Lenovo

# NVIDIA SN2100 Switches

NVIDIA SN2100 Switches

**Second edition (September 2023)**

# Contents

# Chapter 1. Overview

## 1.1. Overview of installation and configuration for NVIDIA SN2100 switches

The NVIDIA SN2100 is a cluster switch that allows you to build ONTAP clusters with more than two nodes.

### 1.1.1. Initial configuration overview

To configure a NVIDIA SN2100 switch on systems running ONTAP, follow these steps:

1. Install the hardware for the NVIDIA SN2100 switch.

   Instructions are available in the *NVIDIA Switch Installation Guide*.

2. Configure the switch.

   Instructions are available in NVIDIA's documentation.

3. Review cabling and configuration considerations.

   Review requirements for optical connections, the QSA adapter, and the switchport speed.

4. Cable the DM240N shelves as switch-attached storage.

   Follow the cabling procedures if you have a system in which the DM240N drive shelves need to be cabled as switch-attached storage (not direct-attached storage).

5. Install Cumulus Linux in Cumulus mode or install Cumulus Linux in ONIE mode.

   You can install Cumulus Linux (CL) OS when the switch is running either Cumulus Linux or ONIE.

6. Install the Reference Configuration File (RCF) script.

   There are two RCF scripts available for Clustering and Storage applications. The procedure for each is the same.

7. Configure SNMPv3 for switch log collection.

   This release includes support for SNMPv3 for switch log collection and for Switch Health Monitoring (SHM).

The procedures use Network Command Line Utility (NCLU), which is a command line interface that ensures Cumulus Linux is fully accessible to all. The net command is the wrapper utility you use to execute actions from a terminal.

#### 1.1.2. Additional information

Before you begin installation or maintenance, be sure to review the following:

- Configuration requirements
- Components and part numbers
- Required documentation
- Lenovo Press for all supported ONTAP versions.

## 1.2. Configuration requirements for NVIDIA SN2100 switches

For NVIDIA SN2100 switch installation and maintenance, be sure to review all configuration requirements.

#### 1.2.1. Installation requirements

If you want to build ONTAP clusters with more than two nodes, you need two supported cluster network switches. You can use additional management switches, which are optional.

You install the NVIDIA SN2100 switch in the NVIDIA dual/single switch cabinet with the standard brackets that are included with the switch.

For cabling guidelines, see Review cabling and configuration considerations.

#### 1.2.2. ONTAP and Linux support

The NVIDIA SN2100 switch is a 10/25/40/100GbE switch running Cumulus Linux. The switch supports the following:

- ONTAP 9.10.1P3. The SN2100 switch serves Cluster and Storage applications in ONTAP 9.10.1P3 over different switch-pairs.
- Cumulus Linux (CL) OS version. To download the SN2100 Cumulus software, log into the NVIDIA Enterprise Support Portal. Note that you must have log in credentials to access the Cumulus software.
- You can install Cumulus Linux when the switch is running Cumulus Linux or ONIE.

## 1.3. Components and part numbers for NVIDIA SN2100 switches

For NVIDIA SN2100 switch installation and maintenance, be sure to review the list of components and part numbers for the cabinet and rail kit.

### 1.3.1. Cabinet details

You install the NVIDIA SN2100 switch in the NVIDIA dual/single switch cabinet with the standard brackets that are included with the switch.

### 1.3.2. Rail kit details

The following table lists the part number and description for the SN2100 switches and rail kits:

| Part number | Description |
|---|---|
| 7DBUCTO1WW | Mellanox SN2100 16 port, QSFP28, 100GbE Switch, Cumulus Linux, Rear to Front (PSE) Exhaust |
| 7DBUCTO2WW | Mellanox SN2100 16 port, QSFP28, 100GbE Switch, Cumulus Linux, Front to Rear (oPSE) Exhaust |
| 4XF7A85911 | Mellanox SN2xxx Single switch Rack Mount Kit (RMK) |
| 4M27A68445 | Mellanox SN2xxx Enterprise Dual Rack Mount Kit (RMK) |

See NVIDIA documentation for details on installing your SN2100 switch and rail kit.

## 1.4. Documentation requirements for NVIDIA SN2100 switches

For NVIDIA SN2100 switch installation and maintenance, be sure to review all the recommended documentation.

| Title | Description |
|---|---|
| NVIDIA Switch Installation Guide | Describes how to install your NVIDIA SN2100 switches. |
| DM240N NVMe Drive Shelf Cabling Guide | Overview and illustrations showing how to configure cabling for drive shelves. |
| NVIDIA SN2100 16-port 100Gb Ethernet Storage Switch | Allows you to confirm supported hardware, such as storage switches and cables, for your platform model. |

# Chapter 2. Install hardware

## 2.1. Install the hardware for the NVIDIA SN2100 switch

To install the SN2100 hardware, refer to NVIDIA's documentation.

**Steps**

1. Review the configuration requirements.
2. Follow the instructions in NVIDIA Switch Installation Guide.

**What's next?**

Configure the switch.

## 2.2. Configure the NVIDIA SN2100 switch

To configure the SN2100 switch, refer to NVIDIA's documentation.

**Steps**

1. Review the configuration requirements.
2. Follow the instructions in NVIDIA System Bring-Up..

**What's next?**

Review cabling and configuration considerations.

## 2.3. Review cabling and configuration considerations

Before configuring your NVIDIA SN2100 switch, review the following considerations.

### 2.3.1. NVIDIA port details

| Switch ports | Ports usage |
|---|---|
| swp1s0-3 | 4x10GbE breakout cluster port nodes |
| swp2s0-3 | 4x25GbE breakout cluster port nodes |
| swp3-14 | 40/100GbE cluster port nodes |
| swp15-16 | 40/100GbE Inter-Switch Link (ISL) ports |

See Lenovo Press for more information on switch ports.

### 2.3.2. Link-up delays with optical connections

If you are experiencing link-up delays of more than five seconds, Cumulus Linux 5.4 and later includes support for fast link-up. You can configure the links by using the `nv set` command as follows:

```
nv set interface <interface-id> link fast-linkup on
nv config apply
reload the switchd
```

**Show example**

```
cumulus@cumulus-cs13:mgmt:~$ nv set interface swp5 link fast-linkup on
cumulus@cumulus-cs13:mgmt:~$ nv config apply
switchd need to reload on this config change

Are you sure? [y/N] y
applied [rev_id: 22]

Only switchd reload required
```

### 2.3.3. Support for copper connections

The following configuration changes are required to fix this issue.

**Cumulus Linux 4.4.3**

1. Identify the name for each interface using 40GbE/100GbE copper cables:

```
cumulus@cumulus:mgmt:~$ net show interface pluggables

Interface  Identifier     Vendor Name     Vendor PN    Vendor SN      Vendor Rev
---------  -------------  --------------  -----------  -------------  ----------
swp3       0x11 (QSFP28)  Molex           112-00576    93A2229911111  B0
swp4       0x11 (QSFP28)  Molex           112-00576    93A2229922222  B0
```

2. Add the following two lines to the `/etc/cumulus/switchd.conf` file for every port (swp<n>) that is using 40GbE/100GbE copper cables:
   - `interface.swp<n>.enable_media_depended_linkup_flow=TRUE`
   - `interface.swp<n>.enable_short_tuning=TRUE`

   For example:

```
cumulus@cumulus:mgmt:~$ sudo nano /etc/cumulus/switchd.conf
.
.
interface.swp3.enable_media_depended_linkup_flow=TRUE
interface.swp3.enable_short_tuning=TRUE
interface.swp4.enable_media_depended_linkup_flow=TRUE
interface.swp4.enable_short_tuning=TRUE
```

3. Restart the `switchd` service:

```
cumulus@cumulus:mgmt:~$ sudo systemctl restart switchd.service
```

4. Confirm that the ports are up:

```
cumulus@cumulus:mgmt:~$ net show interface all

State  Name      Spd   MTU    Mode       LLDP              Summary
-----  --------- ----  -----  ---------- ----------------- --------
UP     swp3      100G  9216   Trunk/L2                     Master: bridge(UP)
UP     swp4      100G  9216   Trunk/L2                     Master: bridge(UP)
```

**Cumulus Linux 5.x**

1. Identify the name for each interface using 40GbE/100GbE copper cables:

```
cumulus@cumulus:mgmt:~$ nv show interface pluggables

Interface  Identifier     Vendor Name     Vendor PN    Vendor SN      Vendor Rev
---------  -------------  --------------  -----------  -------------  ----------
swp3       0x11 (QSFP28)  Molex           112-00576    93A2229911111  B0
swp4       0x11 (QSFP28)  Molex           112-00576    93A2229922222  B0
```

2. Configure the links using the `nv set` command as follows:
   - `nv set interface <interface-id> link fast-linkup on`
   - `nv config apply`
   - Reload the `switchd` service

   For example:

   ```
   cumulus@cumulus:mgmt:~$ nv set interface swp5 link fast-linkup on
   cumulus@cumulus:mgmt:~$ nv config apply
   switchd need to reload on this config change

   Are you sure? [y/N] y
   applied [rev_id: 22]

   Only switchd reload required
   ```

3. Confirm that the ports are up:

   ```
   cumulus@cumulus:mgmt:~$ net show interface all

   State  Name      Spd   MTU    Mode       LLDP              Summary
   -----  --------- ----  -----  ---------- ----------------- --------
   UP     swp3      100G  9216   Trunk/L2                     Master: bridge(UP)
   UP     swp4      100G  9216   Trunk/L2                     Master: bridge(UP)
   ```

On Cumulus Linux 4.4.2, copper connections are not supported on SN2100 switches with SN37A71124 NIC, SN37A66059 NIC, or onboard 100GbE ports. For example:

- AFA-DM7100F on ports e3a and e3b

#### 2.3.4. QSA adapter

When a QSA adapter is used to connect to the 10GbE/25GbE cluster ports on a platform, the link might not come up.

To resolve this issue, do the following:

- For 10GbE, manually set the swp1s0-3 link speed to 10000 and set auto-negotiation to off.

- For 25GbE, manually set the swp2s0-3 link speed to 25000 and set auto-negotiation to off.

When using 10GbE/25GbE QSA adapters, insert them in non-breakout 40GbE/100GbE ports (swp3-swp14). Do not insert the QSA adapter in a port that is configured for breakout.

### 2.3.5. Setting interface speed on breakout ports

Depending on the transceiver in the switch port, you might need to set the speed on the switch interface to a fixed speed. If using 10GbE and 25GbE breakout ports, verify that auto-negotiation is off and set the interface speed on the switch.

**Cumulus Linux 4.4.3**

For example:

```
cumulus@cumulus:mgmt:~$ net add int swp1s3 link autoneg off && net com
--- /etc/network/interfaces     2019-11-17 00:17:13.470687027 +0000
+++ /run/nclu/ifupdown2/interfaces.tmp  2019-11-24 00:09:19.435226258 +0000
@@ -37,21 +37,21 @@
     alias 10G Intra-Cluster Node
     link-autoneg off
     link-speed 10000  <---- port speed set
     mstpctl-bpduguard yes
     mstpctl-portadminedge yes
     mtu 9216

auto swp1s3
iface swp1s3
     alias 10G Intra-Cluster Node
-    link-autoneg off
+    link-autoneg on
     link-speed 10000 <---- port speed set
     mstpctl-bpduguard yes
     mstpctl-portadminedge yes
     mtu 9216

auto swp2s0
iface swp2s0
     alias 25G Intra-Cluster Node
     link-autoneg off
     link-speed 25000 <---- port speed set
```

Check the interface and port status to verify that the settings are applied:

```
cumulus@cumulus:mgmt:~$ net show interface

State  Name      Spd    MTU    Mode        LLDP             Summary
-----  --------  -----  -----  ----------  ---------------
-------------------------------------
.
.
UP     swp1s0     10G   9216   Trunk/L2    cs07 (e4c)       Master: br_default(UP)
UP     swp1s1     10G   9216   Trunk/L2    cs07 (e4d)       Master: br_default(UP)
UP     swp1s2     10G   9216   Trunk/L2    cs08 (e4c)       Master: br_default(UP)
UP     swp1s3     10G   9216   Trunk/L2    cs08 (e4d)       Master: br_default(UP)
.
.
UP     swp3       40G   9216   Trunk/L2    cs03 (e4e)       Master: br_default(UP)
UP     swp4       40G   9216   Trunk/L2    cs04 (e4e)       Master: br_default(UP)
DN     swp5       N/A   9216   Trunk/L2                     Master: br_default(UP)
DN     swp6       N/A   9216   Trunk/L2                     Master: br_default(UP)
DN     swp7       N/A   9216   Trunk/L2                     Master: br_default(UP)
.
.
UP     swp15      100G  9216   BondMember  cs01 (swp15)     Master: cluster_isl(UP)
UP     swp16      100G  9216   BondMember  cs01 (swp16)     Master: cluster_isl(UP)
.
.
```

**Cumulus Linux 5.x**

For example:

```
cumulus@cumulus:mgmt:~$ nv set interface swp1s3 link auto-negotiate off
cumulus@cumulus:mgmt:~$ nv set interface swp1s3 link speed 10G
cumulus@cumulus:mgmt:~$ nv show interface swp1s3

link

  auto-negotiate        off                   off                   off
  duplex                full                  full                  full
  speed                 10G                   10G                   10G
  fec                   auto                  auto                  auto
  mtu                   9216                  9216                  9216
[breakout]
  state                 up                    up                    up
```

Check the interface and port status to verify that the settings are applied:

```
cumulus@cumulus:mgmt:~$ nv show interface

State  Name      Spd    MTU    Mode        LLDP             Summary
-----  --------  -----  -----  ----------  ---------------
------------------------------------
.
.
UP     swp1s0     10G   9216   Trunk/L2    cs07 (e4c)       Master: br_default(UP)
UP     swp1s1     10G   9216   Trunk/L2    cs07 (e4d)       Master: br_default(UP)
UP     swp1s2     10G   9216   Trunk/L2    cs08 (e4c)       Master: br_default(UP)
UP     swp1s3     10G   9216   Trunk/L2    cs08 (e4d)       Master: br_default(UP)
.
.
UP     swp3       40G   9216   Trunk/L2    cs03 (e4e)       Master: br_default(UP)
UP     swp4       40G   9216   Trunk/L2    cs04 (e4e)       Master: br_default(UP)
DN     swp5       N/A   9216   Trunk/L2                     Master: br_default(UP)
DN     swp6       N/A   9216   Trunk/L2                     Master: br_default(UP)
DN     swp7       N/A   9216   Trunk/L2                     Master: br_default(UP)
.
.
UP     swp15      100G  9216   BondMember  cs01 (swp15)     Master: cluster_isl(UP)
UP     swp16      100G  9216   BondMember  cs01 (swp16)     Master: cluster_isl(UP)
.
.
```

**What's next?**

Cable DM240N shelves as switch-attached storage.

## 2.4. Cable the DM240N shelves as switch-attached storage

If you have a system in which the DM240N drive shelves need to be cabled as switch-attached storage (not direct-attached storage), use the information provided here.

- Cable DM240N drive shelves through storage switches:

  Cabling switch-attached DM240N drive shelves

- Confirm supported hardware, such as storage switches and cables, for your platform model:

  Lenovo Press

**What's next?**

Install Cumulus Linux in Cumulus mode or Install Cumulus Linux in ONIE mode.

# Chapter 3. Configure software

## 3.1. Software install workflow for NVIDIA SN2100 switches

To install and configure software for a NVIDIA SN2100 switch, follow these steps:

1. Install Cumulus Linux in Cumulus mode or install Cumulus Linux in ONIE mode.

   You can install Cumulus Linux (CL) OS when the switch is running either Cumulus Linux or ONIE.

2. Install the Reference Configuration File (RCF) script.

   There are two RCF scripts available for Clustering and Storage applications. The procedure for each is the same.

3. Configure SNMPv3 for switch log collection.

   This release includes support for SNMPv3 for switch log collection and for Switch Health Monitoring (SHM).

The procedures use Network Command Line Utility (NCLU), which is a command line interface that ensures Cumulus Linux is fully accessible to all. The net command is the wrapper utility you use to execute actions from a terminal.

## 3.2. Install Cumulus Linux in Cumulus mode

Follow this procedure to install Cumulus Linux (CL) OS when the switch is running in Cumulus mode.

Cumulus Linux (CL) OS can be installed either when the switch is running Cumulus Linux or ONIE (see Install in ONIE mode).

**What you'll need**

- Intermediate-level Linux knowledge.
- Familiarity with basic text editing, UNIX file permissions, and process monitoring. A variety of text editors are pre-installed, including `vi` and `nano`.
- Access to a Linux or UNIX shell. If you are running Windows, use a Linux environment as your command line tool for interacting with Cumulus Linux.
- The baud rate requirement is set to 115200 on the serial console switch for NVIDIA SN2100 switch console access, as follows:
  - 115200 baud

- 8 data bits
- 1 stop bit
- parity: none
- flow control: none

**About this task**

Be aware of the following:

Each time Cumulus Linux is installed, the entire file system structure is erased and rebuilt.

The default password for the cumulus user account is **cumulus**. The first time you log into Cumulus Linux, you must change this default password. Be sure to update any automation scripts before installing a new image. Cumulus Linux provides command line options to change the default password automatically during the installation process.

**Example 1. Steps**

**Cumulus Linux 4.4.3**

1. Log in to the switch.

   First time log in to the switch requires username/password of **cumulus**/**cumulus** with `sudo` privileges.

   ```
   cumulus login: cumulus
   Password: cumulus
   You are required to change your password immediately (administrator enforced)
   Changing password for cumulus.
   Current password: cumulus
   New password: <new_password>
   Retype new password: <new_password>
   ```

2. Check the Cumulus Linux version: `net show system`

   ```
   cumulus@cumulus:mgmt:~$ net show system
   Hostname......... cumulus
   Build............ Cumulus Linux 4.4.3
   Uptime........... 0:08:20.860000
   Model............ Mlnx X86
   CPU.............. x86_64 Intel Atom C2558 2.40GHz
   Memory........... 8GB
   Disk............. 14.7GB
   ASIC............. Mellanox Spectrum MT52132
   Ports............ 16 x 100G-QSFP28
   Part Number...... MSN2100-CB2FC
   Serial Number.... MT2105T05177
   Platform Name.... x86_64-mlnx_x86-r0
   Product Name..... MSN2100
   ONIE Version..... 2019.11-5.2.0020-115200
   Base MAC Address. 04:3F:72:43:92:80
   Manufacturer..... Mellanox
   ```

3. Configure the hostname, IP address, subnet mask, and default gateway. The new hostname only becomes effective after restarting the console/SSH session.

   

   A Cumulus Linux switch provides at least one dedicated Ethernet management port called `eth0`. This interface is specifically for out-of-band management use. By default, the management interface uses DHCPv4 for addressing.

   

   Do not use an underscore (_), apostrophe ('), or non-ASCII characters in the hostname.

```
cumulus@cumulus:mgmt:~$ net add hostname sw1
cumulus@cumulus:mgmt:~$ net add interface eth0 ip address 10.233.204.71
cumulus@cumulus:mgmt:~$ net add interface eth0 ip gateway 10.233.204.1
cumulus@cumulus:mgmt:~$ net pending
cumulus@cumulus:mgmt:~$ net commit
```

This command modifies both the `/etc/hostname` and `/etc/hosts` files.

4. Confirm that the hostname, IP address, subnet mask, and default gateway have been updated.

```
cumulus@sw1:mgmt:~$ hostname sw1
cumulus@sw1:mgmt:~$ ifconfig eth0
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
inet 10.233.204.71  netmask 255.255.254.0  broadcast 10.233.205.255
inet6 fe80::bace:f6ff:fe19:1df6  prefixlen 64  scopeid 0x20<link>
ether b8:ce:f6:19:1d:f6  txqueuelen 1000  (Ethernet)
RX packets 75364  bytes 23013528 (21.9 MiB)
RX errors 0  dropped 7  overruns 0  frame 0
TX packets 4053  bytes 827280 (807.8 KiB)
TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0 device memory 0xdfc00000-
dfc1ffff

cumulus@sw1::mgmt:~$ ip route show vrf mgmt
default via 10.233.204.1 dev eth0
unreachable default metric 4278198272
10.233.204.0/23 dev eth0 proto kernel scope link src 10.233.204.71
127.0.0.0/8 dev mgmt proto kernel scope link src 127.0.0.1
```

5. Configure the time zone using NTP interactive mode.
   a. On a terminal, run the following command:

```
cumulus@sw1:~$ sudo dpkg-reconfigure tzdata
```

   b. Follow the on-screen menu options to select the geographic area and region.
   c. To set the time zone for all services and daemons, reboot the switch.
   d. Verify that the date and time on the switch are correct and update if necessary.
6. Install Cumulus Linux 4.4.3:

```
cumulus@sw1:mgmt:~$ sudo onie-install -a -i http://<web-server>/<path>/cumulus-linux-
4.4.3-mlx-amd64.bin
```

The installer starts the download. Type **y** when prompted.

7. Reboot the NVIDIA SN2100 switch:

```
cumulus@sw1:mgmt:~$ sudo reboot
```

8. The installation starts automatically, and the following GRUB screen choices appear. Do **not** make any selections.
   - Cumulus-Linux GNU/Linux
   - ONIE: Install OS
   - CUMULUS-INSTALL
   - Cumulus-Linux GNU/Linux
9. Repeat steps 1 to 4 to log in.
10. Verify that the Cumulus Linux version is 4.4.3: `net show version`

```
cumulus@sw1:mgmt:~$ net show version
NCLU_VERSION=1.0-cl4.4.3u0
DISTRIB_ID="Cumulus Linux"
DISTRIB_RELEASE=4.4.3
DISTRIB_DESCRIPTION="Cumulus Linux 4.4.3"
```

11. Create a new user and add this user to the `sudo` group. This user only becomes effective after the console/SSH session is restarted.

    ```
    sudo adduser --ingroup netedit admin
    ```

```
cumulus@sw1:mgmt:~$ sudo adduser --ingroup netedit admin
[sudo] password for cumulus:
Adding user 'admin' ...
Adding new user 'admin' (1001) with group `netedit' ...
Creating home directory '/home/admin' ...
Copying files from '/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for admin
Enter the new value, or press ENTER for the default
Full Name []:
Room Number []:
Work Phone []:
Home Phone []:
Other []:
Is the information correct? [Y/n] y

cumulus@sw1:mgmt:~$ sudo adduser admin sudo
[sudo] password for cumulus:
Adding user `admin' to group `sudo' ...
Adding user admin to group sudo
Done.
cumulus@sw1:mgmt:~$ exit
logout
Connection to 10.233.204.71 closed.

[admin@cycrh6svl01 ~]$ ssh admin@10.233.204.71
admin@10.233.204.71's password:
Linux sw1 4.19.0-cl-1-amd64 #1 SMP Cumulus 4.19.206-1+cl4.4.1u1 (2021-09-09) x86_64
Welcome to NVIDIA Cumulus (R) Linux (R)

For support and online technical documentation, visit
http://www.cumulusnetworks.com/support

The registered trademark Linux (R) is used pursuant to a sublicense from LMI, the
exclusive licensee of Linus Torvalds, owner of the mark on a world-wide basis.
admin@sw1:mgmt:~$
```

### Cumulus Linux 5.x

1. Log in to the switch.

   First time log in to the switch requires username/password of **cumulus**/**cumulus** with `sudo` privileges.

```
cumulus login: cumulus
Password: cumulus
You are required to change your password immediately (administrator enforced)
Changing password for cumulus.
Current password: cumulus
New password: <new_password>
Retype new password: <new_password>
```

2. Check the Cumulus Linux version: `nv show system`

```
cumulus@cumulus:mgmt:~$ nv show system
operational         applied              description
------------------- -------------------- --------------------
hostname            cumulus              cumulus
build               Cumulus Linux 5.3.0  system build version
uptime              6 days, 8:37:36      system uptime
timezone            Etc/UTC              system time zone
```

3. Configure the hostname, IP address, subnet mask, and default gateway. The new hostname only becomes effective after restarting the console/SSH session.

A Cumulus Linux switch provides at least one dedicated Ethernet management port called `eth0`. This interface is specifically for out-of-band management use. By default, the management interface uses DHCPv4 for addressing.

Do not use an underscore (_), apostrophe ('), or non-ASCII characters in the hostname.

```
cumulus@cumulus:mgmt:~$ nv add hostname sw1
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cumulus@cumulus:mgmt:~$ nv pending
cumulus@cumulus:mgmt:~$ nv commit
```

This command modifies both the `/etc/hostname` and `/etc/hosts` files.

4. Confirm that the hostname, IP address, subnet mask, and default gateway have been updated.

```
cumulus@sw1:mgmt:~$ hostname sw1
cumulus@sw1:mgmt:~$ ifconfig eth0
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
inet 10.233.204.71  netmask 255.255.254.0  broadcast 10.233.205.255
inet6 fe80::bace:f6ff:fe19:1df6  prefixlen 64  scopeid 0x20<link>
ether b8:ce:f6:19:1d:f6  txqueuelen 1000  (Ethernet)
RX packets 75364  bytes 23013528 (21.9 MiB)
RX errors 0  dropped 7  overruns 0  frame 0
TX packets 4053  bytes 827280 (807.8 KiB)
TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0 device memory 0xdfc00000-
dfc1ffff

cumulus@sw1::mgmt:~$ ip route show vrf mgmt
default via 10.233.204.1 dev eth0
unreachable default metric 4278198272
10.233.204.0/23 dev eth0 proto kernel scope link src 10.233.204.71
127.0.0.0/8 dev mgmt proto kernel scope link src 127.0.0.1
```

5. Configure the time zone using NTP interactive mode.
   a. On a terminal, run the following command:

      ```
      cumulus@sw1:~$ sudo dpkg-reconfigure tzdata
      ```

   b. Follow the on-screen menu options to select the geographic area and region.
   c. To set the time zone for all services and daemons, reboot the switch.
   d. Verify that the date and time on the switch are correct and update if necessary.
6. Install Cumulus Linux 5.4:

   ```
   cumulus@sw1:mgmt:~$ sudo onie-install -a -i http://<web-server>/<path>/cumulus-linux-5.4-
   mlx-amd64.bin
   ```

   The installer starts the download. Type **y** when prompted.
7. Reboot the NVIDIA SN2100 switch:

   ```
   cumulus@sw1:mgmt:~$ sudo reboot
   ```

8. The installation starts automatically, and the following GRUB screen choices appear. Do **not** make any selections.
   - Cumulus-Linux GNU/Linux
   - ONIE: Install OS
   - CUMULUS-INSTALL

    - Cumulus-Linux GNU/Linux

9. Repeat steps 1 to 4 to log in.
10. Verify that the Cumulus Linux version is 5.4: `nv show system`

```
cumulus@cumulus:mgmt:~$ nv show system
operational         applied             description
------------------- ------------------- --------------------
hostname            cumulus             cumulus
build               Cumulus Linux 5.4.0 system build version
uptime              6 days, 13:37:36    system uptime
timezone            Etc/UTC             system time zone
```

11. Verify that the nodes each have a connection to each switch:

```
cumulus@sw1:mgmt:~$ nv show lldp

LocalPort  Speed  Mode        RemoteHost                          RemotePort
---------  -----  ----------  ----------------------------------  -----------
eth0       100M   Mgmt        mgmt-sw1                            Eth110/1/29
swp2s1     25G    Trunk/L2    node1                               e0a
swp15      100G   BondMember  sw2                                 swp15
swp16      100G   BondMember  sw2                                 swp16
```

12. Create a new user and add this user to the `sudo` group. This user only becomes effective after the console/SSH session is restarted.

    ```
    sudo adduser --ingroup netedit admin
    ```

```
cumulus@sw1:mgmt:~$ sudo adduser --ingroup netedit admin
[sudo] password for cumulus:
Adding user 'admin' ...
Adding new user 'admin' (1001) with group `netedit' ...
Creating home directory '/home/admin' ...
Copying files from '/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for admin
Enter the new value, or press ENTER for the default
Full Name []:
Room Number []:
Work Phone []:
Home Phone []:
Other []:
Is the information correct? [Y/n] y

cumulus@sw1:mgmt:~$ sudo adduser admin sudo
[sudo] password for cumulus:
Adding user `admin' to group `sudo' ...
Adding user admin to group sudo
Done.
cumulus@sw1:mgmt:~$ exit
logout
Connection to 10.233.204.71 closed.

[admin@cycrh6svl01 ~]$ ssh admin@10.233.204.71
admin@10.233.204.71's password:
Linux sw1 4.19.0-cl-1-amd64 #1 SMP Cumulus 4.19.206-1+cl4.4.1u1 (2021-09-09) x86_64
Welcome to NVIDIA Cumulus (R) Linux (R)

For support and online technical documentation, visit
http://www.cumulusnetworks.com/support

The registered trademark Linux (R) is used pursuant to a sublicense from LMI, the
exclusive licensee of Linus Torvalds, owner of the mark on a world-wide basis.
admin@sw1:mgmt:~$
```

13. Add additional user groups for the admin user to access `nv` commands:

```
cumulus@sw1:mgmt:~$ sudo adduser admin nvshow
     [sudo] password for cumulus:
     Adding user 'admin' to group 'nvshow' ...
     Adding user admin to group nvshow
     Done.
```

See NVIDIA User Accounts for more information.

**What's next?**

Install the Reference Configuration File (RCF) script.

## 3.3. Install Cumulus Linux in ONIE mode

Follow this procedure to install Cumulus Linux (CL) OS when the switch is running in ONIE mode.

Cumulus Linux (CL) OS can be installed either when the switch is running ONIE or Cumulus Linux (see Install in Cumulus mode).

**About this task**

You can install Cumulus Linux using Open Network Install Environment (ONIE) that allows for automatic discovery of a network installer image. This facilitates the system model of securing switches with an operating system choice, such as Cumulus Linux. The easiest way to install Cumulus Linux with ONIE is with local HTTP discovery.

If your host is IPv6-enabled, make sure it is running a web server. If your host is IPv4-enabled, make sure it is running DHCP in addition to a web server.

This procedure demonstrates how to upgrade Cumulus Linux after the admin has booted in ONIE.

**Example 2. Steps**

**Cumulus Linux 4.4.3**

1. Download the Cumulus Linux installation file to the root directory of the web server. Rename this file to: `onie-installer`.
2. Connect your host to the management Ethernet port of the switch using an Ethernet cable.
3. Power on the switch.

   The switch downloads the ONIE image installer and boots. After the installation completes, the Cumulus Linux login prompt appears in the terminal window.

   

   Each time Cumulus Linux is installed, the entire file system structure is erased and rebuilt.

4. Reboot the SN2100 switch:

   ```
   cumulus@cumulus:mgmt:~$ sudo reboot
   ```

5. Press the **Esc** key at the GNU GRUB screen to interrupt the normal boot process, select **ONIE**, and press **Enter**.
6. On the next screen, select **ONIE: Install OS**.
7. The ONIE installer discovery process runs searching for the automatic installation. Press **Enter** to temporarily stop the process.
8. When the discovery process has stopped:

   ```
   ONIE:/ # onie-stop
   discover: installer mode detected.
   Stopping: discover...start-stop-daemon: warning: killing process 427:
   No such process done.
   ```

9. If the DHCP service is running on your network, verify that the IP address, subnet mask, and the default gateway are correctly assigned:

   ```
   ifconfig eth0
   ```

```
ONIE:/ # ifconfig eth0
eth0   Link encap:Ethernet  HWaddr B8:CE:F6:19:1D:F6
       inet addr:10.233.204.71  Bcast:10.233.205.255  Mask:255.255.254.0
       inet6 addr: fe80::bace:f6ff:fe19:1df6/64 Scope:Link
       UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
       RX packets:21344 errors:0 dropped:2135 overruns:0 frame:0
       TX packets:3500 errors:0 dropped:0 overruns:0 carrier:0
       collisions:0 txqueuelen:1000
       RX bytes:6119398 (5.8 MiB)  TX bytes:472975 (461.8 KiB)
       Memory:dfc00000-dfc1ffff

ONIE:/ # route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface

default         10.233.204.1    0.0.0.0         UG    0      0      0   eth0
10.233.204.0    *               255.255.254.0   U     0      0      0   eth0
```

10. If the IP addressing scheme is manually defined, do the following:

```
ONIE:/ # ifconfig eth0 10.233.204.71 netmask 255.255.254.0
ONIE:/ # route add default gw 10.233.204.1
```

11. Repeat step 9 to verify that the static information is correctly entered.
12. Install Cumulus Linux:

```
# onie-nos-install http://<web-server>/<path>/cumulus-linux-4.4.3-mlx-amd64.bin
```

```
ONIE:/ # route

  Kernel IP routing table

  ONIE:/ # onie-nos-install http://<web-server>/<path>/cumulus-linux-4.4.3-mlx-amd64.bin

  Stopping: discover... done.
  Info: Attempting http://10.60.132.97/x/eng/testbedN,svl/nic/files/cumulus-linux-4.4.3-
mlx-amd64.bin ...
  Connecting to 10.60.132.97 (10.60.132.97:80)
  installer            100% |*|   552M  0:00:00 ETA
  ...
  ...
```

13. After the installation has completed, log in to the switch.

```
cumulus login: cumulus
Password: cumulus
You are required to change your password immediately (administrator enforced)
Changing password for cumulus.
Current password: cumulus
New password: <new_password>
Retype new password: <new_password>
```

14. Verify the Cumulus Linux version: `net show version`

```
cumulus@cumulus:mgmt:~$ net show version
NCLU_VERSION=1.0-cl4.4.3u4
DISTRIB_ID="Cumulus Linux"
DISTRIB_RELEASE=4.4.3
DISTRIB_DESCRIPTION="Cumulus Linux 4.4.3"
```

**Cumulus Linux 5.x**

1. Download the Cumulus Linux installation file to the root directory of the web server. Rename this file to: `onie-installer`.
2. Connect your host to the management Ethernet port of the switch using an Ethernet cable.
3. Power on the switch.

   The switch downloads the ONIE image installer and boots. After the installation completes, the Cumulus Linux login prompt appears in the terminal window.

   

   Each time Cumulus Linux is installed, the entire file system structure is erased and rebuilt.

4. Reboot the SN2100 switch:

```
cumulus@cumulus:mgmt:~$ sudo reboot
.
.
GNU GRUB version 2.06-3
+----------------------------------------------------------------------------+
| Cumulus-Linux GNU/Linux                                                    |
| Advanced options for Cumulus-Linux GNU/Linux                               |
| ONIE                                                                       |
|                                                                            |
|                                                                            |
|                                                                            |
|                                                                            |
|                                                                            |
|                                                                            |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+
```

5. Press the Esc key at the GNU GRUB screen to interrupt the normal boot process, select ONIE, and press Enter.

```
.
.
Loading ONIE ...

GNU GRUB version 2.02
+----------------------------------------------------------------------------+
| ONIE: Install OS                                                           |
| ONIE: Rescue                                                               |
| ONIE: Uninstall OS                                                         |
| ONIE: Update ONIE                                                          |
| ONIE: Embed ONIE                                                           |
|                                                                            |
|                                                                            |
|                                                                            |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+
```

   Select ONIE: **Install OS.**

6. The ONIE installer discovery process runs searching for the automatic installation. Press **Enter** to temporarily stop the process.
7. When the discovery process has stopped:

```
ONIE:/ # onie-stop
discover: installer mode detected.
Stopping: discover...start-stop-daemon: warning: killing process 427:
No such process done.
```

8. Configure the IP address, subnet mask, and the default gateway:

   ```
   ifconfig eth0
   ```

```
ONIE:/ # ifconfig eth0
eth0   Link encap:Ethernet  HWaddr B8:CE:F6:19:1D:F6
       inet addr:10.233.204.71  Bcast:10.233.205.255  Mask:255.255.254.0
       inet6 addr: fe80::bace:f6ff:fe19:1df6/64 Scope:Link
       UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
       RX packets:21344 errors:0 dropped:2135 overruns:0 frame:0
       TX packets:3500 errors:0 dropped:0 overruns:0 carrier:0
       collisions:0 txqueuelen:1000
       RX bytes:6119398 (5.8 MiB)  TX bytes:472975 (461.8 KiB)
       Memory:dfc00000-dfc1ffff
ONIE:/ #
ONIE:/ # ifconfig eth0 10.228.140.27 netmask 255.255.248.0
ONIE:/ # ifconfig eth0
eth0   Link encap:Ethernet HWaddr B8:CE:F6:5E:05:E6
       inet addr:10.228.140.27 Bcast:10.228.143.255 Mask:255.255.248.0
       inet6 addr: fd20:8b1e:b255:822b:bace:f6ff:fe5e:5e6/64 Scope:Global
       inet6 addr: fe80::bace:f6ff:fe5e:5e6/64 Scope:Link
       UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
       RX packets:18813 errors:0 dropped:1418 overruns:0 frame:0
       TX packets:491 errors:0 dropped:0 overruns:0 carrier:0
       collisions:0 txqueuelen:1000
       RX bytes:1339596 (1.2 MiB) TX bytes:49379 (48.2 KiB)
       Memory:dfc00000-dfc1ffff
ONIE:/ # route add default gw 10.228.136.1
ONIE:/ # route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface

default         10.228.136.1    0.0.0.0         UG    0      0      0   eth0
10.228.136.1    *               255.255.248.0   U     0      0      0   eth0
```

9. Install Cumulus Linux 5.4:

```
# onie-nos-install http://<web-server>/<path>/cumulus-linux-5.4-mlx-amd64.bin
```

```
ONIE:/ # route

  Kernel IP routing table

  ONIE:/ # onie-nos-install http://<web-server>/<path>/cumulus-linux-5.4-mlx-amd64.bin

  Stopping: discover... done.
  Info: Attempting http://10.60.132.97/x/eng/testbedN,svl/nic/files/cumulus-linux-5.4-mlx-
amd64.bin ...
  Connecting to 10.60.132.97 (10.60.132.97:80)
  installer            100% |*|   552M  0:00:00 ETA
  ...
  ...
```

10. After the installation has completed, log in to the switch.

```
cumulus login: cumulus
Password: cumulus
You are required to change your password immediately (administrator enforced)
Changing password for cumulus.
Current password: cumulus
New password: <new_password>
Retype new password: <new_password>
```

11. Verify the Cumulus Linux version: `nv show system`

```
cumulus@cumulus:mgmt:~$ nv show system
operational         applied              description
------------------- -------------------- --------------------
hostname            cumulus              cumulus
build               Cumulus Linux 5.4.0  system build version
uptime              6 days, 13:37:36     system uptime
timezone            Etc/UTC              system time zone
```

12. Create a new user and add this user to the `sudo` group. This user only becomes effective after the console/SSH session is restarted.

    ```
    sudo adduser --ingroup netedit admin
    ```

```
cumulus@sw1:mgmt:~$ sudo adduser --ingroup netedit admin
[sudo] password for cumulus:
Adding user 'admin' ...
Adding new user 'admin' (1001) with group `netedit' ...
Creating home directory '/home/admin' ...
Copying files from '/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for admin
Enter the new value, or press ENTER for the default
Full Name []:
Room Number []:
Work Phone []:
Home Phone []:
Other []:
Is the information correct? [Y/n] y

cumulus@sw1:mgmt:~$ sudo adduser admin sudo
[sudo] password for cumulus:
Adding user `admin' to group `sudo' ...
Adding user admin to group sudo
Done.
cumulus@sw1:mgmt:~$ exit
logout
Connection to 10.233.204.71 closed.

[admin@cycrh6svl01 ~]$ ssh admin@10.233.204.71
admin@10.233.204.71's password:
Linux sw1 4.19.0-cl-1-amd64 #1 SMP Cumulus 4.19.206-1+cl4.4.1u1 (2021-09-09) x86_64
Welcome to NVIDIA Cumulus (R) Linux (R)

For support and online technical documentation, visit
http://www.cumulusnetworks.com/support

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exclusive licensee of Linus Torvalds, owner of the mark on a world-wide basis.
admin@sw1:mgmt:~$
```

13. Add additional user groups for the admin user to access `nv` commands:

```
cumulus@cumulus:mgmt:~$ sudo adduser admin nvshow
     [sudo] password for cumulus:
     Adding user `admin' to group `nvshow' ...
     Adding user admin to group nvshow
     Done.
```

See NVIDIA User Accounts for more information.

**What's next?**

Install the Reference Configuration File (RCF) script.

## 3.4. Install the Reference Configuration File (RCF) script

Follow this procedure to install the RCF script.

**What you'll need**

Before installing the RCF script, make sure that the following are available on the switch:

- Cumulus Linux is installed.
- IP address, subnet mask, and default gateway defined via DHCP or manually configured.

**Current RCF script versions**

There are two RCF scripts available for Cluster and Storage applications. Download RCFs from Lenovo Data Center Support Site. The procedure for each is the same.

- Cluster: **MSN2100-RCF-v1.x-Cluster**
- Storage: **MSN2100-RCF-v1.*x*-Storage**

**About the examples**

The following example procedure shows how to download and apply the RCF script for Cluster switches.

Example command output uses switch management IP address 10.233.204.71, netmask 255.255.254.0 and default gateway 10.233.204.1.

**Example 3. Steps**

**Cumulus Linux 4.4.3**

1. Display the available interfaces on the SN2100 switch:

```
admin@sw1:mgmt:~$ net show interface all

State  Name   Spd  MTU    Mode         LLDP               Summary
-----  -----  ---  -----  -----------  -----------------  --------------
...
...
ADMDN  swp1   N/A  9216   NotConfigured
ADMDN  swp2   N/A  9216   NotConfigured
ADMDN  swp3   N/A  9216   NotConfigured
ADMDN  swp4   N/A  9216   NotConfigured
ADMDN  swp5   N/A  9216   NotConfigured
ADMDN  swp6   N/A  9216   NotConfigured
ADMDN  swp7   N/A  9216   NotConfigure
ADMDN  swp8   N/A  9216   NotConfigured
ADMDN  swp9   N/A  9216   NotConfigured
ADMDN  swp10  N/A  9216   NotConfigured
ADMDN  swp11  N/A  9216   NotConfigured
ADMDN  swp12  N/A  9216   NotConfigured
ADMDN  swp13  N/A  9216   NotConfigured
ADMDN  swp14  N/A  9216   NotConfigured
ADMDN  swp15  N/A  9216   NotConfigured
ADMDN  swp16  N/A  9216   NotConfigured
```

2. Copy the RCF python script to the switch.

```
cumulus@cumulus:mgmt:~$ pwd
/home/cumulus
cumulus@cumulus:mgmt: /tmp$ scp <user>@<host:/<path>/cumulus@swrackd:mgmt:~$ cd /tmp
cumulus@swrackd:mgmt:/tmp$ ./
ssologin@10.233.204.71's password:
MSN2100-RCF-v1.x-Cluster         100% 8607   111.2KB/s         00:00
```

3. Apply the RCF python script **MSN2100-RCF-v1.x-Cluster**.

```
cumulus@cumulus:mgmt:/tmp$ sudo python3 MSN2100-RCF-v1.x-Cluster
[sudo] password for cumulus:
...
Step 1: Creating the banner file
Step 2: Registering banner message
Step 3: Updating the MOTD file
Step 4: Ensuring passwordless use of cl-support command by admin
Step 5: Disabling apt-get
Step 6: Creating the interfaces
Step 7: Adding the interface config
Step 8: Disabling cdp
Step 9: Adding the lldp config
Step 10: Adding the RoCE base config
Step 11: Modifying RoCE Config
Step 12: Configure SNMP
Step 13: Reboot the switch
```

The RCF script completes the steps listed in the example above.

In step 3 **Updating the MOTD file** above, the command `cat /etc/motd` is run. This allows you to verify the RCF filename, RCF version, ports to use, and other important information in the RCF banner.

For any RCF python script issues that cannot be corrected, contact Lenovo Data Center Support for assistance.

4. Verify the configuration after the reboot:

```
admin@sw1:mgmt:~$ net show interface all

State  Name      Spd   MTU    Mode       LLDP              Summary
-----  --------- ----  -----  ---------- ----------------- --------
...
...
DN     swp1s0    N/A   9216   Trunk/L2                     Master: bridge(UP)
DN     swp1s1    N/A   9216   Trunk/L2                     Master: bridge(UP)
DN     swp1s2    N/A   9216   Trunk/L2                     Master: bridge(UP)
DN     swp1s3    N/A   9216   Trunk/L2                     Master: bridge(UP)
DN     swp2s0    N/A   9216   Trunk/L2                     Master: bridge(UP)
DN     swp2s1    N/A   9216   Trunk/L2                     Master: bridge(UP)
DN     swp2s2    N/A   9216   Trunk/L2                     Master: bridge(UP)
DN     swp2s3    N/A   9216   Trunk/L2                     Master: bridge(UP)
UP     swp3      100G  9216   Trunk/L2                     Master: bridge(UP)
UP     swp4      100G  9216   Trunk/L2                     Master: bridge(UP)
DN     swp5      N/A   9216   Trunk/L2                     Master: bridge(UP)
DN     swp6      N/A   9216   Trunk/L2                     Master: bridge(UP)
DN     swp7      N/A   9216   Trunk/L2                     Master: bridge(UP)
DN     swp8      N/A   9216   Trunk/L2                     Master: bridge(UP)
DN     swp9      N/A   9216   Trunk/L2                     Master: bridge(UP)
DN     swp10     N/A   9216   Trunk/L2                     Master: bridge(UP)
DN     swp11     N/A   9216   Trunk/L2                     Master: bridge(UP)
```

```
DN     swp12     N/A   9216   Trunk/L2                    Master: bridge(UP)
DN     swp13     N/A   9216   Trunk/L2                    Master: bridge(UP)
DN     swp14     N/A   9216   Trunk/L2                    Master: bridge(UP)
UP     swp15     N/A   9216   BondMember                  Master: bond_15_16(UP)
UP     swp16     N/A   9216   BondMember                  Master: bond_15_16(UP)
...
...

admin@sw1:mgmt:~$ net show roce config
RoCE mode.......... lossless
Congestion Control:
  Enabled SPs.... 0 2 5
  Mode........... ECN
  Min Threshold.. 150 KB
  Max Threshold.. 1500 KB
PFC:
  Status......... enabled
  Enabled SPs.... 2 5
  Interfaces......... swp10-16,swp1s0-3,swp2s0-3,swp3-9

DSCP                    802.1p  switch-priority
----------------------  ------  ---------------
0 1 2 3 4 5 6 7              0                0
8 9 10 11 12 13 14 15        1                1
16 17 18 19 20 21 22 23      2                2
24 25 26 27 28 29 30 31      3                3
32 33 34 35 36 37 38 39      4                4
40 41 42 43 44 45 46 47      5                5
48 49 50 51 52 53 54 55      6                6
56 57 58 59 60 61 62 63      7                7

switch-priority  TC  ETS
---------------  --  --------
0 1 3 4 6 7       0  DWRR 28%
2                 2  DWRR 28%
5                 5  DWRR 43%
```

5. Verify information for the transceiver in the interface:

```
admin@sw1:mgmt:~$ net show interface pluggables
Interface  Identifier     Vendor Name  Vendor PN        Vendor SN       Vendor Rev
---------  -------------  -----------  ---------------  --------------  ----------
swp3       0x11 (QSFP28)  Amphenol     112-00574        APF20379253516  B0
swp4       0x11 (QSFP28)  AVAGO        332-00440        AF1815GU05Z     A0
swp15      0x11 (QSFP28)  Amphenol     112-00573        APF21109348001  B0
swp16      0x11 (QSFP28)  Amphenol     112-00573        APF21109347895  B0
```

6. Verify that the nodes each have a connection to each switch:

```
admin@sw1:mgmt:~$ net show lldp

LocalPort  Speed  Mode        RemoteHost              RemotePort
---------  -----  ----------  ----------------------  -----------
swp3       100G   Trunk/L2    sw1                     e3a
swp4       100G   Trunk/L2    sw2                     e3b
swp15      100G   BondMember  sw13                    swp15
swp16      100G   BondMember  sw14                    swp16
```

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

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

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

Node: node1
                                                                        Ignore
                                                  Speed(Mbps) Health    Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status    Status
--------- ------------ ---------------- ---- ---- ----------- --------- ------
e3a       Cluster      Cluster          up   9000  auto/10000 healthy   false
e3b       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
--------- ------------ ---------------- ---- ---- ----------- --------- ------
e3a       Cluster      Cluster          up   9000  auto/10000 healthy   false
e3b       Cluster      Cluster          up   9000  auto/10000 healthy   false
```

   b. Verify the switch health from the cluster (this might not show switch sw2, since LIFs are not homed on e0d).

```
cluster1::*> network device-discovery show -protocol lldp
Node/       Local  Discovered
Protocol    Port   Device (LLDP: ChassisID)  Interface Platform
----------- ------ ------------------------- --------- ----------
node1/lldp
            e3a    sw1 (b8:ce:f6:19:1a:7e)   swp3      -
            e3b    sw2 (b8:ce:f6:19:1b:96)   swp3      -

node2/lldp
            e3a    sw1 (b8:ce:f6:19:1a:7e)   swp4      -
            e3b    sw2 (b8:ce:f6:19:1b:96)   swp4      -


cluster1::*> system switch ethernet show -is-monitoring-enabled-operational true
Switch                      Type               Address          Model
--------------------------- ------------------ ---------------- -----
sw1                         cluster-network    10.233.205.90    MSN2100-CB2RC
     Serial Number: MNXXXXXXGD
      Is Monitored: true
            Reason: None
  Software Version: Cumulus Linux version 4.4.3 running on Mellanox
                    Technologies Ltd. MSN2100
    Version Source: LLDP

sw2                         cluster-network    10.233.205.91    MSN2100-CB2RC
     Serial Number: MNCXXXXXXGS
      Is Monitored: true
            Reason: None
  Software Version: Cumulus Linux version 4.4.3 running on Mellanox
                    Technologies Ltd. MSN2100
    Version Source: LLDP
```

**Cumulus Linux 5.x**

1. Display the available interfaces on the SN2100 switch:

```
admin@sw1:mgmt:~$ nv show interface
Interface     MTU   Speed State Remote Host         Remote Port- Type      Summary
------------ ----- ----- ----- ------------------- ------------ --------- -------------
+ cluster_isl 9216  200G  up                                     bond
+ eth0        1500  100M  up    mgmt-sw1           Eth105/1/14   eth       IP Address:
10.231.80 206/22
  eth0                                                                     IP Address:
fd20:8b1e:f6ff:fe31:4a0e/64
+ lo          65536       up                                     loopback  IP Address:
127.0.0.1/8
  lo                                                                       IP Address:
::1/128
+ swp1s0      9216 10G    up cluster01               e0b         swp
.
.
.
+ swp15      9216 100G    up sw2                     swp15       swp
+ swp16      9216 100G    up sw2                     swp16       swp
```

2. Copy the RCF python script to the switch.

```
admin@sw1:mgmt:~$ pwd
/home/cumulus
cumulus@cumulus:mgmt: /tmp$ scp <user>@<host:/<path>/MSN2100-RCF-v1.x-Cluster ./
ssologin@10.233.204.71's password:
MSN2100-RCF-v1.x-Cluster          100% 8607   111.2KB/s         00:00
```

3. Apply the RCF python script **MSN2100-RCF-v1.x-Cluster**.

```
cumulus@cumulus:mgmt:/tmp$ sudo python3 MSN2100-RCF-v1.x-Cluster
[sudo] password for cumulus:
.
.
Step 1: Creating the banner file
Step 2: Registering banner message
Step 3: Updating the MOTD file
Step 4: Ensuring passwordless use of cl-support command by admin
Step 5: Disabling apt-get
Step 6: Creating the interfaces
Step 7: Adding the interface config
Step 8: Disabling cdp
Step 9: Adding the lldp config
Step 10: Adding the RoCE base config
Step 11: Modifying RoCE Config
Step 12: Configure SNMP
Step 13: Reboot the switch
```

The RCF script completes the steps listed in the example above.

In step 3 **Updating the MOTD file** above, the command `cat /etc/issue` is run. This allows you to verify the RCF filename, RCF version, ports to use, and other important information in the RCF banner.

For example:

```
admin@sw1:mgmt:~$ cat /etc/issue
*******************************************************************************
*
* Lenovo Reference Configuration File (RCF)
* Switch       : Mellanox MSN2100
* Filename     : MSN2100-RCF-1.x-Cluster-HA-Breakout-LLDP
* Release Date : 13-02-2023
* Version      : 1.x-Cluster-HA-Breakout-LLDP
*
* Port Usage:
* Port 1      : 4x10G Breakout mode for Cluster+HA Ports, swp1s0-3
* Port 2      : 4x25G Breakout mode for Cluster+HA Ports, swp2s0-3
* Ports 3-14  : 40/100G for Cluster+HA Ports, swp3-14
* Ports 15-16 : 100G Cluster ISL Ports, swp15-16
*
* NOTE:
*   RCF manually sets swp1s0-3 link speed to 10000 and
*   auto-negotiation to off for Intel 10G
*   RCF manually sets swp2s0-3 link speed to 25000 and
*   auto-negotiation to off for Chelsio 25G
*
*
* IMPORTANT: Perform the following steps to ensure proper RCF installation:
* - Copy the RCF file to /tmp
* - Ensure the file has execute permission
* - From /tmp run the file as sudo python3 <filename>
*
*******************************************************************************
```

4. Verify the configuration after the reboot:

```
admin@sw1:mgmt:~$ nv show interface
Interface   MTU   Speed State Remote Host Remote Port Type Summary
----------- ----- ----- ----- ----------- ----------- ---- -------------
+ cluster_isl 9216 200G up bond
+ eth0 1500 100M up RTP-LF01-410G38.rtp.eng.lenovo.com Eth105/1/14 eth IP Address:
10.231.80.206/22
eth0 IP Address: fd20:8b1e:b255:85a0:bace:f6ff:fe31:4a0e/64
+ lo 65536 up loopback IP Address: 127.0.0.1/8
lo IP Address: ::1/128
+ swp1s0 9216 10G up cumulus1 e0b swp
.
.
.
+ swp15 9216 100G up cumulus swp15 swp----
admin@sw1:mgmt:~$ nv show interface
```

```
Interface     MTU   Speed State Remote Host         Remote Port- Type      Summary
------------- ----- ----- ----- ------------------- ------------ --------- -------------
+ cluster_isl 9216  200G  up                                      bond
+ eth0        1500  100M  up    mgmt-sw1            Eth105/1/14  eth       IP Address:
10.231.80 206/22
  eth0                                                                     IP Address:
fd20:8b1e:f6ff:fe31:4a0e/64
+ lo          65536       up                                      loopback  IP Address:
127.0.0.1/8
  lo                                                                       IP Address:
::1/128
+ swp1s0      9216 10G    up cluster01               e0b         swp
.
.
.
+ swp15      9216 100G    up sw2                     swp15       swp
+ swp16      9216 100G    up sw2                     swp16       swp

admin@sw1:mgmt:~$ nv show qos roce
                  operational  applied   description
----------------  -----------  --------- ---------------------------------------
enable            on                     Turn feature 'on' or 'off'. This feature is
disabled by default.
mode              lossless     lossless  Roce Mode
congestion-control
  congestion-mode   ECN,RED               Congestion config mode
  enabled-tc        0,2,5                 Congestion config enabled Traffic Class
  max-threshold     200000 B              Congestion config max-threshold
  min-threshold     40000 B               Congestion config min-threshold
lldp-app-tlv
  priority          3                     switch-priority of roce
  protocol-id       4791                  L4 port number
  selector          UDP                   L4 protocol
pfc
  pfc-priority      2, 5                  switch-prio on which PFC is enabled
  rx-enabled        enabled               PFC Rx Enabled status
  tx-enabled        enabled               PFC Tx Enabled status
trust
  trust-mode        pcp,dscp              Trust Setting on the port for packet
classification

RoCE PCP/DSCP->SP mapping configurations
========================================
        pcp  dscp                    switch-prio
    --  ---  ----------------------  -----------
    0   0    0,1,2,3,4,5,6,7         0
    1   1    8,9,10,11,12,13,14,15   1
    2   2    16,17,18,19,20,21,22,23 2
    3   3    24,25,26,27,28,29,30,31 3
    4   4    32,33,34,35,36,37,38,39 4
    5   5    40,41,42,43,44,45,46,47 5
    6   6    48,49,50,51,52,53,54,55 6
    7   7    56,57,58,59,60,61,62,63 7

RoCE SP->TC mapping and ETS configurations
==========================================
```

```
        switch-prio  traffic-class  scheduler-weight
    --  -----------  -------------  ----------------
    0   0            0              DWRR-28%
    1   1            0              DWRR-28%
    2   2            2              DWRR-28%
    3   3            0              DWRR-28%
    4   4            0              DWRR-28%
    5   5            5              DWRR-43%
    6   6            0              DWRR-28%
    7   7            0              DWRR-28%

RoCE pool config
==================
        name                   mode     size  switch-priorities  traffic-class
    --  ---------------------  -------  ----  -----------------  -------------
    0   lossy-default-ingress  Dynamic  50%   0,1,3,4,6,7        -
    1   roce-reserved-ingress  Dynamic  50%   2,5                -
    2   lossy-default-egress   Dynamic  50%   -                  0
    3   roce-reserved-egress   Dynamic  inf   -                  2,5
```

5. Verify information for the transceiver in the interface:

```
admin@sw1:mgmt:~$ nv show interface pluggables
Interface  Identifier     Vendor Name  Vendor PN        Vendor SN       Vendor Rev
---------  -------------  -----------  ---------------  --------------  ----------
swp1s0     0x00 None
swp1s1     0x00 None
swp1s2     0x00 None
swp1s3     0x00 None
swp2s0     0x11 (QSFP28)  CISCO-LEONI  L45593-D278-D20  LCC2321GTTJ     00
swp2s1     0x11 (QSFP28)  CISCO-LEONI  L45593-D278-D20  LCC2321GTTJ     00
swp2s2     0x11 (QSFP28)  CISCO-LEONI  L45593-D278-D20  LCC2321GTTJ     00
swp2s3     0x11 (QSFP28)  CISCO-LEONI  L45593-D278-D20  LCC2321GTTJ     00
swp3       0x00 None
swp4       0x00 None
swp5       0x00 None
swp6       0x00 None
.
.
.
swp15      0x11 (QSFP28)  Amphenol     112-00595        APF20279210117  B0
swp16      0x11 (QSFP28)  Amphenol     112-00595        APF20279210166  B0
```

6. Verify that the nodes each have a connection to each switch:

```
admin@sw1:mgmt:~$ nv show lldp

LocalPort  Speed  Mode        RemoteHost              RemotePort
---------  -----  ----------  ----------------------  -----------
eth0       100M   Mgmt        mgmt-sw1                Eth110/1/29
swp2s1     25G    Trunk/L2    node1                   e0a
swp15      100G   BondMember  sw2                     swp15
swp16      100G   BondMember  sw2                     swp16
```

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

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

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

Node: node1
                                                                        Ignore
                                                  Speed(Mbps) Health    Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status    Status
--------- ------------ ---------------- ---- ---- ----------- --------- ------
e3a       Cluster      Cluster          up   9000  auto/10000 healthy   false
e3b       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
--------- ------------ ---------------- ---- ---- ----------- --------- ------
e3a       Cluster      Cluster          up   9000  auto/10000 healthy   false
e3b       Cluster      Cluster          up   9000  auto/10000 healthy   false
```

   b. Verify the switch health from the cluster (this might not show switch sw2, since LIFs are not homed on e0d).

```
cluster1::*> network device-discovery show -protocol lldp
Node/       Local  Discovered
Protocol    Port   Device (LLDP: ChassisID)  Interface Platform
----------- ------ ------------------------- --------- ----------
node1/lldp
            e3a    sw1 (b8:ce:f6:19:1a:7e)   swp3      -
            e3b    sw2 (b8:ce:f6:19:1b:96)   swp3      -

node2/lldp
            e3a    sw1 (b8:ce:f6:19:1a:7e)   swp4      -
            e3b    sw2 (b8:ce:f6:19:1b:96)   swp4      -


cluster1::*> system switch ethernet show -is-monitoring-enabled-operational true
Switch                      Type               Address          Model
--------------------------- ------------------ ---------------- -----
sw1                         cluster-network    10.233.205.90    MSN2100-CB2RC
     Serial Number: MNXXXXXXGD
      Is Monitored: true
            Reason: None
  Software Version: Cumulus Linux version 5.4.0 running on Mellanox
                    Technologies Ltd. MSN2100
    Version Source: LLDP

sw2                         cluster-network    10.233.205.91    MSN2100-CB2RC
     Serial Number: MNCXXXXXXGS
      Is Monitored: true
            Reason: None
  Software Version: Cumulus Linux version 5.4.0 running on Mellanox
                    Technologies Ltd. MSN2100
    Version Source: LLDP
```

**What's next?**

Configure switch log collection.

## 3.5. Configure SNMPv3 for switch log collection

Follow this procedure to configure SNMPv3, which supports switch log collection and Switch Health Monitoring (SHM).

**About this task**

The following commands configure an SNMPv3 username on NVIDIA SN2100 switches:

- For **no authentication**: `net add snmp-server username SNMPv3_USER auth-none`
- For **MD5/SHA authentication**: `net add snmp-server username SNMPv3_USER [auth-md5|auth-sha] AUTH-PASSWORD`
- For **MD5/SHA authentication with AES/DES encryption**: `net add snmp-server username SNMPv3_USER [auth-md5|auth-sha] AUTH-PASSWORD [encrypt-aes|encrypt-des] PRIV-PASSWORD`

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

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

**Steps**

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

   ```
   net show snmp status
   ```

### Show example

```
cumulus@sw1:~$ net show snmp status
Simple Network Management Protocol (SNMP) Daemon.
---------------------------------  ----------------
Current Status                     active (running)
Reload Status                      enabled
Listening IP Addresses             all vrf mgmt
Main snmpd PID                     4318
Version 1 and 2c Community String  Configured
Version 3 Usernames                Not Configured
---------------------------------  ----------------
cumulus@sw1:~$
cumulus@sw1:~$ net add snmp-server username SNMPv3User auth-md5 <password> encrypt-aes
<password>
cumulus@sw1:~$ net commit
--- /etc/snmp/snmpd.conf        2020-08-02 21:09:34.686949282 +0000
+++ /run/nclu/snmp/snmpd.conf   2020-08-11 00:13:51.826126655 +0000
@@ -1,26 +1,28 @@
 # Auto-generated config file: do not edit. #
 agentaddress udp:@mgmt:161
 agentxperms 777 777 snmp snmp
 agentxsocket /var/agentx/master
 createuser _snmptrapusernameX
+createuser SNMPv3User MD5 <password> AES <password>
 ifmib_max_num_ifaces 500
 iquerysecname _snmptrapusernameX
 master agentx
 monitor -r 60 -o laNames -o laErrMessage "laTable" laErrorFlag != 0
 pass -p 10 1.3.6.1.2.1.1.1 /usr/share/snmp/sysDescr_pass.py
 pass_persist 1.2.840.10006.300.43 /usr/share/snmp/ieee8023_lag_pp.py
 pass_persist 1.3.6.1.2.1.17 /usr/share/snmp/bridge_pp.py
 pass_persist 1.3.6.1.2.1.31.1.1.1.18 /usr/share/snmp/snmpifAlias_pp.py
 pass_persist 1.3.6.1.2.1.47 /usr/share/snmp/entity_pp.py
 pass_persist 1.3.6.1.2.1.99 /usr/share/snmp/entity_sensor_pp.py
 pass_persist 1.3.6.1.4.1.40310.1 /usr/share/snmp/resq_pp.py
 pass_persist 1.3.6.1.4.1.40310.2 /usr/share/snmp/cl_drop_cntrs_pp.py
 pass_persist 1.3.6.1.4.1.40310.3 /usr/share/snmp/cl_poe_pp.py
 pass_persist 1.3.6.1.4.1.40310.4 /usr/share/snmp/bgpun_pp.py
 pass_persist 1.3.6.1.4.1.40310.5 /usr/share/snmp/cumulus-status.py
 pass_persist 1.3.6.1.4.1.40310.6 /usr/share/snmp/cumulus-sensor.py
 pass_persist 1.3.6.1.4.1.40310.7 /usr/share/snmp/vrf_bgpun_pp.py
+rocommunity cshm1! default
 rouser _snmptrapusernameX
+rouser SNMPv3User priv
 sysobjectid 1.3.6.1.4.1.40310
 sysservices 72
-rocommunity cshm1! default


net add/del commands since the last "net commit"
================================================

User        Timestamp                  Command
----------  -------------------------
```

```
--------------------------------------------------------------------------------
SNMPv3User  2020-08-11 00:13:51.826987  net add snmp-server username SNMPv3User auth-md5
<password> encrypt-aes <password>

cumulus@sw1:~$
cumulus@sw1:~$ net show snmp status
Simple Network Management Protocol (SNMP) Daemon.
---------------------------------  ----------------
Current Status                     active (running)
Reload Status                      enabled
Listening IP Addresses             all vrf mgmt
Main snmpd PID                     24253
Version 1 and 2c Community String  Configured
Version 3 Usernames                Configured     <---- Configured here
---------------------------------  ----------------
cumulus@sw1:~$
```

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

   `security login create -user-or-group-name SNMPv3User -application snmp -authentication-method usm -remote-switch-ipaddress 10.231.80.212`

   **Show example**

   ```
   cluster1::*> security login create -user-or-group-name SNMPv3User -application snmp
   -authentication-method usm -remote-switch-ipaddress 10.231.80.212

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

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

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

   Enter the authentication protocol password again:

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

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

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

   `system switch ethernet show-all -device "sw1 (b8:59:9f:09:7c:22)" -instance`

**Show example**

```
cluster1::*> system switch ethernet show-all -device "sw1 (b8:59:9f:09:7c:22)" -instance
                                  Device Name: sw1 (b8:59:9f:09:7c:22)
                                   IP Address: 10.231.80.212
                                 SNMP Version: SNMPv2c
                                Is Discovered: true
DEPRECATED-Community String or SNMPv3 Username: -
           Community String or SNMPv3 Username: cshm1!
                                 Model Number: MSN2100-CB2FC
                               Switch Network: cluster-network
                             Software Version: Cumulus Linux version 4.4.3 running on
Mellanox Technologies Ltd. MSN2100
                     Reason For Not Monitoring: None
                      Source Of Switch Version: LLDP
                                Is Monitored ?: true
                   Serial Number of the Device: MT2110X06399  <---- serial number to check
                                   RCF Version: MSN2100-RCF-v1.9X6-Cluster-LLDP Aug-18-
2022

cluster1::*>
cluster1::*> system switch ethernet modify -device "sw1 (b8:59:9f:09:7c:22)" -snmp-version
SNMPv3 -community-or-username SNMPv3User
```

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

   `system switch ethernet polling-interval show`

**Show example**

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

cluster1::*> system switch ethernet show-all -device "sw1 (b8:59:9f:09:7c:22)" -instance
                                  Device Name: sw1 (b8:59:9f:09:7c:22)
                                   IP Address: 10.231.80.212
                                 SNMP Version: SNMPv3
                                Is Discovered: true
DEPRECATED-Community String or SNMPv3 Username: -
           Community String or SNMPv3 Username: SNMPv3User
                                 Model Number: MSN2100-CB2FC
                               Switch Network: cluster-network
                             Software Version: Cumulus Linux version 4.4.3 running on
Mellanox Technologies Ltd. MSN2100
                     Reason For Not Monitoring: None
                      Source Of Switch Version: LLDP
                                Is Monitored ?: true
                   Serial Number of the Device: MT2110X06399  <---- serial number to check
                                   RCF Version: MSN2100-RCF-v1.9X6-Cluster-LLDP Aug-18-
2022
```

## 3.6. Upgrade Cumulus Linux versions

Complete the following procedure to upgrade your Cumulus Linux version as required.

**What you'll need**

- Intermediate-level Linux knowledge.
- Familiarity with basic text editing, UNIX file permissions, and process monitoring. A variety of text editors are pre-installed, including `vi` and `nano`.
- Access to a Linux or UNIX shell. If you are running Windows, use a Linux environment as your command line tool for interacting with Cumulus Linux.
- The baud rate requirement is set to 115200 on the serial console switch for NVIDIA SN2100 switch console access, as follows:
  - 115200 baud
  - 8 data bits
  - 1 stop bit
  - parity: none
  - flow control: none

**About this task**

Be aware of the following:

Each time Cumulus Linux is upgraded, the entire file system structure is erased and rebuilt. Your existing configuration will be erased. You must save and record your switch configuration before updating Cumulus Linux.

The default password for the cumulus user account is **cumulus**. The first time you log into Cumulus Linux, you must change this default password. You must update any automation scripts before installing a new image. Cumulus Linux provides command line options to change the default password automatically during the installation process.

**Example 4. Steps**

**From Cumulus Linux 4.4.x to Cumulus Linux 5.x**

1. Check the current Cumulus Linux version and connected ports:

```
admin@sw1:mgmt:~$ net show system
Hostname......... cumulus
Build............ Cumulus Linux 4.4.3
Uptime........... 0:08:20.860000
Model............ Mlnx X86
CPU.............. x86_64 Intel Atom C2558 2.40GHz
Memory........... 8GB
Disk............. 14.7GB
ASIC............. Mellanox Spectrum MT52132
Ports............ 16 x 100G-QSFP28
Part Number...... MSN2100-CB2FC
Serial Number.... MT2105T05177
Platform Name.... x86_64-mlnx_x86-r0
Product Name..... MSN2100
ONIE Version..... 2019.11-5.2.0020-115200
Base MAC Address. 04:3F:72:43:92:80
Manufacturer..... Mellanox

admin@sw1:mgmt:~$ net show interface

State  Name    Spd   MTU    Mode        LLDP                    Summary
-----  ------  ----  -----  ----------  ----------------------  --------------------
.
.
UP     swp1    100G  9216   Trunk/L2    node1 (e5b)             Master: bridge(UP)
UP     swp2    100G  9216   Trunk/L2    node2 (e5b)             Master: bridge(UP)
UP     swp3    100G  9216   Trunk/L2    SHFFG1826000112 (e0b)   Master: bridge(UP)
UP     swp4    100G  9216   Trunk/L2    SHFFG1826000112 (e0b)   Master: bridge(UP)
UP     swp5    100G  9216   Trunk/L2    SHFFG1826000102 (e0b)   Master: bridge(UP)
UP     swp6    100G  9216   Trunk/L2    SHFFG1826000102 (e0b)   Master: bridge(UP))
.
.
```

2. Download the Cumulux Linux 5.x image:

```
admin@sw1:mgmt:~$ sudo onie-install -a -i
http://10.60.132.97/x/eng/testbedN,svl/nic/files/NVIDIA/cumulus-linux-5.4.0-mlx-amd64.bin/
[sudo] password for cumulus:
Fetching installer: http://10.60.132.97/x/eng/testbedN,svl/nic/files/NVIDIA/cumulus-linux-
5.4.0-mlx-amd64.bin
Downloading URL: http://10.60.132.97/x/eng/testbedN,svl/nic/files/NVIDIA/cumulus-linux-
5.4.0-mlx-amd64.bin
# 100.0%
Success: HTTP download complete.
EFI variables are not supported on this system
Warning: SecureBoot is not available.
Image is signed.
.
.
.
Staging installer image...done.
WARNING:
WARNING: Activating staged installer requested.
WARNING: This action will wipe out all system data.
WARNING: Make sure to back up your data.
WARNING:
Are you sure (y/N)? y
Activating staged installer...done.
Reboot required to take effect.
```

3. Reboot the switch:

```
admin@sw1:mgmt:~$ sudo reboot
```

4. Change the password:

```
cumulus login: cumulus
Password:
You are required to change your password immediately (administrator enforced)
Changing password for cumulus.
Current password: cumulus
New password: <new_password>
Retype new password: <new_password>
Linux cumulus 5.10.0-cl-1-amd64 #1 SMP Debian 5.10.162-1+cl5.4.0u1 (2023-01-20) x86_64

Welcome to NVIDIA Cumulus (R) Linux (R)

ZTP in progress. To disable, do 'ztp -d'
```

5. Check the Cumulus Linux version: `nv show system`

```
cumulus@cumulus:mgmt:~$ nv show system
           operational    applied
---------- -------------- ----------
hostname   cumulus        cumulus
build      Cumulus Linux 5.4.0
uptime     14:07:08
timezone   Etc/UTC
```

6. Change the hostname:

```
cumulus@cumulus:mgmt:~$ nv set system hostname sw1
cumulus@cumulus:mgmt:~$ nv config apply
Warning: The following files have been changed since the last save, and they WILL be
overwritten.
- /etc/nsswitch.conf
- /etc/synced/synced.conf
.
.
```

7. Logout and log in to the switch again to see the updated switch name at the prompt:

```
cumulus@cumulus:mgmt:~$ exit
logout

Debian GNU/Linux 10 cumulus ttyS0

cumulus login: cumulus
Password:
Last login: Tue Dec 15 21:43:13 UTC 2020 on ttyS0
Linux cumulus 5.10.0-cl-1-amd64 #1 SMP Debian 5.10.162-1+cl5.4.0u1 (2023-01-20) x86_64

Welcome to NVIDIA Cumulus (R) Linux (R)


ZTP in progress. To disable, do 'ztp -d'

cumulus@sw1:mgmt:~$
```

8. Set the IP address:

```
cumulus@sw1:mgmt:~$ nv set interface eth0 ip address 10.231.80.206
cumulus@sw1:mgmt:~$ nv set interface eth0 ip gateway 10.231.80.1
cumulus@sw1:mgmt:~$ nv config apply
applied [rev_id: 2]
cumulus@sw1:mgmt:~$ ip route show vrf mgmt
default via 10.231.80.1 dev eth0 proto kernel
unreachable default metric 4278198272
10.231.80.0/22 dev eth0 proto kernel scope link src 10.231.80.206
127.0.0.0/8 dev mgmt proto kernel scope link src 127.0.0.1
```

9. Create a new user and add this user to the sudo group. This user only becomes effective after the console/SSH session is restarted.

   sudo adduser --ingroup netedit admin

```
cumulus@sw1:mgmt:~$ sudo adduser --ingroup netedit admin
[sudo] password for cumulus:
Adding user 'admin' ...
Adding new user 'admin' (1001) with group `netedit' ...
Creating home directory '/home/admin' ...
Copying files from '/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for admin
Enter the new value, or press ENTER for the default
Full Name []:
Room Number []:
Work Phone []:
Home Phone []:
Other []:
Is the information correct? [Y/n] y

cumulus@sw1:mgmt:~$ sudo adduser admin sudo
[sudo] password for cumulus:
Adding user `admin' to group `sudo' ...
Adding user admin to group sudo
Done.
cumulus@sw1:mgmt:~$ exit
logout
Connection to 10.233.204.71 closed.

[admin@cycrh6svl01 ~]$ ssh admin@10.233.204.71
admin@10.233.204.71's password:
Linux sw1 4.19.0-cl-1-amd64 #1 SMP Cumulus 4.19.206-1+cl4.4.1u1 (2021-09-09) x86_64
Welcome to NVIDIA Cumulus (R) Linux (R)

For support and online technical documentation, visit
http://www.cumulusnetworks.com/support

The registered trademark Linux (R) is used pursuant to a sublicense from LMI, the
exclusive licensee of Linus Torvalds, owner of the mark on a world-wide basis.
admin@sw1:mgmt:~$
```

10. Add additional user groups for the admin user to access nv commands:

```
cumulus@sw1:mgmt:~$ sudo adduser admin nvshow
     [sudo] password for cumulus:
     Adding user `admin' to group `nvshow' ...
     Adding user admin to group nvshow
     Done.
```

See NVIDIA User Accounts for more information.

### From Cumulus Linux 5.x to Cumulus Linux 5.x

1. Check the current Cumulus Linux version and connected ports:

```
admin@sw1:mgmt:~$ nv show system
                    operational          applied
------------------- -------------------- ----------------
hostname            cumulus              cumulus
build               Cumulus Linux 5.3.0
uptime              6 days, 8:37:36
timezone            Etc/UTC

admin@sw1:mgmt:~$ nv show interface
Interface     MTU   Speed State Remote Host         Remote Port- Type      Summary
------------ ----- ----- ----- ------------------- ------------ --------- -------------
+ cluster_isl 9216  200G  up                                     bond
+ eth0        1500  100M  up    mgmt-sw1           Eth105/1/14   eth       IP Address:
10.231.80 206/22
  eth0                                                                     IP Address:
fd20:8b1e:f6ff:fe31:4a0e/64
+ lo          65536       up                                     loopback  IP Address:
127.0.0.1/8
  lo                                                                       IP Address:
::1/128
+ swp1s0      9216 10G    up cluster01               e0b         swp
.
.
.
+ swp15      9216 100G    up sw2                     swp15       swp
+ swp16      9216 100G    up sw2                     swp16       swp
```

2. Download the Cumulux Linux 5.4.0 image:

```
admin@sw1:mgmt:~$ sudo onie-install -a -i
http://10.60.132.97/x/eng/testbedN,svl/nic/files/NVIDIA/cumulus-linux-5.4.0-mlx-amd64.bin/
[sudo] password for cumulus:
Fetching installer: http://10.60.132.97/x/eng/testbedN,svl/nic/files/NVIDIA/cumulus-linux-
5.4.0-mlx-amd64.bin
Downloading URL: http://10.60.132.97/x/eng/testbedN,svl/nic/files/NVIDIA/cumulus-linux-
5.4.0-mlx-amd64.bin
# 100.0%
Success: HTTP download complete.
EFI variables are not supported on this system
Warning: SecureBoot is not available.
Image is signed.
.
.
.
Staging installer image...done.
WARNING:
WARNING: Activating staged installer requested.
WARNING: This action will wipe out all system data.
WARNING: Make sure to back up your data.
WARNING:
Are you sure (y/N)? y
Activating staged installer...done.
Reboot required to take effect.
```

3. Reboot the switch:

```
admin@sw1:mgmt:~$ sudo reboot
```

4. Change the password:

```
cumulus login: cumulus
Password:
You are required to change your password immediately (administrator enforced)
Changing password for cumulus.
Current password: cumulus
New password: <new_password>
Retype new password: <new_password>
Linux cumulus 5.10.0-cl-1-amd64 #1 SMP Debian 5.10.162-1+cl5.4.0u1 (2023-01-20) x86_64

Welcome to NVIDIA Cumulus (R) Linux (R)

ZTP in progress. To disable, do 'ztp -d'
```

5. Check the Cumulus Linux version: `nv show system`

```
cumulus@cumulus:mgmt:~$ nv show system
operational    applied
-------------- ----------------
hostname       cumulus cumulus
build          Cumulus Linux 5.4.0
uptime         14:07:08
timezone       Etc/UTC
```

6. Change the hostname:

```
cumulus@cumulus:mgmt:~$ nv set system hostname sw1
cumulus@cumulus:mgmt:~$ nv config apply
Warning: The following files have been changed since the last save, and they WILL be
overwritten.
- /etc/nsswitch.conf
- /etc/synced/synced.conf
.
.
```

7. Logout and log in again to the switch to see the updated switch name at the prompt:

```
cumulus@cumulus:mgmt:~$ exit
logout

Debian GNU/Linux 10 cumulus ttyS0

cumulus login: cumulus
Password:
Last login: Tue Dec 15 21:43:13 UTC 2020 on ttyS0
Linux cumulus 5.10.0-cl-1-amd64 #1 SMP Debian 5.10.162-1+cl5.4.0u1 (2023-01-20) x86_64

Welcome to NVIDIA Cumulus (R) Linux (R)


ZTP in progress. To disable, do 'ztp -d'

cumulus@sw1:mgmt:~$
```

8. Set the IP address:

```
cumulus@sw1:mgmt:~$ nv set interface eth0 ip address 10.231.80.206
cumulus@sw1:mgmt:~$ nv set interface eth0 ip gateway 10.231.80.1
cumulus@sw1:mgmt:~$ nv config apply
applied [rev_id: 2]
cumulus@sw1:mgmt:~$ ip route show vrf mgmt
default via 10.231.80.1 dev eth0 proto kernel
unreachable default metric 4278198272
10.231.80.0/22 dev eth0 proto kernel scope link src 10.231.80.206
127.0.0.0/8 dev mgmt proto kernel scope link src 127.0.0.1
```

9. Create a new user and add this user to the sudo group. This user only becomes effective after the console/SSH session is restarted.

   sudo adduser --ingroup netedit admin

```
cumulus@sw1:mgmt:~$ sudo adduser --ingroup netedit admin
[sudo] password for cumulus:
Adding user 'admin' ...
Adding new user 'admin' (1001) with group `netedit' ...
Creating home directory '/home/admin' ...
Copying files from '/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for admin
Enter the new value, or press ENTER for the default
Full Name []:
Room Number []:
Work Phone []:
Home Phone []:
Other []:
Is the information correct? [Y/n] y

cumulus@sw1:mgmt:~$ sudo adduser admin sudo
[sudo] password for cumulus:
Adding user `admin' to group `sudo' ...
Adding user admin to group sudo
Done.
cumulus@sw1:mgmt:~$ exit
logout
Connection to 10.233.204.71 closed.

[admin@cycrh6svl01 ~]$ ssh admin@10.233.204.71
admin@10.233.204.71's password:
Linux sw1 4.19.0-cl-1-amd64 #1 SMP Cumulus 4.19.206-1+cl4.4.1u1 (2021-09-09) x86_64
Welcome to NVIDIA Cumulus (R) Linux (R)

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exclusive licensee of Linus Torvalds, owner of the mark on a world-wide basis.
admin@sw1:mgmt:~$
```

10. Add additional user groups for the admin user to access nv commands:

```
cumulus@sw1:mgmt:~$ sudo adduser admin nvshow
     [sudo] password for cumulus:
     Adding user `admin' to group `nvshow' ...
     Adding user admin to group nvshow
     Done.
```

See NVIDIA User Accounts for more information.

**What's next?**

Install the Reference Configuration File (RCF) script.

# Chapter 4. Migrate switches

## 4.1. Migrate from a Cisco cluster switch to a NVIDIA SN2100 cluster switch

You can migrate Cisco cluster switches for an ONTAP cluster to NVIDIA SN2100 cluster switches. This is a nondisruptive procedure.

### 4.1.1. Review requirements

You must be aware of certain configuration information, port connections and cabling requirements when you are replacing some older Cisco cluster switches with NVIDIA SN2100 cluster switches. See Overview of installation and configuration for NVIDIA SN2100 switches.

**Supported switches**

The following Cisco cluster switches are supported:

- Nexus 9336C-FX2
- Nexus 3232C
- Nexus 3132Q-V

For details of supported ports and their configurations, see Lenovo Press.

**What you'll need**

Ensure that:

- The existing cluster is properly set up and functioning.
- All cluster ports are in the **up** state to ensure nondisruptive operations.
- The NVIDIA SN2100 cluster switches are configured and operating under the proper version of Cumulus Linux installed with the reference configuration file (RCF) applied.
- The existing cluster network configuration have the following:
  - A redundant and fully functional Lenovo cluster using both older Cisco switches.
  - Management connectivity and console access to both the older Cisco switches and the new switches.
  - All cluster LIFs in the up state with the cluster LIfs are on their home ports.
  - ISL ports enabled and cabled between the older Cisco switches and between the new switches.
- Some of the ports are configured on NVIDIA SN2100 switches to run at 40 GbE or 100 GbE.
- You have planned, migrated, and documented 40 GbE and 100 GbE connectivity from nodes to NVIDIA SN2100 cluster switches.

### 4.1.2. Migrate the switches

#### About the examples

In this procedure, Cisco Nexus 3232C cluster switches are used for example commands and outputs.

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

- The existing Cisco Nexus 3232C cluster switches are *c1* and *c2*.
- The new NVIDIA SN2100 cluster switches are *sw1* and *sw2*.
- The nodes are *node1* and *node2*.
- The cluster LIFs are *node1_clus1* and *node1_clus2* on node 1, and *node2_clus1* and *node2_clus2* on node 2 respectively.
- The `cluster1::*>` prompt indicates the name of the cluster.
- The cluster ports used in this procedure are *e3a* and *e3b*.
- Breakout ports take the format: swp[port]s[breakout port 0-3]. For example, four breakout ports on swp1 are *swp1s0*, *swp1s1*, *swp1s2*, and *swp1s3*.
- Switch c2 is replaced by switch sw2 first and then switch c1 is replaced by switch sw1.
  - Cabling between the nodes and c2 are then disconnected from c2 and reconnected to sw2.
  - Cabling between the nodes and c1 are then disconnected from c1 and reconnected to sw1.

#### Step 1: Prepare for migration

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

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

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

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

   ```
   set -privilege advanced
   ```

   The advanced prompt (*>) appears.

3. Disable auto-revert on the cluster LIFs:

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

**Show example**

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

Warning: Disabling the auto-revert feature of the cluster logical interface may effect the
availability of your cluster network. Are you sure you want to continue? {y|n}: y
```

### Step 2: Configure ports and cabling

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

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

   a. Display the network port attributes:

      `network port show -ipspace Cluster`

      **Show example**

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

      Node: node1
                                                                                 Ignore
                                                 Speed(Mbps)  Health   Health
      Port      IPspace    Broadcast Domain Link MTU   Admin/Oper   Status   Status
      --------- ---------- ---------------- ---- ----- ------------ -------- ------
      e3a       Cluster    Cluster          up   9000  auto/100000  healthy  false
      e3b       Cluster    Cluster          up   9000  auto/100000  healthy  false

      Node: node2
                                                                                 Ignore
                                                 Speed(Mbps)  Health   Health
      Port      IPspace    Broadcast Domain Link MTU   Admin/Oper   Status   Status
      --------- ---------- ---------------- ---- ----- ------------ -------- ------
      e3a       Cluster    Cluster          up   9000  auto/100000  healthy  false
      e3b       Cluster    Cluster          up   9000  auto/100000  healthy  false
      ```

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

      `network interface show -vserver Cluster`

      Each LIF should display `up/up` for `Status Admin/Oper` and true for `Is Home`.

**Show example**

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

            Logical      Status     Network            Current     Current Is
Vserver     Interface    Admin/Oper Address/Mask       Node        Port    Home
----------- -----------  ---------- ------------------ ----------- ------- ----
Cluster
            node1_clus1  up/up      169.254.209.69/16  node1       e3a     true
            node1_clus2  up/up      169.254.49.125/16  node1       e3b     true
            node2_clus1  up/up      169.254.47.194/16  node2       e3a     true
            node2_clus2  up/up      169.254.19.183/16  node2       e3b     true
```

2. The cluster ports on each node are connected to existing cluster switches in the following way (from the nodes' perspective) using the command:

   `network device-discovery show -protocol lldp`

   **Show example**

```
cluster1::*> network device-discovery show -protocol lldp
Node/       Local  Discovered
Protocol    Port   Device (LLDP: ChassisID)  Interface         Platform
----------- ------ ------------------------- ----------------  ----------------
node1      /lldp
            e3a    c1 (6a:ad:4f:98:3b:3f)    Eth1/1            -
            e3b    c2 (6a:ad:4f:98:4c:a4)    Eth1/1            -
node2      /lldp
            e3a    c1 (6a:ad:4f:98:3b:3f)    Eth1/2            -
            e3b    c2 (6a:ad:4f:98:4c:a4)    Eth1/2            -
```

3. The cluster ports and switches are connected in the following way (from the switches' perspective) using the command:

   `show cdp neighbors`

**Show example**

```
c1# show cdp neighbors

Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater,
                  V - VoIP-Phone, D - Remotely-Managed-Device,
                  s - Supports-STP-Dispute

Device-ID             Local Intrfce Hldtme Capability  Platform         Port ID
node1                 Eth1/1         124   H           AFA-DM7100F         e3a
node2                 Eth1/2         124   H           AFA-DM7100F         e3a
c2                    Eth1/31        179   S I s       N3K-C3232C       Eth1/31
c2                    Eth1/32        175   S I s       N3K-C3232C       Eth1/32

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
node1                 Eth1/1        124    H           AFA-DM7100F         e3b
node2                 Eth1/2        124    H           AFA-DM7100F         e3b
c1                    Eth1/31       175    S I s       N3K-C3232C       Eth1/31
c1                    Eth1/32       175    S I s       N3K-C3232C       Eth1/32
```

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

   `cluster ping-cluster -node node-name`

**Show example**

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

Host is node2
Getting addresses from network interface table...
Cluster node1_clus1 169.254.209.69 node1     e3a
Cluster node1_clus2 169.254.49.125 node1     e3b
Cluster node2_clus1 169.254.47.194 node2     e3a
Cluster node2_clus2 169.254.19.183 node2     e3b
Local = 169.254.47.194 169.254.19.183
Remote = 169.254.209.69 169.254.49.125
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s)
................
Detected 9000 byte MTU on 4 path(s):
    Local 169.254.19.183 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)
```

5. On switch c2, shut down the ports connected to the cluster ports of the nodes.

**Show example**

```
(c2)# configure
Enter configuration commands, one per line. End with CNTL/Z.

(c2)(Config)# interface
(c2)(config-if-range)# shutdown <interface_list>
(c2)(config-if-range)# exit
(c2)(Config)# exit
(c2)#
```

6. Move the node cluster ports from the old switch c2 to the new switch sw2, using appropriate cabling supported by NVIDIA SN2100.
7. Display the network port attributes:

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

**Show example**

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

Node: node1
                                                                        Ignore
                                                  Speed(Mbps)  Health   Health
Port      IPspace    Broadcast Domain Link MTU   Admin/Oper   Status   Status
--------- ---------- ---------------- ---- ----- ------------ -------- ------
e3a       Cluster    Cluster          up   9000  auto/100000  healthy  false
e3b       Cluster    Cluster          up   9000  auto/100000  healthy  false

Node: node2
                                                                        Ignore
                                                  Speed(Mbps)  Health   Health
Port      IPspace    Broadcast Domain Link MTU   Admin/Oper   Status   Status
--------- ---------- ---------------- ---- ----- ------------ -------- ------
e3a       Cluster    Cluster          up   9000  auto/100000  healthy  false
e3b       Cluster    Cluster          up   9000  auto/100000  healthy  false
```

8. The cluster ports on each node are now connected to cluster switches in the following way, from the nodes' perspective:

**Show example**

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

Node/       Local  Discovered
Protocol    Port   Device (LLDP: ChassisID)  Interface         Platform
----------- ------ ------------------------- ----------------  ----------------
node1      /lldp
            e3a    c1  (6a:ad:4f:98:3b:3f)   Eth1/1            -
            e3b    sw2 (b8:ce:f6:19:1a:7e)   swp3              -
node2      /lldp
            e3a    c1  (6a:ad:4f:98:3b:3f)   Eth1/2            -
            e3b    sw2 (b8:ce:f6:19:1b:96)   swp4              -
```

9. On switch sw2, verify that all node cluster ports are up:

```
net show interface
```

**Show example**

```
cumulus@sw2:~$ net show interface

State  Name         Spd   MTU    Mode        LLDP              Summary
-----  -----------  ----  -----  ----------  ----------------- ----------------------
...
...
UP     swp3         100G  9216   Trunk/L2    e3b               Master: bridge(UP)
UP     swp4         100G  9216   Trunk/L2    e3b               Master: bridge(UP)
UP     swp15        100G  9216   BondMember  sw1 (swp15)       Master: cluster_isl(UP)
UP     swp16        100G  9216   BondMember  sw1 (swp16)       Master: cluster_isl(UP)
```

10. On switch c1, shut down the ports connected to the cluster ports of the nodes.

    **Show example**

    ```
    (c1)# configure
    Enter configuration commands, one per line. End with CNTL/Z.

    (c1)(Config)# interface
    (c1)(config-if-range)# shutdown <interface_list>
    (c1)(config-if-range)# exit
    (c1)(Config)# exit
    (c1)#
    ```

11. Move the node cluster ports from the old switch c1 to the new switch sw1, using appropriate cabling supported by NVIDIA SN2100.

12. Verify the final configuration of the cluster:

    `network port show -ipspace Cluster`

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

**Show example**

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

Node: node1
                                                                        Ignore
                                                  Speed(Mbps)  Health   Health
Port      IPspace    Broadcast Domain Link MTU   Admin/Oper   Status   Status
--------- ---------- ---------------- ---- ----- ------------ -------- ------
e3a       Cluster    Cluster          up   9000  auto/100000  healthy  false
e3b       Cluster    Cluster          up   9000  auto/100000  healthy  false

Node: node2
                                                                        Ignore
                                                  Speed(Mbps)  Health   Health
Port      IPspace    Broadcast Domain Link MTU   Admin/Oper   Status   Status
--------- ---------- ---------------- ---- ----- ------------ -------- ------
e3a       Cluster    Cluster          up   9000  auto/100000  healthy  false
e3b       Cluster    Cluster          up   9000  auto/100000  healthy  false
```

13. The cluster ports on each node are now connected to cluster switches in the following way, from the nodes' perspective:

    **Show example**

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

    Node/       Local  Discovered
    Protocol    Port   Device (LLDP: ChassisID)  Interface       Platform
    ----------- ------ ------------------------- --------------  ----------------
    node1      /lldp
                e3a    sw1 (b8:ce:f6:19:1a:7e)   swp3            -
                e3b    sw2 (b8:ce:f6:19:1b:96)   swp3            -
    node2      /lldp
                e3a    sw1 (b8:ce:f6:19:1a:7e)   swp4            -
                e3b    sw2 (b8:ce:f6:19:1b:96)   swp4            -
    ```

14. On switches sw1 and sw2, verify that all node cluster ports are up:

    ```
    net show interface
    ```

**Show example**

```
cumulus@sw1:~$ net show interface

State  Name         Spd   MTU    Mode        LLDP              Summary
-----  -----------  ----  -----  ----------  ----------------- ----------------------
...
...
UP     swp3         100G  9216   Trunk/L2    e3a               Master: bridge(UP)
UP     swp4         100G  9216   Trunk/L2    e3a               Master: bridge(UP)
UP     swp15        100G  9216   BondMember  sw2 (swp15)       Master: cluster_isl(UP)
UP     swp16        100G  9216   BondMember  sw2 (swp16)       Master: cluster_isl(UP)


cumulus@sw2:~$ net show interface

State  Name         Spd   MTU    Mode        LLDP              Summary
-----  -----------  ----  -----  ----------  ----------------- ----------------------
...
...
UP     swp3         100G  9216   Trunk/L2    e3b               Master: bridge(UP)
UP     swp4         100G  9216   Trunk/L2    e3b               Master: bridge(UP)
UP     swp15        100G  9216   BondMember  sw1 (swp15)       Master: cluster_isl(UP)
UP     swp16        100G  9216   BondMember  sw1 (swp16)       Master: cluster_isl(UP)
```

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

    ```
    net show lldp
    ```

**Show example**

The following example shows the appropriate results for both switches:

```
cumulus@sw1:~$ net show lldp

LocalPort  Speed  Mode        RemoteHost          RemotePort
---------  -----  ----------  ------------------  -----------
swp3       100G   Trunk/L2    node1               e3a
swp4       100G   Trunk/L2    node2               e3a
swp15      100G   BondMember  sw2                 swp15
swp16      100G   BondMember  sw2                 swp16

cumulus@sw2:~$ net show lldp

LocalPort  Speed  Mode        RemoteHost          RemotePort
---------  -----  ----------  ------------------  -----------
swp3       100G   Trunk/L2    node1               e3b
swp4       100G   Trunk/L2    node2               e3b
swp15      100G   BondMember  sw1                 swp15
swp16      100G   BondMember  sw1                 swp16
```

### Step 3: Complete the procedure

1. Enable auto-revert on the cluster LIFs:

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

2. Verify that all cluster network LIFs are back on their home ports:

   ```
   network interface show
   ```

   **Show example**

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

               Logical    Status     Network            Current       Current Is
   Vserver     Interface  Admin/Oper Address/Mask       Node          Port    Home
   ----------- ---------- ---------- ------------------ ------------- ------- ----
   Cluster
               node1_clus1  up/up    169.254.209.69/16  node1         e3a     true
               node1_clus2  up/up    169.254.49.125/16  node1         e3b     true
               node2_clus1  up/up    169.254.47.194/16  node2         e3a     true
               node2_clus2  up/up    169.254.19.183/16  node2         e3b     true
   ```

3. Enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the two commands:

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

a. Enter: `system switch ethernet log setup-password`

**Show example**

```
cluster1::*> system switch ethernet log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
sw1
sw2

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

Enter the switch name: sw1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

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

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

Enter the switch name: sw2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

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

b. Followed by: `system switch ethernet log enable-collection`

**Show example**

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

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

Enabling cluster switch log collection.

cluster1::*>
```

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

4. Initiate the switch log collection feature:

```
system switch ethernet log collect -device *
```

Wait for 10 minutes and then check that the log collection was successful using the command:

```
system switch ethernet log show
```

**Show example**

```
cluster1::*> system switch ethernet log show
Log Collection Enabled: true

Index  Switch                       Log Timestamp        Status
------ ---------------------------- -------------------  ---------
1      sw1 (b8:ce:f6:19:1b:42)      4/29/2022 03:05:25   complete
2      sw2 (b8:ce:f6:19:1b:96)      4/29/2022 03:07:42   complete
```

5. Change the privilege level back to admin:

   ```
   set -privilege admin
   ```

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

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

## 4.2. Migrate to a two-node switched cluster with NVIDIA SN2100 cluster switches

If you have an existing two-node switchless cluster environment, you can migrate to a two-node switched cluster environment using NVIDIA SN2100 switches to enable you to scale beyond two nodes in the cluster.

The procedure you use depends on whether you have two dedicated cluster-network ports on each controller or a single cluster port on each controller. The process documented works for all nodes using optical or Twinax ports but is not supported on this switch if nodes are using onboard 10GBASE-T RJ45 ports for the cluster-network ports.

### 4.2.1. Review requirements

**Two-node switchless configuration**

Ensure that:

- The two-node switchless configuration are properly set up and functioning.
- The nodes are running ONTAP 9.10.1P3 and later.
- All cluster ports are in the **up** state.

- All cluster logical interfaces (LIFs) are in the **up** state and on their home ports.

**NVIDIA SN2100 cluster switch configuration**

Ensure that:

- Both switches have management network connectivity.
- There is console access to the cluster switches.
- NVIDIA SN2100 node-to-node switch and switch-to-switch connections use Twinax or fiber cables.

See Review cabling and configuration considerations for caveats and further details. The Lenovo Press - Switches also contains more information about cabling.

- Inter-Switch Link (ISL) cables are connected to ports swp15 and swp16 on both NVIDIA SN2100 switches.
- Initial customization of both the SN2100 switches are completed, so that:
  - SN2100 switches are running the latest version of Cumulus Linux
  - Reference Configuration Files (RCFs) are applied to the switches
  - Any site customization, such as SMTP, SNMP, and SSH are configured on the new switches.

    The Lenovo Press contains the latest information about the actual cluster ports for your platforms.

### 4.2.2. Migrate the switches

**About the examples**

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

- The names of the SN2100 switches are *sw1* and *sw2*.
- The names of the cluster SVMs are *node1* and *node2*.
- The names of the LIFs are *node1_clus1* and *node1_clus2* on node 1, and *node2_clus1* and *node2_clus2* on node 2 respectively.
- The `cluster1::*>` prompt indicates the name of the cluster.
- The cluster ports used in this procedure are *e3a* and *e3b*.
- Breakout ports take the format: swp[port]s[breakout port 0-3]. For example, four breakout ports on swp1 are *swp1s0*, *swp1s1*, *swp1s2*, and *swp1s3*.

### Step 1: Prepare for migration

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

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

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

   The advanced prompt (`*>`) appears.

### Step 2: Configure ports and cabling

1. Disable all node-facing ports (not ISL ports) on both the new cluster switches sw1 and sw2.

   You must not disable the ISL ports.

   **Show example**

   The following commands disable the node-facing ports on switches sw1 and sw2:

   ```
   cumulus@sw1:~$ net add interface swp1s0-3, swp2s0-3, swp3-14 link down
   cumulus@sw1:~$ net pending
   cumulus@sw1:~$ net commit

   cumulus@sw2:~$ net add interface swp1s0-3, swp2s0-3, swp3-14 link down
   cumulus@sw2:~$ net pending
   cumulus@sw2:~$ net commit
   ```

2. Verify that the ISL and the physical ports on the ISL between the two SN2100 switches sw1 and sw2 are up on ports swp15 and swp16:

   `net show interface`

**Show example**

The following example shows that the ISL ports are up on switch sw1:

```
cumulus@sw1:~$ net show interface

State  Name       Spd   MTU    Mode        LLDP         Summary
-----  ---------  ----  -----  ----------  -----------  ----------------------
...
...
UP     swp15      100G  9216   BondMember  sw2 (swp15)  Master: cluster_isl(UP)
UP     swp16      100G  9216   BondMember  sw2 (swp16)  Master: cluster_isl(UP)
```

+ The following example shows that the ISL ports are up on switch sw2:

+

```
cumulus@sw2:~$ net show interface

State  Name       Spd   MTU    Mode        LLDP         Summary
-----  ---------  ----  -----  ----------  -----------  ----------------------
...
...
UP     swp15      100G  9216   BondMember  sw1 (swp15)  Master: cluster_isl(UP)
UP     swp16      100G  9216   BondMember  sw1 (swp16)  Master: cluster_isl(UP)
```

3. Verify that all cluster ports are up:

   `network port show`

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

**Show example**

```
cluster1::*> network port show

Node: node1

                                                                  Ignore
                                             Speed(Mbps)  Health   Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper   Status   Status
--------- ------------ ---------------- ---- ---- ------------ -------- ------
e3a       Cluster      Cluster          up   9000  auto/100000 healthy  false
e3b       Cluster      Cluster          up   9000  auto/100000 healthy  false

Node: node2

                                                                  Ignore
                                             Speed(Mbps)  Health   Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper   Status   Status
--------- ------------ ---------------- ---- ---- ------------ -------- ------
e3a       Cluster      Cluster          up   9000  auto/100000 healthy  false
e3b       Cluster      Cluster          up   9000  auto/100000 healthy  false
```

4. Verify that all cluster LIFs are up and operational:

   `network interface show`

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

   **Show example**

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

               Logical    Status     Network            Current       Current Is
   Vserver     Interface  Admin/Oper Address/Mask       Node          Port    Home
   ----------- ---------- ---------- ------------------ ------------- ------- -----
   Cluster
               node1_clus1  up/up    169.254.209.69/16  node1         e3a     true
               node1_clus2  up/up    169.254.49.125/16  node1         e3b     true
               node2_clus1  up/up    169.254.47.194/16  node2         e3a     true
               node2_clus2  up/up    169.254.19.183/16  node2         e3b     true
   ```

5. Disable auto-revert on the cluster LIFs:

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

**Show example**

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

          Logical
Vserver   Interface     Auto-revert
--------- ------------- ------------
Cluster
          node1_clus1   false
          node1_clus2   false
          node2_clus1   false
          node2_clus2   false
```

6. Disconnect the cable from cluster port e3a on node1, and then connect e3a to port 3 on cluster switch sw1, using the appropriate cabling supported by the SN2100 switches.

   The Lenovo Press - Switches contains more information about cabling.

7. Disconnect the cable from cluster port e3a on node2, and then connect e3a to port 4 on cluster switch sw1, using the appropriate cabling supported by the SN2100 switches.
8. On switch sw1, enable all node-facing ports.

   **Show example**

   The following command enables all node-facing ports on switch sw1:

   ```
   cumulus@sw1:~$ net del interface swp1s0-3, swp2s0-3, swp3-14 link down
   cumulus@sw1:~$ net pending
   cumulus@sw1:~$ net commit
   ```

9. On switch sw1, verify that all ports are up:

   ```
   net show interface all
   ```

**Show example**

```
cumulus@sw1:~$ net show interface all

State  Name      Spd   MTU    Mode       LLDP            Summary
-----  --------- ----  -----  ---------- --------------- --------
...
DN     swp1s0    10G   9216   Trunk/L2                   Master: br_default(UP)
DN     swp1s1    10G   9216   Trunk/L2                   Master: br_default(UP)
DN     swp1s2    10G   9216   Trunk/L2                   Master: br_default(UP)
DN     swp1s3    10G   9216   Trunk/L2                   Master: br_default(UP)
DN     swp2s0    25G   9216   Trunk/L2                   Master: br_default(UP)
DN     swp2s1    25G   9216   Trunk/L2                   Master: br_default(UP)
DN     swp2s2    25G   9216   Trunk/L2                   Master: br_default(UP)
DN     swp2s3    25G   9216   Trunk/L2                   Master: br_default(UP)
UP     swp3      100G  9216   Trunk/L2    node1 (e3a)    Master: br_default(UP)
UP     swp4      100G  9216   Trunk/L2    node2 (e3a)    Master: br_default(UP)
...
...
UP     swp15     100G  9216   BondMember  swp15          Master: cluster_isl(UP)
UP     swp16     100G  9216   BondMember  swp16          Master: cluster_isl(UP)
...
```

10. Verify that all cluster ports are up:

    `network port show -ipspace Cluster`

    **Show example**

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

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

Node: node1
                                                                        Ignore
                                                  Speed(Mbps)  Health   Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper   Status   Status
--------- ------------ ---------------- ---- ---- ------------ -------- ------
e3a       Cluster      Cluster          up   9000  auto/100000 healthy  false
e3b       Cluster      Cluster          up   9000  auto/100000 healthy  false

Node: node2
                                                                        Ignore
                                                  Speed(Mbps)  Health   Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper   Status   Status
--------- ------------ ---------------- ---- ---- ------------ -------- ------
e3a       Cluster      Cluster          up   9000  auto/100000 healthy  false
e3b       Cluster      Cluster          up   9000  auto/100000 healthy  false
```

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

    ```
    cluster show
    ```

    **Show example**

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

    ```
    cluster1::*> cluster show

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

12. Disconnect the cable from cluster port e3b on node1, and then connect e3b to port 3 on cluster switch sw2, using the appropriate cabling supported by the SN2100 switches.
13. Disconnect the cable from cluster port e3b on node2, and then connect e3b to port 4 on cluster switch sw2, using the appropriate cabling supported by the SN2100 switches.
14. On switch sw2, enable all node-facing ports.

    **Show example**

    The following commands enable the node-facing ports on switch sw2:

    ```
    cumulus@sw2:~$ net del interface swp1s0-3, swp2s0-3, swp3-14 link down
    cumulus@sw2:~$ net pending
    cumulus@sw2:~$ net commit
    ```

15. On switch sw2, verify that all ports are up:

    ```
    net show interface all
    ```

**Show example**

```
cumulus@sw2:~$ net show interface all

State  Name      Spd   MTU    Mode       LLDP            Summary
-----  --------- ----  -----  ---------- --------------- --------
...
DN     swp1s0    10G   9216   Trunk/L2                   Master: br_default(UP)
DN     swp1s1    10G   9216   Trunk/L2                   Master: br_default(UP)
DN     swp1s2    10G   9216   Trunk/L2                   Master: br_default(UP)
DN     swp1s3    10G   9216   Trunk/L2                   Master: br_default(UP)
DN     swp2s0    25G   9216   Trunk/L2                   Master: br_default(UP)
DN     swp2s1    25G   9216   Trunk/L2                   Master: br_default(UP)
DN     swp2s2    25G   9216   Trunk/L2                   Master: br_default(UP)
DN     swp2s3    25G   9216   Trunk/L2                   Master: br_default(UP)
UP     swp3      100G  9216   Trunk/L2    node1 (e3b)    Master: br_default(UP)
UP     swp4      100G  9216   Trunk/L2    node2 (e3b)    Master: br_default(UP)
...
...
UP     swp15     100G  9216   BondMember  swp15          Master: cluster_isl(UP)
UP     swp16     100G  9216   BondMember  swp16          Master: cluster_isl(UP)
...
```

16. On both switches sw1 and sw2, verify that both nodes each have one connection to each switch:

    `net show lldp`

    **Show example**

    The following example shows the appropriate results for both switches sw1 and sw2:

    ```
    cumulus@sw1:~$ net show lldp

    LocalPort  Speed  Mode        RemoteHost         RemotePort
    ---------  -----  ----------  -----------------  -----------
    swp3       100G   Trunk/L2    node1              e3a
    swp4       100G   Trunk/L2    node2              e3a
    swp15      100G   BondMember  sw2                swp15
    swp16      100G   BondMember  sw2                swp16

    cumulus@sw2:~$ net show lldp

    LocalPort  Speed  Mode        RemoteHost         RemotePort
    ---------  -----  ----------  -----------------  -----------
    swp3       100G   Trunk/L2    node1              e3b
    swp4       100G   Trunk/L2    node2              e3b
    swp15      100G   BondMember  sw1                swp15
    swp16      100G   BondMember  sw1                swp16
    ```

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

    `net device-discovery show -protocol lldp`

    **Show example**

    ```
    cluster1::*> network device-discovery show -protocol lldp
    Node/       Local  Discovered
    Protocol    Port   Device (LLDP: ChassisID)  Interface     Platform
    ----------- ------ ------------------------- ------------  ----------------
    node1      /lldp
                e3a    sw1 (b8:ce:f6:19:1a:7e)   swp3          -
                e3b    sw2 (b8:ce:f6:19:1b:96)   swp3          -
    node2      /lldp
                e3a    sw1 (b8:ce:f6:19:1a:7e)   swp4          -
                e3b    sw2 (b8:ce:f6:19:1b:96)   swp4          -
    ```

18. Verify that all cluster ports are up:

    `network port show -ipspace Cluster`

    **Show example**

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

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

    Node: node1
                                                                             Ignore
                                                       Speed(Mbps) Health    Health
    Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status    Status
    --------- ------------ ---------------- ---- ---- ----------- --------- ------
    e3a       Cluster      Cluster          up   9000  auto/10000 healthy   false
    e3b       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
    --------- ------------ ---------------- ---- ---- ----------- --------- ------
    e3a       Cluster      Cluster          up   9000  auto/10000 healthy   false
    e3b       Cluster      Cluster          up   9000  auto/10000 healthy   false
    ```

### Step 3: Complete the procedure

1. Enable auto-revert on all cluster LIFs:

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

**Show example**

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

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

2. Verify that all interfaces display `true` for `Is Home`:

   `net interface show -vserver Cluster`

   This might take a minute to complete.

   **Show example**

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

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

             Logical      Status     Network            Current    Current Is
   Vserver   Interface    Admin/Oper Address/Mask       Node       Port    Home
   --------- ------------ ---------- ------------------ ---------- ------- ----
   Cluster
             node1_clus1  up/up      169.254.209.69/16  node1      e3a     true
             node1_clus2  up/up      169.254.49.125/16  node1      e3b     true
             node2_clus1  up/up      169.254.47.194/16  node2      e3a     true
             node2_clus2  up/up      169.254.19.183/16  node2      e3b     true
   ```

3. Verify that the settings are disabled:

   `network options switchless-cluster show`

**Show example**

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

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

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

   `cluster show`

   **Show example**

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

   ```
   cluster1::*> cluster show

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

5. Verify that the cluster network has full connectivity:

   `cluster ping-cluster -node node-name`

**Show example**

```
cluster1::*> cluster ping-cluster -node node1
Host is node1
Getting addresses from network interface table...
Cluster node1_clus1 169.254.209.69 node1 e3a
Cluster node1_clus2 169.254.49.125 node1 e3b
Cluster node2_clus1 169.254.47.194 node2 e3a
Cluster node2_clus2 169.254.19.183 node2 e3b
Local = 169.254.47.194 169.254.19.183
Remote = 169.254.209.69 169.254.49.125
Cluster Vserver Id = 4294967293
Ping status:

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

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

6. Enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the commands:

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

   a. Enter: `system switch ethernet log setup-password`

**Show example**

```
cluster1::*> system switch ethernet log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
sw1
sw2

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

Enter the switch name: sw1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

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

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

Enter the switch name: sw2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

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

b. Followed by: `system switch ethernet log enable-collection`

**Show example**

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

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

Enabling cluster switch log collection.

cluster1::*>
```

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

7. Initiate the switch log collection feature:

   `system switch ethernet log collect -device *`

   Wait for 10 minutes and then check that the log collection was successful using the command:

```
system switch ethernet log show
```

**Show example**

```
cluster1::*> system switch ethernet log show
Log Collection Enabled: true

Index  Switch                       Log Timestamp        Status
------ ---------------------------- -------------------  ---------
1      sw1 (b8:ce:f6:19:1b:42)      4/29/2022 03:05:25   complete
2      sw2 (b8:ce:f6:19:1b:96)      4/29/2022 03:07:42   complete
```

8. Change the privilege level back to admin:

   ```
   set -privilege admin
   ```

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

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

# Chapter 5. Replace switches

## 5.1. Replace a NVIDIA SN2100 cluster switch

Follow this procedure to replace a defective NVIDIA SN2100 switch in a cluster network. This is a nondisruptive procedure (NDU).

### 5.1.1. Review requirements

**Existing cluster and network infrastructure**

Ensure that:

- The existing cluster are verified as completely functional, with at least one fully connected cluster switch.
- All cluster ports are up.
- All cluster logical interfaces (LIFs) are up and on their home ports.
- The ONTAP `cluster ping-cluster -node node1` command indicates that basic connectivity and larger than PMTU communication are successful on all paths.

**NVIDIA SN2100 replacement switch**

Ensure that:

- Management network connectivity on the replacement switch are functional.
- Console access to the replacement switch are in place.
- The node connections are ports swp1 through swp14.
- All Inter-Switch Link (ISL) ports are disabled on ports swp15 and swp16.
- The desired reference configuration file (RCF) and Cumulus operating system image switch are loaded onto the switch.
- Initial customization of the switch is complete.

Also make sure that any previous site customizations, such as STP, SNMP, and SSH, are copied to the new switch.

You must execute the command for migrating a cluster LIF from the node where the cluster LIF is hosted.

### 5.1.2. Replace the switch

**About the examples**

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

- The names of the existing NVIDIA SN2100 switches are *sw1* and *sw2*.

- The name of the new NVIDIA SN2100 switch is *nsw2*.
- The node names are *node1* and *node2*.
- The cluster ports on each node are named *e3a* and *e3b*.
- The cluster LIF names are *node1_clus1* and *node1_clus2* for node1, and *node2_clus1* and *node2_clus2* for node2.
- The prompt for changes to all cluster nodes is `cluster1::*>`
- Breakout ports take the format: swp[port]s[breakout port 0-3]. For example, four breakout ports on swp1 are *swp1s0*, *swp1s1*, *swp1s2*, and *swp1s3*.

**About the cluster network topology**

This procedure is based on the following cluster network topology:

### Show example topology

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

Node: node1
                                                                        Ignore
                                                  Speed(Mbps)  Health   Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper   Status   Status
--------- ------------ ---------------- ---- ---- ------------ -------- ------
e3a       Cluster      Cluster          up   9000  auto/100000 healthy  false
e3b       Cluster      Cluster          up   9000  auto/100000 healthy  false

Node: node2
                                                                        Ignore
                                                  Speed(Mbps)  Health   Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper   Status   Status
--------- ------------ ---------------- ---- ---- ------------ -------- ------
e3a       Cluster      Cluster          up   9000  auto/100000 healthy  false
e3b       Cluster      Cluster          up   9000  auto/100000 healthy  false


cluster1::*> network interface show -vserver Cluster

            Logical    Status     Network            Current       Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node          Port    Home
----------- ---------- ---------- ------------------ ------------- ------- ----
Cluster
            node1_clus1  up/up    169.254.209.69/16  node1         e3a     true
            node1_clus2  up/up    169.254.49.125/16  node1         e3b     true
            node2_clus1  up/up    169.254.47.194/16  node2         e3a     true
            node2_clus2  up/up    169.254.19.183/16  node2         e3b     true


cluster1::*> network device-discovery show -protocol lldp
Node/       Local  Discovered
Protocol    Port   Device (LLDP: ChassisID)  Interface     Platform
----------- ------ ------------------------- ------------  ----------------
node1      /lldp
            e3a    sw1 (b8:ce:f6:19:1a:7e)   swp3          -
            e3b    sw2 (b8:ce:f6:19:1b:96)   swp3          -
node2      /lldp
            e3a    sw1 (b8:ce:f6:19:1a:7e)   swp4          -
            e3b    sw2 (b8:ce:f6:19:1b:96)   swp4          -
```

+

```
cumulus@sw1:~$ net show lldp

LocalPort  Speed  Mode        RemoteHost         RemotePort
---------  -----  ----------  -----------------  -----------
swp3       100G   Trunk/L2    sw2                e3a
swp4       100G   Trunk/L2    sw2                e3a
swp15      100G   BondMember  sw2                swp15
swp16      100G   BondMember  sw2                swp16


cumulus@sw2:~$ net show lldp

LocalPort  Speed  Mode        RemoteHost         RemotePort
---------  -----  ----------  -----------------  -----------
swp3       100G   Trunk/L2    sw1                e3b
swp4       100G   Trunk/L2    sw1                e3b
swp15      100G   BondMember  sw1                swp15
swp16      100G   BondMember  sw1                swp16
```

### Step 1: Prepare for replacement

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

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

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

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

   `set -privilege advanced`

   The advanced prompt (*>) appears.

3. Install the appropriate RCF and image on the switch, nsw2, and make any necessary site preparations.

   If necessary, verify, download, and install the appropriate versions of the RCF and Cumulus software for the new switch.

   a. You can download the applicable Cumulus software for your cluster switches from the *NVIDIA Support* site. Follow the steps on the Download page to download the Cumulus Linux for the version of ONTAP software you are installing.

   b. The appropriate RCF is available from the Lenovo Data Center Support Site. Follow the steps on the Download page to download the correct RCF for the version of ONTAP software you are installing.

### Step 2: Configure ports and cabling

1. On the new switch nsw2, log in as admin and shut down all of the ports that will be connected to the node cluster interfaces (ports swp1 to swp14).

   The LIFs on the cluster nodes should have already failed over to the other cluster port for each node.

   **Show example**

   ```
   cumulus@nsw2:~$ net add interface swp1s0-3, swp2s0-3, swp3-14 link down
   cumulus@nsw2:~$ net pending
   cumulus@nsw2:~$ net commit
   ```

2. Disable auto-revert on the cluster LIFs:

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

   **Show example**

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

   Warning: Disabling the auto-revert feature of the cluster logical interface may effect the
   availability of your cluster network. Are you sure you want to continue? {y|n}: y
   ```

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

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

4. Shut down the ISL ports swp15 and swp16 on the SN2100 switch sw1.

   **Show example**

   ```
   cumulus@sw1:~$ net add interface swp15-16 link down
   cumulus@sw1:~$ net pending
   cumulus@sw1:~$ net commit
   ```

5. Remove all the cables from the SN2100 sw1 switch, and then connect them to the same ports on the SN2100 nsw2 switch.
6. Bring up the ISL ports swp15 and swp16 between the sw1 and nsw2 switches.

**Show example**

The following commands enable ISL ports swp15 and swp16 on switch sw1:

```
cumulus@sw1:~$ net del interface swp15-16 link down
cumulus@sw1:~$ net pending
cumulus@sw1:~$ net commit
```

The following example shows that the ISL ports are up on switch sw1:

```
cumulus@sw1:~$ net show interface

State  Name         Spd   MTU    Mode        LLDP           Summary
-----  -----------  ----  -----  ----------  -------------- ----------------------
...
...
UP     swp15        100G  9216   BondMember  nsw2 (swp15)   Master: cluster_isl(UP)
UP     swp16        100G  9216   BondMember  nsw2 (swp16)   Master: cluster_isl(UP)
```

+ The following example shows that the ISL ports are up on switch nsw2:

+

```
cumulus@nsw2:~$ net show interface

State  Name         Spd   MTU    Mode        LLDP           Summary
-----  -----------  ----  -----  ----------  -------------  -----------------------
...
...
UP     swp15        100G  9216   BondMember  sw1 (swp15)    Master: cluster_isl(UP)
UP     swp16        100G  9216   BondMember  sw1 (swp16)    Master: cluster_isl(UP)
```

7. Verify that port `e3b` is up on all nodes:

   `network port show -ipspace Cluster`

**Show example**

The output should be similar to the following:

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

Node: node1
                                                                        Ignore
                                                  Speed(Mbps)  Health   Health
Port      IPspace      Broadcast Domain Link MTU   Admin/Oper   Status   Status
--------- ------------ ---------------- ---- ----- ------------ -------- -------
e3a       Cluster      Cluster          up   9000  auto/100000  healthy  false
e3b       Cluster      Cluster          up   9000  auto/100000  healthy  false


Node: node2
                                                                        Ignore
                                                  Speed(Mbps) Health    Health
Port      IPspace      Broadcast Domain Link MTU   Admin/Oper  Status    Status
--------- ------------ ---------------- ---- ----- ----------- --------- -------
e3a       Cluster      Cluster          up   9000  auto/100000  healthy  false
e3b       Cluster      Cluster          up   9000  auto/100000  healthy  false
```

8. The cluster ports on each node are now connected to cluster switches in the following way, from the nodes' perspective:

   **Show example**

   ```
   cluster1::*> network device-discovery show -protocol lldp
   Node/       Local  Discovered
   Protocol    Port   Device (LLDP: ChassisID)  Interface     Platform
   ----------- ------ ------------------------- ------------  ----------------
   node1      /lldp
               e3a    sw1  (b8:ce:f6:19:1a:7e)   swp3          -
               e3b    nsw2 (b8:ce:f6:19:1b:b6)   swp3          -
   node2      /lldp
               e3a    sw1  (b8:ce:f6:19:1a:7e)   swp4          -
               e3b    nsw2 (b8:ce:f6:19:1b:b6)   swp4          -
   ```

9. Verify that all node cluster ports are up:

   ```
   net show interface
   ```

**Show example**

```
cumulus@nsw2:~$ net show interface

State  Name         Spd   MTU    Mode        LLDP              Summary
-----  -----------  ----  -----  ----------  ----------------- ---------------------
...
...
UP     swp3         100G  9216   Trunk/L2                      Master: bridge(UP)
UP     swp4         100G  9216   Trunk/L2                      Master: bridge(UP)
UP     swp15        100G  9216   BondMember  sw1 (swp15)       Master: cluster_isl(UP)
UP     swp16        100G  9216   BondMember  sw1 (swp16)       Master: cluster_isl(UP)
```

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

    `net show lldp`

    **Show example**

    The following example shows the appropriate results for both switches:

    ```
    cumulus@sw1:~$ net show lldp

    LocalPort  Speed  Mode        RemoteHost         RemotePort
    ---------  -----  ----------  -----------------  -----------
    swp3       100G   Trunk/L2    node1              e3a
    swp4       100G   Trunk/L2    node2              e3a
    swp15      100G   BondMember  nsw2               swp15
    swp16      100G   BondMember  nsw2               swp16


    cumulus@nsw2:~$ net show lldp

    LocalPort  Speed  Mode        RemoteHost         RemotePort
    ---------  -----  ----------  -----------------  -----------
    swp3       100G   Trunk/L2    node1                e3b
    swp4       100G   Trunk/L2    node2                e3b
    swp15      100G   BondMember  sw1                swp15
    swp16      100G   BondMember  sw1                swp16
    ```

11. Enable auto-revert on the cluster LIFs:

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

12. On switch nsw2, bring up the ports connected to the network ports of the nodes.

**Show example**

```
cumulus@nsw2:~$ net del interface swp1-14 link down
cumulus@nsw2:~$ net pending
cumulus@nsw2:~$ net commit
```

13. Display information about the nodes in a cluster:

    `cluster show`

    **Show example**

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

    ```
    cluster1::*> cluster show

    Node          Health  Eligibility
    ------------- ------- ------------
    node1         true    true
    node2         true    true
    ```

14. Verify that all physical cluster ports are up:

    `network port show ipspace Cluster`

    **Show example**

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

    Node node1                                                      Ignore
                                                 Speed(Mbps) Health   Health
    Port      IPspace     Broadcast Domain  Link  MTU   Admin/Oper  Status   Status
    --------- ----------- ----------------- ----- ----- ----------- -------- ------
    e3a       Cluster     Cluster           up    9000  auto/10000  healthy  false
    e3b       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
    --------- ------------ ---------------- ----- ----- ----------- -------- ------
    e3a       Cluster      Cluster          up    9000  auto/10000  healthy  false
    e3b       Cluster      Cluster          up    9000  auto/10000  healthy  false
    ```

### Step 3: Complete the procedure

1. Verify that the cluster network is healthy.

   **Show example**

   ```
   cumulus@sw1:~$ net show lldp

   LocalPort  Speed  Mode        RemoteHost      RemotePort
   ---------  -----  ----------  --------------  -----------
   swp3       100G   Trunk/L2    node1           e3a
   swp4       100G   Trunk/L2    node2           e3a
   swp15      100G   BondMember  nsw2            swp15
   swp16      100G   BondMember  nsw2            swp16
   ```

2. Enable the Ethernet switch health monitor log collection feature for collecting switch-related log files, using the commands:

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

   a. Enter: `system switch ethernet log setup-password`

      **Show example**

      ```
      cluster1::*> system switch ethernet log setup-password
      Enter the switch name: <return>
      The switch name entered is not recognized.
      Choose from the following list:
      sw1
      nsw2

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

      Enter the switch name: sw1
      RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
      Do you want to continue? {y|n}::[n] y

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

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

      Enter the switch name: nsw2
      RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
      Do you want to continue? {y|n}:: [n] y

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

b. Followed by: `system switch ethernet log enable-collection`

**Show example**

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

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

Enabling cluster switch log collection.

cluster1::*>
```

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

3. Initiate the switch log collection feature:

   `system switch ethernet log collect -device *`

   Wait for 10 minutes and then check that the log collection was successful using the command: `system switch ethernet log show`

   **Show example**

```
cluster1::*> system switch ethernet log show
Log Collection Enabled: true

Index  Switch                       Log Timestamp        Status
------ ---------------------------- -------------------  ---------
1      sw1 (b8:ce:f6:19:1b:42)      4/29/2022 03:05:25   complete
2      nsw2 (b8:ce:f6:19:1b:96)     4/29/2022 03:07:42   complete
```

4. Change the privilege level back to admin:

   `set -privilege admin`

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

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

## 5.2. Replace NVIDIA SN2100 cluster switches with switchless connections

You can migrate from a cluster with a switched cluster network to one where

two nodes are directly connected.

### 5.2.1. 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.

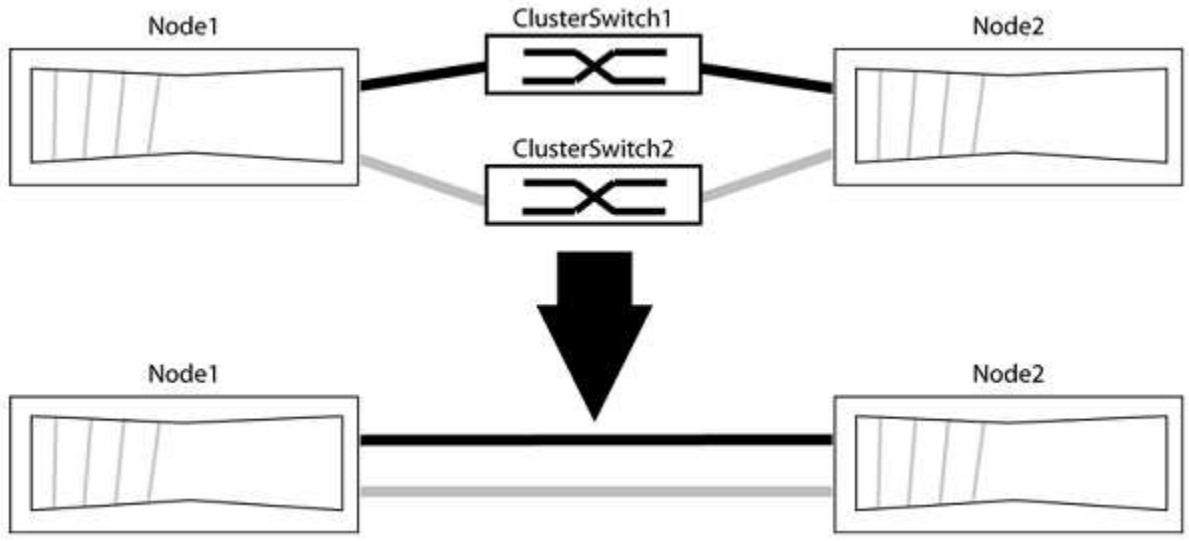
#### What you'll need

- 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.

### 5.2.2. 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 Lenovo 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**

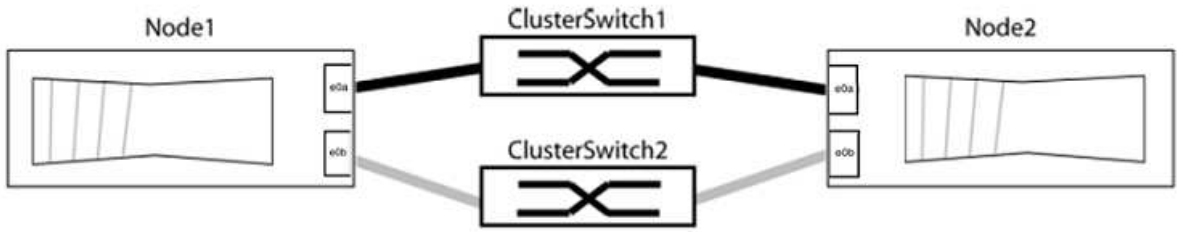
   ```
   cluster::*> system node autosupport invoke -node * -type all -message MAINT=2h
   ```

### 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 cluster connectivity:

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

7. Verify that the cluster is healthy:

   ```
   cluster ring show
   ```

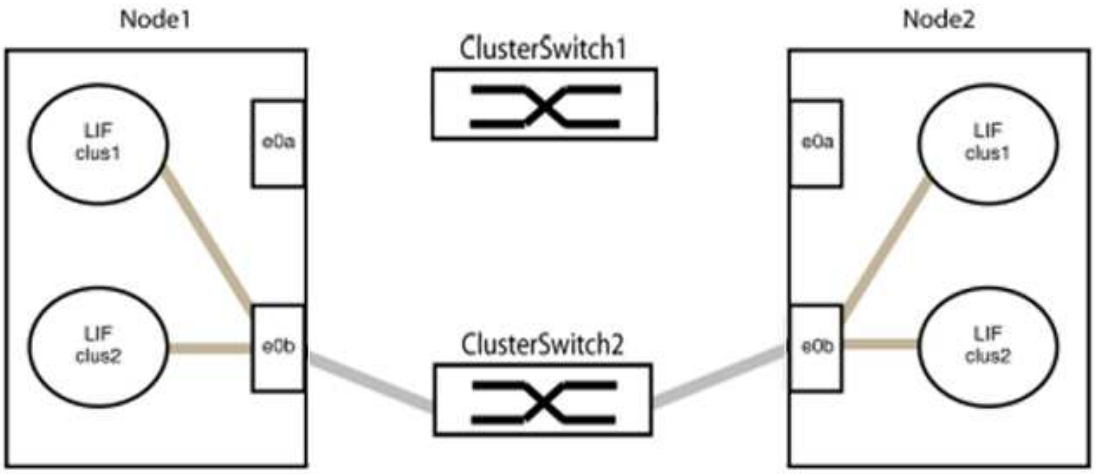
   All units must be either master or secondary.

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**.

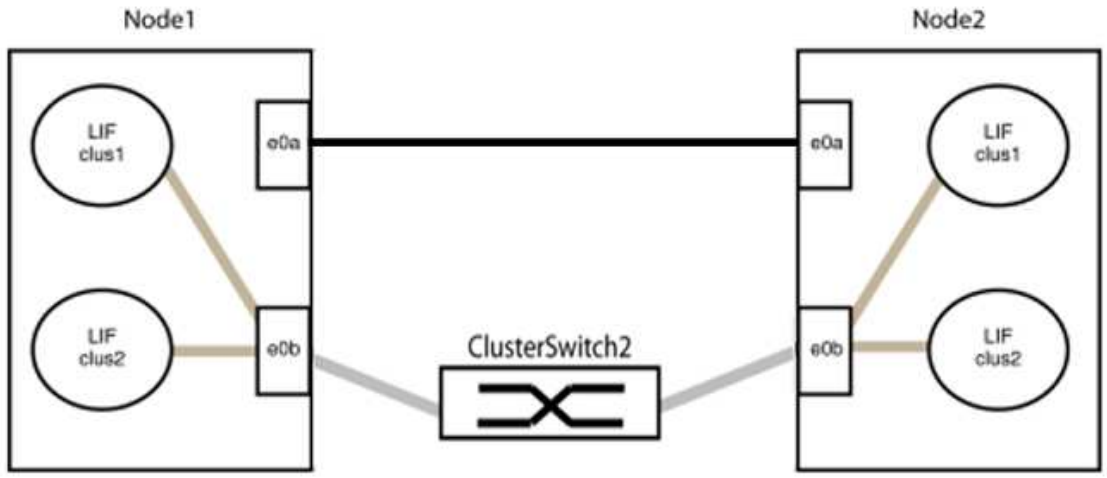
   a. Disconnect all the cables from the ports in group1 at the same time.

      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 that the cluster network is not disrupted:

    `cluster ping-cluster -node local`

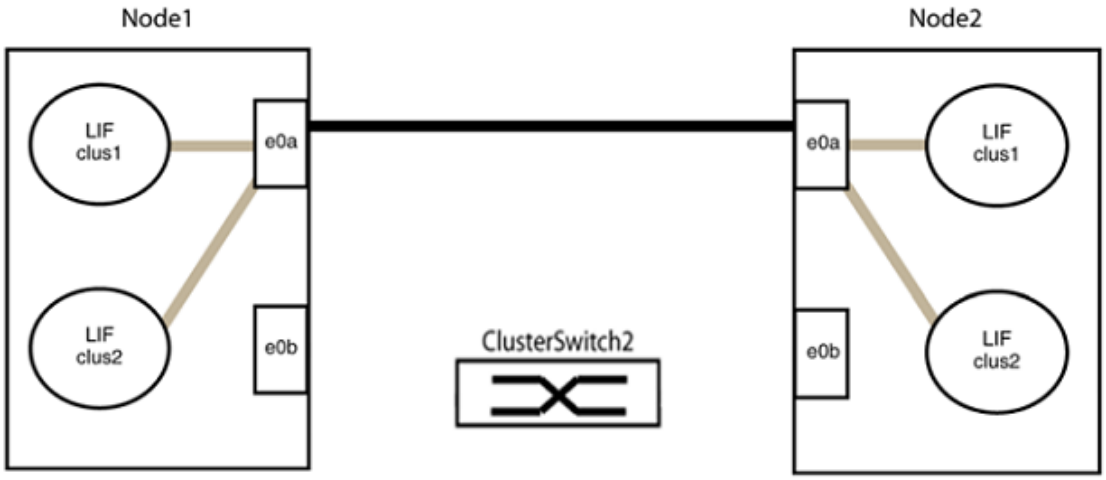
    Before proceeding to the next step, you must wait at least two minutes to confirm a working back-to-back connection on group 1.

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        AFA-DM7000F
           e0b    node2                     e0b        AFA-DM7000F
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        AFA-DM7000F
           e0b    node1                     e0b        AFA-DM7000F
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:

```
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. Confirm connectivity between the cluster ports:

   ```
   cluster ping-cluster local
   ```

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

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

7. Change the privilege level back to admin:

   ```
   set -privilege admin
   ```

# Chapter 6. Contacting Support

You can contact Support to obtain help for your issue.

You can receive hardware service through a Lenovo Authorized Service Provider. To locate a service provider authorized by Lenovo to provide warranty service, go to https://datacentersupport.lenovo.com/serviceprovider and use filter searching for different countries. For Lenovo support telephone numbers, see https://datacentersupport.lenovo.com/supportphonelist for your region support details.

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