



Cisco® Nexus Switches

Installing NX-OS and Reference Configuration Files (RCFs)

For Cisco Nexus 3232C switches

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Installing 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 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.

[Cisco Ethernet switch](#)

- 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.

[Cisco Nexus 3000 Series Switches](#)

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.

[Hardware Universe](#)

Note: 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.

Note: 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.

Note: 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) 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
```

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

Installing NX-OS software and RCFs on Cisco Nexus 3232C cluster switches

```

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

```

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

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

```

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.

```

- 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::*>

```

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

- 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
```

Installing NX-OS software and RCFs on Cisco Nexus 3232C cluster switches

```

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::*>

```

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

Installing 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

```

Installing NX-OS software and RCFs on Cisco Nexus 3232C cluster switches

```
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.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
```

Installing NX-OS software and RCFs on Cisco Nexus 3232C cluster switches

```

-----
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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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.

Installing NX-OS software and RCFs on Cisco Nexus 3232C cluster switches

```

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.
    
```

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             0x12
IO  FPGA             0x12
    
```

Installing 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.

Note: 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
    
```

Installing NX-OS software and RCFs on Cisco Nexus 3232C cluster switches

```

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

Port          IPspace      Broadcast Domain Link MTU      Speed(Mbps) Health Ignore
              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

Port          IPspace      Broadcast Domain Link MTU      Speed(Mbps) Health Ignore
              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

Port          IPspace      Broadcast Domain Link MTU      Speed(Mbps) Health Health
              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

Port          IPspace      Broadcast Domain Link MTU      Speed(Mbps) Health Ignore
              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
cluster1-01_clus1 up/up      169.254.3.4/23 cluster1-01 e0a          true
cluster1-01_clus2 up/up      169.254.3.5/23 cluster1-01 e0d          true
cluster1-02_clus1 up/up      169.254.3.8/23 cluster1-02 e0a          true
cluster1-02_clus2 up/up      169.254.3.9/23 cluster1-02 e0d          true
cluster1-03_clus1 up/up      169.254.1.3/23 cluster1-03 e0a          true
cluster1-03_clus2 up/up      169.254.1.1/23 cluster1-03 e0b          true
cluster1-04_clus1 up/up      169.254.1.6/23 cluster1-04 e0a          true
cluster1-04_clus2 up/up      169.254.1.7/23 cluster1-04 e0b          true
8 entries were displayed.
cluster1::*>
    
```

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

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

```

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

Switch      Type          Address          Model
-----
cs1         cluster-network 10.233.205.92   NX3232C
Serial Number: FOXXXXXXGXS
Is Monitored: true
Reason: None
Software Version: Cisco Nexus Operating System (NX-OS) Software, Version
    
```

Installing NX-OS software and RCFs on Cisco Nexus 3232C cluster switches

```

          9.3(4)
Version Source: CDP
cs2          cluster-network    10.233.205.93    NX3232C
  Serial Number: FOXXXXXXGD
  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
```

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

```

8 entries were displayed.
cluster1::*>

```

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 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
*****
```

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.

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.

```
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.

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```
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_3232C_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

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

Node: cluster1-02

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

Node: cluster1-03

Port      IPspace      Broadcast Domain  Link  MTU  Speed(Mbps)  Health  Ignore
-----  -
e0a      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)  Health  Ignore
-----  -
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    cs2                        Ethernet1/7  N3K-C3232C
e0d        cs2    cs1                        Ethernet1/7  N3K-C3232C
cluster01-2/cdp
e0a        cs1    cs2                        Ethernet1/8  N3K-C3232C
e0d        cs2    cs1                        Ethernet1/8  N3K-C3232C
cluster01-3/cdp
e0a        cs1    cs2                        Ethernet1/1/1  N3K-C3232C
e0b        cs2    cs1                        Ethernet1/1/1  N3K-C3232C
cluster1-04/cdp
e0a        cs1    cs2                        Ethernet1/1/2  N3K-C3232C
e0b        cs2    cs1                        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: FOXXXXXXGD
  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: FOXXXXXXGS
  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.
```

Note: 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.
```

- 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
```

- 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
-----
Vserver      Logical      Status      Network      Current      Current      Is
Interface    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::>
```

- 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::>
```

- Repeat Steps 7 to 14 on switch cs1.
- Enable auto-revert on the cluster LIFs.

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

- 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
```

- 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) --
.
.
```

- Verify that the ISL between cs1 and cs2 is functional:

```
show port-channel summary
```

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```

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#

```

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

network interface show -role cluster

```

cluster1::*> network interface show -role cluster
-----
Vserver      Logical      Status      Network      Current      Current      Is
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::*>

```

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)
```


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