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Nexus Virtual Port Channel (vPC)

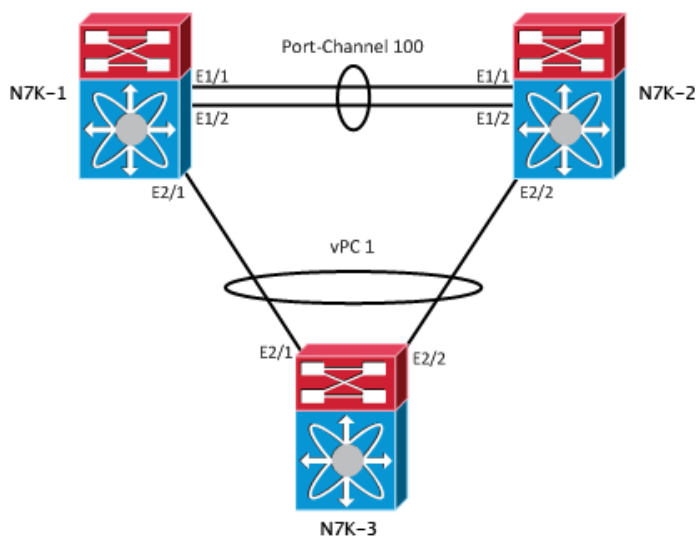
by Tony Mattke on February 1, 2011

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The Nexus 7000 and 5000 series have taken port-channel functionality to the next level by enabling port-channels to exist between links that are connected to different devices. Virtual Port Channels (vPCs) were introduced in NX-OS v4.1(4). vPCs offer better bandwidth utilization while allowing for device level redundancy with faster convergence times compared to multiple port-channels using spanning tree. vPCs also eliminate the need for spanning tree blocked ports.

The vPC Domain

vPCs are configured by associating two Nexus switches (Nexii?) into a vPC domain. Within that domain information is exchanged across two special link types. The **vPC peer-keepalive link** provides heartbeating between the vPC peers to ensure that both devices are online — preventing any active/active (split-brain) scenarios that could present loops into the topology. The **vPC peer link** is used to exchange state information between the vPC peers. It also provides additional mechanisms that can detect and prevent any split-brain circumstances.



vPC Configuration

Our first step here is to enable the vPC feature on N7k-1 and -2.

```
N7k-1# conf t
Enter configuration commands, one per line. End with CNTL/Z.
N7k-1(config)# feature vpc
```

Once complete, we can create our VRF for the VPC keepalive, and test its connectivity.

```

N7k-1(config)# vrf context vpc-keepalive
N7k-1(config-vrf)# int eth 2/10
N7k-1(config-if)# no switchport
N7k-1(config-if)# vrf member vpc-keepalive
N7k-1(config-if)# ip add 10.1.2.1 255.255.255.252
N7k-1(config-if)# no shut
!
N7k-2(config)# vrf context vpc-keepalive
N7k-2(config-vrf)# int eth 2/10
N7k-2(config-if)# no switchport
N7k-2(config-if)# vrf member vpc-keepalive
N7k-2(config-if)# ip add 10.1.2.2 255.255.255.252
N7k-2(config-if)# no shut
!
N7k-1# ping 10.1.1.2 vrf vpc-keepalive
PING 10.1.1.2 (10.1.1.2): 56 data bytes
64 bytes from 10.1.1.2: icmp_seq=0 ttl=254 time=1.24 ms
64 bytes from 10.1.1.2: icmp_seq=1 ttl=254 time=0.941 ms
64 bytes from 10.1.1.2: icmp_seq=2 ttl=254 time=0.808 ms
64 bytes from 10.1.1.2: icmp_seq=3 ttl=254 time=0.817 ms
64 bytes from 10.1.1.2: icmp_seq=4 ttl=254 time=0.816 ms

--- 10.1.1.2 ping statistics ---
5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 0.808/0.924/1.24 ms

```

We can now assign this as our vPC domain's peer-keepalive link and verify that it is working.

```

N7k-1(config)# vpc domain 1
N7k-1(config-vpc-domain)# peer-keepalive destination 10.1.1.2 source 10.1.1.1 vrf vpc-keepalive
!
N7k-2(config)# vpc domain 1
N7k-2(config-vpc-domain)# peer-keepalive destination 10.1.1.1 source 10.1.1.2 vrf vpc-keepalive
!
N7k-1# show vpc
      (*) - local vPC is down, forwarding via vPC peer-link

vPC domain id           : 1
Peer status              : peer link not configured
vPC keep-alive status   : peer is alive
Configuration consistency status: failed
Configuration consistency reason: vPC peer-link does not exist
vPC role                 : none established
Number of vPCs configured : 0
Peer Gateway             : Disabled
Dual-active excluded VLANs : -

```

Since our vPC keep-alive is working, we can move on to configuring the peer-link. Which, as shown in the diagram is made across Port-Channel 100. First we'll define the Port-Channel, then configure it as the vpc peer-link.

```

N7k-1(config)# int ethernet 1/1 - 2
N7k-1(config-if-range)# channel-group 100 on
N7k-1(config-if-range)# interface port-channel 100
N7k-1(config-if)# switchport
N7k-1(config-if)# switchport mode trunk
N7k-1(config-if)# vpc peer-link
Please note that spanning tree port type is changed to "network" port type on vPC peer-link.
This will enable spanning tree Bridge Assurance on vPC peer-link provided the STP Bridge Assurance (which i
!
N7k-2(config)# int ethernet 1/1 - 2
N7k-2(config-if-range)# channel-group 100 on
N7k-2(config-if-range)# interface port-channel 100
N7k-2(config-if)# switchport
N7k-2(config-if)# switchport mode trunk
N7k-2(config-if)# vpc peer-link
Please note that spanning tree port type is changed to "network" port type on vPC peer-link.
This will enable spanning tree Bridge Assurance on vPC peer-link provided the STP Bridge Assurance (which i
!
N7k-1# show vpc
      (*) - local vPC is down, forwarding via vPC peer-link

vPC domain id           : 1
Peer status              : peer adjacency formed ok
vPC keep-alive status   : peer is alive
Configuration consistency status: success
vPC role                 : primary
Number of vPCs configured : 0

```

```
Peer Gateway                : Disabled
Dual-active excluded VLANs  : -
vPC Peer-link status
```

```
-----
id   Port   Status Active vlans
--   -
1    Po100  up     1-20,100
-----
```

Now we're finally able to add our ports to the vPC itself

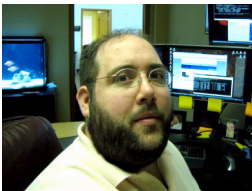
```
N7k-1(config)# interface eth2/1
N7k-1(config-if)# channel-group 1 mode active
N7k-1(config-if)# no shutdown
N7k-1(config-if)# interface port-channel 1
N7k-1(config-if)# switchport
N7k-1(config-if)# switchport mode trunk
!
N7k-2(config)# interface eth2/2
N7k-2(config-if)# channel-group 1 mode active
N7k-2(config-if)# no shutdown
N7k-2(config-if)# interface port-channel 1
N7k-2(config-if)# switchport
N7k-2(config-if)# switchport mode trunk
!
N7k-1# show vpc 1
```

```
vPC status
```

```
-----
id   Port   Status Consistency Reason           Active vlans
--   -
1    Po1    up     success    success           1-20, 100
-----
```

The final step in all of this is to configure the port-channel on the third switch. This is configured as a normal port channel, no special configuration options are needed. In fact, the third switch can be of any type (6509, 3750, etc).

```
N7k-3(config)# int ethernet 2/1 - 2
N7k-3(config-if-range)# channel-group 1 on
N7k-3(config-if-range)# interface port-channel 1
N7k-3(config-if)# switchport
N7k-3(config-if)# switchport mode trunk
```



Who writes this crap?

[Tony Mattke](#) is a network engineer for a financial institution in Indiana. In the past he has worked for ISPs, data centers, networking manufactures, and the occasional enterprise. For feedback, please leave a comment on the article in question. For everything else including fan mail or death threats, contact him via [twitter](#).

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Khalid · 36 weeks ago

0

Tony, great writeup and explains it well, just one question, Does the peer keep-alive need to be a 10G interface or can you allocate any 1G copper

interface?

Reply

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[Tony](#) 47p · 35 weeks ago

+2

You can most certainly use 1-Gig Copper for your peer keep-alive.. that's actually how I'm running in production right now. Your peer-links most definitely need to be 10g though..

Reply

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htm · 28 weeks ago

0

Thank Tony!

Reply

[Report](#)



Rob · 26 weeks ago

0

Have you ever put any STP enhancements on your VPC topology other than bridge assurance? Root guard, loop guard, bpdu guard??? TCN's are killing me in my VPC topology--haven't been able to nail down why, but very disruptive!!

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- RT [@hotdoughs](#): Game of the Week 12/19~ Mountain Man (combination of Elk, Antelope, Buffalo & Venison) w/ Cranberry Mustard & Hickory-Smok ... [about 2 hours ago](#) from [Twitter for Mac ReplyRetweetFavorite](#)
- Thanks to [@MCLNicolas](#) putting the idea in my head. I'll be heading down to my grandmother's for dinner & of course shooting in her back yard [about 1 day ago](#) from [Twitter for Mac ReplyRetweetFavorite](#)
- Odd... roto(config-webvpn)# anyconnect image disk0:/anyconnect-win-3.0.4235-k9.pkg 2 Failed to unzip the Anyconenet Package [about 1 day ago](#) from [Twitter for Mac ReplyRetweetFavorite](#)
- Wow.... it's so much quieter in my home office / lab. Turned off a server, old router, and 2 switches. Using just an ASA 5505 now. [about 2 days ago](#) from [Twitter for Mac ReplyRetweetFavorite](#)
- I find it odd that the ASA (being a decent SOHO device) doesn't support static DHCP reservations.. [about 2 days ago](#) from [Twitter for Mac ReplyRetweetFavorite](#)
- For no reason whatsoever.. I declare that Mr. [@jlgaddis](#) is the freaking man... that is all. [about 2 days ago](#) from [Twitter for Mac ReplyRetweetFavorite](#)

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