



Configure software

Cluster and storage switches

NetApp
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Configure software

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.

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

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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 set system hostname sw1
cumulus@cumulus:mgmt:~$ nv set interface eth0 ip address
10.233.204.71/24
cumulus@cumulus:mgmt:~$ nv set interface eth0 ip gateway
10.233.204.1
cumulus@cumulus:mgmt:~$ nv config apply
cumulus@cumulus:mgmt:~$ nv config save
```

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:~$ net 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

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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.](#)

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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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@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.](#)

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. See the [Hardware Universe](#) for supported versions.
- IP address, subnet mask, and default gateway defined via DHCP or manually configured.



You must specify a user in the RCF (in addition to the admin user) to be used specifically for log collection.

Current RCF script versions

There are two RCF scripts available for Cluster and Storage applications. Download RCFs from [here](#). The procedure for each is the same.

- Cluster: **MSN2100-RCF-v1.x-Cluster-HA-Breakout-LLDP**
- 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	NotConfigured		
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.

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



While `scp` is used in the example, you can use your preferred method of file transfer.

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

```
cumulus@cumulus:mgmt:/tmp$ sudo python3 MSN2100-RCF-v1.x-Cluster-HA-
Breakout-LLDP
[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 [NetApp 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-HA-Breakout-LLDP ./
ssologin@10.233.204.71's password:
MSN2100-RCF-v1.x-Cluster-HA-Breakout-LLDP          100% 8607
111.2KB/s                                00:00

```



While `scp` is used in the example, you can use your preferred method of file transfer.

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

```
cumulus@cumulus:mgmt:/tmp$ sudo python3 MSN2100-RCF-v1.x-Cluster-HA-  
Breakout-LLDP  
[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
*****
*****
*
* NetApp 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>
*
*****
*****

```



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

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.netapp.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        195.31 KB    Congestion config max-

```



```

threshold
  min-threshold      39.06 KB                Congestion config min-
threshold
  probability        100
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          pcsp,dscp              Trust Setting on the port
for packet classification

```

RoCE PCP/DSCP->SP mapping configurations

```

=====
      pcsp  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

```

Exception List

```
=====
```

```
description
```

```
--
```

```
-----
```

```
---...
```

- 1 RoCE PFC Priority Mismatch.Expected pfc-priority: 3.
- 2 Congestion Config TC Mismatch.Expected enabled-tc: 0,3.
- 3 Congestion Config mode Mismatch.Expected congestion-mode: ECN.
- 4 Congestion Config min-threshold Mismatch.Expected min-threshold: 150000.
- 5 Congestion Config max-threshold Mismatch.Expected max-threshold: 1500000.
- 6 Scheduler config mismatch for traffic-class mapped to switch-prio0.
Expected scheduler-weight: DWRR-50%.
- 7 Scheduler config mismatch for traffic-class mapped to switch-prio1.
Expected scheduler-weight: DWRR-50%.
- 8 Scheduler config mismatch for traffic-class mapped to switch-prio2.
Expected scheduler-weight: DWRR-50%.
- 9 Scheduler config mismatch for traffic-class mapped to switch-prio3.
Expected scheduler-weight: DWRR-50%.
- 10 Scheduler config mismatch for traffic-class mapped to switch-prio4.
Expected scheduler-weight: DWRR-50%.
- 11 Scheduler config mismatch for traffic-class mapped to switch-prio5.
Expected scheduler-weight: DWRR-50%.
- 12 Scheduler config mismatch for traffic-class mapped to switch-prio6.
Expected scheduler-weight: strict-priority.
- 13 Scheduler config mismatch for traffic-class mapped to switch-prio7.

```
Expected scheduler-weight: DWRR-50%.
14 Invalid reserved config for ePort.TC[2].Expected 0 Got 1024
15 Invalid reserved config for ePort.TC[5].Expected 0 Got 1024
16 Invalid traffic-class mapping for switch-priority 2.Expected
0 Got 2
17 Invalid traffic-class mapping for switch-priority 3.Expected
3 Got 0
18 Invalid traffic-class mapping for switch-priority 5.Expected
0 Got 5
19 Invalid traffic-class mapping for switch-priority 6.Expected
6 Got 0
Incomplete Command: set interface swp3-16 link fast-linkupp3-16 link
fast-linkup
Incomplete Command: set interface swp3-16 link fast-linkupp3-16 link
fast-linkup
Incomplete Command: set interface swp3-16 link fast-linkupp3-16 link
fast-linkup
```



The exceptions listed do not affect performance and can be safely ignored.

5. Verify information for the transceiver in the interface:

```

admin@sw1:mgmt:~$ nv show interface --view=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 interface --view=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?

[Enable 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.

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

Configure SNMPv3

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

About this task

The following commands configure an SNMPv3 username on 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] PRIVATE-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 laErrorMessage "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  
(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: 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
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
```

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 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 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/syncd/syncd.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

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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/syncd/syncd.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)

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

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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.

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