Cisco Nexus 3232C

Install and maintain

NetApp
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Cisco Nexus 3232C

Get started

Installation and setup workflow for Cisco Nexus 3232C switches

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

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

1 **Configuration requirements**

Review the configuration requirements for the 3232C cluster switch.

2 **Required documentation**

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

3 **Smart Call Home requirements**

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

4 **Install the hardware**

Install the switch hardware.

5 **Configure the software**

Configure the switch software.

Configuration requirements for Cisco Nexus 3232C switches

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

Configuration requirements

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

Network requirements

You need the following network information for all switch configurations:

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

Refer to the Hardware Universe for latest information. See What additional information do I need to install my equipment that is not in HWU? for more information about switch installation requirements.

What's next

After you've confirmed your configuration requirements, you can review the required documentation.

Documentation requirements for Cisco Nexus 3232C switches

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

Switch documentation

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

Document title	Description
Nexus 3000 Series Hardware Installation Guide	Provides detailed information about site requirements, switch hardware details, and installation options.
Cisco Nexus 3000 Series Switch Software Configuration Guides (choose the guide for the NX-OS release installed on your switches)	Provides initial switch configuration information that you need before you can configure the switch for ONTAP operation.
Cisco Nexus 3000 Series NX-OS Software Upgrade and Downgrade Guide (choose the guide for the NX-OS release installed on your switches)	Provides information on how to downgrade the switch to ONTAP supported switch software, if necessary.
Cisco Nexus 3000 Series NX-OS Command Reference Master Index	Provides links to the various command references provided by Cisco.
Cisco Nexus 3000 MIBs Reference	Describes the Management Information Base (MIB) files for the Nexus 3000 switches.
Nexus 3000 Series NX-OS System Message Reference	Describes the system messages for Cisco Nexus 3000 series switches, those that are informational, and others that might help diagnose problems with links, internal hardware, or the system software.

Document title	Description
Cisco Nexus 3000 Series NX-OS Release Notes (choose the notes for the NX-OS release installed on your switches)	Describes the features, bugs, and limitations for the Cisco Nexus 3000 Series.
Regulatory, Compliance, and Safety Information for the Cisco Nexus 6000, Cisco Nexus 5000 Series, Cisco Nexus 3000 Series, and Cisco Nexus 2000 Series	Provides international agency compliance, safety, and statutory information for the Nexus 3000 series switches.

ONTAP systems documentation

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

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

Rail kit and cabinet documentation

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

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

Smart Call Home requirements

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

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

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

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

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

The Cisco support site contains information about the commands to configure Smart Call Home.

Install hardware

Hardware install workflow for Cisco Nexus 3232C switches

To install and configure the hardware for a 3232C cluster switch, follow these steps:

1 **Complete the cabling worksheet**

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

2 **Install the switch**

Install the 3232C switch.

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

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

4 **Review cabling and configuration**

Review support for NVIDIA Ethernet ports.

Complete Cisco Nexus 3232C cabling worksheet

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

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

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

Sample cabling worksheet

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

Cluster switch A		**Cluster switch B**	
Switch port	Node and port usage	Switch port	Node and port usage
1	4x10GbE/4x25GbE or 40/100GbE node	1	4x10GbE/4x25GbE or 40/100GbE node
2	4x10GbE/4x25GbE or 40/100GbE node	2	4x10GbE/4x25GbE or 40/100GbE node
3	4x10GbE/4x25GbE or 40/100GbE node	3	4x10GbE/4x25GbE or 40/100GbE node
4	4x10GbE/4x25GbE or 40/100GbE node	4	4x10GbE/4x25GbE or 40/100GbE node
5	4x10GbE/4x25GbE or 40/100GbE node	5	4x10GbE/4x25GbE or 40/100GbE node
6	4x10GbE/4x25GbE or 40/100GbE node	6	4x10GbE/4x25GbE or 40/100GbE node
7	4x10GbE/4x25GbE or 40/100GbE node	7	4x10GbE/4x25GbE or 40/100GbE node
8	4x10GbE/4x25GbE or 40/100GbE node	8	4x10GbE/4x25GbE or 40/100GbE node
9	4x10GbE/4x25GbE or 40/100GbE node	9	4x10GbE/4x25GbE or 40/100GbE node
10	4x10GbE/4x25GbE or 40/100GbE node	10	4x10GbE/4x25GbE or 40/100GbE node
11	4x10GbE/4x25GbE or 40/100GbE node	11	4x10GbE/4x25GbE or 40/100GbE node
12	4x10GbE/4x25GbE or 40/100GbE node	12	4x10GbE/4x25GbE or 40/100GbE node
13	4x10GbE/4x25GbE or 40/100GbE node	13	4x10GbE/4x25GbE or 40/100GbE node
14	4x10GbE/4x25GbE or 40/100GbE node	14	4x10GbE/4x25GbE or 40/100GbE node

Cluster switch A		Cluster switch B	
15	4x10GbE/4x25GbE or 40/100GbE node	15	4x10GbE/4x25GbE or 40/100GbE node
16	4x10GbE/4x25GbE or 40/100GbE node	16	4x10GbE/4x25GbE or 40/100GbE node
17	4x10GbE/4x25GbE or 40/100GbE node	17	4x10GbE/4x25GbE or 40/100GbE node
18	4x10GbE/4x25GbE or 40/100GbE node	18	4x10GbE/4x25GbE or 40/100GbE node
19	40G/100GbE node 19	19	40G/100GbE node 19
20	40G/100GbE node 20	20	40G/100GbE node 20
21	40G/100GbE node 21	21	40G/100GbE node 21
22	40G/100GbE node 22	22	40G/100GbE node 22
23	40G/100GbE node 23	23	40G/100GbE node 23
24	40G/100GbE node 24	24	40G/100GbE node 24
25 through 30	Reserved	25 through 30	Reserved
31	100GbE ISL to switch B port 31	31	100GbE ISL to switch A port 31
32	100GbE ISL to switch B port 32	32	100GbE ISL to switch A port 32

Blank cabling worksheet

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

Cluster switch A		Cluster switch B	
Switch port	Node/port usage	Switch port	Node/port usage
1		1	
2		2	

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

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

What's next

After you've completed your cabling worksheets, you can install the switch.

Install the 3232C cluster switch

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

Before you begin

Make sure you have the following:

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

Steps

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

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

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

What's next?

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

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

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

Before you begin

- The initial preparation requirements, kit contents, and safety precautions in the Cisco Nexus 3000 Series Hardware Installation Guide.
- For each switch, the eight 10-32 or 12-24 screws and clip nuts to mount the brackets and slider rails to the front and rear cabinet posts.
- Cisco standard rail kit to install the switch in a NetApp cabinet.

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

Steps

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

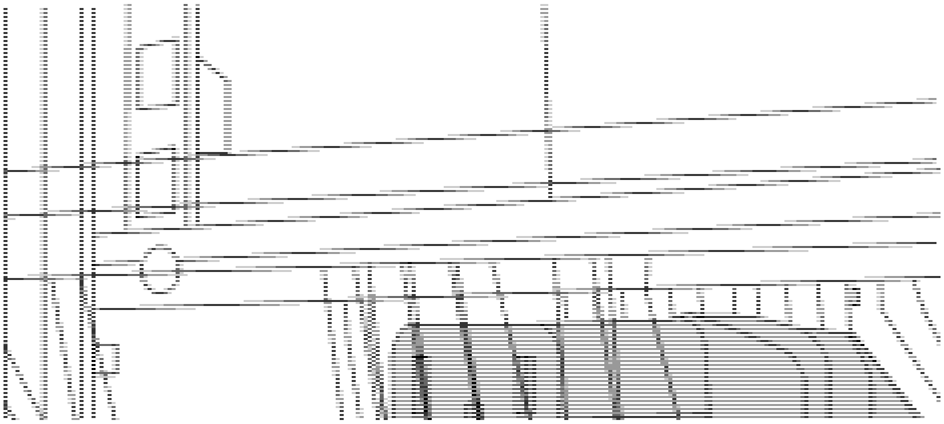
   The pass-through panel kit is available from NetApp (part number X8784-R6).

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

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

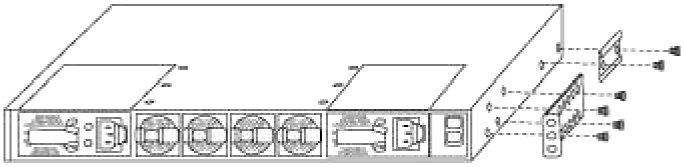
        In this procedure, the blanking panel will be installed in U40.

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

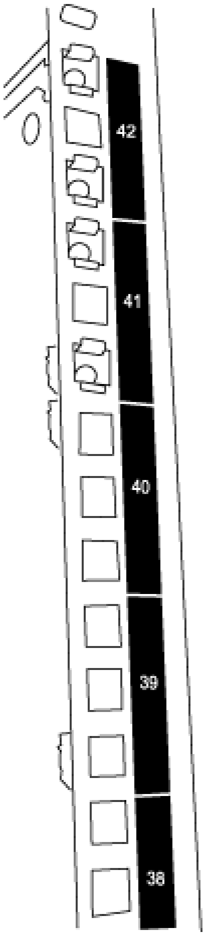


(1) Female connector of the jumper cord.

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



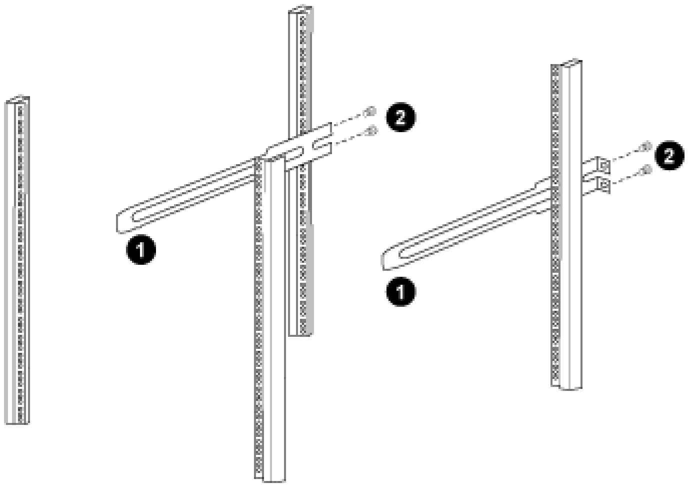
    b. Repeat step 2a with the other front rack-mount bracket on the other side of the switch.
    c. Install the rear rack-mount bracket on the switch chassis.
    d. Repeat step 2c with the other rear rack-mount bracket on the other side of the switch.
2. Install the clip nuts in the square hole locations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



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

3. Install the slider rails in the cabinet.

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



(1) As you gently slide the slider rail, align it to the screw holes in the rack.
(2) Tighten the screws of the slider rails to the cabinet posts.

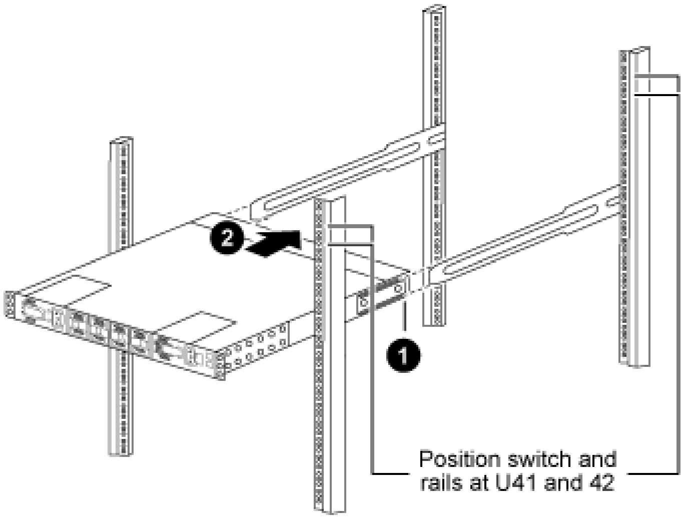
   b. Repeat step 4a for the right side rear post.

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

4. Install the switch in the cabinet.

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

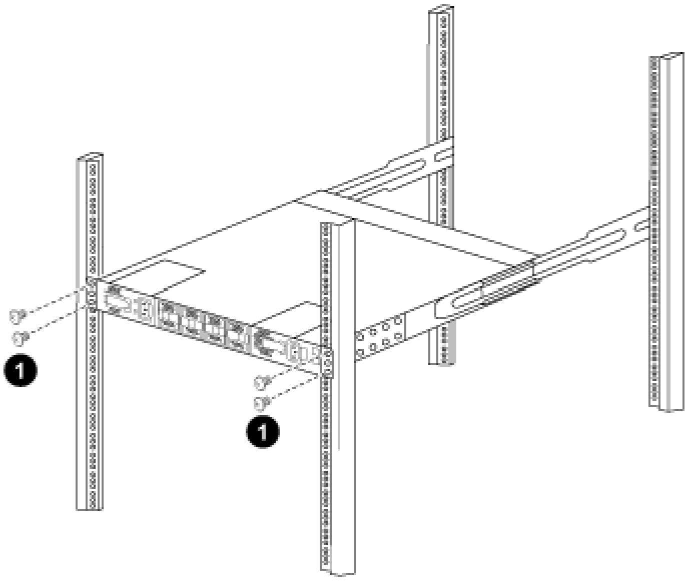
a. Position the back of the switch at RU41.



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

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

b. Attach the switch to the cabinet.



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

c. With the chassis now supported without assistance, fully tighten the front screws to the posts.

d. Repeat steps 5a through 5c for the second switch at the RU42 location.

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

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

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

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

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

Review cabling and configuration considerations

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

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

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

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

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

Configure software

Software install workflow for Cisco Nexus 3232C cluster switches

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

1 Configure the switch

Configure the 3232C cluster switch.

2 Prepare to install the NX-OS software and RCF

The Cisco NX-OS software and reference configuration files (RCFs) must be installed on Cisco 3232C cluster switches.

3 Install or upgrade the NX-OS software

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

4 Install the RCF

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

5 Verify SSH configuration

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

6 Reset the switch to factory defaults

Erase the 3232C cluster switch settings.

Configure the 3232C cluster switch

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

Before you begin

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

  See Required documentation for more information.
- Required controller documentation and ONTAP documentation.

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

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

Steps

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

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

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

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

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

Prompt	Response
Continue with Out-of-band (mgmt0) management configuration? (yes/no)	Respond with **yes** (the default) at that prompt. At the mgmt0 IPv4 address: prompt, enter your IP address: ip_address.
Configure the default-gateway? (yes/no)	Respond with **yes**. At the IPv4 address of the default-gateway: prompt, enter your default_gateway.
Configure advanced IP options? (yes/no)	Respond with **no**. The default is no.
Enable the telnet service? (yes/no)	Respond with **no**. The default is no.
Enabled SSH service? (yes/no)	Respond with **yes**. The default is yes. SSH is recommended when using Ethernet Switch Health Monitor (CSHM) for its log collection features. SSHv2 is also recommended for enhanced security.
Enter the type of SSH key you want to generate (dsa/rsa/rsa1).	The default is **rsa**.
Enter the number of key bits (1024-2048).	Enter the number of key bits from 1024-2048.
Configure the NTP server? (yes/no)	Respond with **no**. The default is no.
Configure default interface layer (L3/L2):	Respond with **L2**. The default is L2.
Configure default switch port interface state (shut/noshut):	Respond with **noshut**. The default is noshut.
Configure CoPP system profile (strict/moderate/lenient/dense):	Respond with **strict**. The default is strict.
Would you like to edit the configuration? (yes/no)	You should see the new configuration at this point. Review and make any necessary changes to the configuration you just entered. Respond with **no** at the prompt if you are satisfied with the configuration. Respond with **yes** if you want to edit your configuration settings.

Prompt	Response
Use this configuration and save it? (yes/no)	Respond with **yes** to save the configuration. This automatically updates the kickstart and system images. ⓘ If you do not save the configuration at this stage, none of the changes will be in effect the next time you reboot the switch.

5. Verify the configuration choices you made in the display that appears at the end of the setup, and make sure that you save the configuration.
6. Check the version on the cluster network switches, and if necessary, download the NetApp-supported version of the software to the switches from the Cisco software download page.

What's next?

After you've configured your switches, you can prepare to install the NX-OS and RCF.

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

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

About the examples

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

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

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

Switch and node nomenclature

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

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

About this task

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

Steps

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

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

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

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

   ```
   set -privilege advanced
   ```

   The advanced prompt (`*>`) appears.

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

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

   Show example

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

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

   4 entries were displayed.
   ```

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

   a. Display the network port attributes:

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

Show example

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

Node: cluster1-02
                                                  Speed(Mbps)
Health
Port      IPspace      Broadcast Domain Link MTU   Admin/Oper
Status
--------- ------------ ---------------- ---- ---- -----------
------
e0a       Cluster      Cluster          up   9000  auto/10000
healthy
e0b       Cluster      Cluster          up   9000  auto/10000
healthy

Node: cluster1-01
                                                  Speed(Mbps)
Health
Port      IPspace      Broadcast Domain Link MTU   Admin/Oper
Status
--------- ------------ ---------------- ---- ---- -----------
------
e0a       Cluster      Cluster          up   9000  auto/10000
healthy
e0b       Cluster      Cluster          up   9000  auto/10000
healthy

4 entries were displayed.
```

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

Show example

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

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

4 entries were displayed.
```

5. Verify the connectivity of the remote cluster interfaces:

ONTAP 9.9.1 and later

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

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

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

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

```
cluster1::*> network interface check cluster-connectivity show
                                  Source              Destination
Packet
Node   Date                       LIF                 LIF
Loss
------ -------------------------- -------------------
------------------- -----------
cluster1-01
       3/5/2022 19:21:18 -06:00   cluster1-01_clus2   cluster1-02_clus1
none
       3/5/2022 19:21:20 -06:00   cluster1-01_clus2   cluster1-02_clus2
none
.
.
cluster1-02
       3/5/2022 19:21:18 -06:00   cluster1-02_clus2   cluster1-01_clus1
none
       3/5/2022 19:21:20 -06:00   cluster1-02_clus2   cluster1-01_clus2
none
```

All ONTAP releases

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

`cluster ping-cluster -node <name>`

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

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

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

What’s next?

After you’ve prepared to install the NX-OS software and RCF, you can install the NX-OS software.

Install the NX-OS software

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

Review requirements

Before you begin

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

Install the software

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

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

Steps

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

   Show example

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

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

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

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

   ```
   network device-discovery show
   ```

Show example

```
cluster1::*> network device-discovery show
Node/        Local  Discovered
Protocol     Port   Device (LLDP: ChassisID)  Interface
Platform
----------- ------ ------------------------- ----------------
----------
cluster1-01/cdp
             e0a    cs1                       Ethernet1/7       N3K-
C3232C
             e0d    cs2                       Ethernet1/7       N3K-
C3232C
cluster1-02/cdp
             e0a    cs1                       Ethernet1/8       N3K-
C3232C
             e0d    cs2                       Ethernet1/8       N3K-
C3232C
cluster1-03/cdp
             e0a    cs1                       Ethernet1/1/1     N3K-
C3232C
             e0b    cs2                       Ethernet1/1/1     N3K-
C3232C
cluster1-04/cdp
             e0a    cs1                       Ethernet1/1/2     N3K-
C3232C
             e0b    cs2                       Ethernet1/1/2     N3K-
C3232C
cluster1::*>
```

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

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

Show example

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

Node: cluster1-01

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

Node: cluster1-02

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

Node: cluster1-03

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

```
Node: cluster1-04

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

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

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

Show example

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

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

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

Show example

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

cs2                         cluster-network    10.233.205.91
N3K-C3232C
     Serial Number: FOCXXXXXXGS
      Is Monitored: true
            Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                    9.3(5)
    Version Source: CDP
cluster1::*>
```

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

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

6. Copy the NX-OS software and EPLD images to the Nexus 3232C switch.

Show example

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

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


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

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

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

```
show version
```

Show example

```
cs2# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
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http://opensource.org/licenses/gpl-3.0.html and
http://www.opensource.org/licenses/lgpl-2.1.php and
http://www.gnu.org/licenses/old-licenses/library.txt.

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

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

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

Last reset at 74117 usecs after Tue Nov 24 06:24:23 2020
  Reason: Reset Requested by CLI command reload
  System version: 9.3(3)
  Service:

plugin
  Core Plugin, Ethernet Plugin

Active Package(s):

cs2#
```

8. Install the NX-OS image.

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

Show example

```
cs2# install all nxos bootflash:nxos.9.3.4.bin
Installer will perform compatibility check first. Please wait.
Installer is forced disruptive

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

Verifying image type.
[] 100% -- SUCCESS

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

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

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

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



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



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



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

```
Install is in progress, please wait.

Performing runtime checks.
[] 100% -- SUCCESS

Setting boot variables.
[] 100% -- SUCCESS

Performing configuration copy.
[] 100% -- SUCCESS

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


Finishing the upgrade, switch will reboot in 10 seconds.
cs2#
```

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

```
show version
```

Show example

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

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

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

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

Last reset at 196755 usecs after Tue Nov 24 06:37:36 2020
  Reason: Reset due to upgrade
  System version: 9.3(3)
  Service:

plugin
  Core Plugin, Ethernet Plugin

Active Package(s):

cs2#
```

10. Upgrade the EPLD image and reboot the switch.

Show example

```
cs2# show version module 1 epld

EPLD Device                     Version
---------------------------------------
MI   FPGA                       0x12
IO   FPGA                       0x11

cs2# install epld bootflash:n9000-epld.9.3.4.img module 1
Compatibility check:
Module        Type         Upgradable    Impact      Reason
------  -----------------  ----------    ----------
-----------------
     1         SUP         Yes           Disruptive  Module
Upgradable

Retrieving EPLD versions.... Please wait.
Images will be upgraded according to following table:
Module  Type   EPLD              Running-Version   New-Version  Upg-
Required
------  ----  -----------------  ---------------   -----------
------------
     1   SUP   MI FPGA                0x12         0x12         No
     1   SUP   IO FPGA                0x11         0x12         Yes
The above modules require upgrade.
The switch will be reloaded at the end of the upgrade
Do you want to continue (y/n) ?  [n] y

Proceeding to upgrade Modules.

Starting Module 1 EPLD Upgrade

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

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

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

See EPLD Upgrade Release Notes, Release 9.3(11) for further details.

Show example

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

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

Proceeding to upgrade Modules.

 Starting Module 1 EPLD Upgrade

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

EPLDs upgraded.

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

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

Show example

```
cs2# show version module 1 epld

EPLD Device                     Version
---------------------------------------
MI   FPGA                        0x12
IO   FPGA                        0x12
```

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

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

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

Show example

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

Node: cluster1-01

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

Node: cluster1-02

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

Node: cluster1-03

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

```
Node: cluster1-04

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

b. Verify the switch health from the cluster.

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

Show example

```
cluster1::*> network device-discovery show -protocol cdp
Node/       Local  Discovered
Protocol    Port   Device (LLDP: ChassisID)  Interface
Platform
----------- ------ ------------------------- -----------------
----------
cluster1-01/cdp
            e0a    cs1                       Ethernet1/7
N3K-C3232C
            e0d    cs2                       Ethernet1/7
N3K-C3232C
cluster01-2/cdp
            e0a    cs1                       Ethernet1/8
N3K-C3232C
            e0d    cs2                       Ethernet1/8
N3K-C3232C
cluster01-3/cdp
            e0a    cs1                       Ethernet1/1/1
N3K-C3232C
            e0b    cs2                       Ethernet1/1/1
N3K-C3232C
cluster1-04/cdp
            e0a    cs1                       Ethernet1/1/2
N3K-C3232C
            e0b    cs2                       Ethernet1/1/2
N3K-C3232C

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

cs2                         cluster-network    10.233.205.91
```

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

2 entries were displayed.
```

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

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

14. Verify that the cluster is healthy:

    ```
    cluster show
    ```

    Show example

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

15. Repeat steps 6 to 14 on switch cs1.
16. Enable auto-revert on the cluster LIFs.

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

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

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

Show example

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

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

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

What's next?

After you've installed the NX-OS software, you can install or upgrade the Reference Configuration File (RCF).

Install or upgrade the RCF

Install or upgrade the Reference Configuration File (RCF) overview

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

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

Available RCF configurations

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

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

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

Available RCFs

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

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

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

Suggested documentation

- Cisco Ethernet Switches (NSS)

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

- Cisco Nexus 3000 Series Switches

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

About the examples

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

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

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

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

For details of the available RCF configurations, see Software install workflow.

Commands used

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

What's next?

After you've reviewed the install RCF or upgrade RCF procedure overview, you can install the RCF or upgrade your RCF as required.

Install the Reference Configuration File (RCF)

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

Before you begin

Verify the following installations and connections:

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

About this task

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

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

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

Step 1: Install the RCF on the switches

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

   Show example

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

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

3. Apply the RCF previously downloaded to the bootflash.

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

Show example

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

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

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

4. Examine the banner output from the `show banner motd` command. You must read and follow the instructions under **Important Notes** to make sure the proper configuration and operation of the switch.
5. Verify that the RCF file is the correct newer version:

   ```
   show running-config
   ```

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

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

     The output varies according to your site configuration. Check the port settings and refer to the release notes for any changes specific to the RCF that you have installed.
6. Reapply any previous customizations to the switch configuration. Refer to Review cabling and configuration considerations for details of any further changes required.
7. Save basic configuration details to the `write_erase.cfg` file on the bootflash.

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

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

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

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

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

   ```
   cs2# show run | section "interface mgmt0" >> bootflash:write_erase.cfg
   ```
8. When installing RCF version 1.12 and later, run the following commands:

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

```
bootflash:write_erase.cfg

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

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

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

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

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

    ```
    cs2# write erase

    Warning: This command will erase the startup-configuration.

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

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

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

12. Reboot switch cs2:

    ```
    cs2# reload

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

13. Repeat Steps 1 to 12 on switch cs1.
14. Connect the cluster ports of all nodes in the ONTAP cluster to switches cs1 and cs2.

Step: 2: Verify the switch connections

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

   ```
   show interface brief | grep up
   ```

Show example

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

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

```
show port-channel summary
```

Show example

```
cs1# show port-channel summary
Flags:  D - Down         P - Up in port-channel (members)
        I - Individual  H - Hot-standby (LACP only)
        s - Suspended    r - Module-removed
        b - BFD Session Wait
        S - Switched     R - Routed
        U - Up (port-channel)
        p - Up in delay-lacp mode (member)
        M - Not in use. Min-links not met
--------------------------------------------------------------------
------------
Group Port-       Type     Protocol  Member Ports
      Channel
--------------------------------------------------------------------
------------
1     Po1(SU)     Eth      LACP      Eth1/31(P)   Eth1/32(P)
cs1#
```

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

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

Show example

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

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

4. Verify that the cluster is healthy:

   ```
   cluster show
   ```

Show example

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

Step 3: Setup your ONTAP cluster

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

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

Refer to Configure ONTAP on a new cluster with System Manager for setup instructions.

What’s next?

After you’ve installed the RCF, you can verify the SSH configuration.

Upgrade your Reference Configuration File (RCF)

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

Before you begin

Make sure you have the following:

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

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

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

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

Step 1: Prepare for the upgrade

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

   ```
   network device-discovery show
   ```

   Show example

   ```
   cluster1::*> network device-discovery show
   Node/       Local  Discovered
   Protocol    Port   Device (LLDP: ChassisID)  Interface
   Platform
   ----------- ------ ------------------------- ----------------
   --------
   cluster1-01/cdp
               e0a    cs1                       Ethernet1/7       N3K-
   C3232C
               e0d    cs2                       Ethernet1/7       N3K-
   C3232C
   cluster1-02/cdp
               e0a    cs1                       Ethernet1/8       N3K-
   C3232C
               e0d    cs2                       Ethernet1/8       N3K-
   C3232C
   cluster1-03/cdp
               e0a    cs1                       Ethernet1/1/1     N3K-
   C3232C
               e0b    cs2                       Ethernet1/1/1     N3K-
   C3232C
   cluster1-04/cdp
               e0a    cs1                       Ethernet1/1/2     N3K-
   C3232C
               e0b    cs2                       Ethernet1/1/2     N3K-
   C3232C
   cluster1::*>
   ```

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

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

      ```
      network port show –role cluster
      ```

Show example

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

Ignore
                                                  Speed(Mbps)
Health   Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper
Status   Status
--------- ------------ ---------------- ---- ---- -----------
-------- ------
e0a       Cluster      Cluster          up   9000  auto/100000
healthy false
e0d       Cluster      Cluster          up   9000  auto/100000
healthy false
Node: cluster1-02

Ignore
                                                  Speed(Mbps)
Health   Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper
Status   Status
--------- ------------ ---------------- ---- ---- -----------
-------- ------
e0a       Cluster      Cluster          up   9000  auto/100000
healthy false
e0d       Cluster      Cluster          up   9000  auto/100000
healthy false
8 entries were displayed.
Node: cluster1-03
   Ignore
                                                  Speed(Mbps)
Health   Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper
Status   Status
--------- ------------ ---------------- ---- ---- -----------
-------- ------
e0a       Cluster      Cluster          up   9000  auto/10000
healthy  false
e0b       Cluster      Cluster          up   9000  auto/10000
healthy  false
Node: cluster1-04

Ignore
                                                  Speed(Mbps)
```

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

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

`network interface show -role cluster`

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    10.233.205.92
NX3232C
     Serial Number: FOXXXXXXXGS
      Is Monitored: true
            Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                    9.3(4)
    Version Source: CDP
cs2                         cluster-network    10.233.205.93
NX3232C
     Serial Number: FOXXXXXXXGD
      Is Monitored: true
            Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                    9.3(4)
    Version Source: CDP
2 entries were displayed.
```

3. Disable auto-revert on the cluster LIFs.

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

Step 2: Configure ports

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

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

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

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

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

Show example

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

   ```
   cs2# write erase

   Warning: This command will erase the startup-configuration.

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

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

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

11. Reboot the switch cs2:

    ```
    cs2# reload

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

12. 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.

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

    Show example

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

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

14. Apply the RCF previously downloaded to the bootflash.

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

Show example

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

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

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

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

    `show running-config`

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

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

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

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

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

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

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

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

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

    a. Verify that e0d ports are up and healthy across all nodes in the cluster:

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

Show example

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

Ignore
                                                  Speed(Mbps)
Health   Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper
Status   Status
--------- ------------ ---------------- ---- ---- -----------
-------- ------
e0a       Cluster      Cluster          up   9000  auto/10000
healthy  false
e0b       Cluster      Cluster          up   9000  auto/10000
healthy  false
Node: cluster1-02

Ignore
                                                  Speed(Mbps)
Health   Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper
Status   Status
--------- ------------ ---------------- ---- ---- -----------
-------- ------
e0a       Cluster      Cluster          up   9000  auto/10000
healthy  false
e0b       Cluster      Cluster          up   9000  auto/10000
healthy  false
Node: cluster1-03

Ignore
                                                  Speed(Mbps)
Health   Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper
Status   Status
--------- ------------ ---------------- ---- ---- -----------
-------- ------
e0a       Cluster      Cluster          up   9000  auto/100000
healthy false
e0d       Cluster      Cluster          up   9000  auto/100000
healthy false
Node: cluster1-04

Ignore
                                                  Speed(Mbps)
```

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

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

Show example

```
cluster1::*> network device-discovery show -protocol cdp
Node/       Local  Discovered
Protocol    Port   Device (LLDP: ChassisID)  Interface
Platform
----------- ------ ------------------------- -----------------
--------
cluster1-01/cdp
            e0a    cs1                       Ethernet1/7
N3K-C3232C
            e0d    cs2                       Ethernet1/7
N3K-C3232C
cluster01-2/cdp
            e0a    cs1                       Ethernet1/8
N3K-C3232C
            e0d    cs2                       Ethernet1/8
N3K-C3232C
cluster01-3/cdp
            e0a    cs1                       Ethernet1/1/1
N3K-C3232C
            e0b    cs2                       Ethernet1/1/1
N3K-C3232C
cluster1-04/cdp
            e0a    cs1                       Ethernet1/1/2
N3K-C3232C
            e0b    cs2                       Ethernet1/1/2
N3K-C3232C
cluster1::*> system cluster-switch show -is-monitoring-enabled
-operational true
Switch                      Type               Address
Model
--------------------------- ------------------ ----------------
-----
cs1                         cluster-network    10.233.205.90
N3K-C3232C
     Serial Number: FOXXXXXXXGD
      Is Monitored: true
            Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                    9.3(4)
    Version Source: CDP
cs2                         cluster-network    10.233.205.91
N3K-C3232C
     Serial Number: FOXXXXXXXGS
```

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

You might observe the following output on the cs1 switch console depending on the RCF version previously loaded on the switch 2020 Nov 17 16:07:18 cs1 %$ VDC-1 %$ %STP-2-UNBLOCK_CONSIST_PORT: Unblocking port port-channel1 on VLAN0092. Port consistency restored. 2020 Nov 17 16:07:23 cs1 %$ VDC-1 %$ %STP-2-BLOCK_PVID_PEER: Blocking port-channel1 on VLAN0001. Inconsistent peer vlan. 2020 Nov 17 16:07:23 cs1 %$ VDC-1 %$ %STP-2-BLOCK_PVID_LOCAL: Blocking port-channel1 on VLAN0092. Inconsistent local vlan.

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

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

    Show example

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

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

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

    `network interface show -role cluster`

Show example

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

22. Verify that the cluster is healthy:

```
cluster show
```

Show example

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

23. Repeat Steps 4 to 19 on switch cs1.
24. Enable auto-revert on the cluster LIFs.

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

Step 3: Verify the cluster network configuration and cluster health

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

   `show interface brief | grep up`

   Show example

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

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

```
show port-channel summary
```

Show example

```
cs1# show port-channel summary
Flags:  D - Down        P - Up in port-channel (members)
        I - Individual  H - Hot-standby (LACP only)
        s - Suspended   r - Module-removed
        b - BFD Session Wait
        S - Switched    R - Routed
        U - Up (port-channel)
        p - Up in delay-lacp mode (member)
        M - Not in use. Min-links not met
--------------------------------------------------------------------
------------
Group Port-       Type     Protocol  Member Ports
      Channel
--------------------------------------------------------------------
------------
1     Po1(SU)     Eth      LACP      Eth1/31(P)   Eth1/32(P)
cs1#
```

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

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

Show example

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

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

4. Verify that the cluster is healthy:

```
cluster show
```

Show example

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

5. Verify the connectivity of the remote cluster interfaces:

ONTAP 9.9.1 and later

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

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

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

```
cluster1::*> network interface check cluster-connectivity show
                                  Source              Destination
Packet
Node   Date                       LIF                 LIF
Loss
------ -------------------------- -------------------
------------------- -----------
cluster1-01
       3/5/2022 19:21:18 -06:00   cluster1-01_clus2   cluster1-02_clus1
none
       3/5/2022 19:21:20 -06:00   cluster1-01_clus2   cluster1-02_clus2
none
.
.
cluster1-02
       3/5/2022 19:21:18 -06:00   cluster1-02_clus2   cluster1-01_clus1
none
       3/5/2022 19:21:20 -06:00   cluster1-02_clus2   cluster1-01_clus2
none
.
.
cluster1-03
.
.
.
.
cluster1-04
.
.
.
.
```

All ONTAP releases

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

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

What’s next?

After you’ve upgraded your RCF, you can verify the SSH configuration.

Verify your SSH configuration

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

Steps

1. Verify that SSH is enabled:

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

2. Verify that the SSH keys are enabled:

   `show ssh key`

Show example

```
(switch)# show ssh key

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

ssh-rsa
AAAAB3NzaC1yc2EAAAADAQABAAAAgQDiNrD52Q586wTGJjFAbjBlFaA23EpDrZ2sDCew
l7nwlioC6HBejxluIObAH8hrW8kR+gj0ZAfPpNeLGTg3APj/yiPTBoIZZxbWRShywAM5
PqyxWwRb7kp9Zt1YHzVuHYpSO82KUDowKrL6lox/YtpKoZUDZjrZjAp8hTv3JZsPgQ==

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

could not retrieve dsa key information

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

ecdsa-sha2-nistp521
AAAAE2VjZHNhLXNoYTItbmlzdHA1MjEAAAAIbmlzdHA1MjEAAACFBABJ+ZX5SFKhS57e
vkE273e0VoqZi4/32dt+f14fBuKv80MjMsmLfjKtCWy1wgVt1Zi+C5TIBbugpzez529z
kFSF0ADb8JaGCoaAYe2HvWR/f6QLbKbqVIewCdqWgxzrIY5BPP5GBdxQJMBiOwEdnHg1
u/9Pzh/Vz9cHDcCW9qGE780QHA==

bitcount:521
fingerprint:
SHA256:TFGe2hXn6QIpcs/vyHzftHJ7Dceg0vQaULYRAlZeHwQ

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

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

What's next?

After you've verified your SSH configuration, you can configure switch health monitoring.

Reset the 3232C cluster switch to factory defaults

To reset the 3232C cluster switch to factory defaults, you must erase the 3232C switch settings.

About this task

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

Steps

1. Erase the existing configuration:

   ```
   write erase
   ```

   ```
   (cs2)# write erase

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

2. Reload the switch software:

   ```
   reload
   ```

   ```
   (cs2)# reload

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

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

What’s next

After resetting the switch, you can reconfigure it according to your requirements.

Migrate switches

Migrate from two-node switchless clusters

Migrate from a two-node switchless cluster workflow

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

1 **Migration requirements**

Review the example switch information for the migration process.

2 **Prepare for migration**

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

3

Configure your ports

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

4

Complete your migration

Complete you migration to a two-node switched cluster.

Migration requirements

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

Before you begin

Verify the following installations and connections:

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

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

About the examples used

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

- Nexus 3232C cluster switches, **C1** and **C2**.
- The nodes are **n1** and **n2**.

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

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

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

What’s next?

After you’ve reviewed the migration requirements, you can prepare to migrate your switches.

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

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

Steps

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

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

   x is the duration of the maintenance window in hours.

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

2. Determine the administrative or operational status for each cluster interface:

   a. Display the network port attributes:

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

Show example

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

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

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

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

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

Show example

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

4 entries were displayed.
```

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

`network options detect-switchless-cluster show``

Show example

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

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

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

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

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

      Cisco Ethernet Switches

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

   c. Download the appropriate version of RCF.

    d. Select **CONTINUE** on the **Description** page, accept the license agreement, and then follow the instructions on the **Download** page to download the RCF.

    e. Download the appropriate version of the image software.

       Cisco Cluster and Management Network Switch Reference Configuration File Download

4. Select **CONTINUE** on the **Description** page, accept the license agreement, and then follow the instructions on the **Download** page to download the RCF.

5. On Nexus 3232C switches C1 and C2, disable all node-facing ports C1 and C2, but do not disable the ISL ports e1/31-32.

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

   Show example

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

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

6. Connect ports 1/31 and 1/32 on C1 to the same ports on C2 using supported cabling.

7. Verify that the ISL ports are operational on C1 and C2:

   `show port-channel summary`

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

Show example

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

```
C1# show port-channel summary
Flags: D - Down         P - Up in port-channel (members)
       I - Individual   H - Hot-standby (LACP only)        s -
Suspended    r - Module-removed
       S - Switched     R - Routed
       U - Up (port-channel)
       M - Not in use. Min-links not met
--------------------------------------------------------------------
------------
      Port-
Group Channel      Type   Protocol  Member Ports
--------------------------------------------------------------------
-----------
1     Po1(SU)      Eth    LACP      Eth1/31(P)   Eth1/32(P)

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

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

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

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

Show example

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

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

9. Display the cluster port connectivity on each node:

```
network device-discovery show
```

Show example

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

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

What's next?

After you've prepared to migrate your switches, you can configure your ports.

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

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

Steps

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

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

   Show example

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

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

2. Verify the cluster interfaces have successfully migrated:

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

Show example

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

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

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

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

   Show example

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

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

4. Verify the connectivity of the remote cluster interfaces:

ONTAP 9.9.1 and later

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

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

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

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

```
cluster1::*> network interface check cluster-connectivity show
                                  Source           Destination
Packet
Node   Date                       LIF              LIF
Loss
------ -------------------------- ---------------- ----------------
-----------
n1
       3/5/2022 19:21:18 -06:00   n1_clus2         n2-clus1
none
       3/5/2022 19:21:20 -06:00   n1_clus2         n2_clus2
none

n2
       3/5/2022 19:21:18 -06:00   n2_clus2         n1_clus1
none
       3/5/2022 19:21:20 -06:00   n2_clus2         n1_clus2
none
```

All ONTAP releases

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

`cluster ping-cluster -node <name>`

```
cluster1::*> cluster ping-cluster -node local
Host is n1
Getting addresses from network interface table...
Cluster n1_clus1 n1         e4a    10.10.0.1
Cluster n1_clus2 n1         e4e    10.10.0.2
Cluster n2_clus1 n2         e4a    10.10.0.3
Cluster n2_clus2 n2         e4e    10.10.0.4
Local = 10.10.0.1 10.10.0.2
Remote = 10.10.0.3 10.10.0.4
Cluster Vserver Id = 4294967293
Ping status:....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s) ................
Detected 9000 byte MTU on 32 path(s):
    Local 10.10.0.1 to Remote 10.10.0.3
    Local 10.10.0.1 to Remote 10.10.0.4
    Local 10.10.0.2 to Remote 10.10.0.3
    Local 10.10.0.2 to Remote 10.10.0.4
Larger than PMTU communication succeeds on 4 path(s) RPC status:
1 paths up, 0 paths down (tcp check)
1 paths up, 0 paths down (ucp check)
```

5. Disconnect the cable from e4a on node n1.

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

6. Disconnect the cable from e4a on node n2.

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

7. Enable all node-facing ports on C1.

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

Show example

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

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

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

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

   Show example

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

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

   `network port show -role cluster`

Show example

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

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

Node: n2

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

4 entries were displayed.
```

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

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

    Show example

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

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

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

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

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

Show example

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

12. Display the cluster port connectivity on each node:

```
network device-discovery show
```

Show example

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

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

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

    Show example

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

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

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

    ```
    network port modify
    ```

    Show example

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

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

15. Verify the cluster LIF status:

    ```
    network interface show
    ```

Show example

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

16. Disconnect the cable from e4e on node n1.

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

17. Disconnect the cable from e4e on node n2.

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

18. Enable all node-facing ports on C2.

    Show example

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

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

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

    ```
    network port modify
    ```

    Show example

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

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

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

    ```
    network interface revert
    ```

    Show example

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

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

What's next?

After you've configured your ports, you can complete your migration.

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

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

Steps

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

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

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

Show example

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

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

   `network port show -role cluster`

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

   `network device-discovery show`

Show example

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

4. Display discovered and monitored cluster switches:

   ```
   system cluster-switch show
   ```

   Show example

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

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

   C2                          cluster-network     10.10.1.102
   NX3232CV
   Serial Number: FOX000002
   Is Monitored: true
   Reason:
   Software Version: Cisco Nexus Operating System (NX-OS) Software,
   Version 7.0(3)I6(1)
   Version Source: CDP 2 entries were displayed.
   ```

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

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

6. Verify the connectivity of the remote cluster interfaces:

ONTAP 9.9.1 and later

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

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

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

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

```
cluster1::*> network interface check cluster-connectivity show
                                  Source           Destination
Packet
Node   Date                       LIF              LIF
Loss
------ -------------------------- ---------------- ----------------
-----------
n1
       3/5/2022 19:21:18 -06:00   n1_clus2         n2-clus1
none
       3/5/2022 19:21:20 -06:00   n1_clus2         n2_clus2
none

n2
       3/5/2022 19:21:18 -06:00   n2_clus2         n1_clus1
none
       3/5/2022 19:21:20 -06:00   n2_clus2         n1_clus2
none
```

All ONTAP releases

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

`cluster ping-cluster -node <name>`

```
cluster1::*> cluster ping-cluster -node local
Host is n1
Getting addresses from network interface table...
Cluster n1_clus1 n1        e4a    10.10.0.1
Cluster n1_clus2 n1        e4e    10.10.0.2
Cluster n2_clus1 n2        e4a    10.10.0.3
Cluster n2_clus2 n2        e4e    10.10.0.4
Local = 10.10.0.1 10.10.0.2
Remote = 10.10.0.3 10.10.0.4
Cluster Vserver Id = 4294967293
Ping status:....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s) ................
Detected 9000 byte MTU on 32 path(s):
    Local 10.10.0.1 to Remote 10.10.0.3
    Local 10.10.0.1 to Remote 10.10.0.4
    Local 10.10.0.2 to Remote 10.10.0.3
    Local 10.10.0.2 to Remote 10.10.0.4
Larger than PMTU communication succeeds on 4 path(s) RPC status:
1 paths up, 0 paths down (tcp check)
1 paths up, 0 paths down (ucp check)
```

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

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

What's next?

After you've completed your switch migration, you can configure switch health monitoring.

Replace switches

Replace a Cisco Nexus 3232C cluster switch

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

Review requirements

What you'll need

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

- The Nexus 3232C cluster infrastructure are redundant and fully functional on both switches.

  The Cisco Ethernet Switches page has the latest RCF and NX-OS versions on your switches.

- All cluster ports must be in the **up** state.

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

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

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

For more information

See the following:

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

Enable console logging

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

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

Replace the switch

About this task

This replacement procedure describes the following scenario:

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

About the examples

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

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

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

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

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

Step 1: Display and migrate the cluster ports to switch

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

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

   x is the duration of the maintenance window in hours.

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

2. Display information about the devices in your configuration:

   ```
   network device-discovery show
   ```

Show example

```
cluster::> network device-discovery show
            Local  Discovered
Node        Port   Device              Interface         Platform
----------- ------ ------------------- ----------------
----------------
n1         /cdp
            e0a    CL1                 Ethernet1/1/1    N3K-C3232C
            e0b    CL2                 Ethernet1/1/1    N3K-C3232C
            e0c    CL2                 Ethernet1/1/2    N3K-C3232C
            e0d    CL1                 Ethernet1/1/2    N3K-C3232C

n2         /cdp
            e0a    CL1                 Ethernet1/1/3    N3K-C3232C
            e0b    CL2                 Ethernet1/1/3    N3K-C3232C
            e0c    CL2                 Ethernet1/1/4    N3K-C3232C
            e0d    CL1                 Ethernet1/1/4    N3K-C3232C

n3         /cdp
            e4a    CL1                 Ethernet1/7      N3K-C3232C
            e4e    CL2                 Ethernet1/7      N3K-C3232C

n4         /cdp
            e4a    CL1                 Ethernet1/8      N3K-C3232C
            e4e    CL2                 Ethernet1/8      N3K-C3232C
```

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

   a. Display the network port attributes:

      `network port show -role cluster`

Show example

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

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

Node: n2

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

Node: n3

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

```
-

Node: n4

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

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

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

Show example

```
cluster::*> network interface show -role cluster
             Logical    Status     Network           Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node
Port   Home
----------- ---------- ---------- ------------------
------------- ------- ---
Cluster
            n1_clus1   up/up      10.10.0.1/24       n1
e0a     true
            n1_clus2   up/up      10.10.0.2/24       n1
e0b     true
            n1_clus3   up/up      10.10.0.3/24       n1
e0c     true
            n1_clus4   up/up      10.10.0.4/24       n1
e0d     true
            n2_clus1   up/up      10.10.0.5/24       n2
e0a     true
            n2_clus2   up/up      10.10.0.6/24       n2
e0b     true
            n2_clus3   up/up      10.10.0.7/24       n2
e0c     true
            n2_clus4   up/up      10.10.0.8/24       n2
e0d     true
            n3_clus1   up/up      10.10.0.9/24       n3
e0a     true
            n3_clus2   up/up      10.10.0.10/24      n3
e0e     true
            n4_clus1   up/up      10.10.0.11/24      n4
e0a     true
            n4_clus2   up/up      10.10.0.12/24      n4
e0e     true
```

c. Display the discovered cluster switches:

```
system cluster-switch show
```

Show example

The following output example displays the cluster switches:

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

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

4. Verify that the appropriate RCF and image are installed on the new Nexus 3232C switch and make any necessary site customizations.
   a. Go to the NetApp Support Site.

      mysupport.netapp.com

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

      Cisco Ethernet Switches

   c. Download the appropriate version of the RCF.
   d. Click **CONTINUE** on the **Description** page, accept the license agreement, and then navigate to the **Download** page.
   e. Download the correct version of the image software from the **Cisco® Cluster and Management Network Switch Reference Configuration File Download** page.

      Cisco® Cluster and Management Network Switch Reference Configuration File Download

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

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

Show example

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

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

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

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

Show example

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

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

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

Show example

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

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

8. Verify the connectivity of the remote cluster interfaces:

ONTAP 9.9.1 and later

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

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

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

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

```
cluster1::*> network interface check cluster-connectivity show
                                  Source           Destination
Packet
Node   Date                       LIF              LIF
Loss
------ -------------------------- ---------------- ----------------
-----------
n1
       3/5/2022 19:21:18 -06:00   n1_clus2         n2-clus1
none
       3/5/2022 19:21:20 -06:00   n1_clus2         n2_clus2
none
.
.
n2
       3/5/2022 19:21:18 -06:00   n2_clus2         n1_clus1
none
       3/5/2022 19:21:20 -06:00   n2_clus2         n1_clus2
none
.
.
n3
.
.
.n4
.
.
```

All ONTAP releases

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

`cluster ping-cluster -node <name>`

```
cluster1::*> cluster ping-cluster -node local
Host is n1
Getting addresses from network interface table...
Cluster n1_clus1 n1        e0a    10.10.0.1
Cluster n1_clus2 n1        e0b    10.10.0.2
Cluster n1_clus3 n1        e0c    10.10.0.3
Cluster n1_clus4 n1        e0d    10.10.0.4
Cluster n2_clus1 n2        e0a    10.10.0.5
Cluster n2_clus2 n2        e0b    10.10.0.6
Cluster n2_clus3 n2        e0c    10.10.0.7
Cluster n2_clus4 n2        e0d    10.10.0.8
Cluster n3_clus1 n4        e0a    10.10.0.9
Cluster n3_clus2 n3        e0e    10.10.0.10
Cluster n4_clus1 n4        e0a    10.10.0.11
Cluster n4_clus2 n4        e0e    10.10.0.12
Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8 10.10.0.9 10.10.0.10
10.10.0.11
10.10.0.12 Cluster Vserver Id = 4294967293 Ping status:
....
Basic connectivity succeeds on 32 path(s)
Basic connectivity fails on 0 path(s) ...............
Detected 9000 byte MTU on 32 path(s):
    Local 10.10.0.1 to Remote 10.10.0.5
    Local 10.10.0.1 to Remote 10.10.0.6
    Local 10.10.0.1 to Remote 10.10.0.7
    Local 10.10.0.1 to Remote 10.10.0.8
    Local 10.10.0.1 to Remote 10.10.0.9
    Local 10.10.0.1 to Remote 10.10.0.10
    Local 10.10.0.1 to Remote 10.10.0.11
    Local 10.10.0.1 to Remote 10.10.0.12
    Local 10.10.0.2 to Remote 10.10.0.5
    Local 10.10.0.2 to Remote 10.10.0.6
    Local 10.10.0.2 to Remote 10.10.0.7
    Local 10.10.0.2 to Remote 10.10.0.8
    Local 10.10.0.2 to Remote 10.10.0.9
    Local 10.10.0.2 to Remote 10.10.0.10
    Local 10.10.0.2 to Remote 10.10.0.11
    Local 10.10.0.2 to Remote 10.10.0.12
    Local 10.10.0.3 to Remote 10.10.0.5
    Local 10.10.0.3 to Remote 10.10.0.6
    Local 10.10.0.3 to Remote 10.10.0.7
    Local 10.10.0.3 to Remote 10.10.0.8
    Local 10.10.0.3 to Remote 10.10.0.9
    Local 10.10.0.3 to Remote 10.10.0.10
    Local 10.10.0.3 to Remote 10.10.0.11
    Local 10.10.0.3 to Remote 10.10.0.12
    Local 10.10.0.4 to Remote 10.10.0.5
    Local 10.10.0.4 to Remote 10.10.0.6
    Local 10.10.0.4 to Remote 10.10.0.7
    Local 10.10.0.4 to Remote 10.10.0.8
    Local 10.10.0.4 to Remote 10.10.0.9
    Local 10.10.0.4 to Remote 10.10.0.10
    Local 10.10.0.4 to Remote 10.10.0.11
    Local 10.10.0.4 to Remote 10.10.0.12
Larger than PMTU communication succeeds on 32 path(s) RPC status:
8 paths up, 0 paths down (tcp check)
8 paths up, 0 paths down (udp check)
```

Step 2: Migrate ISLs to switch CL1 and C2

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

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

   Show example

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

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

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

Show example

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

5. Verify that the ISLs are up on CL1.

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

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

   Show example

```
CL1# show port-channel summary
Flags: D - Down         P - Up in port-channel (members)
       I - Individual   H - Hot-standby (LACP only)
       s - Suspended    r - Module-removed
       S - Switched     R - Routed
       U - Up (port-channel)
       M - Not in use. Min-links not met
--------------------------------------------------------------------
------------
Group Port-        Type   Protocol  Member Ports
      Channel
--------------------------------------------------------------------
------------
1     Po1(SU)      Eth    LACP      Eth1/31(P)   Eth1/32(P)
```

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

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

Show example

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

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

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

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

   Show example

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

Step 3: Revert all LIFs to originally assigned ports

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

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

Show example

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

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

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

   `network interface show`

Show example

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

```
cluster::*> network interface show -role cluster
 (network interface show)
            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node
Port    Home
----------- ---------- ---------- ------------------ -------------
------- ----
Cluster
             n1_clus1   up/up      10.10.0.1/24       n1
e0a     true
             n1_clus2   up/up      10.10.0.2/24       n1
e0b     true
             n1_clus3   up/up      10.10.0.3/24       n1
e0c     true
             n1_clus4   up/up      10.10.0.4/24       n1
e0d     true
             n2_clus1   up/up      10.10.0.5/24       n2
e0a     true
             n2_clus2   up/up      10.10.0.6/24       n2
e0b     true
             n2_clus3   up/up      10.10.0.7/24       n2
e0c     true
             n2_clus4   up/up      10.10.0.8/24       n2
e0d     true
             n3_clus1   up/up      10.10.0.9/24       n3
e4a     true
             n3_clus2   up/up      10.10.0.10/24      n3
e4e     true
             n4_clus1   up/up      10.10.0.11/24      n4
e4a     true
             n4_clus2   up/up      10.10.0.12/24      n4
e4e     true
```

3. Verify that the cluster ports are connected:

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

Show example

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

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

Node: n2

Ignore
                                                  Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
 --------- ------------ ---------------- ---- ---- -----------
-------- -----
e0a       Cluster      Cluster          up   9000  auto/10000 -
e0b       Cluster      Cluster          up   9000  auto/10000 -
e0c       Cluster      Cluster          up   9000  auto/10000 -
e0d       Cluster      Cluster          up   9000  auto/10000 -
-
Node: n3

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

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

4. Verify the connectivity of the remote cluster interfaces:

ONTAP 9.9.1 and later

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

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

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

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

```
cluster1::*> network interface check cluster-connectivity show
                                  Source           Destination
Packet
Node   Date                       LIF              LIF
Loss
------ -------------------------- ---------------- ----------------
-----------
n1
       3/5/2022 19:21:18 -06:00   n1_clus2         n2-clus1
none
       3/5/2022 19:21:20 -06:00   n1_clus2         n2_clus2
none
.
.
n2
       3/5/2022 19:21:18 -06:00   n2_clus2         n1_clus1
none
       3/5/2022 19:21:20 -06:00   n2_clus2         n1_clus2
none
.
.
n3
.
.
.n4
.
.
```

All ONTAP releases

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

`cluster ping-cluster -node <name>`

```
cluster1::*> cluster ping-cluster -node local
Host is n1
Getting addresses from network interface table...
Cluster n1_clus1 n1        e0a    10.10.0.1
Cluster n1_clus2 n1        e0b    10.10.0.2
Cluster n1_clus3 n1        e0c    10.10.0.3
Cluster n1_clus4 n1        e0d    10.10.0.4
Cluster n2_clus1 n2        e0a    10.10.0.5
Cluster n2_clus2 n2        e0b    10.10.0.6
Cluster n2_clus3 n2        e0c    10.10.0.7
Cluster n2_clus4 n2        e0d    10.10.0.8
Cluster n3_clus1 n4        e0a    10.10.0.9
Cluster n3_clus2 n3        e0e    10.10.0.10
Cluster n4_clus1 n4        e0a    10.10.0.11
Cluster n4_clus2 n4        e0e    10.10.0.12
Local = 10.10.0.1 10.10.0.2 10.10.0.3 10.10.0.4
Remote = 10.10.0.5 10.10.0.6 10.10.0.7 10.10.0.8 10.10.0.9 10.10.0.10
10.10.0.11
10.10.0.12 Cluster Vserver Id = 4294967293 Ping status:
....
Basic connectivity succeeds on 32 path(s)
Basic connectivity fails on 0 path(s) ................
Detected 9000 byte MTU on 32 path(s):
    Local 10.10.0.1 to Remote 10.10.0.5
    Local 10.10.0.1 to Remote 10.10.0.6
    Local 10.10.0.1 to Remote 10.10.0.7
    Local 10.10.0.1 to Remote 10.10.0.8
    Local 10.10.0.1 to Remote 10.10.0.9
    Local 10.10.0.1 to Remote 10.10.0.10
    Local 10.10.0.1 to Remote 10.10.0.11
    Local 10.10.0.1 to Remote 10.10.0.12
    Local 10.10.0.2 to Remote 10.10.0.5
    Local 10.10.0.2 to Remote 10.10.0.6
    Local 10.10.0.2 to Remote 10.10.0.7
    Local 10.10.0.2 to Remote 10.10.0.8
    Local 10.10.0.2 to Remote 10.10.0.9
    Local 10.10.0.2 to Remote 10.10.0.10
    Local 10.10.0.2 to Remote 10.10.0.11
    Local 10.10.0.2 to Remote 10.10.0.12
    Local 10.10.0.3 to Remote 10.10.0.5
    Local 10.10.0.3 to Remote 10.10.0.6
    Local 10.10.0.3 to Remote 10.10.0.7
    Local 10.10.0.3 to Remote 10.10.0.8
    Local 10.10.0.3 to Remote 10.10.0.9
    Local 10.10.0.3 to Remote 10.10.0.10
    Local 10.10.0.3 to Remote 10.10.0.11
    Local 10.10.0.3 to Remote 10.10.0.12
    Local 10.10.0.4 to Remote 10.10.0.5
    Local 10.10.0.4 to Remote 10.10.0.6
    Local 10.10.0.4 to Remote 10.10.0.7
    Local 10.10.0.4 to Remote 10.10.0.8
    Local 10.10.0.4 to Remote 10.10.0.9
    Local 10.10.0.4 to Remote 10.10.0.10
    Local 10.10.0.4 to Remote 10.10.0.11
    Local 10.10.0.4 to Remote 10.10.0.12
Larger than PMTU communication succeeds on 32 path(s) RPC status:
8 paths up, 0 paths down (tcp check)
8 paths up, 0 paths down (udp check)
```

Step 4: Verify all ports and LIF are correctly migrated

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

   You can execute the following commands in any order:

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

Show example

```
cluster::> network device-discovery show
            Local  Discovered
Node        Port   Device              Interface        Platform
----------- ------ ------------------- ----------------
----------------
n1         /cdp
            e0a    C1                 Ethernet1/1/1    N3K-C3232C
            e0b    C2                 Ethernet1/1/1    N3K-C3232C
            e0c    C2                 Ethernet1/1/2    N3K-C3232C
            e0d    C1                 Ethernet1/1/2    N3K-C3232C
n2         /cdp
            e0a    C1                 Ethernet1/1/3    N3K-C3232C
            e0b    C2                 Ethernet1/1/3    N3K-C3232C
            e0c    C2                 Ethernet1/1/4    N3K-C3232C
            e0d    C1                 Ethernet1/1/4    N3K-C3232C
n3         /cdp
            e4a    C1                 Ethernet1/7      N3K-C3232C
            e4e    C2                 Ethernet1/7      N3K-C3232C

n4         /cdp
            e4a    C1                 Ethernet1/8      N3K-C3232C
            e4e    C2                 Ethernet1/8      N3K-C3232C

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

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

Node: n2

Ignore
                                                  Speed(Mbps) Health
Health
```

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

Node: n3

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

Node: n4

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

cluster::*> network interface show -role cluster

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

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

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

C2                          cluster-network    10.10.1.103
NX3232C
             Serial Number: FOX000003
```

```
              Is Monitored: true
                    Reason: None
          Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version 7.0(3)I6(1)
            Version Source: CDP 3 entries were displayed.
```

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

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

3. Verify that the proper cluster switches are monitored:

   `system cluster-switch show`

   Show example

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

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

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

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

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

What’s next?

After you’ve replaced your switch, you can configure switch health monitoring.

Replace Cisco Nexus 3232C cluster switches with switchless connections

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

Review requirements

Guidelines

Review the following guidelines:

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

Before you begin

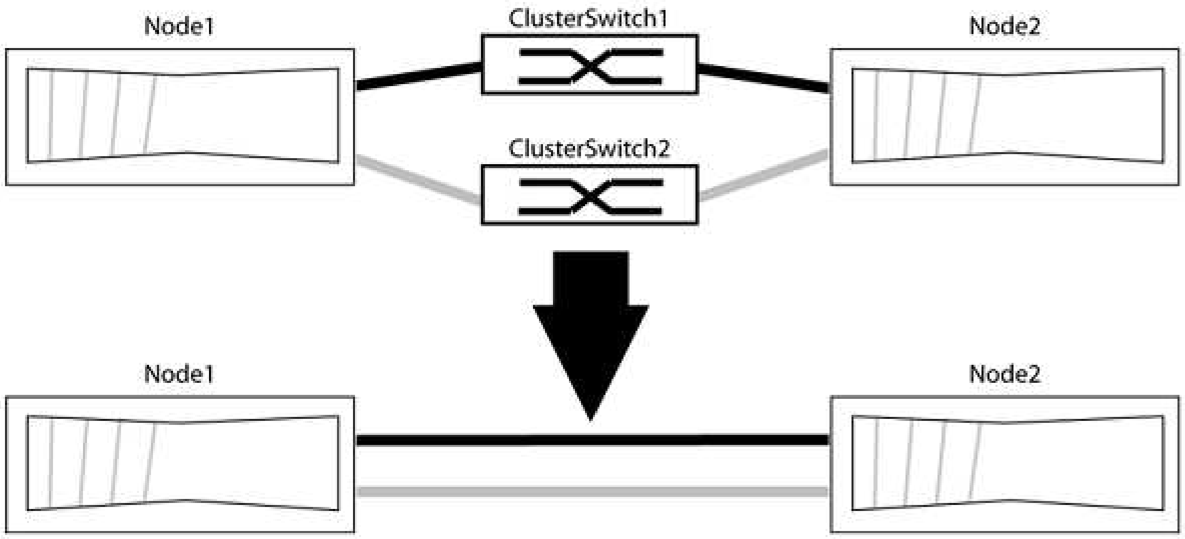
Make sure you have the following:

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

Migrate the switches

About this task

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



About the examples

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

Step 1: Prepare for migration

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

   ```
   set -privilege advanced
   ```

   The advanced prompt `*>` appears.

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

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

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

   Show example

   The following example output shows if the option is enabled.

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

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

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

   ```
   system node autosupport invoke -node * -type all -message
   MAINT=<number_of_hours>h
   ```

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

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

   Show example

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

Step 2: Configure ports and cabling

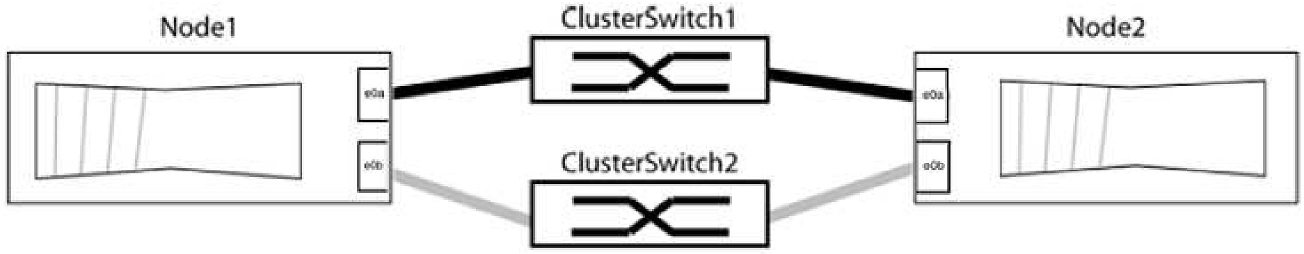
1. Organize the cluster ports on each switch into groups so that the cluster ports in group1 go to cluster

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

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

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

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

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

Show example

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

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

Node: node2

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

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

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

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

Show example

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

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

`network interface revert -vserver Cluster -lif *`

4. Disable auto-revert for the cluster LIFs:

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

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

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

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

   Show example

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

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

6. Verify the connectivity of the remote cluster interfaces:

ONTAP 9.9.1 and later

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

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

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

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

```
cluster1::*> network interface check cluster-connectivity show
                                  Source           Destination
Packet
Node   Date                       LIF              LIF
Loss
------ -------------------------- ---------------- ----------------
-----------
node1
       3/5/2022 19:21:18 -06:00   node1_clus2      node2-clus1
none
       3/5/2022 19:21:20 -06:00   node1_clus2      node2_clus2
none
node2
       3/5/2022 19:21:18 -06:00   node2_clus2      node1_clus1
none
       3/5/2022 19:21:20 -06:00   node2_clus2      node1_clus2
none
```

All ONTAP releases

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

`cluster ping-cluster -node <name>`

```
cluster1::*> cluster ping-cluster -node local
Host is node2
Getting addresses from network interface table...
Cluster node1_clus1 169.254.209.69 node1 e0a
Cluster node1_clus2 169.254.49.125 node1 e0b
Cluster node2_clus1 169.254.47.194 node2 e0a
Cluster node2_clus2 169.254.19.183 node2 e0b
Local = 169.254.47.194 169.254.19.183
Remote = 169.254.209.69 169.254.49.125
Cluster Vserver Id = 4294967293
Ping status:

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

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

7. Verify that the cluster is healthy:

   `cluster ring show`

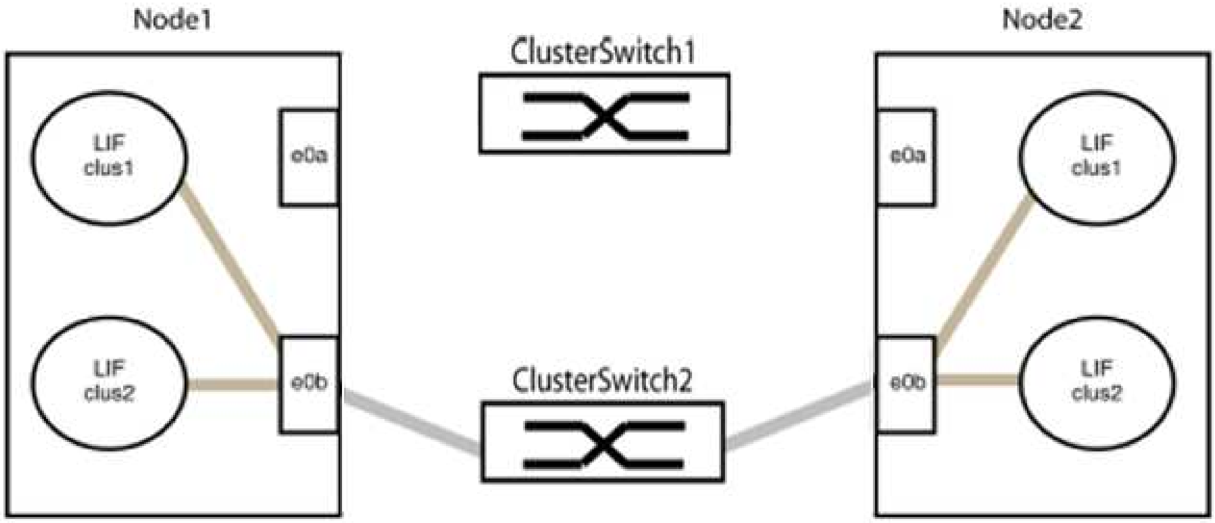
   All units must be either master or secondary.

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

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

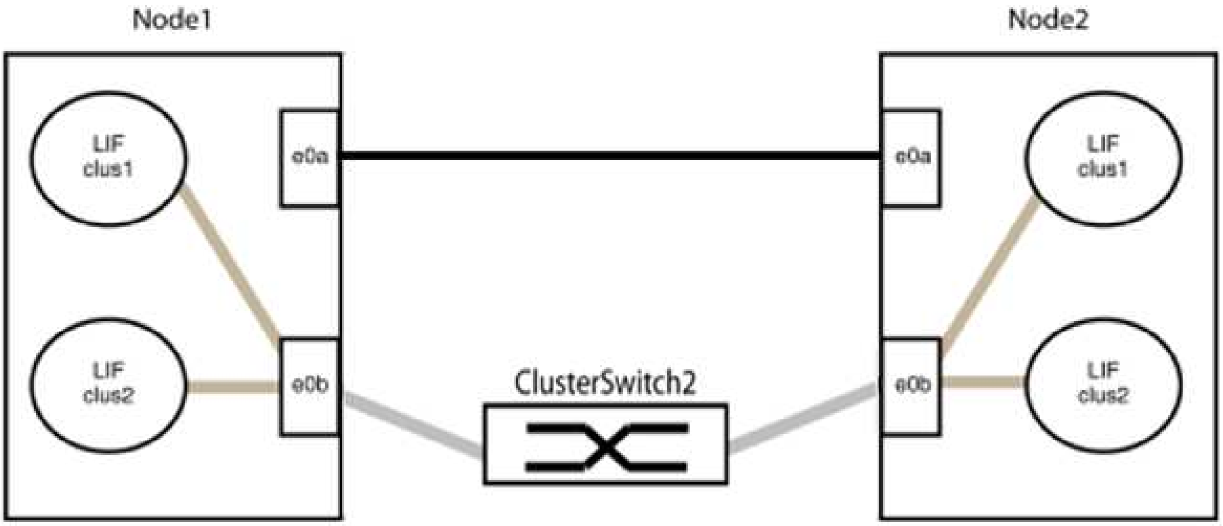
   a. Disconnect all the cables from the ports in group1 at the same time.

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



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

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



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

   `network options switchless-cluster show`

   The following example shows that the switchless cluster is enabled:

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

10. Verify the connectivity of the remote cluster interfaces:

ONTAP 9.9.1 and later

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

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

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

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

```
cluster1::*> network interface check cluster-connectivity show
                                  Source           Destination
Packet
Node   Date                       LIF              LIF
Loss
------ -------------------------- ---------------- ----------------
-----------
node1
       3/5/2022 19:21:18 -06:00   node1_clus2      node2-clus1
none
       3/5/2022 19:21:20 -06:00   node1_clus2      node2_clus2
none
node2
       3/5/2022 19:21:18 -06:00   node2_clus2      node1_clus1
none
       3/5/2022 19:21:20 -06:00   node2_clus2      node1_clus2
none
```

All ONTAP releases

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

`cluster ping-cluster -node <name>`

```
cluster1::*> cluster ping-cluster -node local
Host is node2
Getting addresses from network interface table...
Cluster node1_clus1 169.254.209.69 node1 e0a
Cluster node1_clus2 169.254.49.125 node1 e0b
Cluster node2_clus1 169.254.47.194 node2 e0a
Cluster node2_clus2 169.254.19.183 node2 e0b
Local = 169.254.47.194 169.254.19.183
Remote = 169.254.209.69 169.254.49.125
Cluster Vserver Id = 4294967293
Ping status:

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

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

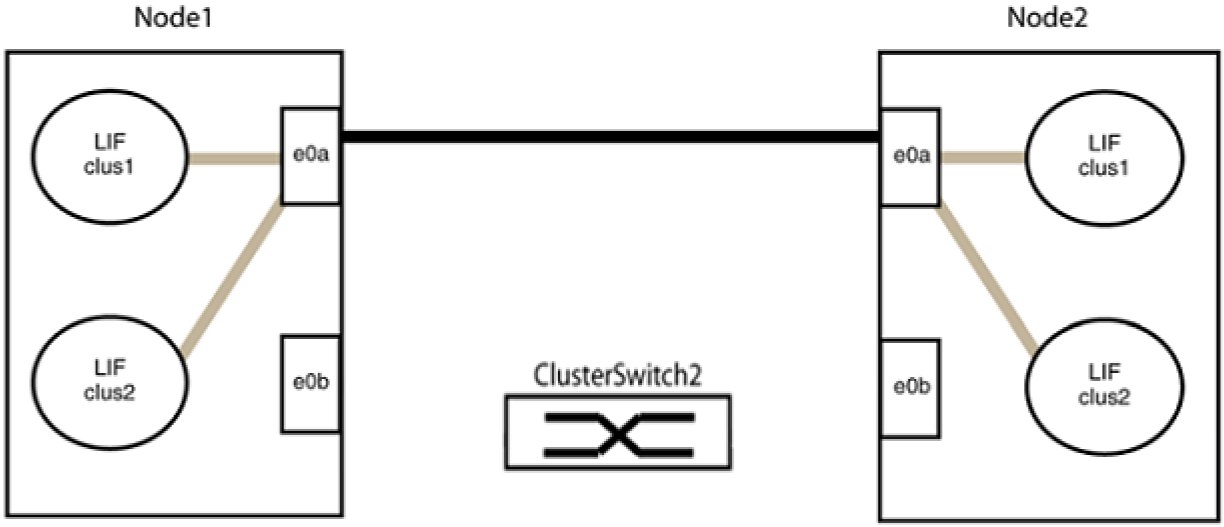
> Before proceeding to the next step, you must wait at least two minutes to confirm a working back-to-back connection on group 1.

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

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

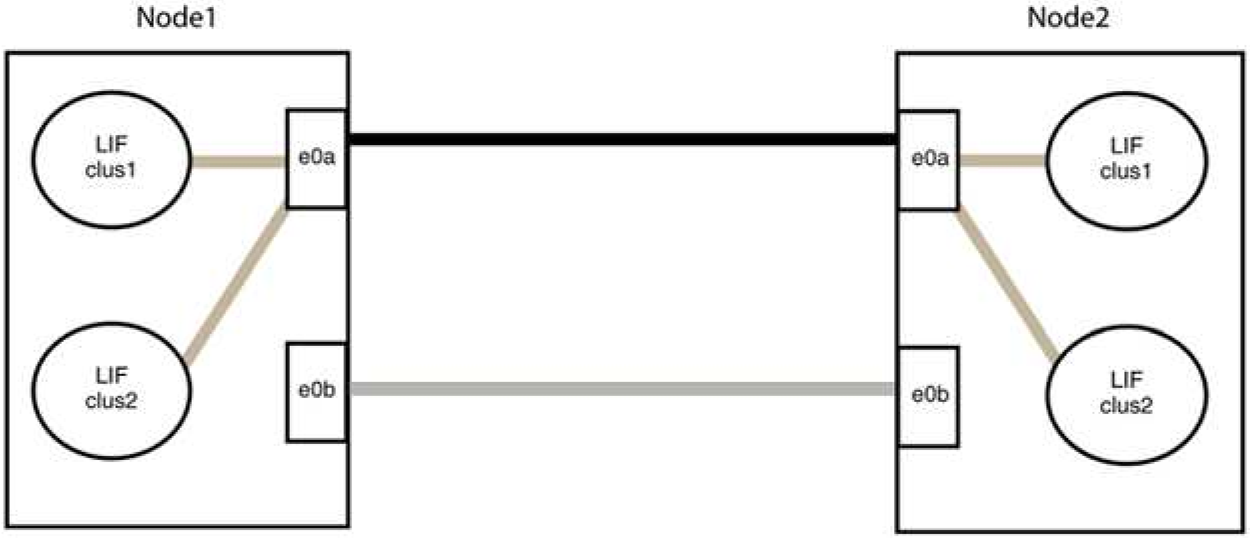
    a. Disconnect all the cables from the ports in group2 at the same time.

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



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

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



Step 3: Verify the configuration

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

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

Show example

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

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

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

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

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

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

Show example

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

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

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

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

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

   `cluster show`

   Show example

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

```
Node  Health  Eligibility Epsilon
----- ------- ----------- --------
node1 true    true        false
node2 true    true        false
2 entries were displayed.
```

5. Verify the connectivity of the remote cluster interfaces:

ONTAP 9.9.1 and later

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

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

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

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

```
cluster1::*> network interface check cluster-connectivity show
                                  Source           Destination
Packet
Node   Date                       LIF              LIF
Loss
------ -------------------------- ---------------- ----------------
-----------
node1
       3/5/2022 19:21:18 -06:00   node1_clus2      node2-clus1
none
       3/5/2022 19:21:20 -06:00   node1_clus2      node2_clus2
none
node2
       3/5/2022 19:21:18 -06:00   node2_clus2      node1_clus1
none
       3/5/2022 19:21:20 -06:00   node2_clus2      node1_clus2
none
```

All ONTAP releases

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

`cluster ping-cluster -node <name>`

```
cluster1::*> cluster ping-cluster -node local
Host is node2
Getting addresses from network interface table...
Cluster node1_clus1 169.254.209.69 node1 e0a
Cluster node1_clus2 169.254.49.125 node1 e0b
Cluster node2_clus1 169.254.47.194 node2 e0a
Cluster node2_clus2 169.254.19.183 node2 e0b
Local = 169.254.47.194 169.254.19.183
Remote = 169.254.209.69 169.254.49.125
Cluster Vserver Id = 4294967293
Ping status:

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

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

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

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

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

7. Change the privilege level back to admin:

   ```
   set -privilege admin
   ```

Cisco 3232C storage switches

Replace a Cisco Nexus 3232C storage switch

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

Review requirements

The existing network configuration must have the following characteristics:

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

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

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

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

Replace the switch

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

Step 1: Confirm the switch to be replaced is S2

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

   x is the duration of the maintenance window in hours.

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

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

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

Show example

```
storage::*> storage port show -port-type ENET
                                      Speed                     VLAN
Node               Port Type  Mode    (Gb/s) State    Status      ID
------------------ ---- ----- ------- ------ -------- --------- ----
node1
                   e3a  ENET  storage    100 enabled  online      30
                   e3b  ENET  storage      0 enabled  offline     30
                   e7a  ENET  storage      0 enabled  offline     30
                   e7b  ENET  storage      0 enabled  offline     30
node2
                   e3a  ENET  storage    100 enabled  online      30
                   e3b  ENET  storage      0 enabled  offline     30
                   e7a  ENET  storage      0 enabled  offline     30
                   e7b  ENET  storage      0 enabled  offline     30
```

3. Verify that storage switch S1 is available:

```
network device-discovery show
```

Show example

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

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

   ```
   show lldp neighbors
   ```

Show example

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

Step 2: Configure cabling

1. Verify the shelf ports in the storage system:

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

Show example

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

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

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

Step 3: Verify all device configurations on switch NS2

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

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

Show example

```
storage::*> storage port show -port-type ENET
                                      Speed
VLAN
Node               Port Type  Mode    (Gb/s) State    Status
ID
------------------ ---- ----- ------- ------ -------- ------------
---
node1
                   e3a  ENET  storage    100 enabled  online
30
                   e3b  ENET  storage      0 enabled  offline
30
                   e7a  ENET  storage      0 enabled  offline
30
                   e7b  ENET  storage    100 enabled  online
30
node2
                   e3a  ENET  storage    100 enabled  online
30
                   e3b  ENET  storage      0 enabled  offline
30
                   e7a  ENET  storage      0 enabled  offline
30
                   e7b  ENET  storage    100 enabled  online
30
```

2. Verify that both switches are available:

```
network device-discovery show
```

Show example

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

3. Verify the shelf ports in the storage system:

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

Show example

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

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

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

What's next?

Configure switch health monitoring

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