

Replace switches

Cluster and storage switches

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Replace switches

Replace a NVIDIA SN2100 cluster switch

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

Review requirements

Existing cluster and network infrastructure

Ensure that:

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

NVIDIA SN2100 replacement switch

Ensure that:

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

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



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

Replace the switch

About the examples

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

- The names of the existing NVIDIA SN2100 switches are *sw1* and *sw2*.
- The name of the new NVIDIA SN2100 switch is nsw2.
- The node names are *node1* and *node2*.
- The cluster ports on each node are named *e3a* and *e3b*.
- The cluster LIF names are node1_clus1 and node1_clus2 for node1, and node2_clus1 and node2_clus2

for node2.

- The prompt for changes to all cluster nodes is cluster1::*>
- Breakout ports take the format: swp[port]s[breakout port 0-3]. For example, four breakout ports on swp1 are *swp1s0*, *swp1s1*, *swp1s2*, and *swp1s3*.

About the cluster network topology

This procedure is based on the following cluster network topology:

cluster1::*> network port show -ipspace Cluster Node: node1 Ignore Speed(Mbps) Health Health IPspace Broadcast Domain Link MTU Admin/Oper Status Port Status _____ ___ _____ _____ e3a Cluster Cluster up 9000 auto/100000 healthy false e3b Cluster Cluster up 9000 auto/100000 healthy false Node: node2 Ignore Speed(Mbps) Health Health Port IPspace Broadcast Domain Link MTU Admin/Oper Status Status _____ Cluster Cluster up 9000 auto/100000 healthy e3a false e3b Cluster Cluster up 9000 auto/100000 healthy false cluster1::*> network interface show -vserver Cluster Logical Status Network Current Current Is Vserver Interface Admin/Oper Address/Mask Node Port Home _____ ___ Cluster nodel clus1 up/up 169.254.209.69/16 node1 e3a true node1 clus2 up/up 169.254.49.125/16 node1 e3b true

	node2_	clus1	up/up	169.254.47	.194/16	node2	e3a
true							
	node2_	clus2	up/up	169.254.19	.183/16	node2	e3b
true							
cluster1::	*> netwo	ork dev	vice-disc	overy show -	protocol	lldp	
Node/	Local	Disco	overed				
Protocol	Port	Devi	ce (LLDP:	ChassisID)	Interfa	ce	Platform
					·		
nodel	/lldp						
	e3a	swl	(b8:ce:f6	:19:1a:7e)	swp3		-
	e3b	sw2	(b8:ce:f6	:19:1b:96)	swp3		-
node2	/lldp						
	e3a	sw1	(b8:ce:f6	:19:1a:7e)	swp4		-
	e3b	sw2	(b8:ce:f6	:19:1b:96)	swp4		-

+

cumulus@sw1:~\$ net show lldp								
Speed	Mode	RemoteHost	RemotePort					
100G 100G 100G 100G	Trunk/L2 Trunk/L2 BondMember BondMember	sw2 sw2 sw2 sw2	e3a e3a swp15 swp16					
cumulus@sw2:~\$ net show lldp								
Speed	Mode	RemoteHost	RemotePort					
100G 100G 100G 100G	Trunk/L2 Trunk/L2 BondMember BondMember	swl swl swl swl	e3b e3b swp15 swp16					
	1:~\$ ne Speed 100G 100G 100G 2:~\$ ne Speed 100G 100G 100G 100G 100G 100G	1:~\$ net show lldp Speed Mode 100G Trunk/L2 100G Trunk/L2 100G BondMember 100G BondMember 2:~\$ net show lldp Speed Mode 100G Trunk/L2 100G Trunk/L2 100G Trunk/L2 100G BondMember 100G BondMember	1:~\$ net show lldp Speed Mode RemoteHost 100G Trunk/L2 sw2 100G Trunk/L2 sw2 100G BondMember sw2 100G BondMember sw2 2:~\$ net show lldp Speed Mode RemoteHost 100G Trunk/L2 sw1 100G Trunk/L2 sw1 100G BondMember sw1 100G BondMember sw1					

Step 1: Prepare for replacement

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

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

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

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

set -privilege advanced

The advanced prompt (*>) appears.

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

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

- a. You can download the applicable Cumulus software for your cluster switches from the *NVIDIA Support* site. Follow the steps on the Download page to download the Cumulus Linux for the version of ONTAP software you are installing.
- b. The appropriate RCF is available from the *NVIDIA Cluster and Storage Switches* page. Follow the steps on the Download page to download the correct RCF for the version of ONTAP software you are installing.

Step 2: Configure ports and cabling

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

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

Show example

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

2. Disable auto-revert on the cluster LIFs:

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

Show example

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

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

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

net interface show -vserver Cluster -fields auto-revert

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

Show example

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

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

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

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

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

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

+

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

network port show -ipspace Cluster

The output should be similar to the following:

```
cluster1::*> network port show -ipspace Cluster
Node: node1
Ignore
                                 Speed(Mbps)
Health Health
Port IPspace Broadcast Domain Link MTU Admin/Oper
Status Status
_____ ____
   Cluster Cluster up 9000 auto/100000
e3a
healthy false
e3b Cluster Cluster up 9000 auto/100000
healthy false
Node: node2
Ignore
                                 Speed(Mbps)
Health Health
Port
     IPspace Broadcast Domain Link MTU Admin/Oper
     Status
Status
_____ _
     Cluster Cluster up 9000 auto/100000
e3a
healthy false
e3b Cluster Cluster up 9000 auto/100000
healthy false
```

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

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

9. Verify that all node cluster ports are up:

net show interface

Show example

```
cumulus@nsw2:~$ net show interface
State Name
              Spd
                   MTU Mode LLDP
Summary
_____ ____
                   _____
                                 _____
_____
. . .
. . .
UP swp3 100G 9216 Trunk/L2
Master: bridge(UP)
UP swp4
          100G 9216 Trunk/L2
Master: bridge(UP)
            100G 9216 BondMember sw1 (swp15)
UP swp15
Master: cluster isl(UP)
UP swp16
             100G 9216 BondMember sw1 (swp16)
Master: cluster isl(UP)
```

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

net show lldp

The following example shows the appropriate results for both switches:

```
cumulus@sw1:~$ net show lldp
LocalPort Speed Mode RemoteHost
                                   RemotePort
_____ ____ _____ ______ ______
swp3
       100G Trunk/L2 node1
                                    e3a
swp4
       100G Trunk/L2 node2
                                    e3a
      100G Huma, 1
100G BondMember nsw2
swp15
                                   swp15
swp16 100G BondMember nsw2
                                   swp16
cumulus@nsw2:~$ net show lldp
LocalPort Speed Mode RemoteHost RemotePort
----- ---- ----- ------ -------
     100G Trunk/L2 node1
swp3
                                     e3b
       100G Trunk/L2 node2
swp4
                                     e3b
swp15
      100G BondMember sw1
                                   swp15
swp16 100G BondMember sw1
                                    swp16
```

11. Enable auto-revert on the cluster LIFs:

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

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

Show example

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

13. Display information about the nodes in a cluster:

cluster show

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

```
cluster1::*> cluster show
Node Health Eligibility
node1 true true
node2 true true
```

14. Verify that all physical cluster ports are up:

```
network port show ipspace Cluster
```

```
cluster1::*> network port show -ipspace Cluster
Node nodel
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
   Cluster Cluster up 9000 auto/10000
e3b
healthy false
```

Step 3: Complete the procedure

1. Verify that the cluster network is healthy.

```
cumulus@sw1:~$ net show lldp
LocalPort Speed Mode RemoteHost RemotePort
----- ----- ------
                                  _____
       100G Trunk/L2 node1
swp3
                                  e3a
       100G Trunk/L2 node2
swp4
                                  e3a
       100G BondMember nsw2
swp15
                                  swp15
      100G BondMember nsw2
swp16
                                  swp16
```

2. 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:
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>
```

3. 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<br/>Log Collection Enabled: trueIndex SwitchLog TimestampStatus1cs1 (b8:ce:f6:19:1b:42)4/29/2022 03:05:25complete2cs2 (b8:ce:f6:19:1b:96)4/29/2022 03:07:42complete
```



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

4. Change the privilege level back to admin:

set -privilege admin

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

Replace NVIDIA SN2100 cluster switches with switchless connections

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

Review requirements

Guidelines

Review the following guidelines:

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

What you'll need

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

Migrate the switches

About this task

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



About the examples

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

Step 1: Prepare for migration

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

set -privilege advanced

The advanced prompt *> appears.

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

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

network options detect-switchless-cluster show

Show example

The following example output shows if the option is enabled.

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

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

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

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

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

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

Show example

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

Step 2: Configure ports and cabling

- 1. Organize the cluster ports on each switch into groups so that the cluster ports in group1 go to cluster switch1 and the cluster ports in group2 go to cluster switch2. These groups are required later in the procedure.
- 2. Identify the cluster ports and verify link status and health:

network port show -ipspace Cluster

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



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

Show example

```
cluster::> network port show -ipspace Cluster
Node: node1
Ignore
                                 Speed(Mbps) Health
Health
Port IPspace Broadcast Domain Link MTU Admin/Oper Status
Status
_____ _____
_____
eOa Cluster Cluster up 9000 auto/10000 healthy
false
eOb Cluster Cluster up 9000 auto/10000 healthy
false
Node: node2
Ignore
                                 Speed(Mbps) Health
Health
Port IPspace Broadcast Domain Link MTU Admin/Oper Status
Status
_____ _____
_____
e0a Cluster Cluster up 9000 auto/10000 healthy
false
eOb Cluster Cluster up 9000 auto/10000 healthy
false
4 entries were displayed.
```

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

Verify that the "is-home" column is true for each of the cluster LIFs:

network interface show -vserver Cluster -fields is-home

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

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

network interface revert -vserver Cluster -lif *

4. Disable auto-revert for the cluster LIFs:

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

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

network device-discovery show -port cluster port

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

Show example

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

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

6. Verify the cluster connectivity:

cluster ping-cluster -node local

7. Verify that the cluster is healthy:

cluster ring show

All units must be either master or secondary.

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



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

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

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



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

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



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

network options switchless-cluster show

The following example shows that the switchless cluster is enabled:

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

10. Verify that the cluster network is not disrupted:

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



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

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



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

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

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



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

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



Step 3: Verify the configuration

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

network device-discovery show -port cluster_port

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

<pre>cluster::> (network</pre>	net device-discovery show -port e0a e0b device-discovery show)							
Node/	Local	Discovered						
Protocol	Port	Device	e (LLDP:	ChassisID)	Interface	Platform		
nodel/cap								
	e0a	node2			e0a	AFF-A300		
	e0b	node2			e0b	AFF-A300		
node1/lldp								
	e0a	node2	(00:a0:	98:da:16:44)	e0a	-		
	e0b	node2	(00:a0:	98:da:16:44)	e0b	-		
node2/cdp								
	e0a	node1			e0a	AFF-A300		
	e0b	node1			e0b	AFF-A300		
node2/11dp								
	e0a	node1	(00:a0:	98:da:87:49)	e0a	-		
	e0b	node1	(00:a0:	98:da:87:49)	e0b	-		
8 entries were displayed.								

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

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

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

network interface show -vserver Cluster -lif lif name

The LIFs have been reverted if the "Is Home" column is true, as shown for node1_clus2 and node2 clus2 in the following example:

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

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

network interface revert -vserver Cluster -lif lif name

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

cluster show

Show example

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

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

5. Confirm connectivity between the cluster ports:

cluster ping-cluster local

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

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

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

7. Change the privilege level back to admin:

set -privilege admin

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