 e3b |

```

8 entries were displayed.
cluster1::*>

```

21. Verify that the cluster is healthy:

```
cluster show
```

```
cluster1::*> cluster show
Node Health Eligibility Epsilon

cluster1-01 true true false
cluster1-02 true true false
cluster1-03 true true true
cluster1-04 true true false
4 entries were displayed.
cluster1::*>
```

22. Repeat Steps 7 to 14 on switch cs1.

23. Enable auto-revert on the cluster LIFs.

```
cluster1::*> network interface modify -vserver Cluster -lif * -auto-revert
True
```

24. Reboot switch cs1. You do this to trigger the cluster LIFs to revert to their home ports. You can ignore the “cluster ports down” events reported on the nodes while the switch reboots.

```
cs1# reload
This command will reboot the system. (y/n)? [n] y
```

25. Verify that the switch ports connected to the cluster ports are up.

```
cs1# show interface brief | grep up
.
.
Eth1/1/1 1 eth access up none 100G (D)
--
Eth1/1/2 1 eth access up none 100G (D)
--
Eth1/7 1 eth trunk up none 100G (D)
--
Eth1/8 1 eth trunk up none 100G (D)
--
.
.
```

26. Verify that the ISL between cs1 and cs2 is functional:

```
show port-channel summary
```

```
cs1# show port-channel summary
```

```
Flags: D - Down P - Up in port-channel (members)
 I - Individual H - Hot-standby (LACP only)
 s - Suspended r - Module-removed
 b - BFD Session Wait
 S - Switched R - Routed
 U - Up (port-channel)
 p - Up in delay-lACP mode (member)
 M - Not in use. Min-links not met
```

```


Group Port- Type Protocol Member Ports Channel

1 Po1 (SU) Eth LACP Eth1/35 (P) Eth1/36 (P)
cs1#
```

27. Verify that the cluster LIFs have reverted to their home port:

```
network interface show -role cluster
```

```

cluster1::*> network interface show -role cluster
 Logical Status Network Current
Current Is
Vserver Interface Admin/Oper Address/Mask Node Port
Home

Cluster
true cluster1-01_clus1 up/up 169.254.3.4/23 cluster1-01 e0d
true cluster1-01_clus2 up/up 169.254.3.5/23 cluster1-01 e0d
true cluster1-02_clus1 up/up 169.254.3.8/23 cluster1-02 e0d
true cluster1-02_clus2 up/up 169.254.3.9/23 cluster1-02 e0d
true cluster1-03_clus1 up/up 169.254.1.3/23 cluster1-03 e3b
true cluster1-03_clus2 up/up 169.254.1.1/23 cluster1-03 e3b
true cluster1-04_clus1 up/up 169.254.1.6/23 cluster1-04 e3b
true cluster1-04_clus2 up/up 169.254.1.7/23 cluster1-04 e3b
8 entries were displayed.
cluster1::*>

```

28. Verify that the cluster is healthy:

```
cluster show
```

```

cluster1::*> cluster show
Node Health Eligibility Epsilon

cluster1-01 true true false
cluster1-02 true true false
cluster1-03 true true true
cluster1-04 true true false
4 entries were displayed.
cluster1::*>

```

29. Ping the remote cluster interfaces to verify connectivity:

```
cluster ping-cluster -node local
```

```

cluster1::*> cluster ping-cluster -node local
Host is cluster1-03
Getting addresses from network interface table...
Cluster cluster1-03_clus1 169.254.1.3 cluster1-03 e3a
Cluster cluster1-03_clus2 169.254.1.1 cluster1-03 e3b
Cluster cluster1-04_clus1 169.254.1.6 cluster1-04 e3a
Cluster cluster1-04_clus2 169.254.1.7 cluster1-04 e3b
Cluster cluster1-01_clus1 169.254.3.4 cluster1-01 e3a
Cluster cluster1-01_clus2 169.254.3.5 cluster1-01 e0d
Cluster cluster1-02_clus1 169.254.3.8 cluster1-02 e3a
Cluster cluster1-02_clus2 169.254.3.9 cluster1-02 e0d
Local = 169.254.1.3 169.254.1.1
Remote = 169.254.1.6 169.254.1.7 169.254.3.4 169.254.3.5 169.254.3.8
169.254.3.9
Cluster Vserver Id = 4294967293
Ping status:
.....
Basic connectivity succeeds on 12 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 9000 byte MTU on 12 path(s):
 Local 169.254.1.3 to Remote 169.254.1.6
 Local 169.254.1.3 to Remote 169.254.1.7
 Local 169.254.1.3 to Remote 169.254.3.4
 Local 169.254.1.3 to Remote 169.254.3.5
 Local 169.254.1.3 to Remote 169.254.3.8
 Local 169.254.1.3 to Remote 169.254.3.9
 Local 169.254.1.1 to Remote 169.254.1.6
 Local 169.254.1.1 to Remote 169.254.1.7
 Local 169.254.1.1 to Remote 169.254.3.4
 Local 169.254.1.1 to Remote 169.254.3.5
 Local 169.254.1.1 to Remote 169.254.3.8
 Local 169.254.1.1 to Remote 169.254.3.9
Larger than PMTU communication succeeds on 12 path(s)
RPC status:
6 paths up, 0 paths down (tcp check)
6 paths up, 0 paths down (udp check)

```

## Install the RCF on a Cisco Nexus 9336C-FX2 storage switch

The reference configuration files (RCFs) can be upgraded on Cisco Nexus 9336C-FX2 storage switches.

### Before you begin

The following conditions must exist before you upgrade the RCF on the storage switch:

- The switch must be fully functioning (there should be no errors in the logs or similar issues).

- You must have checked or set your desired boot variables in the RCF to reflect the desired boot images if you are installing only NX-OS and keeping your current RCF version.
- If you need to change the boot variables to reflect the current boot images, you must do so before reapplying the RCF so that the correct version is instantiated on future reboots.
- You must have referred to the appropriate software and upgrade guides available on the Cisco web site for complete documentation on the Cisco storage upgrade and downgrade procedures. See [Cisco Nexus 9000 Series Switches](#) for more information.
- The number of 100 GbE ports are defined in the reference configuration files (RCFs) available on the [Cisco Ethernet switches](#) page.

### Procedure summary

1. Check the health status of switches and ports (steps 1-4)
2. Download the NX-OS image to Cisco switch st2 and reboot (steps 5-8)
3. Copy the RCF to Cisco switch st2 (steps 9-12)
4. Recheck the health status of switches and ports (steps 13-15)
5. Repeat steps 1-15 for Cisco switch st1.



The command outputs might vary depending on different releases of ONTAP.

The examples in this procedure use the following switch and node nomenclature:

- The names of the two storage switches are *st1* and *st2*.
- The nodes are *node1* and *node2*.



The procedure requires the use of both ONTAP commands and Cisco Nexus 9000 Series Switches commands; ONTAP commands are used unless otherwise indicated.

### Steps

1. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport message: `system node autosupport invoke -node * -type all - message MAINT=xh`

Where x is the duration of the maintenance window in hours.

2. Check that the storage switches are available:

```
system switch ethernet show
```

```

storage::*> system switch ethernet show
Switch Type Address Model
----- -
st1
 storage-network 172.17.227.5 NX9-C9336C
 Serial Number: FOC221206C2
 Is Monitored: true
 Reason: None
 Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
 9.3(5)
 Version Source: CDP
st2
 storage-network 172.17.227.6 NX9-C9336C
 Serial Number: FOC220443LZ
 Is Monitored: true
 Reason: None
 Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
 9.3(5)
 Version Source: CDP
2 entries were displayed.
storage::*>

```

### 3. Verify that the node ports are healthy and operational:

```
storage port show -port-type ENET
```

```

storage::*> storage port show -port-type ENET
Node Port Type Mode Speed State Status VLAN

node1
 e3a ENET storage 100 enabled online 30
 e3b ENET storage 0 enabled offline 30
 e7a ENET storage 0 enabled offline 30
 e7b ENET storage 100 enabled online 30
node2
 e3a ENET storage 100 enabled online 30
 e3b ENET storage 0 enabled offline 30
 e7a ENET storage 0 enabled offline 30
 e7b ENET storage 100 enabled online 30

```

### 4. Check that there are no storage switch or cabling issues with the cluster:



```
system health alert show -instance
```

```
storage::*> system health alert show -instance
There are no entries matching your query.
```

5. Download the NX-OS image to switch st2.
6. Install the system image so that the new version will be loaded the next time switch st2 is rebooted. The switch will be reboot in 10 seconds with the new image as shown in the following output:

```
st2# install all nxos bootflash:nxos.9.3. 5.bin
Installer will perform compatibility check first. Please wait.
Installer is forced disruptive
Verifying image bootflash:/nxos.9.3.4.bin for boot variable "nxos".
[#####] 100% -- SUCCESS
Verifying image type.
[[#####] 100% -- SUCCESS
Preparing "nxos" version info using image bootflash:/nxos.9.3.4.bin.
[#####] 100% -- SUCCESS
Preparing "bios" version info using image bootflash:/nxos.9.3.4.bin.
[#####] 100% -- SUCCESS
Performing module support checks.
[#####] 100% -- SUCCESS
Notifying services about system upgrade.
[#####] 100% -- SUCCESS
Compatibility check is done:
Module bootable Impact Install-type Reason
----- -
1 yes disruptive reset default upgrade is not
hitless
Images will be upgraded according to following table:
Module Image Running-Version(pri:alt) New-Version
Upg

Required

1 nxos 9.3(3) 9.3(4)
yes
1 bios v08.37(01/28/2020):v08.23(09/23/2015)
v08.38(05/29/2020) no
Switch will be reloaded for disruptive upgrade.
Do you want to continue with the installation (y/n)? [n] y
input string too long
Do you want to continue with the installation (y/n)? [n] y
Install is in progress, please wait.
```

```
Performing runtime checks.
[#####] 100% -- SUCCESS
Setting boot variables.
[#####] 100% -- SUCCESS
Performing configuration copy.
[#####] 100% -- SUCCESS
Module 1: Refreshing compact flash and upgrading bios/loader/bootrom.
Warning: please do not remove or power off the module at this time.
[#####] 100% -- SUCCESS
Finishing the upgrade, switch will reboot in 10 seconds.
st2#
```

#### 7. Save the configuration.

You are prompted to reboot the system as shown in the following example:

```
st2# copy running-config startup-config
[#####] 100% Copy complete.
st2# reload
This command will reboot the system. (y/n)? [n] y
```

#### 8. Confirm that the new NX-OS version number is on the switch.

```
st2# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
Upgrading a Cisco Nexus 9336C Storage Switch 6
Upgrading a Cisco Nexus 9336C storage switch
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.
Software
 BIOS: version 08.38
 NXOS: version 9.3(5)
 BIOS compile time: 05/29/2020
 NXOS image file is: bootflash:///nxos.9.3. 5.bin
 NXOS compile time: 4/28/2020 21:00:00 [04/29/2020 02:28:31]
Hardware
 cisco Nexus9000 C9336C Chassis (Nexus 9000 Series)
 Intel(R) Xeon(R) CPU E5-2403 v2 @ 1.80GHz with 8154432 kB of memory.
 Processor Board ID FOC20291J6K
 Device name: S2
 bootflash: 53298520 kB
Kernel uptime is 0 day(s), 0 hour(s), 3 minute(s), 42 second(s)
Last reset at 157524 usecs after Mon Nov 2 18:32:06 2020
 Reason: Reset due to upgrade
 System version: 9.3(5)
 Service:
plugin
 Core Plugin, Ethernet Plugin
 Active Package(s):
st2#
```

9. Copy the RCF on switch st2 to the switch bootflash using one of the following transfer protocols: FTP, HTTP, TFTP, SFTP, or SCP.

For more information about Cisco commands, see the appropriate guide in the [Cisco Nexus 9000 Series NX-OS Command Reference guides](#).

The following example shows HTTP being used to copy an RCF to the bootflash on switch st2:

```
st2# copy http://172.16.10.1//cfg/Nexus_9336C_RCF_v1.6-Storage.txt
bootflash: vrf management
% Total % Received % Xferd Average Speed Time Time Time
Current
 Dload Upload Total Spent Left
Speed
 100 3254 100 3254 0 0 8175 0 --:--:--
--:--:-- --:--:--
8301
Copy complete, now saving to disk (please wait)...
Copy complete.
st2#
```

10. Apply the RCF previously downloaded to the bootflash:  
copy bootflash.

The following example shows the RCF file Nexus\_9336C\_RCF\_v1.6-Storage.txt being installed on switch st2:

```
st2# copy Nexus_9336C_RCF_v1.6-Storage.txt running-config echo-commands
```

11. Verify that the RCF file is the correct newer version:  
show running-config

When you check the output to verify you have the correct RCF, make sure that the following information is correct:

- The RCF banner
- The node and port settings
- Customizations

The output varies according to your site configuration. Check the port settings and refer to the release notes for any changes specific to the RCF that you have installed.

**Important:** In the banner output from the `show banner motd` command, you must read and follow the instructions in the **\*IMPORTANT NOTES** section to ensure the proper configuration and operation of the switch.

```

st2# show banner motd

*NetApp Reference Configuration File (RCF)
*
*Switch : Nexus N9K-C9336C-FX2
*Filename : Nexus_9336C_RCF_v1.6-Storage.txt
* Date : 10-23-2020
*Version : v1.6
*
*Port Usage: Storage configuration
*Ports 1-36: 100GbE Controller and Shelf Storage Ports
*
IMPORTANT NOTES
*- This RCF utilizes QoS and requires TCAM re-configuration, requiring RCF
*to be loaded twice with the Storage Switch rebooted in between.
*
*- Perform the following 4 steps to ensure proper RCF installation:
*
*(1) Apply RCF first time, expect following messages:
*- Please save config and reload the system...
*- Edge port type (portfast) should only be enabled on ports...
*- TCAM region is not configured for feature QoS class IPv4 ingress...
*
*(2) Save running-configuration and reboot Cluster Switch
*
*(3) After reboot, apply same RCF second time and expect following
messages:
*- % Invalid command at '^' marker
*- Syntax error while parsing...
*
*(4) Save running-configuration again

st2#

```

12. After you verify that the software versions and switch settings are correct, copy the running-config file to the startup-config file on switch st2.

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 9000 Series NX-OS Command Reference guides](#).

The following example shows the running-config file successfully copied to the startup-config file:

```
st2# copy running-config startup-config
[#####] 100% Copy complete.
```

13. Recheck that the storage switches are available after the reboot:

system switch ethernet show

```
storage::*> system switch ethernet show
Switch Type Address Model

st1
 storage-network 172.17.227.5 NX9-
C9336C
 Serial Number: FOC221206C2
 Is Monitored: true
 Reason: None
 Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
 9.3(5)
 Version Source: CDP
st2
 storage-network 172.17.227.6 NX9-
C9336C
 Serial Number: FOC220443LZ
 Is Monitored: true
 Reason: None
 Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
 9.3(5)
 Version Source: CDP
2 entries were displayed.
storage::*
```

14. Verify that the switch ports are healthy and operational after the reboot:

storage port show -port-type ENET

```
storage::*> storage port show -port-type ENET
```

| Node  | Port | Type | Mode    | Speed<br>(Gb/s) | State   | Status  | VLAN<br>ID |
|-------|------|------|---------|-----------------|---------|---------|------------|
| ----- |      |      |         |                 |         |         |            |
| node1 |      |      |         |                 |         |         |            |
|       | e3a  | ENET | storage | 100             | enabled | online  | 30         |
|       | e3b  | ENET | storage | 0               | enabled | offline | 30         |
|       | e7a  | ENET | storage | 0               | enabled | offline | 30         |
|       | e7b  | ENET | storage | 100             | enabled | online  | 30         |
| node2 |      |      |         |                 |         |         |            |
|       | e3a  | ENET | storage | 100             | enabled | online  | 30         |
|       | e3b  | ENET | storage | 0               | enabled | offline | 30         |
|       | e7a  | ENET | storage | 0               | enabled | offline | 30         |
|       | e7b  | ENET | storage | 100             | enabled | online  | 30         |

15. Recheck that there is no storage switch or cabling issues with the cluster:

```
system health alert show -instance
```

```
storage::*> system health alert show -instance
There are no entries matching your query.
```

16. Repeat this procedure for the RCF on switch st1.
17. If you suppressed automatic case creation, re-enable it by invoking an AutoSupport message:
- ```
system node autosupport invoke -node * -type all -message MAINT=END
```

Install the RCF on a Cisco Nexus 9336C-FX2 shared switch

From ONTAP 9.9.1, you can use Cisco Nexus 9336C-FX2 switches to combine storage and cluster functionality into a shared switch scenario.

Before you begin

- The cluster switches must be fully functioning (there should be no errors in the logs or similar issues).
- The storage switches must be fully functioning (there should be no errors in the logs or similar issues).
- The names of the two storage switches are *sh1* and *sh2*.
- The example used here loads the shared RCF on to the new switch.

Steps

1. Copy the RCF on switch sh2 to the switch bootflash using one of the following transfer protocols: FTP, HTTP, TFTP, SFTP, or SCP.

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 9000 Series NX-OS Command Reference guides](#).

The following example shows HTTP being used to copy an RCF to the bootflash on switch sh2:

```
sh2# copy http://172.16.10.1//cfg/Nexus_9336C_RCF_v1.7-Cluster-HA-
Storage.txt bootflash: vrf management
% Total % Received % Xferd  Average  Speed  Time    Time    Time
Current
      Dload      Upload  Total  Spent    Left
Speed
  100      5143      100      5143      0      0      11300      0 --:--:--
--:--:-- --:--:--
11300
Copy complete, now saving to disk (please wait)...
Copy complete.
sh2#
```

2. Apply the RCF previously downloaded to the bootflash:
copy bootflash.

The following example shows the RCF file `Nexus_9336C_RCF_v1.7-Cluster-HA-Storage.txt` being installed on switch sh2:

```
sh2# copy Nexus_9336C_RCF_v1.7-Cluster-HA-Storage.txt running-config echo-
commands
```

3. Verify that the RCF file is the correct newer version: show running-config

When you check the output to verify you have the correct RCF, make sure that the following information is correct:

- The RCF banner
- The node and port settings
- Customizations

The output varies according to your site configuration. Check the port settings and refer to the release notes for any changes specific to the RCF that you have installed.

Important: In the banner output from the `show banner motd` command, you must read and follow the instructions in the **IMPORTANT NOTES** section to ensure the proper configuration and operation of the switch.


```

sh2# show banner motd
*****
****
*NetApp Reference Configuration File (RCF)
*
*Switch : Nexus N9K-C9336C-FX2
*Filename : Nexus_9336C_RCF_v1.7-Cluster-HA-Storage.txt
* Date : Jan-08-2021
*Version : v1.7
*
*Port Usage:
*Ports 1-8: 40/100GbE Intra-Cluster/HA Ports, int e1/1-8
*Port 9: 10GbE breakout Intra-Cluster Ports, int e1/9/1-4
*Port 10: 25GbE breakout Intra-Cluster/HA Ports, int e1/10/1-4
*Ports 11-22: First HA-pair Controller and Shelf Storage Ports, int e1/11-
22
*Ports 23-34: Second HA-pair Controller and Shelf Storage Ports, int
e1/23-34
*Ports 35-36: Intra-Cluster ISL Ports, int e1/35-36
*
* Undo breakout commands and return interfaces to 40/100G configuration in
* config mode:
* no interface breakout module 1 port 9 map 10g-4x
* no interface breakout module 1 port 10 map 25g-4x
* interface Ethernet 1/9-10
* inherit port-profile CLUSTER_HA
* priority-flow-control mode auto
* service-policy type qos input HA_POLICY
* exit
*
*IMPORTANT NOTES*
* In certain conditions, N9K-C9336C-FX2 may not be able to auto-negotiate
port
* speed correctly, and port speed must be manually set, in config mode,
e.g.
* int e1/1
* speed 40000
* int e1/3
* speed 100000
*
*****
****
sh2#

```

4. After you verify that the software versions and switch settings are correct, copy the running-config

file to the startup-config file on switch sh2.

For more information on Cisco commands, see the appropriate guide in the [Cisco Nexus 9000 Series NX-OS Command Reference guides](#).

The following example shows the `running-config` file successfully copied to the `startup-config` file:

```
sh2# copy running-config startup-config
[#####] 100% Copy complete.
```

5. Repeat this procedure for the RCF on switch sh1.

Migrate from a switchless cluster with direct-attached storage by adding two new shared switches

Migrate from a switchless cluster with direct-attached storage

You must be aware of certain configuration information, port connections, and cabling requirements when you migrate a two-node switchless cluster, non-disruptively, to a cluster with Cisco Nexus 9336C-FX2 cluster switches. The procedure you use depends on whether you have two dedicated cluster-network ports on each controller or a single cluster port on each controller. The process documented works for all nodes using optical or Twinax ports but is not supported on this switch if nodes are using onboard 10Gb BASE-T RJ45 ports for the cluster-network ports.

Most systems require two dedicated cluster-network ports on each controller. See [Cisco Ethernet Switches](#) for more information.

If you have an existing two-node switchless cluster environment, you can migrate to a two-node switched cluster environment using Cisco Nexus 9336C-FX2 switches to enable you to scale beyond two nodes in the cluster.

Before you begin

- Two-node switchless configuration:
 - The two-node switchless configuration must be properly set up and functioning.
 - The nodes must be running ONTAP 9.8 and later.
 - All cluster ports must be in the **up** state.
 - All cluster logical interfaces (LIFs) must be in the **up** state and on their **home** ports.
- Cisco Nexus 9336C-FX2 switch configuration:
 - Both switches must have management network connectivity.
 - There must be console access to the cluster switches.
 - Nexus 9336C-FX2 node-to-node switch and switch-to-switch connections must use Twinax or fiber cables.
 - The NetApp [Hardware Universe](#) contains more information about cabling.
 - Inter-Switch Link (ISL) cables must be connected to ports 1/35 and 1/36 on both 9336C-FX2 switches.
- Initial customization of the 9336C-FX2 switches must be completed. So that the:

- 9336C-FX2 switches are running the latest version of software
- Reference Configuration Files (RCFs) have been applied to the switches
- Any site customization, such as SMTP, SNMP, and SSH must be configured on the new switches.

About this task

The examples in this procedure use the following cluster switch and node nomenclature:

- The names of the 9336C-FX2 switches are *cs1* and *cs2*.
- The names of the cluster SVMs are *node1* and *node2*.
- The names of the LIFs are *node1_clus1* and *node1_clus2* on node 1, and *node2_clus1* and *node2_clus2* on node 2 respectively.
- The cluster1::*> prompt indicates the name of the cluster.
- The cluster ports used in this procedure are *e3a* and *e3b*, as per the AFF A400 controller. The [Hardware Universe](#) contains the latest information about the actual cluster ports for your platforms.

Steps

1. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport message: `system node autosupport invoke -node * -type all -message MAINT=xh.`

where x is the duration of the maintenance window in hours.



The AutoSupport message notifies technical support of this maintenance task so that automatic case creation is suppressed during the maintenance window.

2. Change the privilege level to advanced, entering y when prompted to continue:

```
set -privilege advanced
```

The advanced prompt (*>) appears.

3. Disable all node-facing ports (not ISL ports) on both the new cluster switches *cs1* and *cs2*. You must not disable the ISL ports.

The following example shows that node-facing ports 1 through 34 are disabled on switch *cs1*:

```
cs1# config
Enter configuration commands, one per line. End with CNTL/Z.
cs1(config)# interface e/1-34
cs1(config-if-range)# shutdown
```

4. Verify that the ISL and the physical ports on the ISL between the two 9336C-FX2 switches *cs1* and *cs2* are up on ports 1/35 and 1/36:

```
show port-channel summary
```

The following example shows that the ISL ports are up on switch *cs1*:

```
cs1# show port-channel summary
Flags:  D - Down          P - Up in port-channel (members)
        I - Individual    H - Hot-standby (LACP only)
        s - Suspended     r - Module-removed
        b - BFD Session Wait
        S - Switched      R - Routed
        U - Up (port-channel)
        p - Up in delay-lACP mode (member)
        M - Not in use. Min-links not met

-----
-----
Group Port-          Type      Protocol  Member Ports
Channel
-----
-----
1      Po1 (SU)      Eth      LACP      Eth1/35 (P)  Eth1/36 (P)
```

The following example shows that the ISL ports are up on switch cs2:

```
cs2# show port-channel summary
Flags:  D - Down          P - Up in port-channel (members)
        I - Individual    H - Hot-standby (LACP only)
        s - Suspended     r - Module-removed
        b - BFD Session Wait
        S - Switched      R - Routed
        U - Up (port-channel)
        p - Up in delay-lACP mode (member)
        M - Not in use. Min-links not met

-----
-----
Group Port-          Type      Protocol  Member Ports
Channel
-----
-----
1      Po1 (SU)      Eth      LACP      Eth1/35 (P)  Eth1/36 (P)
```

5. Display the list of neighboring devices:

```
show cdp neighbors.
```

This command provides information about the devices that are connected to the system. The following example lists the neighboring devices on switch cs1:

```
cs1# show cdp neighbors
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater,
                  V - VoIP-Phone, D - Remotely-Managed-Device,
                  s - Supports-STP-Dispute

Device-ID         Local Intrfce  Hldtme Capability  Platform      Port ID
cs2               Eth1/35       175    R S I s        N9K-C9336C    Eth1/35
cs2               Eth1/36       175    R S I s        N9K-C9336C    Eth1/36
Total entries displayed: 2
```

The following example lists the neighboring devices on switch cs2:

```
cs2# show cdp neighbors
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater,
                  V - VoIP-Phone, D - Remotely-Managed-Device,
                  s - Supports-STP-Dispute

Device-ID         Local Intrfce  Hldtme Capability  Platform      Port ID
cs1               Eth1/35       177    R S I s        N9K-C9336C    Eth1/35
cs1               )  Eth1/36       177    R S I s        N9K-C9336C    Eth1/36
Total entries displayed: 2
```

6. Verify that all cluster ports are up:

```
network port show - ipspace Cluster
```

Each port should display up for Link and healthy for Health Status:

```
cluster1::*> network port show -ipspace Cluster
```

Node: node1

Port	IPspace	Broadcast Domain	Link	MTU	Speed(Mbps)	Health
					Admin/Oper	Status
e3a	Cluster	Cluster	up	9000	auto/100000	healthy
e3b	Cluster	Cluster	up	9000	auto/100000	healthy

Node: node2

Port	IPspace	Broadcast Domain	Link	MTU	Speed(Mbps)	Health
					Admin/Oper	Status
e3a	Cluster	Cluster	up	9000	auto/100000	healthy
e3b	Cluster	Cluster	up	9000	auto/100000	healthy

4 entries were displayed.

7. Verify that all cluster LIFs are up and operational:

```
network interface show - vserver Cluster
```

Each cluster LIF should display true for Is Home and have a Status Admin/Oper of up/up.

```
cluster1::*> network interface show -vserver Cluster
```

	Logical	Status	Network	Current	
Current Is					
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port
Home					
-----	-----	-----	-----	-----	-----

Cluster					
	node1_clus1	up/up	169.254.209.69/16	node1	e3a
true					
	node1_clus2	up/up	169.254.49.125/16	node1	e3b
true					
	node2_clus1	up/up	169.254.47.194/16	node2	e3a
true					
	node2_clus2	up/up	169.254.19.183/16	node2	e3b
true					

4 entries were displayed.

8. Verify that auto-revert is enabled on all cluster LIFs:

```
network interface show - vserver Cluster -fields auto-revert
```

```
cluster1::*> network interface show -vserver Cluster -fields auto-revert
      Logical
Vserver  Interface      Auto-revert
-----  -
Cluster
      node1_clus1      true
      node1_clus2      true
      node2_clus1      true
      node2_clus2      true
4 entries were displayed.
```

9. Disconnect the cable from cluster port e3a on node1, and then connect e3a to port 1 on cluster switch cs1, using the appropriate cabling supported by the 9336C-FX2 switches.

The NetApp [Hardware Universe](#) contains more information about cabling.

10. Disconnect the cable from cluster port e3a on node2, and then connect e3a to port 2 on cluster switch cs1, using the appropriate cabling supported by the 9336C-FX2 switches.
11. Enable all node-facing ports on cluster switch cs1.

The following example shows that ports 1/1 through 1/34 are enabled on switch cs1:

```
cs1# config
Enter configuration commands, one per line. End with CNTL/Z.
cs1(config)# interface e1/1-34
cs1(config-if-range)# no shutdown
```

12. Verify that all cluster LIFs are **up**, operational, and display as true for Is Home:
network interface show - vserver Cluster

The following example shows that all the LIFs are **up** on node1 and node2 and that Is Home results are **true**:

```
cluster1::*> network interface show -vserver Cluster
```

Logical	Status	Network	Current	Current	
Is					
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port
Home					
-----	-----	-----	-----	-----	-----
Cluster					
node1_clus1	up/up	169.254.209.69/16	node1	e3a	
true					
node1_clus2	up/up	169.254.49.125/16	node1	e3b	
true					
node2_clus1	up/up	169.254.47.194/16	node2	e3a	
true					
node2_clus2	up/up	169.254.19.183/16	node2	e3b	
true					

4 entries were displayed.

13. Display information about the status of the nodes in the cluster:

```
cluster show
```

The following example displays information about the health and eligibility of the nodes in the cluster:

```
cluster1::*> cluster show
```

Node	Health	Eligibility	Epsilon
-----	-----	-----	-----
node1	true	true	false
node2	true	true	false

2 entries were displayed.

14. Disconnect the cable from cluster port e3b on node1, and then connect e3b to port 1 on cluster switch cs2, using the appropriate cabling supported by the 9336C-FX2 switches.
15. Disconnect the cable from cluster port e3b on node2, and then connect e3b to port 2 on cluster switch cs2, using the appropriate cabling supported by the 9336C-FX2 switches.
16. Enable all node-facing ports on cluster switch cs2.

The following example shows that ports 1/1 through 1/34 are enabled on switch cs2:

```
cs2# config
Enter configuration commands, one per line. End with CNTL/Z.
cs2(config)# interface e1/1-34
cs2(config-if-range)# no shutdown
```


17. Verify that all cluster ports are up:

```
network port show - ipspace Cluster
```

The following example shows that all the cluster ports are up on node1 and node2:

```
cluster1::*> network port show -ipspace Cluster

Node: node1

Ignore
Speed(Mbps)  Health
Health
Port         IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e3a          Cluster      Cluster      up    9000  auto/100000 healthy
false
e3b          Cluster      Cluster      up    9000  auto/100000 healthy
false

Node: node2

Ignore
Speed(Mbps)  Health
Health
Port         IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
-----
e3a          Cluster      Cluster      up    9000  auto/100000 healthy
false
e3b          Cluster      Cluster      up    9000  auto/100000 healthy
false
4 entries were displayed.
```

18. Verify that all interfaces display true for Is Home:

```
network interface show - vserver Cluster
```



This might take several minutes to complete.

The following example shows that all LIFs are **up** on node1 and node2 and that Is Home results are true:

```
cluster1::*> network interface show -vserver Cluster
```

Vserver	Logical Interface	Status Admin/Oper	Network Address/Mask	Current Node	Current Port	Is
Home						
Cluster	node1_clus1	up/up	169.254.209.69/16	node1	e3a	
true	node1_clus2	up/up	169.254.49.125/16	node1	e3b	
true	node2_clus1	up/up	169.254.47.194/16	node2	e3a	
true	node2_clus2	up/up	169.254.19.183/16	node2	e3b	
true						

4 entries were displayed.

19. Verify that both nodes each have one connection to each switch:

```
show cdp neighbors
```

The following example shows the appropriate results for both switches:

```
cs1# show cdp neighbors
```

Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
S - Switch, H - Host, I - IGMP, r - Repeater,
V - VoIP-Phone, D - Remotely-Managed-Device,
s - Supports-STP-Dispute

Device-ID	Local Intrfce	Hldtme	Capability	Platform	Port ID
node1	Eth1/1	133	H	AFFA400	e3a
node2	Eth1/2	133	H	AFFA400	e3a
cs2	Eth1/35	175	R S I s	N9K-C9336C	Eth1/35
cs2	Eth1/36	175	R S I s	N9K-C9336C	Eth1/36

Total entries displayed: 4

```
cs2# show cdp neighbors
```

Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
S - Switch, H - Host, I - IGMP, r - Repeater,
V - VoIP-Phone, D - Remotely-Managed-Device,
s - Supports-STP-Dispute

Device-ID	Local Intrfce	Hldtme	Capability	Platform	Port ID
node1	Eth1/1	133	H	AFFA400	e3b
node2	Eth1/2	133	H	AFFA400	e3b
cs1	Eth1/35	175	R S I s	N9K-C9336C	Eth1/35
cs1	Eth1/36	175	R S I s	N9K-C9336C	Eth1/36

Total entries displayed: 4

20. Display information about the discovered network devices in your cluster:

```
network device-discovery show -protocol cdp
```

```
cluster1::*> network device-discovery show -protocol cdp
Node/      Local   Discovered
Protocol   Port    Device (LLDP: ChassisID)  Interface      Platform
-----
node2      /cdp
           e3a     cs1                      0/2            N9K-C9336C
           e3b     cs2                      0/2            N9K-C9336C
node1      /cdp
           e3a     cs1                      0/1            N9K-C9336C
           e3b     cs2                      0/1            N9K-C9336C
4 entries were displayed.
```

21. Verify that the storage configuration of HA pair 1 (and HA pair 2) is correct and error free:

```
system switch ethernet show
```

```

storage::*> system switch ethernet show
Switch                               Type                               Address                               Model
-----
sh1
                                     storage-network                   172.17.227.5                       C9336C
    Serial Number: FOC221206C2
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                                     9.3(5)
    Version Source: CDP
sh2
                                     storage-network                   172.17.227.6                       C9336C
    Serial Number: FOC220443LZ
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                                     9.3(5)
    Version Source: CDP
2 entries were displayed.
storage::*>

```

22. Verify that the settings are disabled:

```
network options switchless-cluster show
```



It might take several minutes for the command to complete. Wait for the '3-minute lifetime to expire' announcement.

The false output in the following example shows that the configuration settings are disabled:

```

cluster1::*> network options switchless-cluster show
Enable Switchless Cluster: false

```

23. Verify the status of the node members in the cluster:

```
cluster show
```

The following example shows information about the health and eligibility of the nodes in the cluster:

```
cluster1::*> cluster show
```

Node	Health	Eligibility	Epsilon
node1	true	true	false
node2	true	true	false

24. Ensure that the cluster network has full connectivity:

```
cluster ping-cluster -node node-name
```

```
cluster1::*> cluster ping-cluster -node node2
Host is node2
Getting addresses from network interface table...
Cluster node1_clus1 169.254.209.69 node1 e3a
Cluster node1_clus2 169.254.49.125 node1 e3b
Cluster node2_clus1 169.254.47.194 node2 e3a
Cluster node2_clus2 169.254.19.183 node2 e3b
Local = 169.254.47.194 169.254.19.183
Remote = 169.254.209.69 169.254.49.125
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 9000 byte MTU on 4 path(s):
Local 169.254.47.194 to Remote 169.254.209.69
Local 169.254.47.194 to Remote 169.254.49.125
Local 169.254.19.183 to Remote 169.254.209.69
Local 169.254.19.183 to Remote 169.254.49.125
Larger than PMTU communication succeeds on 4 path(s)
RPC status:
2 paths up, 0 paths down (tcp check)
2 paths up, 0 paths down (udp check)
```

25. Change the privilege level back to admin:

```
set -privilege admin
```

26. Enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the commands:

- ° system switch ethernet log setup-password
- ° system switch ethernet log enable-collection

```

cluster1:*> system switch ethernet log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.

Choose from the following list:
cs1
cs2
cluster1:*> system switch ethernet log setup-password
Enter the switch name: cs1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y
Enter the password: <enter switch password>
Enter the password again: <enter switch password>
cluster1:*> system switch ethernet log setup-password
Enter the switch name: cs2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y
Enter the password: <enter switch password>
Enter the password again: <enter switch password>
cluster1:*> system switch ethernet log enable-collection
Do you want to enable cluster log collection for all nodes in the cluster?
{y|n}: [n] y
Enabling cluster switch log collection.
cluster1:*>

```

Setup the shared switch

The examples in this procedure use the following switch and node nomenclature:

- The names of the two shared switches are *sh1* and *sh2*.
- The nodes are *node1* and *node2*.



The procedure requires the use of both ONTAP commands and Cisco Nexus 9000 Series Switches commands, ONTAP commands are used unless otherwise indicated.

Steps

1. Verify that the storage configuration of HA pair 1 (and HA pair 2) is correct and error free:
`system switch ethernet show`

```

storage::*> system switch ethernet show
Switch                               Type                               Address                               Model
-----                               -
sh1
                                storage-network                    172.17.227.5                        C9336C

    Serial Number: FOC221206C2
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                                9.3(5)
    Version Source: CDP
sh2
                                storage-network                    172.17.227.6                        C9336C

    Serial Number: FOC220443LZ
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                                9.3(5)
    Version Source: CDP
2 entries were displayed.
storage::*>

```

2. Verify that the storage node ports are healthy and operational:

storage port show -port-type ENET

```

storage::*> storage port show -port-type ENET
Node  Port  Type  Mode  Speed  State  Status  VLAN
-----  -
node1
    e0c  ENET  storage  100  enabled  online  30
    e0d  ENET  storage  100  enabled  online  30
    e5a  ENET  storage  100  enabled  online  30
    e5b  ENET  storage  100  enabled  online  30
node2
    e0c  ENET  storage  100  enabled  online  30
    e0d  ENET  storage  100  enabled  online  30
    e5a  ENET  storage  100  enabled  online  30
    e5b  ENET  storage  100  enabled  online  30

```

3. Move the HA pair 1, NSM224 path A ports to sh1 port range 11-22.
4. Install a cable from HA pair 1, node1, path A to sh1 port range 11-22. For example, the path A storage port on an AFF A400 is e0c.
5. Install a cable from HA pair 1, node2, path A to sh1 port range 11-22.
6. Verify that the node ports are healthy and operational:
`storage port show -port-type ENET`

```
storage::*> storage port show -port-type ENET
```

Node	Port	Type	Mode	Speed (Gb/s)	State	Status	VLAN ID
node1							
	e0c	ENET	storage	100	enabled	online	30
	e0d	ENET	storage	0	enabled	offline	30
	e5a	ENET	storage	0	enabled	offline	30
	e5b	ENET	storage	100	enabled	online	30
node2							
	e0c	ENET	storage	100	enabled	online	30
	e0d	ENET	storage	0	enabled	offline	30
	e5a	ENET	storage	0	enabled	offline	30
	e5b	ENET	storage	100	enabled	online	30

7. Check that there are no storage switch or cabling issues with the cluster:
`system health alert show -instance`

```
storage::*> system health alert show -instance
There are no entries matching your query.
```

8. Move the HA pair 1, NSM224 path B ports to sh2 port range 11-22.
9. Install a cable from HA pair 1, node1, path B to sh2 port range 11-22. For example, the path B storage port on an AFF A400 is e5b.
10. Install a cable from HA pair 1, node2, path B to sh2 port range 11-22.
11. Verify that the node ports are healthy and operational:
`storage port show -port-type ENET`


```
storage::*> storage port show -port-type ENET
```

Node	Port	Type	Mode	Speed (Gb/s)	State	Status	VLAN ID
node1							
	e0c	ENET	storage	100	enabled	online	30
	e0d	ENET	storage	0	enabled	offline	30
	e5a	ENET	storage	0	enabled	offline	30
	e5b	ENET	storage	100	enabled	online	30
node2							
	e0c	ENET	storage	100	enabled	online	30
	e0d	ENET	storage	0	enabled	offline	30
	e5a	ENET	storage	0	enabled	offline	30
	e5b	ENET	storage	100	enabled	online	30

12. Verify that the storage configuration of HA pair 1 is correct and error free:

```
system switch ethernet show
```

```
storage::*> system switch ethernet show
```

Switch	Type	Address	Model

sh1			
	storage-network	172.17.227.5	C9336C
Serial Number: FOC221206C2			
Is Monitored: true			
Reason: None			
Software Version: Cisco Nexus Operating System (NX-OS) Software,			
Version			
9.3(5)			
Version Source: CDP			
sh2			
	storage-network	172.17.227.6	C9336C
Serial Number: FOC220443LZ			
Is Monitored: true			
Reason: None			
Software Version: Cisco Nexus Operating System (NX-OS) Software,			
Version			
9.3(5)			
Version Source: CDP			
2 entries were displayed.			

```
storage::*>
```

13. Reconfigure the unused (controller) secondary storage ports on HA pair 1 from storage to networking. If more than one NS224 was direct attached, there will be ports that should be reconfigured.

```
storage port modify -node [node name] -port [port name] -mode network
```

To place storage ports into a broadcast domain:

- `network port broadcast-domain create` (to create a new domain, if needed)
- `network port broadcast-domain add-ports` (to add ports to an existing domain)

14. If you suppressed automatic case creation, re-enable it by invoking an AutoSupport message:
`system node autosupport invoke -node * -type all -message MAINT=END`

Migrate from a switched configuration with direct-attached storage by adding two new shared switches

Migrate from a switched configuration with direct-attached storage

You must be aware of certain configuration information, port connections, and cabling requirements when you are replacing some older Cisco Nexus cluster switches with Cisco Nexus 9336C-FX2 shared switches.

- The following switches are supported:
 - Nexus 9336C-FX2
 - Nexus 3232C
- The switches use the following ports for connections to nodes:
- Nexus 9336C-FX2:
 - Ports 1- 3: Breakout mode (4x10G) Intra-Cluster Ports, int e1/1/1-4, e1/2/1-4, e1/3/1-4
 - Ports 4- 6: Breakout mode (4x25G) Intra-Cluster/HA Ports, int e1/4/1-4, e1/5/1-4, e1/6/1-4
 - Ports 7-34: 40/100GbE Intra-Cluster/HA Ports, int e1/7-34
- Nexus 3232C:
 - Ports 1-30: 10/40/100 GbE
- The switches use the following Inter-Switch Link (ISL) ports:
 - Ports int e1/35-36: Nexus 9336C-FX2
 - Ports e1/31-32: Nexus 3232C
- The Hardware Universe contains information about supported cabling for all cluster switches.

See [Hardware Universe](#) for more information.

- You have configured some of the ports on Nexus 9336C-FX2 switches to run at 100 GbE.
- You have planned, migrated, and documented 100 GbE connectivity from nodes to Nexus 9336C-FX2 switches.
- The ONTAP and NX-OS versions supported in this procedure are on the Cisco Ethernet Switches page. See [Cisco Ethernet switches](#).

- You can migrate nondisruptively other Cisco cluster switches from an ONTAP cluster to Cisco Nexus 9336C-FX2 network switches.

Before you begin

- The existing switch network must be properly set up and functioning.
- All ports must be in the **up** state to ensure nondisruptive operations.
- The Nexus 9336C-FX2 switches must be configured and operating under the proper version of NX-OS installed and reference configuration file (RCF) applied.
- The existing network configuration must have the following:
 - A redundant and fully functional NetApp cluster using both older Cisco switches.
 - Management connectivity and console access to both the older Cisco switches and the new switches.
 - All cluster LIFs in the **up** state with the cluster LIFs are on their home ports.
 - ISL ports enabled and cabled between the other Cisco switches and between the new switches.

About this task

The examples in this procedure use the following switch and node nomenclature:

- The existing Cisco Nexus 3232C cluster switches are *c1* and *c2*.
- The new Nexus 9336C-FX2 switches are *sh1* and *sh2*.
- The nodes are *node1* and *node2*.
- The cluster LIFs are *node1_clus1* and *node1_clus2* on node 1, and *node2_clus1* and *node2_clus2* on node 2 respectively.
- Switch *c2* is replaced by switch *sh2* first and then switch *c1* is replaced by switch *sh1*.

Steps

1. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all -message MAINT=x h
```

Where *x* is the duration of the maintenance window in hours.

2. Check the administrative and operational status of each cluster port.
3. Verify that all the cluster ports are up with a healthy status:

```
network port show -role cluster
```

```
cluster1::*> network port show -role cluster
```

```
Node: node1
```

Port	IPspace	Broadcast Domain	Link	MTU	Speed(Mbps) Admin/Ope	Health Status	Ignore Health Status
e3a	Cluster	Cluster	up	9000	auto/100000	healthy	false
e3b	Cluster	Cluster	up	9000	auto/100000	healthy	false

```
Node: node2
```

Port	IPspace	Broadcast Domain	Link	MTU	Speed(Mbps) Admin/Oper	Health Status	Ignore Health Status
e3a	Cluster	Cluster	up	9000	auto/100000	healthy	false
e3b	Cluster	Cluster	up	9000	auto/100000	healthy	false

```
4 entries were displayed.
```

```
cluster1::*>
```

4. Verify that all the cluster interfaces (LIFs) are on the home port:

```
network interface show -role cluster
```

```
cluster1::*> network interface show -role cluster
```

Vserver	Logical Interface	Status Admin/Oper	Network Address/Mask	Current Node	Current Port	Is Home
Cluster	node1_clus1	up/up	169.254.3.4/23	node1	e3a	true
	node1_clus2	up/up	169.254.3.5/23	node1	e3b	true
	node2_clus1	up/up	169.254.3.8/23	node2	e3a	true
	node2_clus2	up/up	169.254.3.9/23	node2	e3b	true

```
4 entries were displayed.
```

```
cluster1::*>
```

5. Verify that the cluster displays information for both cluster switches:

```
system cluster-switch show -is-monitoring-enabled-operational true
```

```
cluster1::*> system cluster-switch show -is-monitoring-enabled-operational
true
Switch                                Type                                Address                                Model
-----
sh1                                   cluster-network                    10.233.205.90                        N9K-C9336C
    Serial Number: FOCXXXXXXGD
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
                        9.3(5)
    Version Source: CDP
sh2                                   cluster-network                    10.233.205.91                        N9K-C9336C
    Serial Number: FOCXXXXXXGS
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
                        9.3(5)
    Version Source: CDP
cluster1::*>
```

6. Disable auto-revert on the cluster LIFs.

```
cluster1::*> network interface modify -vserver Cluster -lif * -auto-revert
false
```

7. Shutdown the c2 switch:

```
c2# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
c2(config)# interface ethernet <int range>
c2(config)#shutdown
```

8. Verify that the cluster LIFs have migrated to the ports hosted on cluster switch sh1:

```
network interface show -role cluster
This might take a few seconds.
```

```
cluster1::*> network interface show -role cluster
```

Vserver	Logical Interface	Status Admin/Oper	Network Address/Mask	Current Node	Current Port	Is Home
Cluster	node1_clus1	up/up	169.254.3.4/23	node1	e3a	true
	node1_clus2	up/up	169.254.3.5/23	node1	e3a	false
	node2_clus1	up/up	169.254.3.8/23	node2	e3a	true
	node2_clus2	up/up	169.254.3.9/23	node2	e3a	false

4 entries were displayed.

```
cluster1::*>
```

9. Replace switch c2 with the new switch sh2 and re-cable the new switch.
10. Verify that the ports are back up on sh2. **Note** that the LIFs are still on switch c1.
11. Shutdown the c1 switch:

```
c1# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
c1(config)# interface ethernet <int range>
c1(config)#shutdown
```

12. Verify that the cluster LIFs have migrated to the ports hosted on cluster switch sh2. This might take a few seconds.

```
cluster1::*> network interface show -role cluster
```

Vserver	Logical Interface	Status Admin/Oper	Network Address/Mask	Current Node	Current Port	Is Home
Cluster	node1_clus1	up/up	169.254.3.4/23	node1	e3a	true
	node1_clus2	up/up	169.254.3.5/23	node1	e3a	false
	node2_clus1	up/up	169.254.3.8/23	node2	e3a	true
	node2_clus2	up/up	169.254.3.9/23	node2	e3a	false

4 entries were displayed.

```
cluster1::*>
```

13. Replace switch c1 with the new switch sh1 and re-cable the new switch.

14. Verify that the ports are back up on sh1. **Note** that the LIFs are still on switch c2.

15. Enable auto-revert on the cluster LIFs:

```
cluster1::*> network interface modify -vserver Cluster -lif * -auto-revert
True
```

16. Verify that the cluster is healthy:

```
cluster show
```

```
cluster1::*> cluster show
Node                Health  Eligibility  Epsilon
-----
node1                true    true         false
node2                true    true         false
2 entries were displayed.
cluster1::*>
```

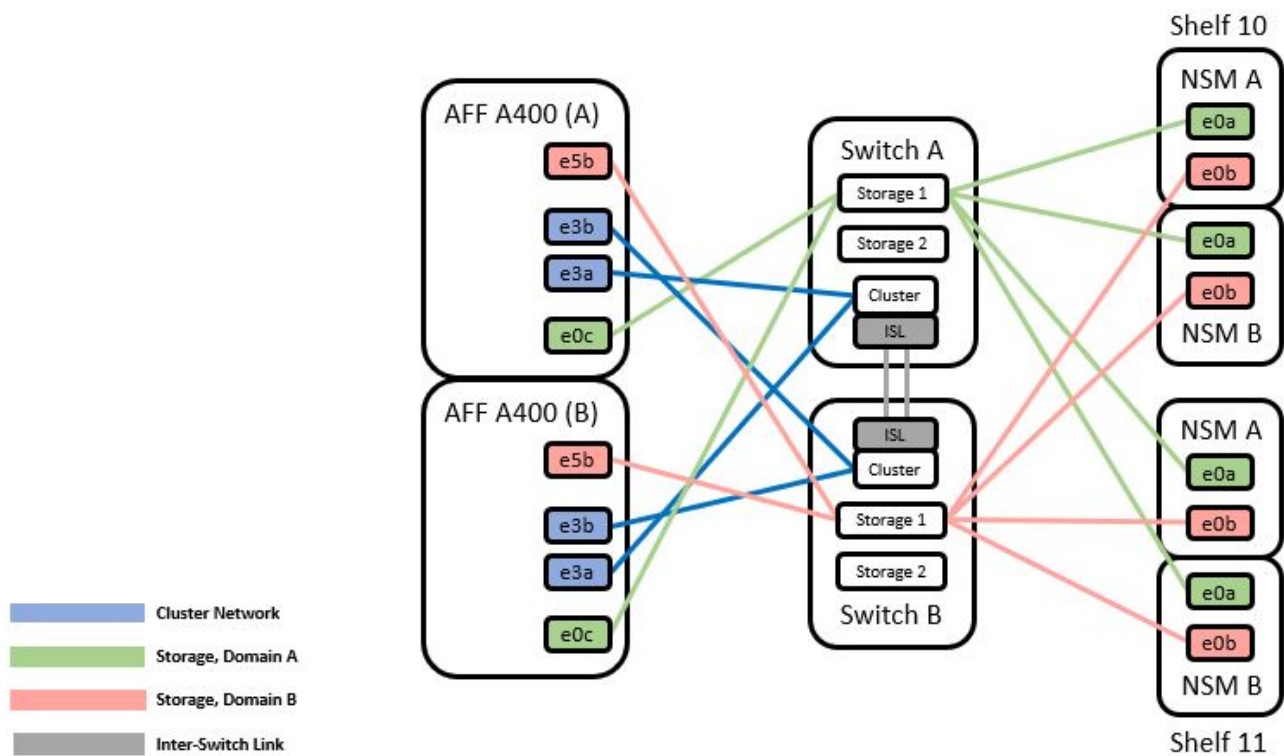
Migrate from a switchless configuration with switch-attached storage by reusing the storage switches

Migrate the storage switches

By reusing the storage switches the storage switches of HA pair 1 become the shared switches.

Cabling diagram for switch-attached

Switch Attached



Steps

1. Verify that the storage configuration of HA pair 1 (and HA pair 2) is correct and error free:
`system switch ethernet show`


```

storage::*> system switch ethernet show
Switch                               Type                               Address                               Model
-----
sh1
                                storage-network                172.17.227.5                C9336C

    Serial Number: FOC221206C2
    Is Monitored: true
    Reason: none
    Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
                      9.3(5)
    Version Source: CDP
sh2
                                storage-network                172.17.227.6                C9336C

    Serial Number: FOC220443LZ
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
                      9.3(5)
    Version Source: CDP
2 entries were displayed.
storage::*>

```

2. Verify that the node ports are healthy and operational:

```
storage port show -port-type ENET
```

```

storage::*> storage port show -port-type ENET
Node   Port   Type   Mode   Speed   State   Status   VLAN
-----
node1
    e0c   ENET   storage   100   enabled   online   30
    e0d   ENET   storage   100   enabled   online   30
    e5a   ENET   storage   100   enabled   online   30
    e5b   ENET   storage   100   enabled   online   30
node2
    e0c   ENET   storage   100   enabled   online   30
    e0d   ENET   storage   100   enabled   online   30
    e5a   ENET   storage   100   enabled   online   30
    e5b   ENET   storage   100   enabled   online   30

```

3. Move the HA pair 1, NSM224 path A cables from storage switch A to the shared NS224 storage ports for

HA pair 1, path A on storage switch A.

4. Move the cable from HA pair 1, node A, path A to the shared storage port for HA pair 1, node A on storage switch A.
5. Move the cable from HA pair 1, node B, path A to the shared storage port for HA pair 1, node B on storage switch A.
6. Verify the storage attached to HA pair 1, storage switch A is healthy:
`system health alert show -instance`

```
storage::*> system health alert show -instance
There are no entries matching your query.
```

7. Replace the storage RCF on shared switch A with the shared RCF file. See [Install the RCF on a Cisco Nexus 9336C-FX2 shared switch](#) for further details.
8. Verify the storage attached to HA pair 1, storage switch B is healthy:
`system health alert show -instance`

```
storage::*> system health alert show -instance
There are no entries matching your query.
```

9. Move the HA pair 1, NSM224 path B cables from storage switch B to the shared NS224 storage ports for HA pair 1, path B to storage switch B.
10. Move the cable from HA pair 1, node A, path B to the shared storage port for HA pair 1, node A, path B on storage switch B.
11. Move the cable from HA pair 1, node B, path B to the shared storage port for HA pair 1, node B, path B on storage switch B.
12. Verify the storage attached to HA pair 1, storage switch B is healthy:
`system health alert show -instance`

```
storage::*> system health alert show -instance
There are no entries matching your query.
```

13. Replace the storage RCF file on shared switch B with the shared RCF file. See [Install the RCF on a Cisco Nexus 9336C-FX2 shared switch](#) for further details.
14. Verify the storage attached to HA pair 1, storage switch B is healthy:
`system health alert show -instance`

```
storage::*> system health alert show -instance
There are no entries matching your query.
```

15. Install the ISLs between shared switch A and shared switch B:

```
sh1# configure
Enter configuration commands, one per line. End with CNTL/Z.
sh1 (config)# interface e1/35-36
sh1 (config-if-range)# no lldp transmit
sh1 (config-if-range)# no lldp receive
sh1 (config-if-range)# switchport mode trunk
sh1 (config-if-range)# no spanning-tree bpduguard enable
sh1 (config-if-range)# channel-group 101 mode active
sh1 (config-if-range)# exit
sh1 (config)# interface port-channel 101
sh1 (config-if)# switchport mode trunk
sh1 (config-if)# spanning-tree port type network
sh1 (config-if)# exit
sh1 (config)# exit
```

16. Convert HA pair 1 from a switchless cluster to a switched cluster. Use the cluster port assignments defined by the shared RCF. See [Install NX-OS software and Reference Configuration Files \(RCFs\)](#) for further details.
17. Verify that the switched networking configuration is valid:
`network port show`

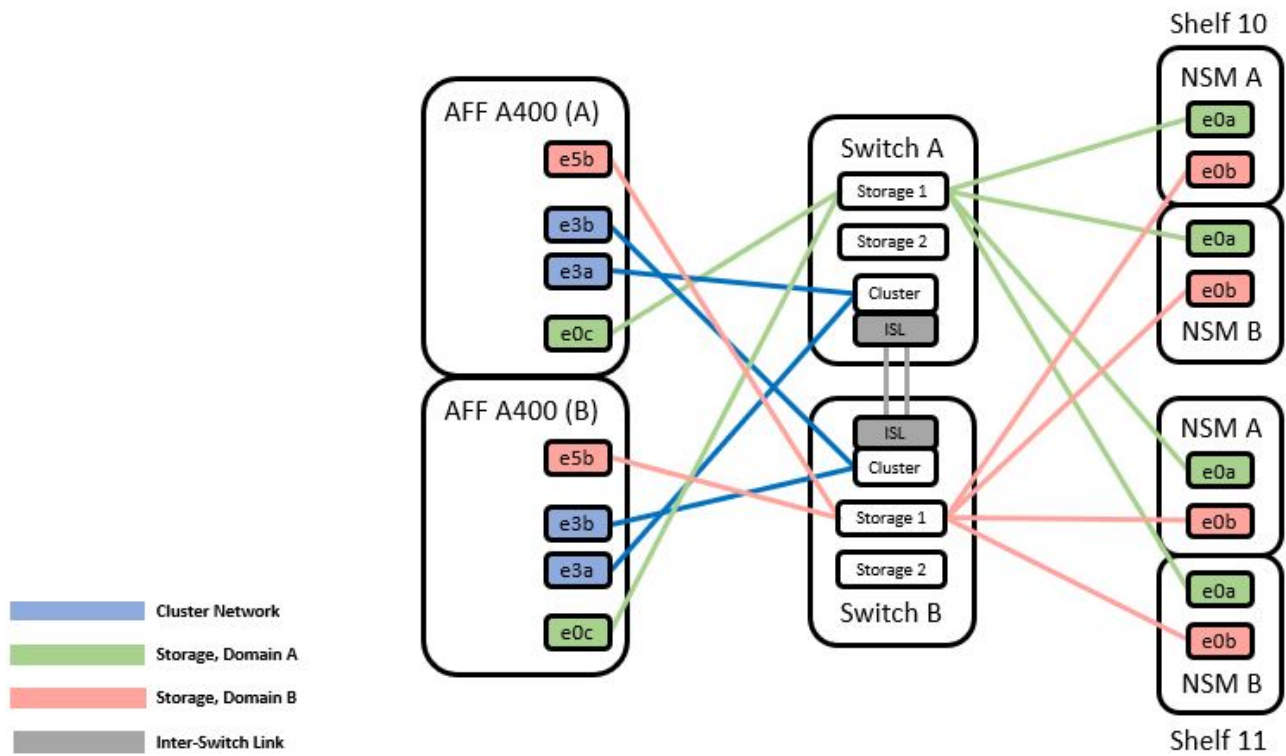
Migrate from a switched cluster with switch-attached storage by reusing the storage switches

Migrate the storage switches

By reusing the storage switches the storage switches of HA pair 1 become the shared switches.

Cabling diagram for switch-attached

Switch Attached



Steps

1. Verify that the storage configuration of HA pair 1 (and HA pair 2) is correct and error free:
`system switch ethernet show`

```

storage::*> system switch ethernet show
Switch                               Type                               Address                               Model
-----                               -
sh1
                                     storage-network                   172.17.227.5                       C9336C

    Serial Number: FOC221206C2
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
                        9.3(5)
    Version Source: CDP
sh2
                                     storage-network                   172.17.227.6                       C9336C

    Serial Number: FOC220443LZ
    Is Monitored: true
    Reason: None
    Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
                        9.3(5)
    Version Source: CDP
2 entries were displayed.
storage::*>

```

2. Move the HA pair 1, NSM224 path A cables from storage switch A to the NSM224 storage ports for HA pair 1, path A on storage switch A.
3. Move the cable from HA pair 1, node A, path A to the NSM224 storage port for HA pair 1, node A on storage switch A.
4. Move the cable from HA pair 1, node B, path A to the NSM224 storage port for HA pair 1, node B on storage switch A.
5. Verify the storage attached to HA pair 1, storage switch A is healthy:

```
storage port show -port-type ENET
```

```
storage::*> storage port show -port-type ENET
```

Node	Port	Type	Mode	Speed (Gb/s)	State	Status	VLAN ID
node1							
	e0c	ENET	storage	100	enabled	online	30
	e0d	ENET	storage	100	enabled	online	30
	e5a	ENET	storage	100	enabled	online	30
	e5b	ENET	storage	100	enabled	online	30
node2							
	e0c	ENET	storage	100	enabled	online	30
	e0d	ENET	storage	100	enabled	online	30
	e5a	ENET	storage	100	enabled	online	30
	e5b	ENET	storage	100	enabled	online	30

- Replace the storage RCF on shared switch A with the shared RCF file. See [Install the RCF on a Cisco Nexus 9336C-FX2 shared switch](#) for further details.

- Verify the storage attached to HA pair 1, storage switch A is healthy:

```
system health alert show -instance
```

```
storage::*> system health alert show -instance
There are no entries matching your query.
```

- Move the HA pair 1, NSM224 path B cables from storage switch B to the shared NS224 storage ports for HA pair 1, path B to storage switch B.
- Move the cable from HA pair 1, node A, path B to the shared storage port for HA pair 1, node A, path B on storage switch B.
- Move the cable from HA pair 1, node B, path B to the shared storage port for HA pair 1, node B, path B on storage switch B.

- Verify the storage attached to HA pair 1, storage switch B is healthy:

```
system health alert show -instance
```

```
storage::*> system health alert show -instance
There are no entries matching your query.
```

- Replace the storage RCF file on shared switch B with the shared RCF file. See [Install the RCF on a Cisco Nexus 9336C-FX2 shared switch](#) for further details.

- Verify the storage attached to HA pair 1, storage switch B is healthy:

```
system health alert show -instance
```

```
storage::*> system health alert show -instance
There are no entries matching your query.
```

14. Verify the storage configuration of HA pair 1 is correct and error free:

```
system switch ethernet show
```

```
storage::*> system switch ethernet show
```

Switch	Type	Address	Model
sh1	storage-network	172.17.227.5	C9336C
Serial Number: FOC221206C2			
Is Monitored: true			
Reason: None			
Software Version: Cisco Nexus Operating System (NX-OS) Software, Version 9.3(5)			
Version Source: CDP			
sh2	storage-network	172.17.227.6	C9336C
Serial Number: FOC220443LZ			
Is Monitored: true			
Reason: None			
Software Version: Cisco Nexus Operating System (NX-OS) Software, Version 9.3(5)			
Version Source: CDP			

```
2 entries were displayed.
storage::*>
```

15. Install the ISLs between shared switch A and shared switch B:

```
sh1# configure
Enter configuration commands, one per line. End with CNTL/Z.
sh1 (config)# interface e1/35-36
sh1 (config-if-range)# no lldp transmit
sh1 (config-if-range)# no lldp receive
sh1 (config-if-range)# switchport mode trunk
sh1 (config-if-range)# no spanning-tree bpduguard enable
sh1 (config-if-range)# channel-group 101 mode active
sh1 (config-if-range)# exit
sh1 (config)# interface port-channel 101
sh1 (config-if)# switchport mode trunk
sh1 (config-if)# spanning-tree port type network
sh1 (config-if)# exit
sh1 (config)# exit
```

16. Migrate the cluster networking from the existing cluster switches to the shared switches using the switch replacement procedure and the shared RCF. The new shared switch A is "cs1". The new shared switch B is "cs2". See [Replace a Cisco Nexus 9336C-FX2 shared switch](#) and [Install the RCF on a Cisco Nexus 9336C-FX2 shared switch](#) for further details.
17. Verify that the switched networking config is valid:
`network port show`
18. Remove the unused cluster switches.
19. Remove the unused storage switches.

Replace a Cisco Nexus 9336C-FX2 shared switch

Replace a Cisco Nexus 9336C-FX2 shared switch

Replacing a defective Nexus 9336C-FX2 shared switch is a nondisruptive procedure (NDU).

Before you begin

The following conditions must exist before performing the switch replacement in the current environment and on the replacement switch.

- Existing cluster and network infrastructure:
 - The existing cluster must be verified as completely functional, with at least one fully connected cluster switch.
 - All cluster ports must be **up**.
 - All cluster logical interfaces (LIFs) must be **up** and on their home ports.
 - The ONTAP cluster ping-cluster -node node1 command must indicate that basic connectivity and larger than PMTU communication are successful on all paths.
- Nexus 9336C-FX2 replacement switch:
 - Management network connectivity on the replacement switch must be functional.
 - Console access to the replacement switch must be in place.

- The node connections are ports 1/1 through 1/34:
- All Inter-Switch Link (ISL) ports must be disabled on ports 1/35 and 1/36.
- The desired reference configuration file (RCF) and NX-OS operating system image switch must be loaded onto the switch.
- Any previous site customizations, such as STP, SNMP, and SSH, should be copied to the new switch.

About this task

You must execute the command for migrating a cluster LIF from the node where the cluster LIF is hosted.

The examples in this procedure use the following switch and node nomenclature:

- The names of the existing Nexus 9336C-FX2 switches are *sh1* and *sh2*.
- The name of the new Nexus 9336C-FX2 switches are *newsh1* and *newsh2*.
- The node names are *node1* and *node2*.
- The cluster ports on each node are named *e3a* and *e3b*.
- The cluster LIF names are *node1_clus1* and *node1_clus2* for *node1*, and *node2_clus1* and *node2_clus2* for *node2*.
- The prompt for changes to all cluster nodes is *cluster1::*>*.



The following procedure is based on the following network topology:

```
cluster1::*> network port show -ipspace Cluster

Node: node1

Ignore

Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
e3a        Cluster      Cluster      up    9000  auto/100000 healthy
false
e3b        Cluster      Cluster      up    9000  auto/100000 healthy
false

Node: node2

Ignore

Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
-----
```

```

-----
e3a      Cluster      Cluster      up    9000  auto/100000 healthy
false
e3b      Cluster      Cluster      up    9000  auto/100000 healthy
false
4 entries were displayed.

cluster1::*> network interface show -vserver Cluster
      Logical      Status      Network      Current      Current
Is
Vserver      Interface  Admin/Oper  Address/Mask      Node      Port
Home
-----
----
Cluster
      node1_clus1  up/up      169.254.209.69/16  node1      e3a
true
      node1_clus2  up/up      169.254.49.125/16  node1      e3b
true
      node2_clus1  up/up      169.254.47.194/16  node2      e3a
true
      node2_clus2  up/up      169.254.19.183/16  node2      e3b
true
4 entries were displayed.

cluster1::*> network device-discovery show -protocol cdp
Node/      Local  Discovered
Protocol    Port   Device (LLDP: ChassisID)  Interface      Platform
-----
-----
node2      /cdp
      e3a    sh1          Eth1/2          N9K-C9336C
      e3b    sh2          Eth1/2          N9K-C9336C

node1      /cdp
      e3a    sh1          Eth1/1          N9K-C9336C
      e3b    sh2          Eth1/1          N9K-C9336C
4 entries were displayed.

sh1# show cdp neighbors
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater,
                  V - VoIP-Phone, D - Remotely-Managed-Device,
                  s - Supports-STP-Dispute
Device-ID      Local Intrfce  Hldtme Capability  Platform      Port ID

```

```

node1          Eth1/1          144      H          FAS2980      e3a
node2          Eth1/2          145      H          FAS2980      e3a
sh2            Eth1/35          176      R S I s    N9K-C9336C   Eth1/35
sh2 (FDO220329V5) Eth1/36          176      R S I s    N9K-C9336C   Eth1/36
Total entries displayed: 4

sh2# show cdp neighbors
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater,
                  V - VoIP-Phone, D - Remotely-Managed-Device,
                  s - Supports-STP-Dispute

Device-ID      Local Intrfce  Hldtme  Capability  Platform      Port ID
node1          Eth1/1         139     H           FAS2980       eb
node2          Eth1/2         124     H           FAS2980       eb
sh1            Eth1/35        178     R S I s     N9K-C9336C    Eth1/35
sh1            Eth1/36        178     R S I s     N9K-C9336C    Eth1/36
Total entries displayed: 4

```

Steps

1. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport message:
`system node autosupport invoke -node * -type all -message MAINT=xh`
 Where x is the duration of the maintenance window in hours.
2. Optional: Install the appropriate RCF and image on the switch, newsh2, and make any necessary site preparations.
 - a. If necessary, verify, download, and install the appropriate versions of the RCF and NX-OS software for the new switch. If you have verified that the new switch is correctly set up and does not need updates to the RCF and NX-OS software, continue to [Step 3](#).
 - b. Go to the [NetApp Cluster and Management Network Switches Reference Configuration File Description Page](#) on the NetApp Support Site.
 - c. Click the link for the [Cluster Network and Management Network Compatibility Matrix](#), and then note the required switch software version.
 - d. Click your browser's back arrow to return to the Description page, click CONTINUE, accept the license agreement, and then go to the Download page.
 - e. Follow the steps on the Download page to download the correct RCF and NX-OS files for the version of ONTAP software you are installing.
3. On the new switch, log in as admin and shut down all the ports that will be connected to the node cluster interfaces (ports 1/1 to 1/34).
 If the switch that you are replacing is not functional and is powered down, go to [Step 4](#). The LIFs on the cluster nodes should have already failed over to the other cluster port for each node.

```
newsh2# config
Enter configuration commands, one per line. End with CNTL/Z.
newsh2(config)# interface e1/1-34
newsh2(config-if-range)# shutdown
```

4. Verify that all cluster LIFs have auto-revert enabled.

```
network interface show - vserver Cluster -fields auto-revert
```

```
cluster1::> network interface show -vserver Cluster -fields auto-revert
      Logical
Vserver   Interface      Auto-revert
-----
Cluster   node1_clus1      true
Cluster   node1_clus2      true
Cluster   node2_clus1      true
Cluster   node2_clus2      true
4 entries were displayed.
```

5. Verify that all the cluster LIFs can communicate:

```
cluster ping-cluster <node name>
```

```

cluster1::*> cluster ping-cluster node1
Host is node2
Getting addresses from network interface table...
Cluster node1_clus1 169.254.209.69 node1 e3a
Cluster node1_clus2 169.254.49.125 node1 e3b
Cluster node2_clus1 169.254.47.194 node2 e3a
Cluster node2_clus2 169.254.19.183 node2 e3b
Local = 169.254.47.194 169.254.19.183
Remote = 169.254.209.69 169.254.49.125
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 9000 byte MTU on 4 path(s):
Local 169.254.47.194 to Remote 169.254.209.69
Local 169.254.47.194 to Remote 169.254.49.125
Local 169.254.19.183 to Remote 169.254.209.69
Local 169.254.19.183 to Remote 169.254.49.125
Larger than PMTU communication succeeds on 4 path(s)
RPC status:
2 paths up, 0 paths down (tcp check)
2 paths up, 0 paths down (udp check)

```

6. Shut down the ISL ports 1/35 and 1/36 on the Nexus 9336C-FX2 switch sh1.

```

sh1# configure
Enter configuration commands, one per line. End with CNTL/Z.
sh1(config)# interface e1/35-36
sh1(config-if-range)# shutdown
sh1(config-if-range)#

```

7. Remove all the cables from the Nexus 9336C-FX2 sh2 switch, and then connect them to the same ports on the Nexus C9336C-FX2 newsh2 switch.
8. Bring up the ISLs ports 1/35 and 1/36 between the sh1 and newsh2 switches, and then verify the port channel operation status.

Port-Channel should indicate Po1(SU) and Member Ports should indicate Eth1/35(P) and Eth1/36(P).

This example enables ISL ports 1/35 and 1/36 and displays the port channel summary on switch sh1.

```

sh1# configure
Enter configuration commands, one per line. End with CNTL/Z.
sh1 (config)# int e1/35-36
sh1 (config-if-range)# no shutdown
sh1 (config-if-range)# show port-channel summary
Flags:  D - Down          P - Up in port-channel (members)
        I - Individual    H - Hot-standby (LACP only)
        s - Suspended     r - Module-removed
        b - BFD Session Wait
        S - Switched      R - Routed
        U - Up (port-channel)
        p - Up in delay-lacp mode (member)
        M - Not in use. Min-links not met
-----
-----
Group Port-          Type      Protocol  Member      Ports
      Channel
-----
-----
1      Po1 (SU)      Eth      LACP      Eth1/35 (P)  Eth1/36 (P)

sh1 (config-if-range)#

```

9. Verify that port e3b is up on all nodes:
network port show ipspace Cluster

The output should be like the following:

```
cluster1::*> network port show -ipspace Cluster
```

```
Node: node1
```

```
Ignore
```

						Speed(Mbps)	Health
Health							
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							
-----	-----	-----	-----	-----	-----	-----	-----

e3a	Cluster	Cluster		up	9000	auto/100000	healthy
false							
e3b	Cluster	Cluster		up	9000	auto/100000	healthy
false							

```
Node: node2
```

```
Ignore
```

						Speed(Mbps)	Health
Health							
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							
-----	-----	-----	-----	-----	-----	-----	-----

e3a	Cluster	Cluster		up	9000	auto/100000	healthy
false							
e3b	Cluster	Cluster		up	9000	auto/auto	-
false							

```
4 entries were displayed.
```

10. On the same node you used in the previous step, revert the cluster LIF associated with the port in the previous step by using the network interface revert command.

In this example, LIF node1_clus2 on node1 is successfully reverted if the Home value is true and the port is e3b.

The following commands return LIF node1_clus2 on node1 to home port e3a and displays information about the LIFs on both nodes. Bringing up the first node is successful if the Is Home column is **true** for both cluster interfaces and they show the correct port assignments, in this example e3a and e3b on node1.

```
cluster1::*> network interface show -vserver Cluster
```

Is	Logical	Status	Network	Current	Current
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port
Home					
-----	-----	-----	-----	-----	-----

Cluster	node1_clus1	up/up	169.254.209.69/16	node1	e3a
true	node1_clus2	up/up	169.254.49.125/16	node1	e3b
true	node2_clus1	up/up	169.254.47.194/16	node2	e3a
true	node2_clus2	up/up	169.254.19.183/16	node2	e3a
false					

4 entries were displayed.

11. Display information about the nodes in a cluster:

```
cluster show
```

This example shows that the node health for node1 and node2 in this cluster is true:

```
cluster1::*> cluster show
```

Node	Health	Eligibility
-----	-----	-----
node1	false	true
node2	true	true

12. Verify that all physical cluster ports are up:

```
network port show ipspace Cluster
```



```
cluster1::*> network port show -ipspace Cluster
```

```
Node node1
```

```
Ignore
```

						Speed (Mbps)	Health
Health							
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							
-----	-----	-----	-----	-----	-----	-----	-----
e3a	Cluster	Cluster		up	9000	auto/100000	healthy
false							
e3b	Cluster	Cluster		up	9000	auto/100000	healthy
false							

```
Node: node2
```

```
Ignore
```

						Speed (Mbps)	Health
Health							
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							
-----	-----	-----	-----	-----	-----	-----	-----
e3a	Cluster	Cluster		up	9000	auto/100000	healthy
false							
e3b	Cluster	Cluster		up	9000	auto/100000	healthy
false							

```
4 entries were displayed.
```

13. Verify that all the cluster LIFs can communicate:

```
cluster ping-cluster
```

```

cluster1::*> cluster ping-cluster -node node2
Host is node2
Getting addresses from network interface table...
Cluster node1_clus1 169.254.209.69 node1 e3a
Cluster node1_clus2 169.254.49.125 node1 e3b
Cluster node2_clus1 169.254.47.194 node2 e3a
Cluster node2_clus2 169.254.19.183 node2 e3b
Local = 169.254.47.194 169.254.19.183
Remote = 169.254.209.69 169.254.49.125
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s)
.....
Detected 9000 byte MTU on 4 path(s):
Local 169.254.47.194 to Remote 169.254.209.69
Local 169.254.47.194 to Remote 169.254.49.125
Local 169.254.19.183 to Remote 169.254.209.69
Local 169.254.19.183 to Remote 169.254.49.125
Larger than PMTU communication succeeds on 4 path(s)
RPC status:
2 paths up, 0 paths down (tcp check)
2 paths up, 0 paths down (udp check)

```

14. Confirm the following cluster network configuration:

network port show

```

cluster1::*> network port show -ipspace Cluster

Node: node1

Ignore
Speed (Mbps)
Health
Health
Port      IPspace      Broadcast Domain Link MTU      Admin/Oper      Status
Status
-----
-----
e3a      Cluster      Cluster      up    9000    auto/100000    healthy
false
e3b      Cluster      Cluster      up    9000    auto/100000    healthy
false

Node: node2

```

Ignore

				Speed (Mbps)		Health	
Health	Port	IPspace	Broadcast Domain	Link	MTU	Admin/Oper	Status
Status							
-----	-----	-----	-----	----	-----	-----	-----

e3a	Cluster	Cluster		up	9000	auto/1000000	healthy
false							
e3b	Cluster	Cluster		up	9000	auto/1000000	healthy
false							

4 entries were displayed.

cluster1::*> network interface show -vserver Cluster

	Logical	Status	Network	Current	Current
Is					
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port
Home					
-----	-----	-----	-----	-----	-----

Cluster					
	node1_clus1	up/up	169.254.209.69/16	node1	e3a
true					
	node1_clus2	up/up	169.254.49.125/16	node1	e3b
true					
	node2_clus1	up/up	169.254.47.194/16	node2	e3a
true					
	node2_clus2	up/up	169.254.19.183/16	node2	e3b
true					

4 entries were displayed.

cluster1::> network device-discovery show -protocol cdp

Node/	Local	Discovered		
Protocol	Port	Device (LLDP: ChassisID)	Interface	Platform
-----	-----	-----	-----	

node2	/cdp			
	e3a	sh1 0/2	N9K-C9336C	
	e3b	newsh2	0/2	N9K-C9336C
node1	/cdp			
	e3a	sh1	0/1	N9K-C9336C
	e3b	newsh2	0/1	N9K-C9336C

4 entries were displayed.

sh1# show cdp neighbors

Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
 S - Switch, H - Host, I - IGMP, r - Repeater,
 V - VoIP-Phone, D - Remotely-Managed-Device,
 s - Supports-STP-Dispute

Device-ID	Local Intrfce	Hldtme	Capability	Platform	Port
node1	Eth1/1	144	H	FAS2980	e3a
node2	Eth1/2	145	H	FAS2980	e3a
newsh2	Eth1/35	176	R S I s	N9K-C9336C	
Eth1/35					
newsh2	Eth1/36	176	R S I s	N9K-C9336C	
Eth1/36					

Total entries displayed: 4

sh2# show cdp neighbors

Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
 S - Switch, H - Host, I - IGMP, r - Repeater,
 V - VoIP-Phone, D - Remotely-Managed-Device,
 s - Supports-STP-Dispute

Device-ID	Local Intrfce	Hldtme	Capability	Platform	Port ID
node1	Eth1/1	139	H	FAS2980	e3b
node2	Eth1/2	124	H	FAS2980	eb
sh1	Eth1/35	178	R S I s	N9K-C9336C	Eth1/35
sh1	Eth1/36	178	R S I s	N9K-C9336C	Eth1/36

Total entries displayed: 4

15. Enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the following commands:

- ° system switch ethernet log setup password
- ° system switch ethernet log enable-collection

```

cluster1::*> system switch ethernet log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
sh1
sh2
cluster1::*> system switch ethernet log setup-password
Enter the switch name: sh1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y
Enter the password: <enter switch password>
Enter the password again: <enter switch password>
cluster1::*> system switch ethernet log setup-password
Enter the switch name: sh2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y
Enter the password: <enter switch password>
Enter the password again: <enter switch password>
cluster1::*> system switch ethernet log enable-collection
Do you want to enable cluster log collection for all nodes in the cluster?
y|n}: [n] y
Enabling cluster switch log collection.
cluster1::*>

```



If any of these commands return an error, contact NetApp support.

16. Move the storage ports from the old switch sh2 to the new switch newsh2.
17. Verify the storage attached to HA pair 1, shared switch newsh2 is healthy.
18. Verify the storage attached to HA pair 2, shared switch newsh2 is healthy:

```
storage port show -port-type ENET
```

```
storage::*> storage port show -port-type ENET
```

Node	Port	Type	Mode	Speed (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	100	enabled	online	30
node2							
	e3a	ENET	storage	100	enabled	online	30
	e3b	ENET	storage	0	enabled	offline	30
	e7a	ENET	storage	0	enabled	offline	30
	e7b	ENET	storage	100	enabled	online	30

19. Verify that the shelves are correctly cabled:

```
storage shelf port show -fields remote- device,remote-port
```

```
cluster1::*> storage shelf port show -fields remote-device,remote-port
```

shelf	id	remote-port	remote-device
3.20	0	Ethernet1/13	sh1
3.20	1	Ethernet1/13	newsh2
3.20	2	Ethernet1/14	sh1
3.20	3	Ethernet1/14	newsh2
3.30	0	Ethernet1/15	sh1
3.30	1	Ethernet1/15	newsh2
3.30	2	Ethernet1/16	sh1
3.30	3	Ethernet1/16	newsh2

8 entries were displayed.

20. Remove the old switch sh2.

21. Repeat these steps for the switch sh1 and new switch newsh1.

22. If you suppressed automatic case creation, reenable it by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all -message MAINT=END
```

Cisco Nexus 92300YC switches

Cisco Nexus 92300YC switch overview

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.

You can install the Cisco Nexus 92300YC switch (X190003/R) in a NetApp system cabinet or third-party cabinet with the standard brackets that are included with the switch.

The following table lists the part number and description for the 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.

Other supported Switches

- Nexus 3232C

You can install the Cisco Nexus 3232C switch (X190100) NetApp system cabinet with the custom brackets that come with the switch, or you can install it in a rack with the standard brackets that are also included with the switch.

- Nexus 3132Q-V

You can install the Cisco Nexus 3132Q-V switch (X190001) in a NetApp system cabinet or third-party cabinet with the standard brackets that are included with the switch.

The following cluster switches are no longer available from NetApp, but will be supported by Cisco for a limited time:

- Nexus 5596UP/5596T

You can install the Cisco Nexus 5596UP switch (X1967-R6) or 5596T (X1989-R6) in a NetApp system cabinet with the custom brackets that come with the switch, or you can install it in a rack with the standard brackets that are also included with the switch.

The Nexus 5596UP switch also supports one or two 16-port expansion modules (X1988-R6).

The Nexus 5596T switch is only supported as a cluster interconnect switch for the FAS2520 and is intended to be used for performing nondisruptive hardware upgrades.

[End of Availability](#) details.

Available documentation

The following table lists the documentation available for the Cisco Nexus 92300YC switches.

Title	Description
Setup the Cisco® Nexus 92300YC cluster switches	Describes how to setup and configure your Cisco Nexus 92300YC cluster switches.
Install NX-OS and Reference Configuration Files (RCFs)	Describes how to install NX-OS and reference configuration files (RCFs) on Nexus 92300YC cluster switch.
Configure a new Cisco Nexus 92300YC Switch	Describes how to migrate from environments that use older Cisco switches to environments that use Cisco 92300YC switches.
Migrate from an older Cisco Switch to a Cisco Nexus 92300YC Switch	Describes the procedure to replace an older Cisco switch with a Cisco Nexus 92300YC cluster switch.
Migrate from a two-node Switchless Cluster	Describes how to migrate from a two-node switchless cluster environment to a two-node switched environment using Cisco Nexus 92300YC cluster switches.
Replace a Cisco Nexus 92300YC Cluster Switch	Describes the procedure to replace a defective Cisco Nexus 92300YC switch in a cluster and download the switch operating system and reference configuration file.

Set up

Set up the switches

If you do not already have the required configuration information and documentation, you

need to gather that information before setting up your cluster and management network switches.

- You must have access to an HTTP, FTP or TFTP server at the installation site to download the applicable NX-OS and reference configuration file (RCF) releases.
- You must have the required cluster network and management network switch documentation.

See [Required documentation](#) for more information.

- You must have the required controller documentation and ONTAP documentation.

[NetApp documentation](#)

- You must have the applicable licenses, network and configuration information, and cables.
- You must have the completed cabling worksheets.



Due to the complexity that can result from illustrating layers of cabling, this guide does not provide cabling graphics. This guide does provide sample worksheets with recommended port assignments and blank worksheets that you can use to set up your cluster.



For more information refer to the [Hardware Universe](#).

- 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.



You must download the applicable NetApp cluster network and management network RCFs from the NetApp Support Site at mysupport.netapp.com for the switches that you receive.

- In addition, you might need to install the required configuration file to support the Cluster Switch Health Monitor (CSHM) for the 92300YC cluster switches. See [Installing the Cluster Switch Health Monitor \(CSHM\) configuration file for 92300YC switches](#) for details.

Steps

1. Rack the cluster network and management network switches and controllers.

If you are installing your...	Then...
Cisco Nexus 9336C-FX2 in a NetApp system cabinet	See the <i>Installing a Cisco Nexus 9336C-FX2 cluster switch and pass-through panel in a NetApp cabinet</i> guide for instructions to install the switch in a NetApp cabinet.
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.
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.
Cisco Nexus 5596UP/5596T in a NetApp system cabinet	See the <i>Installing a Cisco Nexus 5596 cluster switch and pass-through panel in a NetApp cabinet</i> guide for instructions to install the switch in a NetApp cabinet.

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 based on information provided in [Required configuration information](#).
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.

If you download the NetApp-supported version of the software, then you must also download the *NetApp Cluster Network Switch Reference Configuration File* and merge it with the configuration you saved in Step 5. You can download the file and the instructions from the [Cisco Ethernet Switches](#) page.

7. Check the software version on the network switches and, if necessary, download the NetApp-supported version of the software to the switches. If you have your own switches, refer to the [Cisco site](#).

If you download the NetApp-supported version of the software, then you must also download the *NetApp Management Network Switch Reference Configuration File* and merge it with the configuration you saved in Step 5. You can download the file and instructions from the [Cisco Ethernet Switches](#) page.

Related information

[Required cluster configuration information](#)

[Required documentation](#)

[Sample and blank cabling worksheets](#)

Required cluster configuration information

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.

Required network information for all switches

You need the following network information for all switch configurations:

- IP subnet for management network traffic
- Host names and IP addresses for each of the storage system controllers and all applicable switches

- Most storage system controllers are managed through the e0M interface by connecting to the Ethernet service port (wrench icon). On AFF A800 and AFF A700 systems, the e0M interface uses a dedicated Ethernet port.

Refer to the [Hardware Universe](#) for latest information.

Required network information for Cisco Nexus 9336C-FX2, 92300YC, 3232C, 3132Q-V, and 5596UP/5596T switches

For the Cisco Nexus 9336C-FX2, 92300YC, 3232C, 3132Q-V, and 5596UP/5596T switches, you need to provide applicable responses to the following initial setup questions when you first boot the switch. Your site's security policy defines the responses and services to enable.

- 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.

- 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 Cluster 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).
- 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.

For more information about the initial configuration of your switch, see the following guides:

[Cisco Nexus 9336C-FX2 Installation and Upgrade Guides](#)

[Cisco Nexus 92300YC Installation and Upgrade Guides](#)

[Cisco Nexus 5000 Series Hardware Installation Guide](#)

[Cisco Nexus 3000 Series Hardware Installation Guide](#)

Install the Cluster Switch Health Monitor (CSHM) configuration file for 92300YC switches

You can use this procedure to install the applicable configuration file for cluster switch health monitoring of Nexus 92300YC cluster switches. In ONTAP releases 9.5P7 and earlier and 9.6P2 and earlier, you must download the cluster switch health monitor configuration file separately. In ONTAP releases 9.5P8 and later, 9.6P3 and later, and 9.7 and later, the cluster switch health monitor configuration file is bundled with ONTAP.

Before you setup the switch health monitor for 92300YC cluster switches, you must ensure that the ONTAP cluster is up and running.



It is advisable to enable SSH in order to use all features available in CSHM.

1. Download the cluster switch health monitor configuration zip file based on the corresponding ONTAP release version. This file is available from the [NetApp Software download](#) page.
 - a. On the Software download page, select **Switch Health Monitor Configuration Files**
 - b. Select Platform = **ONTAP** and click **Go!**
 - c. On the Switch Health Monitor Configuration Files for ONTAP page, click **View & Download**
 - d. On the Switch Health Monitor Configuration Files for ONTAP - Description page, click **Download** for the applicable cluster switch model, for example: **Cisco Nexus 92300YC**
 - e. On the End User License Agreement page, click **Accept**
 - f. On the Switch Health Monitor Configuration Files for ONTAP - Download page, select the applicable configuration file, for example, **Cisco_Nexus_92300YC.zip**
2. Upload the applicable zip file to your internal web server where the IP address is X.X.X.X.

For an internal web server IP address of 192.168.2.20 and assuming a /usr/download directory exists, you can upload your zip file to your web server using scp:

```
% scp Cisco_Nexus_92300YC.zip
admin@192.168.2.20:/usr/download/Cisco_Nexus_92300YC.zip
```

3. Access the advanced mode setting from one of the ONTAP systems in the cluster, using the command set-privilege advanced:

```
cluster1::> set -privilege advanced
```

4. Run the switch health monitor configure command system cluster-switch configure-health-monitor -node * -package-url X.X.X.X/location_to_download_zip_file:

```
cluster1::> system cluster-switch configure-health-monitor -node *
-package-url 192.168.2.20/usr/download/Cisco_Nexus_92300YC.zip
```

5. Verify that the command output contains the text string "downloaded package processed successfully". If

an error occurs, contact NetApp support.

6. Run the command `system cluster-switch show` on the ONTAP system and ensure that the cluster switches are discovered with the monitored field set to "True".

```
cluster1::> system cluster-switch show
```



If at any time you revert to an earlier version of ONTAP, you will need to install the CSHM configuration file again to enable switch health monitoring of 92300YC cluster switches.

Required documentation

You need specific switch and controller documentation to set up your ONTAP cluster.

Required documentation for cluster network switches

To set up the Cisco Nexus 9336C-FX2 and 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.

Document title	Description
Regulatory Compliance and Safety Information for Cisco Nexus 9000 Series	Provides international agency compliance, safety, and statutory information for the Nexus 9000 series switches.

To set up the Cisco Nexus 3232C and 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.
<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.

To set up the Cisco Nexus 5596 switch, you need the following documents from [Cisco Nexus 5000 Series Switches Support](#) page:

Document title	Description
<i>Nexus 5000 Series Hardware Installation Guide</i>	Provides detailed information about site requirements, switch hardware details, and installation options.
<i>Cisco Nexus 5000 Series Switch Software Configuration Guide</i> (choose the guide for the software you are using)	Provides initial switch configuration information that you need before you can configure the switch for ONTAP operation.
<i>Cisco Nexus 5000 Series NX-OS Software Upgrade and Downgrade Guide</i>	Provides information about how to downgrade the switch to the supported ONTAP switch software, if necessary.
<i>Cisco Nexus 5000 Series NX-OS Command Reference Master Index</i>	Provides an alphabetical list of all the commands supported for a specific NX-OS release.
<i>Cisco Nexus 5000 and Nexus 2000 MIBs Reference</i>	Describes the Management Information Base (MIB) files for the Nexus 5000 switches.
<i>Nexus 5000 Series NX-OS System Message Reference</i>	Describes troubleshooting information.
<i>Regulatory, Compliance, and Safety Information for the Cisco Nexus 6000 Series, Cisco Nexus 5000 Series, Cisco Nexus 3000 Series, and Cisco Nexus 2000 Series</i>	Provides international agency compliance, safety, and statutory information for the Nexus 5000 series switches.

Required documentation for supported ONTAP systems

To set up an ONTAP system, you need the following documents for your version of the operating system from the [ONTAP 9 Documentation Center](#).

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 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.
Installing a Cisco Nexus 3232C cluster switch and pass-through panel in a NetApp cabinet	Describes how to install a Cisco Nexus 3232C switch in a four-post NetApp cabinet.
Installing a Cisco Nexus 3132Q-V switch and pass-through panel in a NetApp Cabinet	Describes how to install a Cisco Nexus 3132Q-V switch in a four-post NetApp cabinet.
Installing a Cisco Nexus 5596 switch and pass-through panel in a NetApp Cabinet	Describes how to install a Cisco Nexus 5596 switch in a NetApp cabinet.

Considerations for using Smart Call Home

Smart Call Home monitors the hardware and software components on your network, to generate an email-based notification of critical system conditions. When an event occurs on your device, Smart Call Home raises an alert to all the recipients that are configured in your destination profile.

You must configure a cluster network switch to communicate using email with the Smart Call Home system. You can optionally set up your cluster network switch to take advantage of Cisco's embedded Smart Call Home support feature.

Before you can use Smart Call Home feature, you need to be aware of the following considerations:

- 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.

[Cisco support site](#)

Sample and blank cabling worksheets

Cisco Nexus 9336C-FX2 cabling worksheet

If you want to document the supported platforms, you must complete the blank cabling worksheet by using the completed sample cabling worksheet as a guide.

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 node 1	1	4x10GbE node 1
2	4x10GbE node 2	2	4x10GbE node 2
3	4x10GbE node 3	3	4x10GbE node 3
4	4x25GbE node 4	4	4x25GbE node 4
5	4x25GbE node 5	5	4x25GbE node 5
6	4x25GbE node 6	6	4x25GbE node 6
7	4x100GbE node 7	7	4x100GbE node 7
8	4x100GbE node 8	8	4x100GbE node 8
9	4x100GbE node 9	9	4x100GbE node 9
10	4x100GbE node 10	10	4x100GbE node 10
11	4x100GbE node 11	11	4x100GbE node 11
12	4x100GbE node 12	12	4x100GbE node 12
13	4x100GbE node 13	13	4x100GbE node 13
14	4x100GbE node 14	14	4x100GbE node 14
15	4x100GbE node 15	15	4x100GbE node 15
16	4x100GbE node 16	16	4x100GbE node 16
17	4x100GbE node 17	17	4x100GbE node 17
18	4x100GbE node 18	18	4x100GbE node 18
19	4x100GbE node 19	19	4x100GbE node 19
20	4x100GbE node 20	20	4x100GbE node 20

Cluster switch A		Cluster switch B	
21	4x100GbE node 21	21	4x100GbE node 21
22	4x100GbE node 22	22	4x100GbE node 22
23	4x100GbE node 23	23	4x100GbE node 23
24	4x100GbE node 24	24	4x100GbE node 24
25 through 34	Reserved	25 through 34	Reserved
35	100G ISL to switch B port 35	35	100G ISL to switch A port 35
36	100G ISL to switch B port 36	36	100G ISL to switch A port 36

Blank cabling worksheet

You can use the blank cabling worksheet to document the platforms that are supported as nodes in a cluster. The *Supported Cluster Connections* section of the *Hardware Universe* defines the cluster ports used by the platform.

Cluster switch A		Cluster switch B	
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	

Cluster switch A		Cluster switch B	
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 through 34	Reserved	25 through 34	Reserved
35	100G ISL to switch B port 35	35	100G ISL to switch A port 35
36	100G ISL to switch B port 36	36	100G ISL to switch A port 36

Cisco Nexus 92300YC cabling worksheet

If you want to document the supported platforms, you must complete the blank cabling worksheet by using the completed sample cabling worksheet as a guide.

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
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

Cluster switch A		Cluster switch B	
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
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

Cluster switch A		Cluster switch B	
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
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

Cluster switch A		Cluster switch B	
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	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	

Cluster switch A		Cluster switch B	
16		16	
17		17	
18		18	
19		19	
20		20	
21		21	
22		22	
23		23	
24		24	
25		25	
26		26	
27		27	
28		28	
29		29	
30		30	
31		31	
32		32	
33		33	
34		34	
35		35	
36		36	
37		37	

Cluster switch A		Cluster switch B	
38		38	
39		39	
40		40	
41		41	
42		42	
43		43	
44		44	
45		45	
46		46	
47		47	
48		48	
49		49	
50		50	
51		51	
52		52	
53		53	
54		54	
55		55	
56		56	
57		57	
58		58	
59		59	

Cluster switch A		Cluster switch B	
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

Cisco Nexus 3232C cabling worksheet

If you want to document the supported platforms, you must complete the blank cabling worksheet by using the completed sample cabling worksheet as a guide. 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	4x10G/40G/100G node	1	4x10G/40G/100G node
2	4x10G/40G/100G node	2	4x10G/40G/100G node
3	4x10G/40G/100G node	3	4x10G/40G/100G node
4	4x10G/40G/100G node	4	4x10G/40G/100G node
5	4x10G/40G/100G node	5	4x10G/40G/100G node
6	4x10G/40G/100G node	6	4x10G/40G/100G node
7	4x10G/40G/100G node	7	4x10G/40G/100G node
8	4x10G/40G/100G node	8	4x10G/40G/100G node
9	4x10G/40G/100G node	9	4x10G/40G/100G node

Cluster switch A		Cluster switch B	
10	4x10G/40G/100G node	10	4x10G/40G/100G node
11	4x10G/40G/100G node	11	4x10G/40G/100G node
12	4x10G/40G/100G node	12	4x10G/40G/100G node
13	4x10G/40G/100G node	13	4x10G/40G/100G node
14	4x10G/40G/100G node	14	4x10G/40G/100G node
15	4x10G/40G/100G node	15	4x10G/40G/100G node
16	4x10G/40G/100G node	16	4x10G/40G/100G node
17	4x10G/40G/100G node	17	4x10G/40G/100G node
18	4x10G/40G/100G node	18	4x10G/40G/100G node
19	40G/100G node 19	19	40G/100G node 19
20	40G/100G node 20	20	40G/100G node 20
21	40G/100G node 21	21	40G/100G node 21
22	40G/100G node 22	22	40G/100G node 22
23	40G/100G node 23	23	40G/100G node 23
24	40G/100G node 24	24	40G/100G node 24
25 through 30	Reserved	25 through 30	Reserved
31	100G ISL to switch B port 31	31	100G ISL to switch A port 31
32	100G ISL to switch B port 32	32	100G 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	100G ISL to switch B port 31	31	100G ISL to switch A port 31
32	100G ISL to switch B port 32	32	100G ISL to switch A port 32

Cisco Nexus 3132Q-V cabling worksheet

If you want to document the supported platforms, you must complete the blank cabling worksheet by using the completed sample cabling worksheet as a guide. 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

Cisco Nexus 5596UP and 5596T cabling worksheet

If you want to document the supported platforms, you must complete the blank cabling worksheet by using the completed sample cabling worksheet as a guide.

Sample cabling worksheet

Some platforms support more than one 10GbE cluster port connection per cluster interconnect switch. To support additional cluster connections, you can use ports 25 through 40, as well as ports 49 through 80 when expansion modules are installed.

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	Node port 1	1	Node port 1
2	Node port 2	2	Node port 2
3	Node port 3	3	Node port 3
4	Node port 4	4	Node port 4
5	Node port 5	5	Node port 5
6	Node port 6	6	Node port 6
7	Node port 7	7	Node port 7
8	Node port 8	8	Node port 8

Cluster switch A		Cluster switch B	
9	Node port 9	9	Node port 9
10	Node port 10	10	Node port 10
11	Node port 11	11	Node port 11
12	Node port 12	12	Node port 12
13	Node port 13	13	Node port 13
14	Node port 14	14	Node port 14
15	Node port 15	15	Node port 15
16	Node port 16	16	Node port 16
17	Node port 17	17	Node port 17
18	Node port 18	18	Node port 18
19	Node port 19	19	Node port 19
20	Node port 20	20	Node port 20
21	Node port 21	21	Node port 21
22	Node port 22	22	Node port 22
23	Node port 23	23	Node port 23
24	Node port 24	24	Node port 24
25 through 40	Reserved	25 through 40	Reserved
41	ISL to switch B port 41	41	ISL to switch A port 41
42	ISL to switch B port 42	42	ISL to switch A port 42
43	ISL to switch B port 43	43	ISL to switch A port 43
44	ISL to switch B port 44	44	ISL to switch A port 44
45	ISL to switch B port 45	45	ISL to switch A port 45

Cluster switch A		Cluster switch B	
46	ISL to switch B port 46	46	ISL to switch A port 46
47	ISL to switch B port 47	47	ISL to switch A port 47
48	ISL to switch B port 48	48	ISL to switch A port 48

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.



Switch ports 1 through 24 function as 10 GbE ports. Switch ports 41 through 48 are reserved for Inter-Switch Links (ISLs).

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 40	Reserved	25 through 40	Reserved
41	ISL to switch B port 41	41	ISL to switch A port 41
42	ISL to switch B port 42	42	ISL to switch A port 42
43	ISL to switch B port 43	43	ISL to switch A port 43
44	ISL to switch B port 44	44	ISL to switch A port 44
45	ISL to switch B port 45	45	ISL to switch A port 45
46	ISL to switch B port 46	46	ISL to switch A port 46
47	ISL to switch B port 47	47	ISL to switch A port 47
48	ISL to switch B port 48	48	ISL to switch A port 48

Sample and blank cabling worksheets

The sample cabling worksheets provide examples of recommended port assignments

from the switches to the controllers. The blank worksheets provide a template that you can use in setting up your cluster.

Configure a new Cisco Nexus 92300YC switch

Configure a new Cisco Nexus 92300YC switch

You can configure a new Nexus 92300YC switch by completing the steps detailed in this chapter.

Installing the Nexus 92300YC switch on systems running ONTAP 9.6 and later, starts with setting up an IP address and configuration to allow the switch to communicate through the management interface. You can then install the NX-OS software and reference configuration file (RCF). This procedure is intended for preparing the Nexus 92300YC switch before controllers are added.

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.

- 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.
- The examples in this procedure use two nodes, but you can have up to 24 nodes in a cluster.

Initial installation of the Cisco Nexus 92300YC switch

You can use this procedure to perform the initial installation of the Cisco Nexus 92300YC switch.

About this task

You can download the applicable NetApp Cisco NX-OS software for your switches from the NetApp Support Site at mysupport.netapp.com

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.

This procedure provides a summary of the process to install your switches and get them running:

Steps

1. Connect the serial port to the host or serial port of your choice.

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. 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. You are then presented with the System Admin Account setup:

```
$ 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]:

1. Type **y** to enforce secure password standard:

```
Do you want to enforce secure password standard (yes/no) [y]: y
```

2. Enter and confirm the password for user admin:

```
Enter the password for "admin":
Confirm the password for "admin":
```

3. Enter the Basic System Configuration dialog:

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):

4. Create another login account:

Create another login account (yes/no) [n]:

5. 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]:

6. Configure the cluster switch name:

Enter the switch name : **cs2**

7. 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

8. Configure advanced IP options:

```
Configure advanced IP options? (yes/no) [n]: n
```

9. Configure Telnet services:

```
Enable the telnet service? (yes/no) [n]: n
```

10. 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
```

11. 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
```

12. 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.
```

Install the NX-OS software

You can use this procedure to install the NX-OS software on the Nexus 92300YC switch.

Steps

1. Connect the cluster switch to the management network.
2. Use the `ping` command to verify connectivity to the server hosting the NX-OS software and the RCF.

This example verifies that the switch can reach the server at IP address 172.19.2.1:

```
cs2# ping 172.19.2.1  
Pinging 172.19.2.1 with 0 bytes of data:  
  
Reply From 172.19.2.1: icmp_seq = 0. time= 5910 usec.
```

3. Copy the NX-OS software and EPLD images to the Nexus 92300YC switch.

```

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:

```

cs2# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
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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.

```
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	Image	Running-Version(pri:alt	New-Version
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
```

```
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.
```

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http://www.opensource.org/licenses/lgpl-2.1.php and  
http://www.gnu.org/licenses/old-licenses/library.txt.
```

Software

```
BIOS: version 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.

```
cs2# show version module 1 epld
```

EPLD Device	Version
MI FPGA	0x7
IO FPGA	0x17
MI FPGA2	0x2
GEM FPGA	0x2
GEM FPGA	0x2
GEM FPGA	0x2
GEM FPGA	0x2

```
cs2# install epld bootflash:n9000-epld.9.2.2.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.

```
cs2# show version module 1 epld
```

EPLD Device	Version
MI FPGA	0x7
IO FPGA	0x19
MI FPGA2	0x2
GEM FPGA	0x2
GEM FPGA	0x2
GEM FPGA	0x2
GEM FPGA	0x2

Install the Reference Configuration File (RCF)

You can install the RCF after setting up the Nexus 92300YC switch for the first time.

Steps

1. Connect the cluster switch to the management network.
2. Use the ping command to verify connectivity to the server hosting the RCF.

This example verifies that the switch can reach the server at IP address 172.19.2.1:

```
cs2# ping 172.19.2.1  
Pinging 172.19.2.1 with 0 bytes of data:  
  
Reply From 172.19.2.1: icmp_seq = 0. time= 5910 usec.
```

3. Copy the RCF to the Nexus 92300YC switch:


```
cs2# copy sftp: bootflash: vrf management
Enter source filename: /code/Nexus_92300YC_RCF_v1.0.2.txt
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/Nexus_92300YC_RCF_v1.0.2.txt
/bootflash/nxos.9.2.2.bin
/code/Nexus_92300YC_R 100% 9687 530.2KB/s 00:00
sftp> exit
Copy complete, now saving to disk (please wait)...
Copy complete.
```

4. Merge the RCF with the running-config of the switch:

```
cs2# copy bootflash:Nexus_92300YC_RCF_v1.0.2.txt running-config
```

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.

5. 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
*
*
*

```

6. Save the running configuration so that it becomes the startup configuration when you reboot the switch:

```
cs2# *copy running-config startup-config*

[#####] 100%
Copy complete, now saving to disk (please wait)...
Copy complete.
```

7. For ONTAP 9.6P8 and later, enable the CSHM ASUP log collection feature for collecting switch-related log files: `system cluster-switch log setup-password` and `system cluster-switch log enable-collection`

```
cs2# system cluster-switch log setup-password
Output example required here
cs2# system cluster-switch log enable-collection
Output example required here too
```

8. Reboot the switch and verify that the running configuration is correct:

```
reload
```

```
cs2# reload

This command will reboot the system. (y/n)? [n] y
```

Install NX-OS software and RCF on Cisco Nexus 92300YC cluster switches

Install NX-OS software and RCF on Cisco Nexus 92300YC cluster switches

The Cisco NX-OS software and reference configuration files (RCFs) must be installed on Cisco Nexus 92300YC cluster switches.

Before you begin

The following conditions must exist before you install the NX-OS software and Reference Configurations Files (RCFs) on the cluster switch:

- The cluster must be fully functioning (there should be no errors in the logs or similar issues).
- You must have checked or set your desired boot configuration in the RCF to reflect the desired boot images if you are installing only NX-OS and keeping your current RCF version.
- If you need to change the boot configuration to reflect the current boot images, you must do so before reapplying the RCF so that the correct version is instantiated on future reboots.
- You must have consulted the switch compatibility table on the [Cisco Ethernet switch](#) page for the supported ONTAP, NX-OS, and RCF versions.
- There can be command dependencies between the command syntax in the RCF and that found in

versions of NX-OS.

- You must have referred to the appropriate software and upgrade guides available on the Cisco web site for complete documentation on the Cisco switch upgrade and downgrade procedures on the [Cisco Nexus 9000 Series Switches](#) page.
- You must have the current RCF.

About this task

The examples in this procedure use two nodes. These nodes use two 10GbE cluster interconnect ports e0a and e0b.

See the [Hardware Universe](#) to verify the correct cluster ports on your platforms.



The command outputs might vary depending on different releases of ONTAP.

The examples in this procedure use the following switch and node nomenclature:

- The names of the two Cisco switches are `cs1` and `cs2`.
- The node names are `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.



The procedure requires the use of both ONTAP commands and Cisco Nexus 9000 Series Switches commands; ONTAP commands are used unless otherwise indicated.

Steps

1. 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=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.

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`

```
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.

4. Check the administrative or operational status of each cluster interface.

- a. Display the network port attributes: `network port show -ipspace Cluster`

```
cluster1::*> network port show -ipspace Cluster
```

Node: 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

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

4 entries were displayed.

b. Display information about the LIFs: `network interface show -vserver Cluster`

```
cluster1::*> network interface show -vserver Cluster
```

	Logical	Status	Network	Current
Current Is				
Vserver	Interface	Admin/Oper	Address/Mask	Node
Port	Home			

Cluster				
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. Ping the remote cluster LIFs:

```
cluster ping-cluster -node node-name
```

```

cluster1::*> cluster ping-cluster -node node2
Host is node2
Getting addresses from network interface table...
Cluster node1_clus1 169.254.209.69 node1      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
```

```

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.

```

7. For ONTAP 9.4 and later, enable the cluster switch health monitor log collection feature for collecting switch-related log files using the commands:

system cluster-switch log setup-password and system cluster-switch log enable-collection

```
cluster1::*> system cluster-switch log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
cs1
cs2

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster1::*>
```



If any of these commands return an error, contact NetApp support.

Install the NX-OS software

You can use this procedure to install the NX-OS software on the Nexus 92300YC switch.

Steps

1. Connect the cluster switch to the management network.
2. Use the `ping` command to verify connectivity to the server hosting the NX-OS software and the RCF.

This example verifies that the switch can reach the server at IP address 172.19.2.1:

```
cs2# ping 172.19.2.1
Pinging 172.19.2.1 with 0 bytes of data:

Reply From 172.19.2.1: icmp_seq = 0. time= 5910 usec.
```

3. Copy the NX-OS software and EPLD images to the Nexus 92300YC switch.

```
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:

```
cs2# show version
```

```
Cisco Nexus Operating System (NX-OS) Software
```

```
TAC support: http://www.cisco.com/tac
```

```
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```

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http://www.opensource.org/licenses/lgpl-2.1.php and
```

```
http://www.gnu.org/licenses/old-licenses/library.txt.
```

Software

```
BIOS: version 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.

```
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	Image	Running-Version(pri:alt	New-Version
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

cs2# **show version**

Cisco Nexus Operating System (NX-OS) Software

TAC support: <http://www.cisco.com/tac>

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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.

cs2# **show version module 1 epld**

EPLD Device	Version
MI FPGA	0x7
IO FPGA	0x17
MI FPGA2	0x2
GEM FPGA	0x2
GEM FPGA	0x2
GEM FPGA	0x2
GEM FPGA	0x2

cs2# **install epld bootflash:n9000-epld.9.2.2.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.

```
cs2# show version module 1 epld
```

EPLD Device	Version
MI FPGA	0x7
IO FPGA	0x19
MI FPGA2	0x2
GEM FPGA	0x2
GEM FPGA	0x2
GEM FPGA	0x2
GEM FPGA	0x2

Install the Reference Configuration File (RCF)

You can install the RCF after setting up the Nexus 92300YC switch for the first time.

Steps

1. Connect the cluster switch to the management network.
2. Use the ping command to verify connectivity to the server hosting the RCF.

This example verifies that the switch can reach the server at IP address 172.19.2.1:

```
cs2# ping 172.19.2.1
Pinging 172.19.2.1 with 0 bytes of data:

Reply From 172.19.2.1: icmp_seq = 0. time= 5910 usec.
```

3. Copy the RCF to the Nexus 92300YC switch:


```
cs2# copy sftp: bootflash: vrf management
Enter source filename: /code/Nexus_92300YC_RCF_v1.0.2.txt
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/Nexus_92300YC_RCF_v1.0.2.txt
/bootflash/nxos.9.2.2.bin
/code/Nexus_92300YC_R 100% 9687 530.2KB/s 00:00
sftp> exit
Copy complete, now saving to disk (please wait)...
Copy complete.
```

4. Merge the RCF with the running-config of the switch:

```
cs2# copy bootflash:Nexus_92300YC_RCF_v1.0.2.txt running-config
```

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.

5. 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
*
*
*

```

6. Save the running configuration so that it becomes the startup configuration when you reboot the switch:

```
cs2# copy running-config startup-config
```

```
[ ] 100%
```

```
Copy complete, now saving to disk (please wait)...
```

```
Copy complete.
```

7. For ONTAP 9.6P8 and later, enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the commands: `system cluster-switch log setup-password` and `system cluster-switch log enable-collection`

```
cluster1::*> system cluster-switch log setup-password
```

```
Enter the switch name: <return>
```

```
The switch name entered is not recognized.
```

```
Choose from the following list:
```

```
cs1
```

```
cs2
```

```
cluster1::*> system cluster-switch log setup-password
```

```
Enter the switch name: cs1
```

```
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
```

```
Do you want to continue? {y|n}::[n] y
```

```
Enter the password: <enter switch password>
```

```
Enter the password again: <enter switch password>
```

```
cluster1::*> system cluster-switch log setup-password
```

```
Enter the switch name: cs2
```

```
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
```

```
Do you want to continue? {y|n}:: [n] y
```

```
Enter the password: <enter switch password>
```

```
Enter the password again: <enter switch password>
```

```
cluster1::*> system cluster-switch log enable-collection
```

```
Do you want to enable cluster log collection for all nodes in the cluster?
```

```
{y|n}: [n] y
```

```
Enabling cluster switch log collection.
```

```
cluster1::*>
```

8. Reboot the switch and verify that the running configuration is correct:

```
reload
```

```
cs2# reload
```

```
This command will reboot the system. (y/n)? [n] y
```

Migrate to a two-node switched cluster with Cisco Nexus 92300YC switches

Migrate to a two-node switched cluster with Cisco Nexus 92300YC switches

You must be aware of certain configuration information, port connections, and cabling requirements when you migrate a two-node switchless cluster, non-disruptively, to a cluster with Cisco Nexus 92300YC cluster switches. The procedure you use depends on whether you have two dedicated cluster-network ports on each controller or a single cluster port on each controller. The process documented works for all nodes using optical or twinax ports but is not supported on this switch if nodes are using onboard 10Gb BASE-T RJ45 ports for the cluster-network ports.

Most systems require two dedicated cluster-network ports on each controller.



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 *Installing the Cluster Switch Health Monitor (CSHM) configuration file for 92300YC switches* in the [Setting up](#) guide.

How to 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.

Before you begin

Two-node switchless configuration:

- The two-node switchless configuration must be properly set up and functioning.
- The nodes must be running ONTAP 9.6 and later.
- All cluster ports must be in the up state.
- All cluster logical interfaces (LIFs) must be in the up state and on their home ports.

Cisco Nexus 92300YC switch configuration:

- Both switches must have management network connectivity.

- There must be console access to the cluster switches.
- Nexus 92300YC node-to-node switch and switch-to-switch connections must use twinax or fiber cables.

The [Hardware Universe - Switches](#) contains more information about cabling.

- Inter-Switch Link (ISL) cables must be connected to ports 1/65 and 1/66 on both 92300YC switches.
- Initial customization of both the 92300YC switches must be completed. So that the:
 - 92300YC switches are running the latest version of software
 - Reference Configuration Files (RCFs) have been applied to the switches
 Any site customization, such as SMTP, SNMP, and SSH must be configured on the new switches.

About this task

The examples in this procedure use the following cluster switch and node nomenclature:

- The names of the 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.

The [Hardware Universe](#) contains the latest information about the actual cluster ports for your platforms.

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. Disable all node-facing ports (not ISL ports) on both the new cluster switches cs1 and cs2.

You must not disable the ISL ports.

The following example shows that node-facing ports 1 through 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
```

4. 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
```

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)
```

5. Display the list of neighboring devices:

```
show cdp neighbors
```

This command provides information about the devices that are connected to the system.

The following example lists the neighboring devices on switch cs1:

```
cs1# show cdp neighbors
```

```
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater,
                  V - VoIP-Phone, D - Remotely-Managed-Device,
                  s - Supports-STP-Dispute
```

Device-ID ID	Local Intrfce	Hldtme	Capability	Platform	Port
cs2(FD0220329V5) Eth1/65	Eth1/65	175	R S I s	N9K-C92300YC	
cs2(FD0220329V5) Eth1/66	Eth1/66	175	R S I s	N9K-C92300YC	

```
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 ID	Local Intrfce	Hldtme	Capability	Platform	Port
cs1(FDO220329KU) Eth1/65	Eth1/65	177	R S I s	N9K-C92300YC	
cs1(FDO220329KU) Eth1/66	Eth1/66	177	R S I s	N9K-C92300YC	

Total entries displayed: 2

6. Verify that all cluster ports are up:

```
network port show -ipspace Cluster
```

Each port should display up for Link and healthy for Health Status.

```
cluster1::*> network port show -ipspace Cluster
```

Node: node1

Port	IPspace	Broadcast Domain	Link	MTU	Speed(Mbps) 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.

7. Verify that all cluster LIFs are up and operational:

```
network interface show -vserver Cluster
```

Each cluster LIF should display true for Is Home and have a Status Admin/Oper of up/up

```
cluster1::*> network interface show -vserver Cluster
```

	Logical	Status	Network	Current	
Current Is					
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port
Home					
-----	-----	-----	-----	-----	-----
Cluster					
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.

8. Verify that auto-revert is enabled on all cluster LIFs:

```
network interface show -vserver Cluster -fields auto-revert
```

```
cluster1::*> network interface show -vserver Cluster -fields auto-revert
```

	Logical	
Vserver	Interface	Auto-revert
-----	-----	-----
Cluster		
	node1_clus1	true
	node1_clus2	true
	node2_clus1	true
	node2_clus2	true

4 entries were displayed.

9. Disconnect the cable from cluster port 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.

10. 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.

11. Enable all node-facing ports on cluster switch cs1.

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
```

12. Verify that all cluster LIFs are up, operational, and display as true for Is Home:

```
network interface show -vserver Cluster
```

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
```

Is	Logical	Status	Network	Current	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.

13. Display information about the status of the nodes in the cluster:

```
cluster show
```

The following example displays information about the health and eligibility of the nodes in the cluster:

```
cluster1::*> cluster show
```

Node	Health	Eligibility	Epsilon
node1	true	true	false
node2	true	true	false

```
2 entries were displayed.
```

14. Disconnect the cable from cluster port e0b on node1, and then connect e0b to port 1 on cluster switch cs2, using the appropriate cabling supported by the 92300YC switches.
15. 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.
16. Enable all node-facing ports on cluster switch cs2.

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
```

17. Verify that all cluster ports are up:

```
network port show -ipSpace Cluster
```

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
```

						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.
```

18. Verify that all interfaces display true for `Is Home`:

```
network interface show -vserver Cluster
```



This might take several minutes to complete.

The following example shows that all LIFs are up on node1 and node2 and that `Is Home` results are true:

```
cluster1::*> network interface show -vserver Cluster
```

Is Vserver Home	Logical Interface	Status Admin/Oper	Network Address/Mask	Current Node	Current Port
-----	-----	-----	-----	-----	-----

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
true					

```
4 entries were displayed.
```

19. Verify that both nodes each have one connection to each switch:

```
show cdp neighbors
```

The following example shows the appropriate results for both switches:

```
(cs1)# show cdp neighbors
```

Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
S - Switch, H - Host, I - IGMP, r - Repeater,
V - VoIP-Phone, D - Remotely-Managed-Device,
s - Supports-STP-Dispute

Device-ID ID	Local Intrfce	Hldtme	Capability	Platform	Port
node1	Eth1/1	133	H	FAS2980	e0a
node2	Eth1/2	133	H	FAS2980	e0a
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 ID	Local Intrfce	Hldtme	Capability	Platform	Port
node1	Eth1/1	133	H	FAS2980	e0b
node2	Eth1/2	133	H	FAS2980	e0b
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

20. Display information about the discovered network devices in your cluster:

```
network device-discovery show -protocol cdp
```

```
cluster1::*> network device-discovery show -protocol cdp
```

Node/ Protocol	Local Port	Discovered 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.

21. Verify that the settings are disabled:

```
network options switchless-cluster show
```



It might take several minutes for the command to complete. Wait for the '3 minute lifetime to expire' announcement.

The false output in the following example shows that the configuration settings are disabled:

```
cluster1::*> network options switchless-cluster show
Enable Switchless Cluster: false
```

22. Verify the status of the node members in the cluster:

```
cluster show
```

The following example shows information about the health and eligibility of the nodes in the cluster:

```
cluster1::*> cluster show
```

Node	Health	Eligibility	Epsilon
node1	true	true	false
node2	true	true	false

23. Ensure that the cluster network has full connectivity:


```
cluster ping-cluster -node node-name
```

```
cluster1::> cluster ping-cluster -node node2
Host is node2
Getting addresses from network interface table...
Cluster node1_clus1 169.254.209.69 node1 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)
```

24. If you suppressed automatic case creation, reenable it by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all -message MAINT=END
```

```
cluster1::*> system node autosupport invoke -node * -type all -message  
MAINT=END
```

25. Change the privilege level back to admin:

```
set -privilege admin
```

26. For ONTAP 9.4 and later, enable the cluster switch health monitor log collection feature for collecting switch-related log files, using the commands:

```
system cluster-switch log setup-password and system cluster-switch log enable-  
collection
```

```

cluster1::*> system cluster-switch log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
cs1
cs2

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster1::*>

```



If any of these commands return an error, contact NetApp support.

Migrate from a Cisco switch to a Cisco Nexus 92300YC switch

Migrate from a Cisco switch to a Cisco Nexus 92300YC switch

You must be aware of certain configuration information, port connections and cabling requirements when you are replacing some older Cisco Nexus cluster switches with

Cisco Nexus 92300YC cluster switches.

- The following cluster switches are supported:
 - Nexus 92300YC
 - Nexus 5596UP
 - Nexus 5020
 - Nexus 5010
- The cluster switches use the following ports for connections to nodes:
 - Ports e1/1-48 (10/25 GbE), e1/49-64 (40/100 GbE): Nexus 92300YC
 - Ports e1/1-40 (10 GbE): Nexus 5596UP
 - Ports e1/1-32 (10 GbE): Nexus 5020
 - Ports e1/1-12, e2/1-6 (10 GbE): Nexus 5010 with expansion module
- The cluster switches use the following Inter-Switch Link (ISL) ports:
 - Ports e1/65-66 (100 GbE): Nexus 92300YC
 - Ports e1/41-48 (10 GbE): Nexus 5596UP
 - Ports e1/33-40 (10 GbE): Nexus 5020
 - Ports e1/13-20 (10 GbE): Nexus 5010
- The [Hardware Universe - Switches](#) contains information about supported cabling for all cluster switches.
- You have configured some of the ports on Nexus 92300YC switches to run at 10 GbE or 40 GbE.
- You have planned, migrated, and documented 10 GbE and 40 GbE connectivity from nodes to Nexus 92300YC cluster switches.
- The ONTAP and NX-OS versions supported in this procedure are on the [Cisco Ethernet Switches](#) page.



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 *Installing the Cluster Switch Health Monitor (CSHM) configuration file for 92300YC switches* in the [Setting up](#) guide.

How to migrate from a Cisco switch to a Cisco Nexus 92300YC switch

You can migrate nondisruptively older Cisco cluster switches for an ONTAP cluster to Cisco Nexus 92300YC cluster network switches.

About this task

- The existing cluster must be properly set up and functioning.
- All cluster ports must be in the up state to ensure nondisruptive operations.
- The Nexus 92300YC cluster switches must be configured and operating under the proper version of NX-OS installed and reference configuration file (RCF) applied.
- The existing cluster network configuration must have the following:
 - A redundant and fully functional NetApp cluster using both older Cisco switches.
 - Management connectivity and console access to both the older Cisco switches and the new switches.

- All cluster LIFs in the up state with the cluster LIFs are on their home ports.
- ISL ports enabled and cabled between the older Cisco switches and between the new switches.

The examples in this procedure use the following switch and node nomenclature:

- The existing Cisco Nexus 5596UP cluster switches are c1 and c2.
- The new Nexus 92300YC cluster switches are cs1 and cs2.
- The nodes are node1 and node2.
- The cluster LIFs are node1_clus1 and node1_clus2 on node 1, and node2_clus1 and node2_clus2 on node 2 respectively.
- Switch c2 is replaced by switch cs2 first and then switch c1 is replaced by switch cs1.
 - A temporary ISL is built on cs1 connecting c1 to cs1.
 - Cabling between the nodes and c2 are then disconnected from c2 and reconnected to cs2.
 - Cabling between the nodes and c1 are then disconnected from c1 and reconnected to cs1.
 - The temporary ISL between c1 and cs1 is then removed.

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. Verify that auto-revert is enabled on all cluster LIFs:

```
network interface show -vserver Cluster -fields auto-revert
```

```
cluster1::*> network interface show -vserver Cluster -fields auto-revert
```

Vserver	Logical Interface	Auto-revert
Cluster	node1_clus1	true
	node1_clus2	true
	node2_clus1	true
	node2_clus2	true

4 entries were displayed.

4. Determine the administrative or operational status for each cluster interface:

Each port should display up for Link and healthy for Health Status.

a. Display the network port attributes:

```
network port show -ipspace Cluster
```

```
cluster1::*> network port show -ipspace Cluster
```

```
Node: node1
```

```
Ignore
```

						Speed(Mbps)	Health
Health							
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							
-----	-----	-----	-----	----	----	-----	
-----	-----						
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.
```

b. Display information about the logical interfaces and their designated home nodes:

```
network interface show -vserver Cluster
```

Each LIF should display up/up for Status Admin/Oper and true for Is Home.

```
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	node1_clus2	up/up	169.254.49.125/16	node1
e0a	node2_clus1	up/up	169.254.47.194/16	node2
e0b	node2_clus2	up/up	169.254.19.183/16	node2

4 entries were displayed.

5. The cluster ports on each node are connected to existing cluster switches in the following way (from the nodes' perspective) using the command:

```
network device-discovery show -protocol cdp
```

```
cluster1::*> network device-discovery show -protocol cdp
```

Node/	Local	Discovered		
Protocol	Port	Device (LLDP: ChassisID)	Interface	Platform
node2	/cdp			
	e0a	c1	0/2	N5K-
C5596UP				
	e0b	c2	0/2	N5K-
C5596UP				
node1	/cdp			
	e0a	c1	0/1	N5K-
C5596UP				
	e0b	c2	0/1	N5K-
C5596UP				

4 entries were displayed.

6. The cluster ports and switches are connected in the following way (from the switches' perspective) using the command:

```
show cdp neighbors
```

```
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 Port ID	Local Intrfce	Hldtme	Capability	Platform
node1 e0a	Eth1/1	124	H	FAS2750
node2 e0a	Eth1/2	124	H	FAS2750
c2 (FOX2025GEFC) Eth1/41	Eth1/41	179	S I s	N5K-C5596UP
c2 (FOX2025GEFC) Eth1/42	Eth1/42	175	S I s	N5K-C5596UP
c2 (FOX2025GEFC) Eth1/43	Eth1/43	179	S I s	N5K-C5596UP
c2 (FOX2025GEFC) Eth1/44	Eth1/44	175	S I s	N5K-C5596UP
c2 (FOX2025GEFC) Eth1/45	Eth1/45	179	S I s	N5K-C5596UP
c2 (FOX2025GEFC) Eth1/46	Eth1/46	179	S I s	N5K-C5596UP
c2 (FOX2025GEFC) Eth1/47	Eth1/47	175	S I s	N5K-C5596UP
c2 (FOX2025GEFC) Eth1/48	Eth1/48	179	S I s	N5K-C5596UP

Total entries displayed: 10

```
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 Port ID	Local Intrfce	Hldtme	Capability	Platform
node1 e0b	Eth1/1	124	H	FAS2750
node2 e0b	Eth1/2	124	H	FAS2750
c1 (FOX2025GEEX) Eth1/41	Eth1/41	175	S I s	N5K-C5596UP
c1 (FOX2025GEEX) Eth1/42	Eth1/42	175	S I s	N5K-C5596UP
c1 (FOX2025GEEX) Eth1/43	Eth1/43	175	S I s	N5K-C5596UP
c1 (FOX2025GEEX) Eth1/44	Eth1/44	175	S I s	N5K-C5596UP
c1 (FOX2025GEEX) Eth1/45	Eth1/45	175	S I s	N5K-C5596UP
c1 (FOX2025GEEX) Eth1/46	Eth1/46	175	S I s	N5K-C5596UP
c1 (FOX2025GEEX) Eth1/47	Eth1/47	176	S I s	N5K-C5596UP
c1 (FOX2025GEEX) Eth1/48	Eth1/48	176	S I s	N5K-C5596UP

7. Ensure that the cluster network has full connectivity using the command:

```
cluster ping-cluster -node node-name
```

```

cluster1::*> cluster ping-cluster -node node2
Host is node2
Getting addresses from network interface table...
Cluster node1_clus1 169.254.209.69 node1      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)

```

8. Configure a temporary ISL on cs1 on ports e1/41-48, between c1 and cs1.

The following example shows how the new ISL is configured on c1 and cs1:

```
cs1# configure
Enter configuration commands, one per line. End with CNTL/Z.
cs1(config)# interface e1/41-48
cs1(config-if-range)# description temporary ISL between Nexus 5596UP and
Nexus 92300YC
cs1(config-if-range)# no lldp transmit
cs1(config-if-range)# no lldp receive
cs1(config-if-range)# switchport mode trunk
cs1(config-if-range)# no spanning-tree bpduguard enable
cs1(config-if-range)# channel-group 101 mode active
cs1(config-if-range)# exit
cs1(config)# interface port-channel 101
cs1(config-if)# switchport mode trunk
cs1(config-if)# spanning-tree port type network
cs1(config-if)# exit
cs1(config)# exit
```

9. Remove ISL cables from ports e1/41-48 from c2 and connect the cables to ports e1/41-48 on cs1.
10. Verify that the ISL ports and port-channel are operational connecting c1 and cs1:

```
show port-channel summary
```

The following example shows the Cisco show port-channel summary command being used to verify the ISL ports are operational on c1 and cs1:

```
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
        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      Eth1/41(P)  Eth1/42(P)
Eth1/43(P)
                        Eth1/44(P)  Eth1/45(P)
Eth1/46(P)
                        Eth1/47(P)  Eth1/48(P)
```

```
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)
101    Po101(SU)  Eth       LACP      Eth1/41(P)  Eth1/42(P)
Eth1/43(P)
                        Eth1/44(P)  Eth1/45(P)
Eth1/46(P)
                        Eth1/47(P)  Eth1/48(P)
```

11. For node1, disconnect the cable from e1/1 on c2, and then connect the cable to e1/1 on cs2, using

appropriate cabling supported by Nexus 92300YC.

12. For node2, disconnect the cable from e1/2 on c2, and then connect the cable to e1/2 on cs2, using appropriate cabling supported by Nexus 92300YC.
13. The cluster ports on each node are now connected to cluster switches in the following way, from the nodes' perspective:

```
network device-discovery show -protocol cdp
```

```
cluster1::*> network device-discovery show -protocol cdp
```

Node/ Protocol	Local Port	Discovered Device (LLDP: ChassisID)	Interface	Platform
node2	/cdp			
	e0a	c1	0/2	N5K-
C5596UP				
	e0b	cs2	0/2	N9K-
C92300YC				
node1	/cdp			
	e0a	c1	0/1	N5K-
C5596UP				
	e0b	cs2	0/1	N9K-
C92300YC				

```
4 entries were displayed.
```

14. For node1, disconnect the cable from e1/1 on c1, and then connect the cable to e1/1 on cs1, using appropriate cabling supported by Nexus 92300YC.
15. For node2, disconnect the cable from e1/2 on c1, and then connect the cable to e1/2 on cs1, using appropriate cabling supported by Nexus 92300YC.
16. The cluster ports on each node are now connected to cluster switches in the following way, from the nodes' perspective:

```
network device-discovery show -protocol cdp
```

```
cluster1::*> network device-discovery show -protocol cdp
```

Node/ Protocol	Local Port	Discovered 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.

17. Delete the temporary ISL between cs1 and c1.

```
cs1(config)# no interface port-channel 10
cs1(config)# interface e1/41-48
cs1(config-if-range)# lldp transmit
cs1(config-if-range)# lldp receive
cs1(config-if-range)# no switchport mode trunk
cs1(config-if-range)# no channel-group
cs1(config-if-range)# description 10GbE Node Port
cs1(config-if-range)# spanning-tree bpduguard enable
cs1(config-if-range)# exit
cs1(config)# exit
```

18. Verify the final configuration of the cluster:

```
network port show -ipSpace Cluster
```

Each port should display up for Link and healthy for Health Status.

```
cluster1::*> network port show -ipSpace Cluster
```

Node: node1					Ignore		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

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	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.

```
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	124	H	FAS2750	
e0a					
node2	Eth1/2	124	H	FAS2750	
e0a					
cs2 (FDO220329V5)	Eth1/65	179	R S I s	N9K-C92300YC	
Eth1/65					
cs2 (FDO220329V5)	Eth1/66	179	R S I s	N9K-C92300YC	
Eth1/66					

```
cs2# show cdp neighbors
```

Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
S - Switch, H - Host, I - IGMP, r - Repeater,
V - VoIP-Phone, D - Remotely-Managed-Device,
s - Supports-STP-Dispute

Device-ID	Local Intrfce	Hldtme	Capability	Platform	Port
-----------	---------------	--------	------------	----------	------

ID				
node1	Eth1/1	124	H	FAS2750
e0b				
node2	Eth1/2	124	H	FAS2750
e0b				
cs1 (FDO220329KU)	Eth1/65	179	R S I S	N9K-C92300YC
Eth1/65				
cs1 (FDO220329KU)	Eth1/66	179	R S I S	N9K-C92300YC
Eth1/66				
Total entries displayed: 4				

19. Ensure that the cluster network has full connectivity:

```
cluster ping-cluster -node node-name
```

```
cluster1::*> set -priv advanced
```

Warning: These advanced commands are potentially dangerous; use them only when

directed to do so by NetApp personnel.

Do you want to continue? {y|n}: **y**

```
cluster1::*> cluster ping-cluster -node node2
```

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)

```
cluster1::*> set -privilege admin
```

```
cluster1::*>
```

20. For ONTAP 9.4 and later, enable the cluster switch health monitor log collection feature for collecting switch-related log files, using the commands:

```
system cluster-switch log setup-password and system cluster-switch log enable-  
collection
```

```

cluster1::*> system cluster-switch log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
cs1
cs2

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster1::*>

```



If any of these commands return an error, contact NetApp support.

Replace a Cisco Nexus 92300YC switch

Replacing a defective Nexus 92300YC switch in a cluster network is a nondisruptive procedure (NDU).

Before you begin

The following conditions must exist before performing the switch replacement in the current environment and on the replacement switch.

- Existing cluster and network infrastructure:
 - The existing cluster must be verified as completely functional, with at least one fully connected cluster switch.
 - All cluster ports must be up.
 - All cluster logical interfaces (LIFs) must be up and on their home ports.
 - The ONTAP cluster ping-cluster -node node1 command must indicate that basic connectivity and larger than PMTU communication are successful on all paths.
- Nexus 92300YC replacement switch:
 - Management network connectivity on the replacement switch must be functional.
 - Console access to the replacement switch must be in place.
 - The node connections are ports 1/1 through 1/64.
 - All Inter-Switch Link (ISL) ports must be disabled on ports 1/65 and 1/66.
 - The desired reference configuration file (RCF) and NX-OS operating system image switch must be loaded onto the switch.
 - Initial customization of the switch must be complete, as detailed in:

[Configuring a new Cisco Nexus 92300YC switch](#)

Any previous site customizations, such as STP, SNMP, and SSH, should be copied to the new switch.

About this task

You must execute the command for migrating a cluster LIF from the node where the cluster LIF is hosted.

The examples in this procedure use the following switch and node nomenclature:

- The names of the existing Nexus 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::*>



The following procedure is based on the following cluster network topology:

```
cluster1::*> network port show -ipspace Cluster
```

```
Node: node1
```

```
Ignore
```

```
Speed (Mbps) Health
```

```
Health
```

```
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
```

```
Status
```

```

-----
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/      Local  Discovered

```

Protocol	Port	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	Local Intrfce	Hldtme	Capability	Platform	Port ID
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	Local Intrfce	Hldtme	Capability	Platform	Port ID
node1	Eth1/1	139	H	FAS2980	e0b
node2	Eth1/2	124	H	FAS2980	e0b
cs1 (FDO220329KU)	Eth1/65	178	R S I s	N9K-C92300YC	Eth1/65
cs1 (FDO220329KU)	Eth1/66	178	R S I s	N9K-C92300YC	Eth1/66

Steps

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.

```
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
```

```
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 that all the cluster LIFs can communicate:

```
cluster ping-cluster
```

```
cluster1::*> cluster ping-cluster node1

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)
```

5. Shut down the ISL ports 1/65 and 1/66 on the Nexus 92300YC switch cs1:

```
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)#
```

6. 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.
7. 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).

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)#

```

8. Verify that port e0b is up on all nodes:

```
network port show ipspace Cluster
```

The output should be similar to the following:

```
cluster1::*> network port show -ipspace Cluster
```

```
Node: node1
```

```
Ignore
```

						Speed(Mbps)	Health
Health							
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							
-----	-----	-----	-----	-----	-----	-----	-----
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/auto	-
false							

```
4 entries were displayed.
```

9. On the same node you used in the previous step, revert the cluster LIF associated with the port in the previous step by using the network interface revert command.

In this example, LIF node1_clus2 on node1 is successfully reverted if the Home value is true and the port is e0b.

The following commands return LIF node1_clus2 on node1 to home port e0a and displays information about the LIFs on both nodes. Bringing up the first node is successful if the Is Home column is true for both cluster interfaces and they show the correct port assignments, in this example e0a and e0b on node1.

```
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	
node1_clus2	up/up	169.254.49.125/16	node1	e0b	
node2_clus1	up/up	169.254.47.194/16	node2	e0a	
node2_clus2	up/up	169.254.19.183/16	node2	e0a	

4 entries were displayed.

10. Display information about the nodes in a cluster:

```
cluster show
```

This example shows that the node health for node1 and node2 in this cluster is true:

```
cluster1::*> cluster show
```

Node	Health	Eligibility
-----	-----	-----
node1	false	true
node2	true	true

11. Verify that all physical cluster ports are up:

```
network port show ipspace Cluster
```

```
cluster1::*> network port show -ipspace Cluster
```

```
Node: node1
```

```
Ignore
```

						Speed(Mbps)	Health
Health							
Port	IPspace	Broadcast	Domain	Link	MTU	Admin/Oper	Status
Status							
-----	-----	-----	-----	-----	-----	-----	-----
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.
```

12. Verify that all the cluster LIFs can communicate:

```
cluster ping-cluster
```

```

cluster1::*> cluster ping-cluster -node node2
Host is node2
Getting addresses from network interface table...
Cluster node1_clus1 169.254.209.69 node1 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)

```

13. Confirm the following cluster network configuration:

network port show

```

cluster1::*> network port show -ipspace Cluster
Node: node1

Ignore
Speed (Mbps)
Health
Port      IPspace      Broadcast Domain Link MTU   Admin/Oper Status
Status
-----
e0a       Cluster      Cluster      up    9000    auto/10000 healthy
false
e0b       Cluster      Cluster      up    9000    auto/10000 healthy
false

Node: node2

```

Ignore

		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							

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	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 Port ID	Local Intrfce	Hldtme	Capability	Platform	
node1	Eth1/1	144	H	FAS2980	e0a
node2	Eth1/2	145	H	FAS2980	e0a
newcs2 (FDO296348FU) Eth1/65	Eth1/65	176	R S I s	N9K-C92300YC	
newcs2 (FDO296348FU) Eth1/66	Eth1/66	176	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 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

14. For ONTAP 9.4 and later, enable the cluster switch health monitor log collection feature for collecting switch-related log files, using the commands:

```
system cluster-switch log setup-password and system cluster-switch log enable-  
collection
```

```
cluster1::*> system cluster-switch log setup-password  
Enter the switch name: <return>  
The switch name entered is not recognized.  
Choose from the following list:  
cs1  
cs2  
  
cluster1::*> system cluster-switch log setup-password  
  
Enter the switch name: cs1  
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc  
Do you want to continue? {y|n}::[n] y  
  
Enter the password: <enter switch password>  
Enter the password again: <enter switch password>  
  
cluster1::*> system cluster-switch log setup-password  
  
Enter the switch name: cs2  
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1  
Do you want to continue? {y|n}:: [n] y  
  
Enter the password: <enter switch password>  
Enter the password again: <enter switch password>  
  
cluster1::*> system cluster-switch log enable-collection  
  
Do you want to enable cluster log collection for all nodes in the  
cluster?  
{y|n}: [n] y  
  
Enabling cluster switch log collection.  
  
cluster1::*>
```



If any of these commands return an error, contact NetApp support.

Other switch models

Other Cisco Cluster, Storage and Management Switches

You can use the link below to access documentation for the following switches:

- Cisco Nexus 5596
- NetApp CN1601

[Documentation for other Cisco Cluster, Storage and Management Switches](#)

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