



# CHAPTER 4

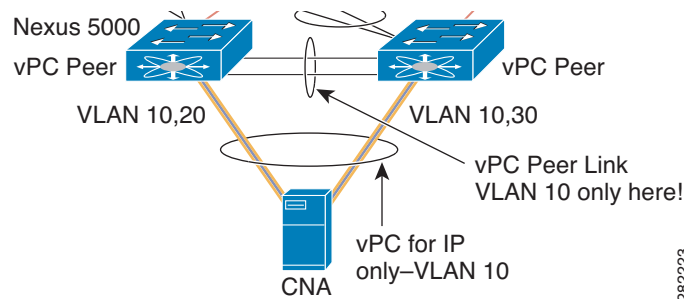
## FCoE with vPC Configuration Example

Beginning with Cisco NX-OS Release 4.1(3)N1(1), the Cisco Nexus 5000 Series switch supports vPCs which can be configured to increase bandwidth and increased load-balancing to the Ethernet fabric. This appendix includes a sample configuration on how to configure FCoE when using vPCs on the Cisco Nexus 5000 Series switch and includes the following sections:

- [Cisco Nexus 5000 Series Switch vPC Configuration Example, page 4-2](#)
- [Cisco Nexus 5000 Series Switch FCoE Configuration Example, page 4-5](#)

Figure 4-1 shows the topology used in the examples described in this appendix.

Figure 4-1 Nexus 5000 FCoE and vPC Lab Topology



**Note**

FCoE VLANs should not be trunked across vPC peer-links.

The configuration example includes the following parameters:

```
switchname: n5k-tme-1
switchname: n5k-tme-2
mgmt ip: 172.25.182.66
mgmt ip: 172.25.182.67
```

The configuration example includes the following hardware:

- Dell Server PE2950
- QLogic QLE8142 (Schultz) Generation-2 CNA
- 2 Cisco Nexus 5010 switches running Cisco NX-OS Release 4.1(3)N1(1)

The configuration example includes the following considerations and requirements:

1. Generation 2 CNAs that support DCBX are required.

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2. Single host CNA port channel connection to a separate switch. FCoE interfaces will not be brought up if the port channel on a single switch contains more than one member port in a port channel or vPC.
3. Cisco NX-OS Release 4.1(3)N1(1) or a later release.
4. FC Features Package (FC\_FEATURES\_PKG) is necessary for running FCoE. If this is not installed, there will be a temporary license that will last 90 days.

This appendix includes the following sections:

- [Cisco Nexus 5000 Series Switch vPC Configuration Example, page 4-2](#)
- [Cisco Nexus 5000 Series Switch FCoE Configuration Example, page 4-5](#)

## Cisco Nexus 5000 Series Switch vPC Configuration Example

This example presumes that the basic configuration has been completed on the switch (for example, IP Address (mgmt0), switchname, and password for the administrator).

This example shows how to configure the basic vPC configuration. For more information on configuring vPC, refer to the [Cisco Nexus 5000 Series vPC Quick Configuration Guide](#).



**Note**

The configuration must be done on both peer switches in the vPC topology.

**Step 1** Enable the vPC feature on both peer switches.

```
tme-n5k-1# conf t
Enter configuration commands, one per line. End with CNTL/Z.
tme-n5k-1(config)# feature vpc
tme-n5k-1(config)#

tme-n5k-2# conf t
Enter configuration commands, one per line. End with CNTL/Z.
tme-n5k-2(config)# feature vpc
tme-n5k-2(config)#
```

**Step 2** Configure the vPC domain and peer-keep alive destinations:

```
tme-n5k-1(config)# vpc domain 2
tme-n5k-1(config-vpc-domain)# peer-keepalive destination 192.165.200.229

tme-n5k-2(config)# vpc domain 2
tme-n5k-2(config-vpc-domain)# peer-keepalive destination 192.165.200.230
```



**Note**

In this set up, switch tme-n5k-1 has the mgmt IP address of 192.165.200.229 and switch tme-n5k-2 has the mgmt IP address of 192.165.200.230.

**Step 3** Configure the port channel interface that will be used as the vPC peer-link:

```
tme-n5k-1(config)# int port-channel 1
tme-n5k-1(config-if)# vpc peer-link
```



**Note**

The spanning tree port type is changed to network port type on vPC peer-link. This will enable STP Bridge Assurance on vPC peer-link provided that the STP Bridge Assurance (which is enabled by default) is not disabled.

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```
tme-n5k-2(config)# int port-channel 1
tme-n5k-2(config-if)# vpc peer-link
```

**Step 4** Verify that the peer-keepalive can be reached:

```
tme-n5k-1(config)# show vpc peer-keepalive
vPC keep-alive status      : peer is alive
--Destination              : 172.25.182.167
--Send status              : Success
--Receive status           : Success
--Last update from peer    : (0 ) seconds, (975 ) msec
tme-n5k-1(config)#
```

```
tme-n5k-2(config)# show vpc peer-keepalive
--PC keep-alive status     : peer is alive
--Destination              : 172.25.182.166
--Send status              : Success
--Receive status           : Success
--Last update from peer    : (0 ) seconds, (10336 ) msec
tme-n5k-2(config)#
```

**Step 5** Add member ports to the vpc-peer link port channel and bring up the port channel interface:

```
tme-n5k-1(config-if-range)# int po 1
tme-n5k-1(config-if)# switchport mode trunk
tme-n5k-1(config-if)# no shut
tme-n5k-1(config-if)# exit
tme-n5k-1(config)# int eth 1/39-40
tme-n5k-1(config-if-range)# switchport mode trunk
tme-n5k-1(config-if-range)# channel-group 1
tme-n5k-1(config-if-range)# no shut
tme-n5k-1(config-if-range)#
```

```
tme-n5k-2(config-if-range)# int po 1
tme-n5k-2(config-if)# switchport mode trunk
tme-n5k-2(config-if)# no shut
tme-n5k-2(config-if)# exit
tme-n5k-2(config)# int eth 1/39-40
tme-n5k-2(config-if-range)# switchport mode trunk
tme-n5k-2(config-if-range)# channel-group 1
tme-n5k-2(config-if-range)# no shut
tme-n5k-2(config-if-range)#
```

```
tme-n5k-1(config-if-range)# show int po1
port-channel 1 is up
Hardware: Port-Channel, address: 000d.ecde.a92f (bia 000d.ecde.a92f)
MTU 1500 bytes, BW 20000000 Kbit, DLY 10 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA
Port mode is trunk
full-duplex, 10 Gb/s
Beacon is turned off
Input flow-control is off, output flow-control is off
Switchport monitor is off
Members in this channel: Eth1/39, Eth1/40
Last clearing of "show interface" counters never
1 minute input rate 1848 bits/sec, 0 packets/sec
1 minute output rate 3488 bits/sec, 3 packets/sec
tme-n5k-1(config-if-range)#

tme-n5k-2(config-if-range)# show int po1
port-channell is up
Hardware: Port-Channel, address: 000d.ecdf.5fae (bia 000d.ecdf.5fae) MTU 1500 bytes,
BW 20000000 Kbit, DLY 10 usec,
```

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```
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA
Port mode is trunk
full-duplex, 10 Gb/s
Beacon is turned off
Input flow-control is off, output flow-control is off
Switchport monitor is off
Members in this channel: Eth1/39, Eth1/40
Last clearing of "show interface" counters never
minute input rate 1848 bits/sec, 0 packets/sec
minute output rate 3488 bits/sec, 3 packets/sec
tme-n5k-2(config-if-range)#
```

**Step 6** Create the vPC and add member interfaces:

```
tme-n5k-1(config)# int po 11
tme-n5k-1(config-if)# vpc 11
tme-n5k-1(config-if)# switchport mode trunk
tme-n5k-1(config-if)# no shut
tme-n5k-1(config-if)# int eth 1/1
tme-n5k-1(config-if)# switchport mode trunk
tme-n5k-1(config-if)# channel-group 11
tme-n5k-1(config-if)# spanning-tree port type edge trunk
tme-n5k-1(config-if)#
```



**Warning**

**Edge port type (portfast) should only be enabled on ports connected to a single host. Connecting some devices such as hubs, concentrators, switches, or bridges to this interface when edge port type (portfast) is enabled, can cause temporary bridging loops. Caution should be used in this type of configuration**

```
tme-n5k-2(config)# int po 11
tme-n5k-2(config-if)# vpc 11
tme-n5k-2(config-if)# switchport mode trunk
tme-n5k-2(config-if)# no shut
tme-n5k-2(config-if)# int eth 1/1
tme-n5k-2(config-if)# switchport mode trunk
tme-n5k-2(config-if)# channel-group 11
tme-n5k-2(config-if)# spanning-tree port type edge trunk
```



**Warning**

**Edge port type (portfast) should only be enabled on ports connected to a single host. Connecting some devices such as hubs, concentrators, switches, or bridges to this interface when edge port type (portfast) is enabled, can cause temporary bridging loops. Caution should be used in this type of configuration.**



**Note**

To run FCoE over a vPC topology, the port channel can only have a single member interface.



**Note**

The vPC number configured under the port channel interface must match on both Nexus 5000 switches. The port channel interface number does not have to match on both switches.

**Step 7** Verify that the vPC interfaces are up and operational:

```
tme-n5k-1(config-if)# show vpc statistics vpc 11
port-channel111 is up
vPC Status: Up, vPC number: 11
Hardware: Port-Channel, address: 000d.ecde.a908 (bia 000d.ecde.a908)
MTU 1500 bytes, BW 10000000 Kbit, DLY 10 usec,
```

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```

reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA
Port mode is trunk
full-duplex, 10 Gb/s
Beacon is turned off
Input flow-control is off, output flow-control is off
Switchport monitor is off
Members in this channel: Eth1/1
Last clearing of "show interface" counters never
minute input rate 4968 bits/sec, 8 packets/sec
minute output rate 792 bits/sec, 1 packets/sec
tme-n5k-1(config-if)#

tme-n5k-2(config-if)# show vpc statistics vpc 11
port-channel11 is up
vPC Status: Up, vPC number: 11
Hardware: Port-Channel, address: 000d.ecdf.5fae (bia 000d.ecdf.5fae)
MTU 1500 bytes, BW 10000000 Kbit, DLY 10 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA
Port mode is trunk
full-duplex, 10 Gb/s
Beacon is turned off
Input flow-control is off, output flow-control is off
Switchport monitor is off
Members in this channel: Eth1/1
Last clearing of "show interface" counters never
minute input rate 4968 bits/sec, 8 packets/sec
minute output rate 792 bits/sec, 1 packets/sec
tme-n5k-1(config-if)#

```

## Cisco Nexus 5000 Series Switch FCoE Configuration Example

Once the vPC is set up between the two Nexus 5000s, we can move on to configuring the FCoE topology. This cheat sheet presumes that basic configuration has been executed on the Nexus 5000 switch that will provide IP Address (mgmt0), switchname, password for admin, etc. and that the vPC configuration has been completed as outlined in the previous section. The following steps will walk through the basic FCoE configuration necessary to set up an FCoE topology in conjunction with the vPC topology.

---

### Step 1 Enable FCoE on the Nexus 5000:

```

tme-n5k-1(config)# feature fcoe
FC license checked out successfully
fc_plugin extracted successfully
FC plugin loaded successfully
FCoE manager enabled successfully
FC enabled on all modules successfully
tme-n5k-1(config)#

tme-n5k-2(config)# feature fcoe
FC license checked out successfully
fc_plugin extracted successfully
FC plugin loaded successfully
FCoE manager enabled successfully
FC enabled on all modules successfully
fme-n5k-2(config)#

```

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**Note** This can take a few moments to complete.

**Step 2** Create a VSAN and map it to a VLAN that has been designated to carry FCoE traffic:

```
tme-n5k-1(config)# vsan database
tme-n5k-1(config-vsan-db)# vsan 100
tme-n5k-1(config-vsan-db)# exit
tme-n5k-1(config)# vlan 100
me-n5k-1(config-vlan)# fcoe vsan 100
tme-n5k-1(config-vlan)# show vlan fcoe
VLAN      VSAN      Status
-----
100       100       Operational
tme-n5k-1(config-vlan)#

tme-n5k-2(config)# vsan database
tme-n5k-2(config-vsan-db)# vsan 101
tme-n5k-2(config-vsan-db)# exit
tme-n5k-2(config)# vlan 101
tme-n5k-2(config-vlan)# fcoe vsan 101
tme-n5k-2(config-vlan)# show vlan fcoe
VLAN      VSAN      Status
-----
101       101       Operational
tme-n5k-2(config)#
```



**Note** VLAN and VSAN numbers are not required to be the same.

**Step 3** Configure the VLANs that are allowed to transverse the vPC links:

```
tme-n5k-1(config)# int po 11
tme-n5k-1(config-if)# switchport trunk allowed vlan 1, 100
tme-n5k-1(config-if)# show int trunk
-----
Port          Native    Status    Port
-----
Eth1/1        1         trnk-bndl Po11
Eth1/39       1         trnk-bndl Po1
Eth1/40       1         trnk-bndl Po1
Po1           1         trunking  --
Po11          1         trunking  --
-----

Port          Vlans Allowed on Trunk
-----
Eth1/1        1,100
Eth1/39       1-3967,4048-4093
Eth1/40       1-3967,4048-4093
Po1           1-3967,4048-4093
Po11          1,100
-----

Port          Vlans Err-disabled on Trunk
-----
Eth1/1        none
Eth1/39       100
Eth1/40       100
Po1           100
Po11          none
```

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```

-----
Port                STP Forwarding
-----
Eth1/1              none
Eth1/39             none
Eth1/40             none
Po1                 1
Po11                1,100
tme-n5k-1(config-if)#

tme-n5k-2(config)# int po 11
tme-n5k-2(config-if)# switchport trunk allowed vlan 1, 101
tme-n5k-2(config-if)# show int trunk
-----
Port                Native      Status      Port
-----
Eth1/1              1          trnk-bndl   Po11
Eth1/39             1          trnk-bndl   Po1
Eth1/40             1          trnk-bndl   Po1
Po1                 1          trunking    --
Po11                1          trunking    --
-----

Port                Vlans Allowed on Trunk
-----
Eth1/1              1,101
Eth1/39             1-3967,4048-4093
Eth1/40             1-3967,4048-4093
Po1                 1-3967,4048-4093
Po11                1,101
-----

Port                Vlans Err-disabled on Trunk
-----
Eth1/1              none
Eth1/39             101
Eth1/40             101
Po1                 101
Po11                none
-----

Port                STP Forwarding
-----
Eth1/1              none
Eth1/39             none
Eth1/40             none
Po1                 1
Po11                1,101
tme-n5k-2(config-if)#

```

- Step 4** Create a virtual Fibre Channel interface (vfc) and add it to the VSAN that was created in the previous step:

```

tme-n5k-1(config)# int vfc 1
tme-n5k-1(config-if)# bind interface po11
Warning: VFC will not come up for pre-FIP CNA
tme-n5k-1(config-if)# no shut
tme-n5k-1(config-if)#

tme-n5k-2(config)# int vfc 1
tme-n5k-2(config-if)# bind interface po11
Warning: VFC will not come up for pre-FIP CNA
tme-n5k-2(config-if)# no shut
tme-n5k-2(config-if)#

```

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```
tme-n5k-1(config)# vsan database
tme-n5k-1(config-vsan-db)# vsan 100 interface vfc 1
tme-n5k-1(config)# show vsan membership
vsan 1 interfaces:
fc2/1          fc2/2          fc2/3          fc2/4
fc2/5          fc2/6          fc2/7          fc2/8

vsan 100 interfaces:
vfc1

vsan 4079(evfp_isolated_vsan) interfaces:

vsan 4094(isolated_vsan) interfaces:
tme-n5k-1(config)#

tme-n5k-2(config)# vsan database
tme-n5k-2(config-vsan-db)# vsan 101 interface vfc 1
tme-n5k-2(config)# show vsan membership
vsan 1 interfaces:
fc2/1          fc2/2          fc2/3          fc2/4
fc2/5          fc2/6          fc2/7          fc2/8

vsan 101 interfaces:
vfc1

vsan 4079(evfp_isolated_vsan) interfaces:

vsan 4094(isolated_vsan) interfaces:
tme-n5k-2(config)#
```

**Step 5** Verify that the vfc is up and operational:

```
tme-n5k-1(config-if)# show int brief
-----
Ethernet      VLAN   Type   Mode   Status   Reason           Speed
-----
Eth1/1        1      eth    trunk  up       none            10G(D)
Eth1/2        1      eth    access up       none            10G(D)
Eth1/38       1      eth    access down    SFP not inserted 10G(D)
Eth1/39       1      eth    trunk  up       none            10G(D)
Eth1/40       1      eth    trunk  up       none            10G(D)

-----
Port-channel  VLAN   Type   Mode   Status   Reason           Speed
-----
Po1           1      eth    trunk  up       none            a-10G(D) none
Po11          1      eth    trunk  up       none            a-10G(D) none

-----
Port   VRF      Status IP Address           Speed   MTU
-----
mgmt0  --       up     172.25.182.166       1000   1500

-----
Interface  Vsan      Admin  Admin  Status   SFP  Oper  Oper  Port
-----
vfc1       100      F      on     up       --   F     auto  --

tme-n5k-1(config-if)#

tme-n5k-2(config-if)# show int brief
-----
Ethernet      VLAN   Type   Mode   Status   Reason           Speed   Port
-----
```



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```

Eth1/1      1      eth   trunk  up      none      10G(D)  11
Eth1/2      1      eth   access up      none      10G(D)  --
Eth1/38     1      eth   access down   SFP not inserted 10G(D)  --
Eth1/39     1      eth   trunk  up      none      10G(D)  1
Eth1/40     1      eth   trunk  up      none      10G(D)  1

-----
Port-channel VLAN  Type Mode  Status Reason          Speed  Protocol
-----
Po1           1      eth   trunk  up      none      a-10G(D) none
Po11          1      eth   trunk  up      none      a-10G(D) none

-----
Port  VRF          Status IP Address          Speed  MTU
-----
mgmt0 --          up      172.25.182.167      1000  1500

-----
Interface  Vsan      Admin  Admin  Status      SFP  Oper  Oper
-----
vfc1       101      F      on     up      --   F     auto  --
tme-n5k-2(config-if)#

```

**Step 6** Verify that the virtual Fibre Channel interface has logged into the fabric:

```

tme-n5k-1# show flogi database
-----
INTERFACE      VSAN      FCID          PORT NAME          NODE NAME
-----
vfc1           100      0x540000 21:00:00:c0:dd:11:2a:01 20:00:00:c0:dd:11:2a:01

Total number of flogi = 1.
tme-n5k-2# show flogi database
-----
INTERFACE      VSAN      FCID          PORT NAME          NODE NAME
-----
vfc1           101      0x540000 21:00:00:c0:dd:11:2a:01 20:00:00:c0:dd:11:2a:01

Total number of flogi = 1.

```

**Step 7** Verify that the vPC is up and operational:

```

tme-n5k-1(config-if)# show vpc statistics vpc 11
port-channel11 is up
vPC Status: Up, vPC number: 11
Hardware: Port-Channel, address: 000d.ecde.a908 (bia 000d.ecde.a908)
  MTU 1500 bytes, BW 10000000 Kbit, DLY 10 usec,
  reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA
  Port mode is trunk
  full-duplex, 10 Gb/s
  Beacon is turned off
  Input flow-control is off, output flow-control is off
  Switchport monitor is off
  Members in this channel: Eth1/1
  Last clearing of "show interface" counters never
  1 minute input rate 4968 bits/sec, 8 packets/sec
  1 minute output rate 792 bits/sec, 1 packets/sec

tme-n5k-2(config-if)# show vpc statistics vpc 11
port-channel11 is up
vPC Status: Up, vPC number: 11

```

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```
Hardware: Port-Channel, address: 000d.ecdf.5fae (bia 000d.ecdf.5fae)
MTU 1500 bytes, BW 10000000 Kbit, DLY 10 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA
Port mode is trunk
full-duplex, 10 Gb/s
Beacon is turned off
Input flow-control is off, output flow-control is off
Switchport monitor is off
Members in this channel: Eth1/1
Last clearing of "show interface" counters never
1 minute input rate 4968 bits/sec, 8 packets/sec
1 minute output rate 792 bits/sec, 1 packets/sec
```