



Configure software

Cluster and storage switches

NetApp
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Configure software

Software install workflow for Cisco Nexus 9336C-FX2 cluster switches

To install and configure the software for a Cisco Nexus 9336C-FX2 switch and to install or upgrade the Reference Configuration File (RCF), follow these steps:

1. [Prepare to install NX-OS software and RCF.](#)
2. [Install the NX-OS software.](#)
3. [Install or upgrade the Reference Configuration File \(RCF\).](#)

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.

Available RCF configurations

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

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

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

Prepare to install NX-OS software and RCF

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

About the examples

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

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

About this task

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

Steps

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

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



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

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

```
set -privilege advanced
```

The advanced prompt (`*>`) appears.

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

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

Show example

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

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

4 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`
```

Show example

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

```
Node: cluster1-02
```

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

```
Node: cluster1-01
```

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

```
4 entries were displayed.
```

b. Display information about the LIFs:

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

Show example

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

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

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
```

Show example

```
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
```


Show example

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

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

4 entries were displayed.

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
```

Show example

```
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

Show example

```
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.

What's next?

[Install the NX-OS software.](#)

Install the NX-OS software

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

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

Review requirements

What you'll need

- A current backup of the switch configuration.
- A fully functioning cluster (no errors in the logs or similar issues).
- [Cisco Ethernet switch page](#). Consult the switch compatibility table for the supported ONTAP and NX-OS versions.
- Appropriate software and upgrade guides available on the Cisco web site for the Cisco switch upgrade and downgrade procedures. See [Cisco Nexus 9000 Series Switches](#).

About the examples

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

- The names of the two Cisco switches are cs1 and cs2.
- The node names are cluster1-01, cluster1-02, cluster1-03, and cluster1-04.
- The cluster LIF names are cluster1-01_clus1, cluster1-01_clus2, cluster1-02_clus1, cluster1-02_clus2, cluster1-03_clus1, cluster1-03_clus2, cluster1-04_clus1, and cluster1-04_clus2.
- The `cluster1::*>` prompt indicates the name of the cluster.

Install the software

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

Steps

1. Connect the cluster switch to the management network.
2. Use the ping command to verify connectivity to the server hosting the NX-OS software and the RCF.

Show example

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

```
cs2# ping 172.19.2.1
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.

Show example

```
cs2# copy sftp: bootflash: vrf management
Enter source filename: /code/nxos.9.3.5.bin
Enter hostname for the sftp server: 172.19.2.1
Enter username: user1

Outbound-ReKey for 172.19.2.1:22
Inbound-ReKey for 172.19.2.1:22
user1@172.19.2.1's password:
sftp> progress
Progress meter enabled
sftp> get /code/nxos.9.3.5.bin /bootflash/nxos.9.3.5.bin
/code/nxos.9.3.5.bin 100% 1261MB 9.3MB/s 02:15
sftp> exit
Copy complete, now saving to disk (please wait)...
Copy complete.

cs2# copy sftp: bootflash: vrf management

Enter source filename: /code/n9000-epld.9.3.5.img
Enter hostname for the sftp server: 172.19.2.1
Enter username: user1

Outbound-ReKey for 172.19.2.1:22
Inbound-ReKey for 172.19.2.1:22
user1@172.19.2.1's password:
sftp> progress
Progress meter enabled
sftp> get /code/n9000-epld.9.3.5.img /bootflash/n9000-
epld.9.3.5.img
/code/n9000-epld.9.3.5.img 100% 161MB 9.5MB/s 00:16
sftp> exit
Copy complete, now saving to disk (please wait)...
Copy complete.
```

4. Verify the running version of the NX-OS software:

```
show version
```

Show example

```
cs2# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
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All rights reserved.
The copyrights to certain works contained in this software are
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own
licenses, such as open source. This software is provided "as is,"
and unless
otherwise stated, there is no warranty, express or implied,
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limited to warranties of merchantability and fitness for a
particular purpose.
Certain components of this software are licensed under
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GNU General Public License (GPL) version 3.0 or the GNU
Lesser General Public License (LGPL) Version 2.1 or
Lesser General Public License (LGPL) Version 2.0.
A copy of each such license is available at
http://www.opensource.org/licenses/gpl-2.0.php and
http://opensource.org/licenses/gpl-3.0.html and
http://www.opensource.org/licenses/lgpl-2.1.php and
http://www.gnu.org/licenses/old-licenses/library.txt.

Software
  BIOS: version 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.

Show example

```
cs2# install all nxos bootflash:nxos.9.3.5.bin
```

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

```
Verifying image bootflash:/nxos.9.3.5.bin for boot variable "nxos".  
[#####] 100% -- SUCCESS
```

```
Verifying image type.  
[#####] 100% -- SUCCESS
```

```
Preparing "nxos" version info using image bootflash:/nxos.9.3.5.bin.  
[#####] 100% -- SUCCESS
```

```
Preparing "bios" version info using image bootflash:/nxos.9.3.5.bin.  
[#####] 100% -- SUCCESS
```

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

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

Compatibility check is done:

Module	bootable	Impact	Install-type	Reason
1	yes	disruptive	reset	default upgrade is not hitless

Images will be upgraded according to following table:

Module	Image	Running-Version(pri:alt	New-
Version		Upg-Required	
1	nxos	9.3(4)	9.3(5)
yes			
1	bios	v08.37(01/28/2020):v08.23(09/23/2015)	
v08.38(05/29/2020)		yes	


```
Switch will be reloaded for disruptive upgrade.

Do you want to continue with the installation (y/n)? [n] y

Install is in progress, please wait.

Performing runtime checks.
[#####] 100% -- SUCCESS

Setting boot variables.
[#####] 100% -- SUCCESS

Performing configuration copy.
[#####] 100% -- SUCCESS

Module 1: Refreshing compact flash and upgrading
bios/loader/bootrom.
Warning: please do not remove or power off the module at this time.
[#####] 100% -- SUCCESS

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

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

```
show version
```

Show example

```
cs2# show version
```

```
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (C) 2002-2020, 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,
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limited to warranties of merchantability and fitness for a
particular purpose.
Certain components of this software are licensed under
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GNU General Public License (GPL) version 3.0 or the GNU
Lesser General Public License (LGPL) Version 2.1 or
Lesser General Public License (LGPL) Version 2.0.
A copy of each such license is available at
http://www.opensource.org/licenses/gpl-2.0.php and
http://opensource.org/licenses/gpl-3.0.html and
http://www.opensource.org/licenses/lgpl-2.1.php and
http://www.gnu.org/licenses/old-licenses/library.txt.
```

Software

```
  BIOS: version 05.33
  NXOS: version 9.3(5)
  BIOS compile time: 09/08/2018
  NXOS image file is: bootflash:///nxos.9.3.5.bin
  NXOS compile time: 11/4/2018 21:00:00 [11/05/2018 06:11:06]
```

Hardware

```
  cisco Nexus9000 C9336C-FX2 Chassis
  Intel(R) Xeon(R) CPU E5-2403 v2 @ 1.80GHz with 8154432 kB of
memory.
  Processor Board ID FOC20291J6K

  Device name: cs2
  bootflash: 53298520 kB
  Kernel uptime is 0 day(s), 0 hour(s), 3 minute(s), 42 second(s)
```

```
Last reset at 277524 usecs after Mon Nov  2 22:45:12 2020
```

```
Reason: Reset due to upgrade
```

```
System version: 9.3(4)
```

```
Service:
```

```
plugin
```

```
Core Plugin, Ethernet Plugin
```

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

7. Upgrade the EPLD image and reboot the switch.

Show example



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

EPLD Device	Version
MI FPGA	0x7
IO FPGA	0x17
MI FPGA2	0x2
GEM FPGA	0x2
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.

Show example

```
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

9. Repeat steps 1 to 8 to install the NX-OS software on switch cs1.

What's next?

[Install the Reference Configuration File \(RCF\).](#)

Install or upgrade the Reference Configuration File (RCF)

You install the Reference Configuration File (RCF) after setting up the Nexus 9336C-FX2 switch for the first time. You upgrade your RCF version when you have an existing version of the RCF file installed on your switch.

Suggested documentation

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

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

- [Cisco Nexus 3000 Series Switches](#)

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

About the examples

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

- The names of the two Cisco switches are cs1 and cs2.
- The node names are cluster1-01, cluster1-02, cluster1-03, and cluster1-04.
- The cluster LIF names are cluster1-01_clus1, cluster1-01_clus2, cluster1-02_clus1, cluster1-02_clus2 , cluster1-03_clus1, cluster1-03_clus2, cluster1-04_clus1, and cluster1-04_clus2.

- The `cluster1::*>` prompt indicates the name of the cluster.

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



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

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

Commands used

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

Option 1: Install RCF file on a new switch

You install the Reference Configuration File (RCF) after setting up the Nexus 9336C-FX2 switch for the first time.

Before you begin

Make sure of the following:

- A console connection to the switch. The console connection is optional if you have remote access to the switch.
- Switch cs1 and switch cs2 are powered up and the initial switch setup is complete (the Management IP address and SSH is setup)
- The desired NX-OS version has been installed.
- ISL connections between switches are connected.
- ONTAP node cluster ports are not connected.

Step 1: Install the RCF on the switches

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

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

Show example

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

```
cs1# copy tftp: bootflash: vrf management
Enter source filename: Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt
Enter hostname for the tftp server: 172.22.201.50
Trying to connect to tftp server.....Connection to Server
Established.
TFTP get operation was successful
Copy complete, now saving to disk (please wait)...
```

3. Apply the RCF previously downloaded to the bootflash.

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

Show example

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

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

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

Show example

```
cs1# show banner motd

*****
*****
* NetApp Reference Configuration File (RCF)
*
* Switch      : Nexus N9K-C9336C-FX2
* Filename    : Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt
* Date       : 10-23-2020
* Version    : v1.6
*
* Port Usage:
* Ports 1- 3: Breakout mode (4x10G) Intra-Cluster Ports, int
e1/1/1-4, e1/2/1-4
, e1/3/1-4
* Ports 4- 6: Breakout mode (4x25G) Intra-Cluster/HA Ports, int
e1/4/1-4, e1/5/
1-4, e1/6/1-4
* Ports 7-34: 40/100GbE Intra-Cluster/HA Ports, int e1/7-34
* Ports 35-36: Intra-Cluster ISL Ports, int e1/35-36
*
* Dynamic breakout commands:
* 10G: interface breakout module 1 port <range> map 10g-4x
* 25G: interface breakout module 1 port <range> map 25g-4x
*
* Undo breakout commands and return interfaces to 40/100G
configuration in confi
g mode:
* no interface breakout module 1 port <range> map 10g-4x
* no interface breakout module 1 port <range> map 25g-4x
* interface Ethernet <interfaces taken out of breakout mode>
* inherit port-profile 40-100G
* priority-flow-control mode auto
* service-policy input HA
* exit
*
*****
*****
```

5. Verify that the RCF file is the correct newer version:

```
show running-config
```

When you check the output to verify you have the correct RCF, make sure that the following information is correct:

- The RCF banner
- The node and port settings
- Customizations

The output varies according to your site configuration. Check the port settings and refer to the release notes for any changes specific to the RCF that you have installed.

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

```
copy running-config startup-config
```

Show example

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

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

7. Reboot switch cs1.

```
cs1# reload
```

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

8. Repeat steps 1 through 7 on switch cs2.
9. Connect the cluster ports of all nodes in the ONTAP cluster to switches cs1 and cs2.

Step 2: Verify the switch connections

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

```
show interface brief
```

Show example

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

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

```
show vlan brief
```

```
show interface trunk
```

Show example

```
cs1# show vlan brief
```

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

```

Eth1/28
Eth1/31
Eth1/34
33    VLAN0033          active  Eth1/11, Eth1/12,
Eth1/13
Eth1/16
Eth1/19
Eth1/22
34    VLAN0034          active  Eth1/23, Eth1/24,
Eth1/25
Eth1/28
Eth1/31
Eth1/34

```

```
cs1# show interface trunk
```

```

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

```

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

```

-----
Port                Vlans Allowed on Trunk
-----
Eth1/1              1,17-18
Eth1/2              1,17-18
Eth1/3              1,17-18
Eth1/4              1,17-18
Eth1/5              1,17-18
Eth1/6              1,17-18
Eth1/7              1,17-18
Eth1/8              1,17-18
Eth1/9/1            1,17-18
Eth1/9/2            1,17-18
Eth1/9/3            1,17-18
Eth1/9/4            1,17-18
Eth1/10/1           1,17-18
Eth1/10/2           1,17-18
Eth1/10/3           1,17-18
Eth1/10/4           1,17-18

```

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



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

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

```
show port-channel summary
```

Show example

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

-----
-----
Group Port-          Type          Protocol  Member Ports          Channel
-----
-----
1      Pol (SU)      Eth       LACP       Eth1/35 (P)          Eth1/36 (P)
cs1#
```

Step 3: Set up your ONTAP cluster

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

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

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

Option 2: Upgrade existing switches with a new RCF version

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

Before you begin

Make sure you have the following:

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

If you need to change the boot configuration to reflect the current boot images, you must do so before reapplying the RCF so that the correct version is instantiated on future reboots.



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



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

Step 1: Prepare for the upgrade

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

```
network device-discovery show
```

Show example

```
cluster1::*> network device-discovery show
Node/          Local   Discovered
Protocol       Port   Device (LLDP: ChassisID)  Interface
Platform
-----
cluster1-01/cdp
              e0a    cs1                      Ethernet1/7      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
```

Show example

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

```
Node: cluster1-01
```

```
Ignore
```

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

```
Node: cluster1-02
```

```
Ignore
```

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

8 entries were displayed.

```
Node: cluster1-03
```

```
Ignore
```

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

Node: cluster1-04

Ignore

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

cluster1::*>

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

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

Show example

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

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

Cluster				
	cluster1-01_clus1	up/up	169.254.3.4/23	
cluster1-01	e0a true			
	cluster1-01_clus2	up/up	169.254.3.5/23	
cluster1-01	e0d true			
	cluster1-02_clus1	up/up	169.254.3.8/23	
cluster1-02	e0a true			
	cluster1-02_clus2	up/up	169.254.3.9/23	
cluster1-02	e0d true			
	cluster1-03_clus1	up/up	169.254.1.3/23	
cluster1-03	e0a true			
	cluster1-03_clus2	up/up	169.254.1.1/23	
cluster1-03	e0b true			
	cluster1-04_clus1	up/up	169.254.1.6/23	
cluster1-04	e0a true			
	cluster1-04_clus2	up/up	169.254.1.7/23	
cluster1-04	e0b true			
8 entries were displayed.				
cluster1::*>				

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

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

Show example

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

3. Disable auto-revert on the cluster LIFs.

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

Step 2: Configure ports

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

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

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

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

Show example

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

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

Cluster				
	cluster1-01_clus1	up/up	169.254.3.4/23	
cluster1-01	e0a true			
	cluster1-01_clus2	up/up	169.254.3.5/23	
cluster1-01	e0a false			
	cluster1-02_clus1	up/up	169.254.3.8/23	
cluster1-02	e0a true			
	cluster1-02_clus2	up/up	169.254.3.9/23	
cluster1-02	e0a false			
	cluster1-03_clus1	up/up	169.254.1.3/23	
cluster1-03	e0a true			
	cluster1-03_clus2	up/up	169.254.1.1/23	
cluster1-03	e0a false			
	cluster1-04_clus1	up/up	169.254.1.6/23	
cluster1-04	e0a true			
	cluster1-04_clus2	up/up	169.254.1.7/23	
cluster1-04	e0a false			
8 entries were displayed.				
cluster1::*>				

3. Verify that the cluster is healthy:

```
cluster show
```

Show example

```
cluster1::*> cluster show
Node                Health  Eligibility  Epsilon
-----
cluster1-01         true    true         false
cluster1-02         true    true         false
cluster1-03         true    true         true
cluster1-04         true    true         false
4 entries were displayed.
cluster1::*>
```

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

```
show running-config
```

- Record any custom additions between the current running-config and the RCF file in use (such as an SNMP configuration for your organization).
- For NX-OS 10.2 and newer use the `show diff running-config` command to compare with the saved RCF file in the bootflash. Otherwise, use a third part diff/compare tool.

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

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

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

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

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

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

```
switch# write erase
```

Warning: This command will erase the startup-configuration.

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

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

```
switch# copy write_erase.cfg startup-config
```

8. Perform a reboot of the switch:

```
switch# reload
```


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

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

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

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

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

Show example

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

```
cs1# copy tftp: bootflash: vrf management
Enter source filename: Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt
Enter hostname for the tftp server: 172.22.201.50
Trying to connect to tftp server.....Connection to Server
Established.
TFTP get operation was successful
Copy complete, now saving to disk (please wait)...
```

11. Apply the RCF previously downloaded to the bootflash.

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

Show example

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

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

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

Show example

```
cs1# show banner motd

*****
*****
* NetApp Reference Configuration File (RCF)
*
* Switch      : Nexus N9K-C9336C-FX2
* Filename    : Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt
* Date       : 10-23-2020
* Version    : v1.6
*
* Port Usage:
* Ports 1- 3: Breakout mode (4x10G) Intra-Cluster Ports, int
e1/1/1-4, e1/2/1-4
, e1/3/1-4
* Ports 4- 6: Breakout mode (4x25G) Intra-Cluster/HA Ports, int
e1/4/1-4, e1/5/
1-4, e1/6/1-4
* Ports 7-34: 40/100GbE Intra-Cluster/HA Ports, int e1/7-34
* Ports 35-36: Intra-Cluster ISL Ports, int e1/35-36
*
* Dynamic breakout commands:
* 10G: interface breakout module 1 port <range> map 10g-4x
* 25G: interface breakout module 1 port <range> map 25g-4x
*
* Undo breakout commands and return interfaces to 40/100G
configuration in confi
g mode:
* no interface breakout module 1 port <range> map 10g-4x
* no interface breakout module 1 port <range> map 25g-4x
* interface Ethernet <interfaces taken out of breakout mode>
* inherit port-profile 40-100G
* priority-flow-control mode auto
* service-policy input HA
* exit
*
*****
*****
```

13. 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.

14. Reapply any previously identified custom additions to the switch configuration.
15. After you verify the RCF versions, custom additions, and switch settings are correct, copy the running-config file to the startup-config file.

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

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

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

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

```
cs1# reload
```

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

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

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

Show example

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

```
Node: cluster1-01
```

```
Ignore
```

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

Node: cluster1-04

Ignore

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

8 entries were displayed.

b. Verify the switch health from the cluster.

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

Show example

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

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

```
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.

```

18. Verify that the cluster is healthy:

```
cluster show
```

Show example

```

cluster1::*> cluster show
Node                Health    Eligibility    Epsilon
-----
cluster1-01         true      true           false
cluster1-02         true      true           false
cluster1-03         true      true           true
cluster1-04         true      true           false
4 entries were displayed.
cluster1::*>

```

19. Repeat steps 1 to 18 on switch cs2.

20. Enable auto-revert on the cluster LIFs.

```

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

```

Step 3: Verify the cluster network configuration and cluster health

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

```
show interface brief
```

Show example

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

2. Verify that the expected nodes are still connected:

```
show cdp neighbors
```


Show example

```
cs1# show cdp neighbors
```

Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge

S - Switch, H - Host, I - IGMP, r - Repeater,
V - VoIP-Phone, D - Remotely-Managed-Device,
s - Supports-STP-Dispute

Device-ID Port ID	Local Intrfce	Hldtme	Capability	Platform
node1 e0a	Eth1/1	133	H	FAS2980
node2 e0a	Eth1/2	133	H	FAS2980
cs1 Eth1/35	Eth1/35	175	R S I s	N9K-C9336C
cs1 Eth1/36	Eth1/36	175	R S I s	N9K-C9336C

Total entries displayed: 4

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

```
show vlan brief
```

```
show interface trunk
```

Show example

```
cs1# show vlan brief
```

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

```

Eth1/28
Eth1/31
Eth1/34
33    VLAN0033          active  Eth1/11, Eth1/12,
Eth1/13
Eth1/16
Eth1/19
Eth1/22
34    VLAN0034          active  Eth1/23, Eth1/24,
Eth1/25
Eth1/28
Eth1/31
Eth1/34

```

```
cs1# show interface trunk
```

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

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

Port	Vlans Allowed on Trunk
Eth1/1	1,17-18
Eth1/2	1,17-18
Eth1/3	1,17-18
Eth1/4	1,17-18
Eth1/5	1,17-18
Eth1/6	1,17-18
Eth1/7	1,17-18
Eth1/8	1,17-18
Eth1/9/1	1,17-18
Eth1/9/2	1,17-18
Eth1/9/3	1,17-18
Eth1/9/4	1,17-18
Eth1/10/1	1,17-18
Eth1/10/2	1,17-18
Eth1/10/3	1,17-18
Eth1/10/4	1,17-18

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



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

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

```
show port-channel summary
```

Show example

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

-----
-----
Group Port-          Type      Protocol  Member Ports      Channel
-----
-----
1      Pol (SU)      Eth      LACP      Eth1/35 (P)      Eth1/36 (P)
cs1#
```

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

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

Show example

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

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

Cluster				
	cluster1-01_clus1	up/up	169.254.3.4/23	
cluster1-01	e0d	true		
	cluster1-01_clus2	up/up	169.254.3.5/23	
cluster1-01	e0d	true		
	cluster1-02_clus1	up/up	169.254.3.8/23	
cluster1-02	e0d	true		
	cluster1-02_clus2	up/up	169.254.3.9/23	
cluster1-02	e0d	true		
	cluster1-03_clus1	up/up	169.254.1.3/23	
cluster1-03	e0b	true		
	cluster1-03_clus2	up/up	169.254.1.1/23	
cluster1-03	e0b	true		
	cluster1-04_clus1	up/up	169.254.1.6/23	
cluster1-04	e0b	true		
	cluster1-04_clus2	up/up	169.254.1.7/23	
cluster1-04	e0b	true		
8 entries were displayed.				
cluster1::*>				

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

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

6. Verify that the cluster is healthy:

```
cluster show
```

Show example

```
cluster1::*> cluster show
Node           Health Eligibility Epsilon
-----
cluster1-01    true   true      false
cluster1-02    true   true      false
cluster1-03    true   true      true
cluster1-04    true   true      false
4 entries were displayed.
cluster1::*>
```

7. Ping the remote cluster interfaces to verify connectivity:

```
cluster ping-cluster -node local
```


Show example

```
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)
```

Enable SSH on Cisco 9336C-FX2 cluster switches

If you are using the Cluster Switch Health Monitor (CSHM) and log collection features,

you must generate the SSH keys and then enable SSH on the cluster switches.

Steps

1. Verify that SSH is disabled:

```
show ip ssh
```

Show example

```
(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
SSH Public Key Authentication Mode: ..... Disabled
SCP server Administrative Mode: ..... Disabled
```

2. Generate the SSH keys:

```
crypto key generate
```

Show example

```
(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 scp server enable
(switch)# ip ssh pubkey-auth
(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!
```

3. Reboot the switch:

```
reload
```

4. Verify that SSH is enabled:

```
show ip ssh
```

Show example

```
(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
SSH Public Key Authentication Mode: ..... Enabled
SCP server Administrative Mode: ..... Enabled
```

What's next?

[Enable log collection.](#)

Ethernet Switch Health Monitoring log collection

You can use the log collection feature to collect switch-related log files in ONTAP. The Ethernet switch health monitor (CSHM) is responsible for ensuring the operational health of Cluster and Storage network switches and collecting switch logs for debugging purposes. This procedure guides you through the process of setting up and starting the collection of detailed **Support** logs from the switch and starts an hourly collection of **Periodic** data that is collected by AutoSupport.

Before you begin

- Verify that you have set up your environment using the 9336C-FX2 cluster switch **CLI**.
- Switch health monitoring must be enabled for the switch. Verify this by ensuring the `Is Monitored:` field is set to **true** in the output of the `system switch ethernet show` command.

Steps

1. Create a password for the Ethernet switch health monitor log collection feature:

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

Show example

```
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
Would you like to specify a user other than admin for log
collection? {y|n}: n

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
Would you like to specify a user other than admin for log
collection? {y|n}: n

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

2. To start log collection, run the following command, replacing **DEVICE** with the switch used in the previous command. This starts both types of log collection: the detailed **Support** logs and an hourly collection of **Periodic** data.

```
system switch ethernet log modify -device <switch-name> -log-request true
```

Show example

```
cluster1::*> system switch ethernet log modify -device cs1 -log  
-request true
```

```
Do you want to modify the cluster switch log collection  
configuration? {y|n}: [n] y
```

```
Enabling cluster switch log collection.
```

```
cluster1::*> system switch ethernet log modify -device cs2 -log  
-request true
```

```
Do you want to modify the cluster switch log collection  
configuration? {y|n}: [n] y
```

```
Enabling cluster switch log collection.
```

Wait for 10 minutes and then check that the log collection completes:

```
system switch ethernet log show
```



If any of these commands return an error or if the log collection does not complete, contact NetApp support.

Troubleshooting

If you encounter any of the following error statuses reported by the log collection feature (visible in the output of `system switch ethernet log show`), try the corresponding debug steps:

Log collection error status	Resolution
RSA keys not present	Regenerate ONTAP SSH keys. Contact NetApp support.
switch password error	Verify credentials, test SSH connectivity, and regenerate ONTAP SSH keys. Review the switch documentation or contact NetApp support for instructions.
ECDSA keys not present for FIPS	If FIPS mode is enabled, ECDSA keys need to be generated on the switch before retrying.
pre-existing log found	Remove the previous log collection file on the switch.

switch dump log error	Ensure the switch user has log collection permissions. Refer to the prerequisites above.
------------------------------	--

Configure SNMPv3

Follow this procedure to configure SNMPv3, which supports Ethernet switch health monitoring (CSHM).

About this task

The following commands configure an SNMPv3 username on Cisco 9336C-FX2 switches:

- For **no authentication**: `snmp-server user SNMPv3_USER NoAuth`
- For **MD5/SHA authentication**: `snmp-server user SNMPv3_USER auth [md5|sha] AUTH-PASSWORD`
- For **MD5/SHA authentication with AES/DES encryption**: `snmp-server user SNMPv3_USER AuthEncrypt auth [md5|sha] AUTH-PASSWORD priv aes-128 PRIV-PASSWORD`

The following command configures an SNMPv3 username on the ONTAP side: `cluster1::*> security login create -user-or-group-name SNMPv3_USER -application snmp -authentication -method usm -remote-switch-ipaddress ADDRESS`

The following command establishes the SNMPv3 username with CSHM: `cluster1::*> system switch ethernet modify -device DEVICE -snmp-version SNMPv3 -community-or-username SNMPv3_USER`

Steps

1. Set up the SNMPv3 user on the switch to use authentication and encryption:

```
show snmp user
```

Show example

```
(sw1) (Config)# snmp-server user SNMPv3User auth md5 <auth_password>
priv aes-128 <priv_password>

(sw1) (Config)# show snmp user

-----
-----
                        SNMP USERS
-----
-----

User                Auth                Priv(enforce)    Groups
acl_filter
-----
-----
admin               md5                des(no)          network-admin
SNMPv3User          md5                aes-128(no)      network-operator
-----
-----
NOTIFICATION TARGET USERS (configured for sending V3 Inform)
-----
-----

User                Auth                Priv
-----
-----

(sw1) (Config)#
```

2. Set up the SNMPv3 user on the ONTAP side:

```
security login create -user-or-group-name <username> -application snmp
-authentication-method usm -remote-switch-ipaddress 10.231.80.212
```


Show example

```
cluster1::*> system switch ethernet modify -device "sw1
(b8:59:9f:09:7c:22)" -is-monitoring-enabled-admin true

cluster1::*> security login create -user-or-group-name <username>
-application snmp -authentication-method usm -remote-switch
-ipaddress 10.231.80.212

Enter the authoritative entity's EngineID [remote EngineID]:

Which authentication protocol do you want to choose (none, md5, sha,
sha2-256)
[none]: md5

Enter the authentication protocol password (minimum 8 characters
long):

Enter the authentication protocol password again:

Which privacy protocol do you want to choose (none, des, aes128)
[none]: aes128

Enter privacy protocol password (minimum 8 characters long):
Enter privacy protocol password again:
```

3. Configure CSHM to monitor with the new SNMPv3 user:

```
system switch ethernet show-all -device "sw1" -instance
```

Show example

```
cluster1::*> system switch ethernet show-all -device "sw1" -instance

Device Name: sw1
IP Address: 10.231.80.212
SNMP Version: SNMPv2c
Is Discovered: true
SNMPv2c Community String or SNMPv3 Username: cshml!
Model Number: N9K-C9336C-FX2
Switch Network: cluster-network
Software Version: Cisco Nexus
Operating System (NX-OS) Software, Version 9.3(7)
Reason For Not Monitoring: None <---- displays
when SNMP settings are valid
Source Of Switch Version: CDP/ISDP
Is Monitored ?: true
Serial Number of the Device: QTFCU3826001C
RCF Version: v1.8X2 for

Cluster/HA/RDMA

cluster1::*>
cluster1::*> system switch ethernet modify -device "sw1" -snmp
-version SNMPv3 -community-or-username <username>
cluster1::*>
```

4. Verify that the serial number to be queried with the newly created SNMPv3 user is the same as detailed in the previous step after the CSHM polling period has completed.

```
system switch ethernet polling-interval show
```

Show example

```
cluster1::*> system switch ethernet polling-interval show
Polling Interval (in minutes): 5

cluster1::*> system switch ethernet show-all -device "sw1" -instance

Device Name: sw1
IP Address: 10.231.80.212
SNMP Version: SNMPv3
Is Discovered: true
SNMPv2c Community String or SNMPv3 Username: SNMPv3User
Model Number: N9K-C9336C-FX2
Switch Network: cluster-network
Software Version: Cisco Nexus
Operating System (NX-OS) Software, Version 9.3(7)
Reason For Not Monitoring: None <---- displays
when SNMP settings are valid
Source Of Switch Version: CDP/ISDP
Is Monitored?: true
Serial Number of the Device: QTFCU3826001C
RCF Version: v1.8X2 for

Cluster/HA/RDMA

cluster1::*>
```

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