



## **NVIDIA SN2100**

### **Cluster and storage switches**

NetApp  
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# NVIDIA SN2100

## Overview

### Overview of configuration process for NVIDIA SN2100 storage switches

The NVIDIA SN2100 is a storage switch that allows you to route data between servers and storage arrays in a Storage Area Network (SAN).

#### 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 the NVIDIA documentation.

3. [Review cabling and configuration considerations.](#)

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

4. [Cable NS224 shelves as switch-attached storage.](#)

Follow these procedures if you have a system in which the NS224 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 script.](#)

There are two RCF scripts available for Clustering and Storage applications.

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.

#### Additional information

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

- [Configuration requirements](#)
- [Components and part numbers](#)

- [Required documentation](#)

## Configuration requirements for NVIDIA SN2100 switches

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

### 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 (X190006/X190106) in the NVIDIA dual/single switch cabinet with the standard brackets that are included with the switch.

For cabling guidelines, see [Cabling and configuration considerations](#).

### ONTAP and Linux support

The NVIDIA SN2100 switch is a 10/25/40/100 Gb Ethernet 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. From ONTAP 9.10.1P3, you can use NVIDIA SN2100 switches to combine storage and cluster functionality into a shared switch configuration.
- Cumulus Linux (CL) OS version 4.4.3. For current compatibility information, see the [NVIDIA Ethernet Switches](#) information page.
- You can install Cumulus Linux when the switch is running Cumulus Linux or ONIE.

## 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.

### Cabinet details

You install the NVIDIA SN2100 switch (X190006/X190106) in the NVIDIA dual/single switch cabinet with the standard brackets that are included with the switch.

### Rail kit details

The following table lists the part number and description for the MSN2100 switches and rail kits:

Part number	Description
X190006-PE	Cluster Switch, NVIDIA SN2100, 16PT 100G, PTSX
X190006-PI	Cluster Switch, NVIDIA SN2100, 16PT 100G, PSIN
X190106-FE-PE	Switch, NVIDIA SN2100, 16PT 100G, PTSX, Front End

Part number	Description
X190106-FE-PI	Switch, NVIDIA SN2100, 16PT 100G, PSIN, Front End
X-MTEF-KIT-D	Rail Kit, NVIDIA Dual switch side by side
X-MTEF-KIT-E	Rail Kit, NVIDIA Single switch short depth



See NVIDIA documentation for details on [installing your SN2100 switch and rail kit](#).

## Documentation requirements for NVIDIA SN2100 switches

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

The following table lists the documentation available for the NVIDIA SN2100 switches.

Title	Description
<a href="#">Setup and configure your NVIDIA SN2100 switches</a>	Describes how to setup and configure your NVIDIA SN2100 switches, including installing Cumulus Linux and applicable RCFs.
<a href="#">Migrate from a Cisco cluster switch to a NVIDIA SN2100 cluster switch</a>	Describes how to migrate from environments that use Cisco cluster switches to environments that use NVIDIA SN2100 cluster switches.
<a href="#">Migrate from a Cisco storage switch to a NVIDIA storage switch</a>	Describes how to migrate from environments that use Cisco storage switches to environments that use NVIDIA SN2100 storage switches.
<a href="#">Migrate to a two-node switched cluster with NVIDIA SN2100 cluster switches</a>	Describes how to migrate to a two-node switched environment using NVIDIA SN2100 cluster switches.
<a href="#">Replace a NVIDIA SN2100 cluster switch</a>	Describes the procedure to replace a defective NVIDIA SN2100 switch in a cluster and download Cumulus Linux and reference configuration file.
<a href="#">Replace a NVIDIA SN2100 storage switch</a>	Describes the procedure to replace a defective NVIDIA SN2100 storage switch and download Cumulus Linux and reference configuration file.

## Install hardware

### 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](#).

## 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](#).

## Review cabling and configuration considerations

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

### NVIDIA port details

Switch ports	Ports usage
swp1s0-3	10/40 cluster port nodes
swp2s0-3	25/100 cluster port nodes
swp3-14 40/100 cluster port nodes	swp15-16 40/100 Inter-Switch Link (ISL) ports

See the [Hardware Universe](#) for more information on switch ports.

### Optical connections

Only optical connections are supported on SN2100 switches with X1151A NIC, X1146A NIC, or onboard 100GbE ports. For example:

- AFF A800 on ports e0a and e0b
- AFF A320 on ports e0g and e0h

### QSA adapter

When a QSA adapter is used to connect to the onboard Intel cluster ports on a platform, not all links come up. Example platforms are: FAS2750, AFF A300, and FAS8200 (all 10G) and AFF A250 (25G).

To resolve this issue, do the following:

1. For Intel 10G, manually set the swp1s0-3 link speed to 10000 and set auto-negotiation to off.
2. For Chelsio 25G, manually set the swp2s0-3 link speed to 25000 and set auto-negotiation to off.



Using 10G/25G QSA, use the non-breakout 40/100G ports. Do not insert the QSA adapter on ports that are configured for breakout.

## Switchport speed

Depending on the transceiver in the switchport, you might need to set the speed on the switchport to fixed speed. If using 10G and 25G breakout ports, make sure that auto-negotiation is off and hard set the port speed on the switch. 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
```

## What's next?

[Cable NS224 shelves as switch-attached storage.](#)

## Cable NS224 shelves as switch-attached storage

If you have a system in which the NS224 drive shelves need to be cabled as switch-attached storage (not direct-attached storage), use the information provided here.

- Cable NS224 drive shelves through storage switches:

[Information for cabling switch-attached NS224 drive shelves](#)

- Install your storage switches:

[AFF and FAS Switch Documentation](#)

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

[NetApp Hardware Universe](#)

## Configure software

### Software install workflow for NVIDIA SN2100 storage switches

To install and configure the 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 script](#).

There are two RCF scripts available for Clustering and Storage applications.

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.

### 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 must be 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.

### Steps

1. Log in to the switch.

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

#### Show example

```
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
```

### Show example

```
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.

### Show example

```
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.

### Show example

```
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 screens 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
```

#### Show example

```
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
```

## Show example

```
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+cl4.4.3u1
(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:~$
```

## What's next?

[Install RCF script.](#)

## 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 Cumulus Linux or ONIE (see [Install in Cumulus mode](#)).

### About this task

You can install the 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.

### Steps

1. Download the Cumulus Linux installation file to the root directory of the web server. Rename this file `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 displayed, 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
```

**Show example**

```
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:/ # 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. Once the installation has completed, log in to the switch:

#### Show example

```
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
```

#### Show example

```
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"
```

What's next?



[Install RCF script.](#)

## Install the 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 4.4.3 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 Clustering and Storage applications. The procedure for each is the same.

- Clustering: **MSN2100-RCF-v1.8-Cluster**
- Storage: **MSN2100-RCF-v1.8-Storage**



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.

### Steps

1. Display the available interfaces on the SN2100 switch:

```
net show interface all
```

## Show example

```
cumulus@cumulus: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>/MSN2100-RCF-v1.8-
Cluster
ssologin@10.233.204.71's password:
MSN2100-RCF-v1.8-Cluster          100% 8607    111.2KB/s
00:00
```

3. Apply the RCF python script **MSN2100-RCF-v1.8-Cluster**:

```
cumulus@cumulus:mgmt:/tmp$ sudo python3 MSN2100-RCF-v1.8-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 above.



For any RCF python script issues that cannot be corrected, contact [NetApp Support](#) for assistance.

#### 4. Verify the configuration after the reboot:

```
net show interface all
```

## Show example

```
cumulus@cumulus: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)
...
...

```

```
cumulus@cumulus: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:

```
net show interface pluggables
```

### Show example

```
cumulus@cumulus: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:

```
net show lldp
```

### Show example

```
cumulus@cumulus: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:

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

## Show example

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

Node: node1

Ignore

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

Node: node2

Ignore

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

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

## 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	-

  

```
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		

## What's next?

[Configure switch log collection.](#)



## Ethernet Switch Health Monitoring log collection

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

### Before you begin

- The user for log collection must be specified when the Reference Configuration File (RCF) is applied. By default, this user is set to 'admin'. If you wish to use a different user, you must specify this in the `*# SHM User*`s section of the RCF.
- The user must have access to the **nv show** commands. This can be added by running `sudo adduser USER nv show` and replacing `USER` with the user for log collection.
- Switch health monitoring must be enabled for the switch. Verify this by ensuring the `Is Monitored:` field is set to **true** in the output of the `system switch ethernet show` command.

### Steps

1. To set up log collection, run the following command for each switch. You are prompted to enter the switch name, username, and password for log collection.

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

## Show example

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

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

Enter the switch name: cs1
Would you like to specify a user other than admin for log
collection? {y|n}: n

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

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

Enter the switch name: cs2
Would you like to specify a user other than admin for log
collection? {y|n}: n

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

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

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

## Show example

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

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

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

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

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

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

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

```
system switch ethernet log show
```



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

## Troubleshooting

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

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

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

## Configure SNMPv3

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

### About this task

The following commands configure an SNMPv3 username on 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 CSHM: `cluster1::*> system switch ethernet modify -device DEVICE -snmp-version SNMPv3 -community-or-username SNMPv3_USER`

### Steps

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

```
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 cshml! default
```

```

rouser _snmptrapusernameX
+rouser SNMPv3User priv
sysobjectid 1.3.6.1.4.1.40310
syssservices 72
-rocommunity cshml! 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 CSHM 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
IP Address: 10.231.80.212
SNMP Version: SNMPv2c
Is Discovered: true
DEPRECATED-Community String or SNMPv3 Username: -
Community String or SNMPv3 Username: cshml!
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 CSHM polling period has completed.

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



### Show example

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

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

## Migrate switches

### Migrate from a Cisco storage switch to a NVIDIA SN2100 storage switch

You can migrate older Cisco switches for an ONTAP cluster to NVIDIA SN2100 storage switches. This is a non-disruptive procedure.

#### Review requirements

The following storage switches are supported:

- Cisco Nexus 9336C-FX2
- Cisco Nexus 3232C
- See the [Hardware Universe](#) for full details of supported ports and their configurations.

#### What you'll need

Ensure that:

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

## Migrate the switches

### About the examples

In this procedure, Cisco Nexus 9336C-FX2 storage switches are used for example commands and outputs.

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

- The existing Cisco Nexus 9336C-FX2 storage switches are *S1* and *S2*.
- The new NVIDIA SN2100 storage 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 network ports used in this procedure are *e5a* and *e5b*.
- Breakout ports take the format: *swp1s0-3*. For example four breakout ports on *swp1* are *swp1s0*, *swp1s1*, *swp1s2*, and *swp1s3*.
- Switch *S2* is replaced by switch *sw2* first and then switch *S1* is replaced by switch *sw1*.
  - Cabling between the nodes and *S2* are then disconnected from *S2* and reconnected to *sw2*.
  - Cabling between the nodes and *S1* are then disconnected from *S1* and reconnected to *sw1*.

### Step 1: Prepare for migration

1. If AutoSupport is enabled, 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. Determine the administrative or operational status for each storage interface:

Each port should display enabled for Status.

## Step 2: Configure cables and ports

1. Display the network port attributes:

```
storage port show
```

### Show example

```
cluster1::*> storage port show
```

Node	Port	Type	Mode	Speed (Gb/s)	State	Status	VLAN ID
node1							
	e0c	ENET	storage	100	enabled	online	30
	e0d	ENET	storage	0	enabled	offline	30
	e5a	ENET	storage	0	enabled	offline	30
	e5b	ENET	storage	100	enabled	online	30
node2							
	e0c	ENET	storage	100	enabled	online	30
	e0d	ENET	storage	0	enabled	offline	30
	e5a	ENET	storage	0	enabled	offline	30
	e5b	ENET	storage	100	enabled	online	30

```
cluster1::*>
```

2. Verify that the storage ports on each node are connected to existing storage 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		
	e0c	S1 (7c:ad:4f:98:6d:f0)	Eth1/1 -
	e5b	S2 (7c:ad:4f:98:8e:3c)	Eth1/1 -
node2	/lldp		
	e0c	S1 (7c:ad:4f:98:6d:f0)	Eth1/2 -
	e5b	S2 (7c:ad:4f:98:8e:3c)	Eth1/2 -

3. On switch S1 and S2, make sure that the storage ports and switches are connected in the following way (from the switches' perspective) using the command:

```
show lldp neighbors
```

## Show example

S1# **show lldp neighbors**

Capability Codes: (R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS  
Cable Device,

(W) WLAN Access Point, (P) Repeater, (S) Station

(O) Other

Device-ID Port ID	Local Intf	Holdtime	Capability
node1 e0c	Eth1/1	121	S
node2 e0c	Eth1/2	121	S
SHFGD1947000186 e0a	Eth1/10	120	S
SHFGD1947000186 e0a	Eth1/11	120	S
SHFGB2017000269 e0a	Eth1/12	120	S
SHFGB2017000269 e0a	Eth1/13	120	S

S2# **show lldp neighbors**

Capability Codes: (R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS  
Cable Device,

(W) WLAN Access Point, (P) Repeater, (S) Station

(O) Other

Device-ID Port ID	Local Intf	Holdtime	Capability
node1 e5b	Eth1/1	121	S
node2 e5b	Eth1/2	121	S
SHFGD1947000186 e0b	Eth1/10	120	S
SHFGD1947000186 e0b	Eth1/11	120	S
SHFGB2017000269 e0b	Eth1/12	120	S
SHFGB2017000269 e0b	Eth1/13	120	S

4. On switch sw2, shut down the ports connected to the storage ports and nodes of the disk shelves.

#### Show example

```
cumulus@sw2:~$ net add interface swp1-16 link down
cumulus@sw2:~$ net pending
cumulus@sw2:~$ net commit
```

5. Move the node storage ports of the controller and disk shelves from the old switch S2 to the new switch sw2, using appropriate cabling supported by NVIDIA SN2100.
6. On switch sw2, bring up the ports connected to the storage ports of the nodes and the disk shelves.

#### Show example

```
cumulus@sw2:~$ net del interface swp1-16 link down
cumulus@sw2:~$ net pending
cumulus@sw2:~$ net commit
```

7. Verify that the storage ports on each node are now connected to the switches in the following way, from the nodes' perspective:

```
network device-discovery show -protocol lldp
```

#### Show example

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

Node/ Protocol	Local Port	Discovered Device (LLDP: ChassisID)	Interface	Platform
-----	-----	-----	-----	
node1	/lldp			
	e0c	S1 (7c:ad:4f:98:6d:f0)	Eth1/1	-
	e5b	sw2 (b8:ce:f6:19:1a:7e)	swp1	-
node2	/lldp			
	e0c	S1 (7c:ad:4f:98:6d:f0)	Eth1/2	-
	e5b	sw2 (b8:ce:f6:19:1a:7e)	swp2	-

8. Verify the network port attributes:

```
storage port show
```

Show example

```
cluster1::*> storage port show
```

Node	Port	Type	Mode	Speed (Gb/s)	State	Status	VLAN ID
-----							
node1	e0c	ENET	storage	100	enabled	online	30
	e0d	ENET	storage	0	enabled	offline	30
	e5a	ENET	storage	0	enabled	offline	30
	e5b	ENET	storage	100	enabled	online	30
node2	e0c	ENET	storage	100	enabled	online	30
	e0d	ENET	storage	0	enabled	offline	30
	e5a	ENET	storage	0	enabled	offline	30
	e5b	ENET	storage	100	enabled	online	30

```
cluster1::*>
```

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

```
net show interface
```

### Show example

```
cumulus@sw2:~$ 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)
...
...
```

10. On switch sw1, shut down the ports connected to the storage ports of the nodes and the disk shelves.

### Show example

```
cumulus@sw1:~$ net add interface swp1-16 link down
cumulus@sw1:~$ net pending
cumulus@sw1:~$ net commit
```

11. Move the node storage ports of the controller and the disk shelves from the old switch S1 to the new switch sw1, using appropriate cabling supported by NVIDIA SN2100.
12. On switch sw1, bring up the ports connected to the storage ports of the nodes and the disk shelves.



### Show example

```
cumulus@sw1:~$ net del interface swp1-16 link down
cumulus@sw1:~$ net pending
cumulus@sw1:~$ net commit
```

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

```
network device-discovery show -protocol lldp
```

### Show example

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

Node/ Protocol Platform	Local Port	Discovered Device (LLDP: ChassisID)	Interface	
-----				
-----				
node1	/lldp			
	e0c	sw1 (b8:ce:f6:19:1b:96)	swp1	-
	e5b	sw2 (b8:ce:f6:19:1a:7e)	swp1	-
node2	/lldp			
	e0c	sw1 (b8:ce:f6:19:1b:96)	swp2	-
	e5b	sw2 (b8:ce:f6:19:1a:7e)	swp2	-

14. Verify the final configuration:

```
storage port show
```

Each port should display enabled for State and enabled for Status.

## Show example

```
cluster1::*> storage port show
```

Node	Port	Type	Mode	Speed (Gb/s)	State	Status	VLAN ID
node1							
	e0c	ENET	storage	100	enabled	online	30
	e0d	ENET	storage	0	enabled	offline	30
	e5a	ENET	storage	0	enabled	offline	30
	e5b	ENET	storage	100	enabled	online	30
node2							
	e0c	ENET	storage	100	enabled	online	30
	e0d	ENET	storage	0	enabled	offline	30
	e5a	ENET	storage	0	enabled	offline	30
	e5b	ENET	storage	100	enabled	online	30

```
cluster1::*>
```

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

```
net show interface
```

### Show example

```
cumulus@sw2:~$ 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)					
...					
...					

16. 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
...				
swp1	100G	Trunk/L2	node1	e0c
swp2	100G	Trunk/L2	node2	e0c
swp3	100G	Trunk/L2	SHFFG1826000112	e0a
swp4	100G	Trunk/L2	SHFFG1826000112	e0a
swp5	100G	Trunk/L2	SHFFG1826000102	e0a
swp6	100G	Trunk/L2	SHFFG1826000102	e0a

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

LocalPort	Speed	Mode	RemoteHost	RemotePort
...				
swp1	100G	Trunk/L2	node1	e5b
swp2	100G	Trunk/L2	node2	e5b
swp3	100G	Trunk/L2	SHFFG1826000112	e0b
swp4	100G	Trunk/L2	SHFFG1826000112	e0b
swp5	100G	Trunk/L2	SHFFG1826000102	e0b
swp6	100G	Trunk/L2	SHFFG1826000102	e0b

### Step 3: Complete the procedure

1. 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
```

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>
```

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 NetApp support.

### 2. 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

### 3. Change the privilege level back to admin:

```
set -privilege admin
```

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

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

## Replace a NVIDIA SN2100 storage switch

You must be aware of certain configuration information, port connections and cabling

requirements when you replace NVIDIA SN2100 storage switches.

### Before you begin

You must verify that the following conditions exist before installing the Cumulus software and RCFs on a NVIDIA SN2100 storage switch:

- Your system can support NVIDIA SN2100 storage switches.
- You must have downloaded the applicable RCFs.
- The [Hardware Universe](#) provides full details of supported ports and their configurations.

### About this task

The existing network configuration must have the following characteristics:

- Make sure that all troubleshooting steps have been completed to confirm that your switch needs replacing.
- Management connectivity must exist on both switches.



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

The replacement NVIDIA SN2100 switch must have the following characteristics:

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

### Procedure summary

This procedure replaces the second NVIDIA SN2100 storage switch sw2 with the new NVIDIA SN2100 switch nsw2. The two nodes are node1 and node2.

Steps to complete:

- Confirm the switch to be replaced is sw2.
- Disconnect the cables from switch sw2.
- Reconnect the cables to switch nsw2.
- Verify all device configurations on switch nsw2.

### Steps

1. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport message: `system node autosupport invoke -node * -type all - message MAINT=xh`  
  
x is the duration of the maintenance window in hours.
2. Change the privilege level to advanced, entering **y** when prompted to continue: `set -privilege advanced`
3. Check on the health status of the storage node ports to make sure that there is connection to storage switch S1:

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

#### Show example

```
cluster1::*> storage port show -port-type ENET
```

Node	Port	Type	Mode	Speed (Gb/s)	State	Status	VLAN ID
node1							
	e3a	ENET	storage	100	enabled	online	30
	e3b	ENET	storage	0	enabled	offline	30
	e7a	ENET	storage	0	enabled	offline	30
	e7b	ENET	storage	100	enabled	online	30
node2							
	e3a	ENET	storage	100	enabled	online	30
	e3b	ENET	storage	0	enabled	offline	30
	e7a	ENET	storage	0	enabled	offline	30
	e7b	ENET	storage	100	enabled	online	30

```
cluster1::*>
```

4. Verify that storage switch sw1 is available: `network device-discovery show`

#### Show example

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

Node/ Protocol	Local Port	Discovered Device (LLDP: ChassisID)	Interface	Platform
node1/lldp				
	e3a	sw1 (b8:ce:f6:19:1b:42)	swp3	-
node2/lldp				
	e3a	sw1 (b8:ce:f6:19:1b:42)	swp4	-

```
cluster1::*>
```

5. Run the `net show interface` command on the working switch to confirm that you can see both nodes and all shelves: `net show interface`



### Show example

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

State	Name	Spd	MTU	Mode	LLDP
Summary					
-----					
-----					
...					
...					
UP	swp1	100G	9216	Trunk/L2	node1 (e3a)
Master: bridge(UP)					
UP	swp2	100G	9216	Trunk/L2	node2 (e3a)
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)					
...					
...					

6. Verify the shelf ports in the storage system: `storage shelf port show -fields remote-device, remote-port`

### Show example

```
cluster1::*> storage shelf port show -fields remote-device, remote-  
port  
shelf    id  remote-port  remote-device  
-----  --  -  
3.20     0   swp3         sw1  
3.20     1   -           -  
3.20     2   swp4         sw1  
3.20     3   -           -  
3.30     0   swp5         sw1  
3.20     1   -           -  
3.30     2   swp6         sw1  
3.20     3   -           -  
cluster1::*>
```

7. Remove all cables attached to storage switch sw2.
8. Reconnect all cables to the replacement switch nsw2.
9. Recheck the health status of the storage node ports: `storage port show -port-type ENET`

### Show example

```
cluster1::*> storage port show -port-type ENET  
  
Node          Port Type  Mode    Speed      State   Status   VLAN  
              (Gb/s)                ID  
-----  -  
node1  
          e3a  ENET   storage 100    enabled  online   30  
          e3b  ENET   storage  0    enabled  offline  30  
          e7a  ENET   storage  0    enabled  offline  30  
          e7b  ENET   storage 100    enabled  online   30  
node2  
          e3a  ENET   storage 100    enabled  online   30  
          e3b  ENET   storage  0    enabled  offline  30  
          e7a  ENET   storage  0    enabled  offline  30  
          e7b  ENET   storage 100    enabled  online   30  
cluster1::*>
```

10. Verify that both switches are available: `net device-discovery show`

### 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:f6:19:1b:96)   swp1       -
          e7b  nsw2 (b8:ce:f6:19:1a:7e)  swp1       -
node2/lldp
          e3a  sw1 (b8:ce:f6:19:1b:96)   swp2       -
          e7b  nsw2 (b8:ce:f6:19:1a:7e)  swp2       -
cluster1::*>
```

11. Verify the shelf ports in the storage system: `storage shelf port show -fields remote-device, remote-port`

### Show example

```
cluster1::*> storage shelf port show -fields remote-device, remote-
port
shelf  id    remote-port  remote-device
-----  --  -----
3.20   0     swp3         sw1
3.20   1     swp3         nsw2
3.20   2     swp4         sw1
3.20   3     swp4         nsw2
3.30   0     swp5         sw1
3.20   1     swp5         nsw2
3.30   2     swp6         sw1
3.20   3     swp6         nsw2
cluster1::*>
```

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

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

## Show example

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

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

Enter the switch name: csw1
Would you like to specify a user other than admin for log
collection? {y|n}: n

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

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

Enter the switch name: nsw2
Would you like to specify a user other than admin for log
collection? {y|n}: n

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

13. Enable the Ethernet switch health monitor log collection feature.

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

### Show example

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

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

Enabling cluster switch log collection.

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

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

Enabling cluster switch log collection.

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

```
system switch ethernet log show
```

### 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



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

14. Change the privilege level back to admin: `set -privilege admin`
15. If you suppressed automatic case creation, re-enable it by invoking an AutoSupport message: `system node autosupport invoke -node * -type all -message MAINT=END`

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