Install hardware

Cluster and storage switches

NetApp
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Table of Contents

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

See the Hardware Universe for more information on switch ports.

Link-up delays with optical connections

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

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

Show example

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

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

Only switchd reload required
```

Support for copper connections

The following configuration changes are required to fix this issue.

Cumulus Linux 4.4.3

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

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

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

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

   For example:

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

3. Restart the `switchd` service:

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

4. Confirm that the ports are up:

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

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

Cumulus Linux 5.x

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

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

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

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

   For example:

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

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

Only switchd reload required
```

3. Confirm that the ports are up:

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

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

See this KB for further details.

On Cumulus Linux 4.4.2, copper connections are not 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 10GbE/25GbE cluster ports on a platform, the link might not come up.

To resolve this issue, do the following:

- For 10GbE, manually set the swp1s0-3 link speed to 10000 and set auto-negotiation to off.
- For 25GbE, manually set the swp2s0-3 link speed to 25000 and set auto-negotiation to off.

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

Setting interface speed on breakout ports

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

Cumulus Linux 4.4.3

For example:

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

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

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

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

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

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

Cumulus Linux 5.x

For example:

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

link

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

  state                 up                      up
up
```

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

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

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

What's next?

Cable NS224 shelves as switch-attached storage.

Cable the 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:

  Cabling switch-attached NS224 drive shelves

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

  NetApp Hardware Universe

What's next?

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

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