



# Migrating from a two-node switchless cluster to a cluster with Cisco® Nexus 3232C cluster switches

You must be aware of certain configuration information, port connections, and cabling requirements when you migrate a two-node switchless cluster to a cluster with Cisco Nexus 3232C cluster switches.

The *Cisco Ethernet Switches* page has information about the ONTAP and NX-OS versions supported in this procedure.

[Cisco Ethernet Switches](#)

You must have the following before you begin the migration process:

- Two standard reference configuration files (RCFs):
  - NX3232\_RCF\_v1.0\_24p10g\_26p100g.txt  
100G/40G ports 1/1 - 1/6 are configured as 4x10G ports 1/1-6/1-4)
  - NX3232\_RCF\_v1.0\_72p10g\_14p100g.txt  
100G/40G ports 1/1 - 1/18 are configured as 4x10G ports 1/1-18/1-4
- Available ports for node connections  
The cluster switches use the Inter-Switch Link (ISL) ports e1/31-32.
- Appropriate cables for cluster connections:
  - The nodes with 10 GbE cluster connections require QSFP28 optical modules with breakout fiber cables or QSFP28 to SFP+ copper breakout cables.
  - The nodes with 40 GbE cluster connections require supported QSFP28 optical modules with fiber cables or QSFP28 copper direct-attach cables.
  - The cluster switches require the appropriate ISL cabling: 2x QSFP28 fiber or copper direct-attach cables.

**Note:** See the *Hardware Universe* for further information on cabling systems with Nexus 3232C switches.

## How to migrate from a two-node switchless cluster to a cluster with Cisco Nexus 3232C cluster switches

If you have a two-node switchless cluster, you can migrate nondisruptively to a two-node switched cluster that includes Cisco Nexus 3232C cluster network switches.

### Before you begin

- The configurations must be properly set up and functioning.  
The two nodes must be connected and functioning in a two-node switchless cluster setting.
- All cluster ports must be in the **up** state.
- The Cisco Nexus 3232C cluster switch must be supported.
- The existing cluster network configuration must have the following:
  - A redundant and fully functional Nexus 3232C cluster infrastructure on both switches

- The latest RCF and NX-OS versions on your switches
- Management connectivity on both switches
- Console access to both switches
- All cluster logical interfaces (LIFs) in the **up** state without having been migrated
- Initial customization of the switch
- All ISL ports enabled and cabled

## About this task

### Procedure summary

- **I. Display and migrate physical and logical ports** (*Steps 1-10 on page 2*)
- **II. Shut down the reassigned LIFs and disconnect the cables** (*Steps 11-14 on page 6*)
- **III. Enable the cluster ports** (*Steps 15-20 on page 7*)
- **IV. Enable the reassigned LIFs** (*Steps 21-33 on page 8*)

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

- Nexus 3232C cluster switches, C1 and C2.
- The nodes are n1 and n2.

**Note:** The examples in this procedure use two nodes, each utilizing two 40 GbE cluster interconnect ports e4a and e4e. The *Hardware Universe* has details about the cluster ports on your platforms.

- n1\_clus1 is the first cluster logical interface (LIF) to be connected to cluster switch C1 for node n1.
- n1\_clus2 is the first cluster LIF to be connected to cluster switch C2 for node n1.
- n2\_clus1 is the first cluster LIF to be connected to cluster switch C1 for node n2.
- n2\_clus2 is the second cluster LIF to be connected to cluster switch C2 for node n2.
- The number of 10 GbE and 40 GbE ports are defined in the following RCFs:
  - The RCF `NX3232_RCF_v1.0_24p10g_26p100g.txt` has 100G/40G ports 1/1-1/6 configured as 4x10G ports 1/1-6/1-4.
  - The RCF `NX3232_RCF_v1.0_72p10g_14p100g.txt` has 100G/40G ports 1/1-1/18 configured as 4x10G ports 1/1-18/1-4

**Note:** The procedure requires the use of both ONTAP commands and Cisco Nexus 3000 Series Switches commands; ONTAP commands are used unless otherwise indicated.

## Steps

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

a. Display the network port attributes:

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

### Example

```
cluster::*> network port show -role cluster
(network port show)
```

```

Node: n1
-----
Port      IPspace      Broadcast Domain Link MTU      Speed(Mbps) Health      Ignore
Admin/Oper Status      Health
Status
e4a      Cluster      Cluster      up   9000    auto/40000 -          -
e4e      Cluster      Cluster      up   9000    auto/40000 -          -
Node: n2
-----
Port      IPspace      Broadcast Domain Link MTU      Speed(Mbps) Health      Ignore
Admin/Oper Status      Health
Status
e4a      Cluster      Cluster      up   9000    auto/40000 -          -
e4e      Cluster      Cluster      up   9000    auto/40000 -          -
4 entries were displayed.

```

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

```
network interface show -role cluster
```

**Example**

```

cluster::*> network interface show -role cluster
(network interface show)
-----
Vserver      Logical      Status      Network      Current      Current      Is
Interface    Admin/Oper   Address/Mask Node          Port         Home
-----
Cluster
true         n1_clus1    up/up       10.10.0.1/24 n1           e4a
true         n1_clus2    up/up       10.10.0.2/24 n1           e4e
true         n2_clus1    up/up       10.10.0.3/24 n2           e4a
true         n2_clus2    up/up       10.10.0.4/24 n2           e4e      true
4 entries were displayed.

```

c. Verify that the switchless cluster status is shown as **true**:

```
network options switchless-cluster show
```

- Verify that the appropriate RCFs and image are installed on the new 3232C switches and make any necessary site customizations such as adding users, passwords, and network addresses.

You must prepare both switches at this time. If you need to upgrade the RCF and image software, you must follow these steps:

- Go to the *Cisco Ethernet Switches* page on the NetApp Support Site.  
[Cisco Ethernet Switches](#)
  - Note your switch and the required software versions in the table on that page.
  - Download the appropriate version of RCF.
  - Click **CONTINUE** on the **Description** page, accept the license agreement, and then follow the instructions on the **Download** page to download the RCF.
  - Download the appropriate version of the image software.  
[Cisco Cluster and Management Network Switch Reference Configuration File download page](#)
- Click **CONTINUE** on the **Description** page, accept the license agreement, and then follow the instructions on the **Download** page to download the RCF.
  - On Nexus 3232C switches C1 and C2, disable all node-facing ports C1 and C2, but do not disable the ISL ports e1/31-32.

For more information on Cisco commands, see the guides listed in the [Cisco Nexus 3000 Series NX-OS Command References](#).

### Example

The following example shows ports 1 through 30 being disabled on Nexus 3232C cluster switches C1 and C2 using a configuration supported in RCF NX3232\_RCF\_v1.0\_24p10g\_24p100g.txt:

```
C1# copy running-config startup-config
[#####] 100% Copy complete.
C1# configure
C1(config)# int e1/1/1-4,e1/2/1-4,e1/3/1-4,e1/4/1-4,e1/5/1-4,e1/6/1-4,e1/7-30
C1(config-if-range)# shutdown
C1(config-if-range)# exit
C1(config)# exit
C2# copy running-config startup-config
[#####] 100% Copy complete.
C2# configure
C2(config)# int e1/1/1-4,e1/2/1-4,e1/3/1-4,e1/4/1-4,e1/5/1-4,e1/6/1-4,e1/7-30
C2(config-if-range)# shutdown
C2(config-if-range)# exit
C2(config)# exit
```

5. Connect ports 1/31 and 1/32 on C1 to the same ports on C2 using supported cabling.
6. Verify that the ISL ports are operational on C1 and C2:

**show port-channel summary**

For more information on Cisco commands, see the guides listed in the [Cisco Nexus 3000 Series NX-OS Command References](#).

### Example

The following example shows the Cisco show port-channel summary command being used to verify the ISL ports are operational on C1 and C2:

```
C1# show port-channel summary
Flags: D - Down          P - Up in port-channel (members)
       I - Individual    H - Hot-standby (LACP only)      s - Suspended      r - Module-
removed
       S - Switched      R - Routed
       U - Up (port-channel)
       M - Not in use. Min-links not met
-----
      Port-
Group Channel          Type   Protocol  Member Ports
-----
1      Pol(SU)          Eth    LACP      Eth1/31(P)  Eth1/32(P)

C2# show port-channel summary
Flags: D - Down          P - Up in port-channel (members)
       I - Individual    H - Hot-standby (LACP only)      s - Suspended      r - Module-
removed
       S - Switched      R - Routed
       U - Up (port-channel)
       M - Not in use. Min-links not met
-----

Group Port-          Type   Protocol  Member Ports
-----
1      Pol(SU)          Eth    LACP      Eth1/31(P)  Eth1/32(P)
```

7. Display the list of neighboring devices on the switch.

For more information on Cisco commands, see the guides listed in the [Cisco Nexus 3000 Series NX-OS Command References](#).

### Example

The following example shows the Cisco command `show cdp neighbors` being used to display the neighboring devices on the switch:

```
C1# show cdp neighbors
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater,
                  V - VoIP-Phone, D - Remotely-Managed-Device,
Supports-STP-Dispute
Device-ID         Local Infrfce  Hldtme Capability  Platform      Port ID
C2                 Eth1/31       174    R S I s      N3K-C3232C   Eth1/31
C2                 Eth1/32       174    R S I s      N3K-C3232C   Eth1/32
Total entries displayed: 2
C2# show cdp neighbors
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater,
                  V - VoIP-Phone, D - Remotely-Managed-Device,
Supports-STP-Dispute
Device-ID         Local Infrfce  Hldtme Capability  Platform      Port ID
C1                 Eth1/31       178    R S I s      N3K-C3232C   Eth1/31
C1                 Eth1/32       178    R S I s      N3K-C3232C   Eth1/32
Total entries displayed: 2
```

8. Display the cluster port connectivity on each node:

**network device-discovery show**

### Example

The following example shows the cluster port connectivity displayed for a two-node switchless cluster configuration:

```
cluster::*> network device-discovery show
Node      Local   Discovered
Port     Device
-----
n1        /cdp
e4a      n2
e4e      n2
n2        /cdp
e4a      n1
e4e      n1
Interface
-----
Platform
-----
FAS9000
FAS9000
FAS9000
FAS9000
```

9. Migrate the `n1_clus1` and `n2_clus1` LIFs to the physical ports of their destination nodes:

**network interface migrate -vserver cluster -lif lif-name source-node source-node-name -destination-port destination-port-name**

### Example

You must execute the command for each local node as shown in the following example:

```
cluster::*> network interface migrate -vserver cluster -lif n1_clus1 -source-node n1
-destination-node n1 -destination-port e4e
cluster::*> network interface migrate -vserver cluster -lif n2_clus1 -source-node n2
-destination-node n2 -destination-port e4e
```

10. Verify the cluster interfaces have successfully migrated:

**network interface show -role cluster**

### Example

The following example shows the “Is Home” status for the n1\_clus1 and n2\_clus1 LIFs has become “false” after the migration is completed:

```
cluster::*> network interface show -role cluster
(network interface show)
-----
Vserver      Logical      Status      Network      Current      Current      Is
Interface    Admin/Oper   Address/Mask Node          Port         Home
-----
Cluster
n1_clus1     up/up       10.10.0.1/24 n1           e4e         false
n1_clus2     up/up       10.10.0.2/24 n1           e4e         true
n2_clus1     up/up       10.10.0.3/24 n2           e4e         false
n2_clus2     up/up       10.10.0.4/24 n2           e4e         true
4 entries were displayed.
```

11. Shut down cluster ports for the n1\_clus1 and n2\_clus1 LIFs, which were migrated in step 9:

```
network port modify -node node-name -port port-name -up-admin false
```

### Example

You must execute the command for each port as shown in the following example:

```
cluster::*> network port modify -node n1 -port e4a -up-admin false
cluster::*> network port modify -node n2 -port e4a -up-admin false
```

12. Ping the remote cluster interfaces and perform an RPC server check:

```
cluster ping-cluster -node node-name
```

### Example

The following example shows node n1 being pinged and the RPC status indicated afterward:

```
cluster::*> cluster ping-cluster -node n1

Host is n1 Getting addresses from network interface table...
Cluster n1_clus1 n1      e4a  10.10.0.1
Cluster n1_clus2 n1      e4e  10.10.0.2
Cluster n2_clus1 n2      e4a  10.10.0.3
Cluster n2_clus2 n2      e4e  10.10.0.4
Local = 10.10.0.1 10.10.0.2
Remote = 10.10.0.3 10.10.0.4
Cluster Vserver Id = 4294967293 Ping status:
....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s) .....
Detected 9000 byte MTU on 32 path(s):
  Local 10.10.0.1 to Remote 10.10.0.3
  Local 10.10.0.1 to Remote 10.10.0.4
  Local 10.10.0.2 to Remote 10.10.0.3
  Local 10.10.0.2 to Remote 10.10.0.4
Larger than PMTU communication succeeds on 4 path(s) RPC status:
1 paths up, 0 paths down (tcp check)
1 paths up, 0 paths down (ucp check)
```

13. Disconnect the cable from e4a on node n1.

You can refer to the running configuration and connect the first 40 GbE port on the switch C1 (port 1/7 in this example) to e4a on n1 using cabling supported for Nexus 3232C switches.

**Attention:** When reconnecting any cables to a new Cisco cluster switch, the cables used must be either fiber or cables supported by Cisco.

14. Disconnect the cable from e4a on node n2.

You can refer to the running configuration and connect e4a to the next available 40 GbE port on C1, port 1/8, using supported cabling.

15. Enable all node-facing ports on C1.

For more information on Cisco commands, see the guides listed in the [Cisco Nexus 3000 Series NX-OS Command References](#).

### Example

The following example shows ports 1 through 30 being enabled on Nexus 3232C cluster switches C1 and C2 using the configuration supported in RCF NX3232\_RCF\_v1.0\_24p10g\_26p100g.txt:

```
C1# configure
C1(config)# int e1/1/1-4,e1/2/1-4,e1/3/1-4,e1/4/1-4,e1/5/1-4,e1/6/1-4,e1/7-30
C1(config-if-range)# no shutdown
C1(config-if-range)# exit
C1(config)# exit
```

16. Enable the first cluster port, e4a, on each node:

```
network port modify -node node-name -port port-name -up-admin true
```

### Example

```
cluster::*> network port modify -node n1 -port e4a -up-admin true
cluster::*> network port modify -node n2 -port e4a -up-admin true
```

17. Verify that the clusters are up on both nodes:

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

### Example

```
cluster::*> network port show -role cluster
(network port show)
Node: n1
```

Port	IPspace	Broadcast Domain	Link	MTU	Speed(Mbps) Admin/Oper	Health Status	Ignore Health Status
e4a	Cluster	Cluster	up	9000	auto/40000	-	-
e4e	Cluster	Cluster	up	9000	auto/40000	-	-

```
Node: n2
```

Port	IPspace	Broadcast Domain	Link	MTU	Speed(Mbps) Admin/Oper	Health Status	Ignore Health Status
e4a	Cluster	Cluster	up	9000	auto/40000	-	-
e4e	Cluster	Cluster	up	9000	auto/40000	-	-

```
4 entries were displayed.
```

18. For each node, revert all of the migrated cluster interconnect LIFs:

```
network interface revert -vserver cluster -lif lif-name
```

### Example

You must revert each LIF to its home port individually as shown in the following example:

```
cluster::*> network interface revert -vserver cluster -lif n1_clus1
cluster::*> network interface revert -vserver cluster -lif n2_clus1
```

19. Verify that all the LIFs are now reverted to their home ports:

```
network interface show -role cluster
```

The `Is Home` column should display a value of `true` for all of the ports listed in the `Current Port` column. If the displayed value is `false`, the port has not been reverted.

### Example

```
cluster::*> network interface show -role cluster
(network interface show)
Vserver      Logical      Status      Network      Current      Current      Is
-----      -
Cluster
              n1_clus1    up/up       10.10.0.1/24  n1           e4a          true
              n1_clus2    up/up       10.10.0.2/24  n1           e4e          true
              n2_clus1    up/up       10.10.0.3/24  n2           e4a          true
              n2_clus2    up/up       10.10.0.4/24  n2           e4e          true
4 entries were displayed.
```

20. Display the cluster port connectivity on each node:

```
network device-discovery show
```

### Example

```
cluster::*> network device-discovery show
Local      Discovered
Node       Port      Device      Interface      Platform
-----
n1         /cdp
          e4a      C1          Ethernet1/7    N3K-C3232C
          e4e      n2          e4e            FAS9000
n2         /cdp
          e4a      C1          Ethernet1/8    N3K-C3232C
          e4e      n1          e4e            FAS9000
```

21. Migrate `clus2` to port `e4a` on the console of each node:

```
network interface migrate cluster -lif lif-name -source-node source-node-name -destination-node destination-node-name -destination-port destination-port-name
```

### Example

You must migrate each LIF to its home port individually as shown in the following example:

```
cluster::*> network interface migrate -vserver cluster -lif n1_clus2 -source-node n1
-destination-node n1 -destination-port e4a
cluster::*> network interface migrate -vserver cluster -lif n2_clus2 -source-node n2 -
destination-node n2 -destination-port e4a
```

22. Shut down cluster ports `clus2` LIF on both nodes:

```
network port modify
```



## Example

The following example shows the specified ports being set to **false**, shutting the ports down on both nodes:

```
cluster::*> network port modify -node n1 -port e4e -up-admin false
cluster::*> network port modify -node n2 -port e4e -up-admin false
```

23. Verify the cluster LIF status:

### network interface show

```
cluster::*> network interface show -role cluster
(network interface show)
Vserver      Logical      Status      Network      Current      Current      Is
-----      -
Cluster
n1_clus1     up/up       10.10.0.1/24  n1           e4a          true
n1_clus2     up/up       10.10.0.2/24  n1           e4a          false
n2_clus1     up/up       10.10.0.3/24  n2           e4a          true
n2_clus2     up/up       10.10.0.4/24  n2           e4a          false
4 entries were displayed.
```

24. Disconnect the cable from e4e on node n1.

You can refer to the running configuration and connect the first 40 GbE port on switch C2 (port 1/7 in this example) to e4e on node n1, using the appropriate cabling for the Nexus 3232C switch model.

25. Disconnect the cable from e4e on node n2.

You can refer to the running configuration and connect e4e to the next available 40 GbE port on C2, port 1/8, using the appropriate cabling for the Nexus 3232C switch model.

26. Enable all node-facing ports on C2.

## Example

The following example shows ports 1 through 30 being enabled on Nexus 3132Q-V cluster switches C1 and C2 using a configuration supported in RCF NX3232C\_RCF\_v1.1\_24p10g\_26p40g.txt:

```
C2# configure
C2(config)# int e1/1/1-4,e1/2/1-4,e1/3/1-4,e1/4/1-4,e1/5/1-4,e1/6/1-4,e1/7-30
C2(config-if-range)# no shutdown
C2(config-if-range)# exit
C2(config)# exit
```

27. Enable the second cluster port, e4e, on each node:

### network port modify

## Example

The following example shows the second cluster port e4e being brought up on each node:

```
cluster::*> network port modify -node n1 -port e4e -up-admin true
cluster::*> network port modify -node n2 -port e4e -up-admin true
```

28. For each node, revert all of the migrated cluster interconnect LIFs:

### network interface revert

## Example

The following example shows the migrated LIFs being reverted to their home ports.

```
cluster::*> network interface revert -vserver Cluster -lif n1_clus2
cluster::*> network interface revert -vserver Cluster -lif n2_clus2
```

29. Verify that all of the cluster interconnect ports are now reverted to their home ports:

```
network interface show -role cluster
```

The **Is Home** column should display a value of **true** for all of the ports listed in the **Current Port** column. If the displayed value is **false**, the port has not been reverted.

```
cluster::*> network interface show -role cluster
(network interface show)
-----
Vserver      Logical      Status      Network      Current      Current      Is
Interface    Admin/Oper   Address/Mask Node          Port          Home
-----
Cluster
n1_clus1     up/up       10.10.0.1/24 n1           e4a          true
n1_clus2     up/up       10.10.0.2/24 n1           e4e          true
n2_clus1     up/up       10.10.0.3/24 n2           e4a          true
n2_clus2     up/up       10.10.0.4/24 n2           e4e          true
4 entries were displayed.
```

30. Verify that all of the cluster interconnect ports are in the **up** state:

```
network interface show -role cluster
```

```
cluster::*> network interface show -role cluster
(network interface show)
-----
Vserver      Logical      Status      Network      Current      Current      Is
Interface    Admin/Oper   Address/Mask Node          Port          Home
-----
Cluster
n1_clus1     up/up       10.10.0.1/24 n1           e4a          true
n1_clus2     up/up       10.10.0.2/24 n1           e4e          true
n2_clus1     up/up       10.10.0.3/24 n2           e4a          true
n2_clus2     up/up       10.10.0.4/24 n2           e4e          true
were displayed.
cluster::*> network port show -role cluster
(network port show)
Node: n1
-----
Port          IPspace      Broadcast   Domain      Link      MTU      Speed(Mbps) Health      Ignore
Admin/Oper   Status      Status      Status      Status   Admin/Oper Status      Health
-----
e4a           Cluster      Cluster    Cluster    up        9000    auto/40000 -          -
e4e           Cluster      Cluster    Cluster    up        9000    auto/40000 -          -
Node: n2
-----
Port          IPspace      Broadcast   Domain      Link      MTU      Speed(Mbps) Health      Ignore
Admin/Oper   Status      Status      Status      Status   Admin/Oper Status      Health
-----
e4a           Cluster      Cluster    Cluster    up        9000    auto/40000 -          -
e4e           Cluster      Cluster    Cluster    up        9000    auto/40000 -          -
4 entries were displayed.
```

31. Display the cluster switch port numbers through which each cluster port is connected to each node:

```
network device-discovery show
```

## Example

```
cluster::*> network device-discovery show
Node      Local Port   Discovered Device      Interface      Platform
-----
n1        /cdp
          e4a     C1         Ethernet1/7   N3K-C3232C
          e4e     C2         Ethernet1/7   N3K-C3232C
n2        /cdp
          e4a     C1         Ethernet1/8   N3K-C3232C
          e4e     C2         Ethernet1/8   N3K-C3232C
```

32. Display discovered and monitored cluster switches:

```
system cluster-switch show
```

```
cluster::*> system cluster-switch show
Switch      Type           Address      Model
-----
C1          cluster-network 10.10.1.101  NX3232CV
Serial Number: FOX000001
Is Monitored: true
Reason:
Software Version: Cisco Nexus Operating System (NX-OS) Software, Version 7.0(3)I6(1)
Version Source: CDP
C2          cluster-network 10.10.1.102  NX3232CV
Serial Number: FOX000002
Is Monitored: true
Reason:
Software Version: Cisco Nexus Operating System (NX-OS) Software, Version 7.0(3)I6(1)
Version Source: CDP 2 entries were displayed.
```

33. Disable the two-node switchless configuration settings on any node:

```
network options switchless-cluster modify -enabled false
```

34. Verify that the switchless-cluster option has been disabled:

```
network options switchless-cluster show
```

35. Ping the remote cluster interfaces and perform an RPC server check:

```
cluster ping-cluster -node node-name
```

```
cluster::*> cluster ping-cluster -node n1
Host is n1 Getting addresses from network interface table...
Cluster n1_clus1 n1      e4a   10.10.0.1
Cluster n1_clus2 n1      e4e   10.10.0.2
Cluster n2_clus1 n2      e4a   10.10.0.3
Cluster n2_clus2 n2      e4e   10.10.0.4
Local = 10.10.0.1 10.10.0.2
Remote = 10.10.0.3 10.10.0.4
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s) .....
Detected 9000 byte MTU on 32 path(s):
  Local 10.10.0.1 to Remote 10.10.0.3
  Local 10.10.0.1 to Remote 10.10.0.4
  Local 10.10.0.2 to Remote 10.10.0.3
  Local 10.10.0.2 to Remote 10.10.0.4
Larger than PMTU communication succeeds on 4 path(s) RPC status:
```

```
1 paths up, 0 paths down (tcp check)
1 paths up, 0 paths down (ucp check)
```

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