

HP Virtual Connect Flex-10 & FlexFabric Cisco Nexus 5000 & 2000 series Integration

Technical white paper

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Introduction

This document will cover how to configure Cisco Nexus 5000 series switches, and Cisco Nexus 2000 series Fabric Extender specifically Cisco Nexus 2232PP Fabric Extender based on two logical architecture lab designs shown in a later section. The purpose of this document is to highlight Cisco Ether Channel and Cisco Virtual Port Channel (vPC) features to easily interoperate with HP Virtual Connect Flex-10 Interconnect Module and HP Virtual Connect FlexFabric Interconnect Module.

This document does not recommend or try to present by any way the general network best practice design architecture for any of HP or Cisco products including the products specifically used in this document. This document was produced based on the behaviour of different lab designs architecture utilizing the below mentioned hardware list of equipment in a test lab environment. It is totally up to the reader to change the architecture and the configuration as per the mentioned product support feature list and business need requirements. The terminologies and definitions of Cisco technologies are all based on Cisco definitions from the public information published in www.cisco.com.

This document covers some of the Cisco Nexus 2000 series Fabric Extender definitions to familiarise the reader with Cisco terminologies that are used later in the lab. It does not cover how to add Cisco Nexus Fabric Extender 2000 series to its parent Cisco Nexus 5000 series switch. It assumes that you know how to add a Cisco Nexus 2000 Fabric Extender to its parent Cisco Nexus 5000 series switch in a Single Homed vPC Topology.

The lab design architecture components used in this document are:

- HP c7000 series Enclosure
- HP Virtual Connect Flex-10
- Cisco Nexus 5020 switch
- Cisco Nexus 2232PP Fabric Extender

This Document will cover design scenario 1 and design scenario 3 in more details including Cisco NX-OS CLI configuration and verification commands.

For more technical information about HP Virtual Connect please visit <http://www.HP.com/go/VirtualConnect>

Cisco Nexus Fabric Extenders 2000 series

As described in Cisco Systems website, Cisco Nexus Fabric Extenders 2000 series integrates with its parent switch, Cisco Nexus 5000 series, to get its configuration from the settings of the parent switch. There is no software included in the Fabric Extenders 2000 series and it gets its operating system from its parent switch. Cisco Fabric Extenders 2000 series connect to its parent switch using a Fabric Interface. Fabric Interface is a 10-Gigabit Ethernet uplink port designated for connection from the Fabric Extender to its parent switch. A fabric interface cannot be used for any other purpose. It must be directly connected to the parent switch.

You can combine Fabric Interfaces together to form a logical bundle called EtherChannel Fabric Interface to communicate between Fabric Extenders 2000 series and its parent switch. End host or server connectivity should be connected to Cisco Nexus Fabric Extender 2000 series through a Host

Interface that might participate in a logical bundle called EtherChannel Host Interface that can group up to 8 Host Interfaces.

EtherChannel Host Interface was added to the Fabric Extender from Cisco NX-OS Release 4.2(1)N1(1). Bridge Protocol Data Unit (BPDU) Guard is enabled by default in all Host Interfaces and you cannot disable it. Based on that you cannot connect a switch or a bridge to a Host Interface as BPDU Guard will put the Host Interface in error-disabled state when a BPDU is received. The Cisco Nexus 2232PP Fabric Extender has eight 10-Gigabit Ethernet fabric interfaces and 32 10-Gigabit Ethernet host interfaces. In the best case scenario, you can have a 4 to 1 oversubscription (4 host interfaces for one fabric interface) or higher. The Cisco Nexus Fabric Extender 2000 Series does not perform any local switching. All traffic is sent to the parent switch that provides central forwarding, even including host-to-host communications between two systems connected to the same Fabric Extender.



NOTE:

It is very important to upgrade the Nexus 5000 series switches that manage the Nexus 2232PP Fabric Extender to the latest NX-OS release 4.2(1)N2(1). Cisco had different bugs in some of the NX-OS software branches in processing LACP PDU with 1 second timeout which in some cases prevent establishing a LACP port channel between HP Virtual Connect and Nexus 2232PP Fabric Extender. Some of these NX-OS bugs are covered under CSCff22871 Bug Details, CSCte09024 Bug Details, and CSCff22871 Bug Details. These bugs were first discovered in NXOS releases 4.1(3)N1(0.164), 4.2(1)N1(0.267), 4.2(1)N1(0.269), 4.2(1)N1(0.284), 4.2(1)N1(0.323), and 4.0(1a)N2(1a). NX-OS 4.2(1)N2(1) is the latest and first release to support LACP PDU with 1 second timeout which provides more stability to the LACP port.

Cisco Virtual Port Channel (vPC)

Starting from Cisco NX-OS release 4.1(3)N1(1), you can configure vPC between Cisco Nexus 5000 series switches that are directly connected to Cisco Nexus 2000 series Fabric Extenders.

vPC Terminology

- **vPC**—The combined EtherChannel between the vPC peer devices and the downstream device.
- **vPC peer device**—One of a pair of devices that are connected with the special EtherChannel known as the vPC peer link
- **vPC peer link**—The link used to synchronize states between the vPC peer devices. It is recommended that you use LACP on the peer-link, because LACP provides configuration checks against a configuration mismatch on the EtherChannel.
- **vPC member port**—Interfaces that belong to the vPCs.
- **Host vPC port**—Fabric Extender host interfaces that belong to a vPC.
- **vPC domain**—This domain includes both vPC peer devices, the vPC peer-keepalive link, and all of the port channels in the vPC connected to the downstream devices. It is also associated to the configuration mode that you must use to assign vPC global parameters. The vPC domain ID must be the same on both switches.
- **vPC peer-keepalive link**—The peer-keepalive link monitors the vitality of a vPC peer. Cisco Nexus 5000 Series device and it must be different than the vPC peer link. The peer-

keepalive link sends configurable, periodic keepalive messages between vPC peer devices. No data or synchronization traffic moves over the vPC peer-keepalive link; the only traffic on this link is a message that indicates that the originating switch is operating and running vPCs. You must have Layer 3 connectivity between the peer switches to transmit these messages; the system cannot bring up the vPC peer link unless a peerkeepalive link is already up and running.



NOTE: You can use either management VRF or default VRF for the vPC peer-keepalive link. In case you want to use the default VRF, then you have to configure a dedicated VLAN, and a VLAN Interface to carry the vPC peer-keepalive messages. Also it is important to use a unique Layer 3 IP address subnet with 30 network bits subnet mask (255.255.255.252 or /30) to avoid any IP addresses conflict in your network and assure the highest reliability to the vPC keepalive communication.

vPC Topology

There are 2 different vPC topology configurations, Single Homed Fabric Extender vPC Topology and Dual Homed Fabric Extender vPC Topology. In Single Homed Fabric Extender vPC Topology you will be able to support Dual Homed Server communication. You will be only allowed to support Single Homed Server communication in Dual Homed Fabric Extender vPC Topology which utilizing the mechanism to manage a single Cisco Nexus Fabric Extender from 2 different Cisco Nexus 5000 series switches that was introduced in NX-OS release 4.1(3).



NOTE: It is very important to configure your vPC topology between Cisco Nexus 5000 series switches and Cisco Nexus 2000 series Fabric Extenders using Single Homed Fabric Extender vPC Topology. ONLY in this topology you will be able to support DUAL Homed Server Edge Communication between HP Virtual Connect and Cisco Nexus 2000 Fabric Extender utilizing vPC feature as shown later in scenario 3. The reason is due to a limitation in the Cisco Nexus 2000 Fabric Extender as a Fabric Extender can be a member of a Host Interface vPC topology or a Fabric Extender vPC topology but not both simultaneously

vPC Limitations

vPC feature and vPC peer-keepalive link must be enabled and configured before configuring vPC peer link. Also You must configure both vPC peer switches as the configuration is not automatically synchronized between the vPC peer devices.

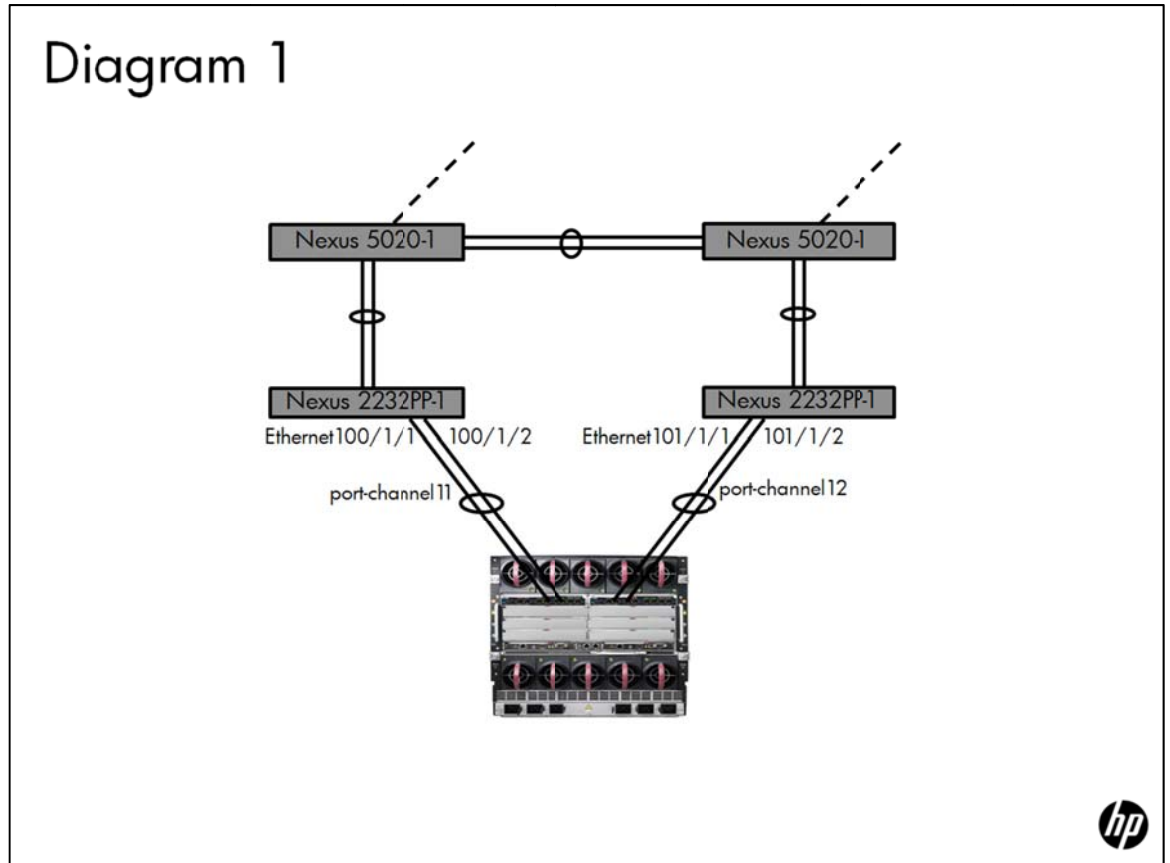
vPCs can only have EtherChannels. A vPC can be configured on a normal EtherChannel (switch-to-switch vPC topology), on an EtherChannel fabric interface (fabric extender vPC topology), and on an EtherChannel host interface (host interface vPC topology).

Plan to configure vPC in the maintenance time window as you may experience traffic disruption while configuring vPCs.

Scenario 1: Lab Design and Configuration based on Cisco EtherChannel Feature

As shown in the below diagram (diagram1), the first HP c7000 enclosure has two HP Virtual Connect Flex-10 Interconnect modules in Bay1 and Bay2. HP Virtual Connect Flex-10 in Bay1 and Bay2 are connected using a total of four 10GbE uplink ports to Nexus 2232PP-1 and Nexus 2232PP-2 to support up to 40GbE uplink bandwidth to the enclosure.

In this lab design architecture we will configure Cisco EtherChannel feature using a Single Homed vPC Fabric Extender Topology and a Dual Homed Server Edge communication Setup.



```

Nexus-5020-1(config)# feature lacp                                →Enable lacp feature
Nexus-5020-1(config)# interface port-channel11                  →Create EtherChannel 11
Nexus-5020-1(config-if)# description connection to Encl-Flex10-Bay1
Nexus-5020-1(config-if)# switchport mode trunk                →Enable Trunk
Nexus-5020-1(config-if)# switchport trunk allowed vlan 101-109 →Allow required VLANs
Nexus-5020-1(config-if)# spanning-tree port type edge trunk   →Consider the interface as edge port (enable
                                                                portfast) even in trunk mode

Nexus-5020-1(config)# interface Ethernet100/1/1, Ethernet100/1/2
Nexus-5020-1(config-if)# description connection to Encl-Flex10-Bay1
Nexus-5020-1(config-if)# lacp rate fast                        →Enable LACP Fast Timeout
Nexus-5020-1(config-if)# switchport mode trunk                →add physical interfaces to the EtherChannel
Nexus-5020-1(config-if)# switchport trunk allowed vlan 101-109
Nexus-5020-1(config-if)# channel-group 11 mode active

Nexus-5020-2(config)# feature lacp                                →Same Configuration for N5020-2
Nexus-5020-2(config)# interface port-channel12
Nexus-5020-2(config-if)# description connection to Encl-Flex10-Bay1
Nexus-5020-2(config-if)# switchport mode trunk
Nexus-5020-2(config-if)# switchport trunk allowed vlan 101-109
Nexus-5020-2(config-if)# spanning-tree port type edge trunk

Nexus-5020-2(config)# interface Ethernet101/1/1, Ethernet101/1/2
Nexus-5020-2(config-if)# description connection to Encl-Flex10-Bay2
Nexus-5020-2(config-if)# lacp rate fast
Nexus-5020-2(config-if)# switchport mode trunk
Nexus-5020-2(config-if)# switchport trunk allowed vlan 101-109
Nexus-5020-2(config-if)# channel-group 12 mode active

! Verification - some output is filtered to only highlight used interfaces

Nexus-5020-1(config)# show run interface po11

!Command: show running-config interface port-channel11
!Time: Sun Sep 5 19:19:47 2010

version 4.2(1)N2(1)

interface port-channel11
  switchport mode trunk
  switchport trunk allowed vlan 101-109
  spanning-tree port type edge trunk

Nexus-5020-2# show run int po12

!Command: show running-config interface port-channel12
!Time: Mon Sep 6 01:18:27 2010

version 4.2(1)N2(1)

interface port-channel12
  switchport mode trunk
  switchport trunk allowed vlan 101-109
  spanning-tree port type edge trunk

Nexus-5020-1(config)# show interface status up

Port          Name          Status          Vlan          Duplex  Speed Type
-----
Po11          connection to Encl up          trunk          full 10G    --
Eth100/1/1    connection to Encl up          trunk          full 10G    --
Eth100/1/2    connection to Encl up          trunk          full 10G    --

Nexus-5020-1# show int trunk

-----
Port          Native Vlan          Status          Port Channel
-----

```

Po11	1	trunking	--			
Eth100/1/1	1	trnk-bndl	Po11			
Eth100/1/2	1	trnk-bndl	Po11			

Port	Vlans Allowed on Trunk					

Po11	101-109					
Eth100/1/1	101-109					
Eth100/1/2	101-109					

Port	Vlans Err-disabled on Trunk					

Po11	none					
Eth100/1/1	none					
Eth100/1/2	none					

Port	STP Forwarding					

Po11	101-108					
Eth100/1/1	none					
Eth100/1/2	none					

Nexus-5020-2(config)# show interface status up						

Port	Name	Status	Vlan	Duplex	Speed	Type

Po12	connection to Encl up	trunk		full	10G	--
Eth101/1/1	connection to Encl up	trunk		full	10G	--
Eth101/1/2	connection to Encl up	trunk		full	10G	--

Nexus-5020-2# show int trunk						

Port	Native Vlan	Status	Port Channel			
Po12	1	trunking	--			
Eth101/1/1	1	trnk-bndl	Po12			
Eth101/1/2	1	trnk-bndl	Po12			

Port	Vlans Allowed on Trunk					

Po12	101-109					
Eth101/1/1	101-109					
Eth101/1/2	101-109					

Port	Vlans Err-disabled on Trunk					

Po12	none					
Eth101/1/1	none					
Eth101/1/2	none					

Port	STP Forwarding					

Po12	101-108					
Eth101/1/1	none					
Eth101/1/2	none					

Nexus-5020-1# show spanning-tree interface poll						
Vlan	Role	Sts	Cost	Prio.	Nbr	Type

VLAN0101	Desg	FWD	1	128.4196	Edge	P2p
VLAN0102	Desg	FWD	1	128.4196	Edge	P2p
VLAN0103	Desg	FWD	1	128.4196	Edge	P2p
VLAN0104	Desg	FWD	1	128.4196	Edge	P2p
VLAN0105	Desg	FWD	1	128.4196	Edge	P2p
VLAN0106	Desg	FWD	1	128.4196	Edge	P2p
VLAN0107	Desg	FWD	1	128.4196	Edge	P2p

```
VLAN0108 Desg FWD 1 128.4196 Edge P2p
```

```
Nexus-5020-2# show spanning-tree interface po12
```

Vlan	Role	Sts	Cost	Prio.	Nbr	Type
VLAN0101	Desg	FWD	1	128.	4196	Edge P2p
VLAN0102	Desg	FWD	1	128.	4196	Edge P2p
VLAN0103	Desg	FWD	1	128.	4196	Edge P2p
VLAN0104	Desg	FWD	1	128.	4196	Edge P2p
VLAN0105	Desg	FWD	1	128.	4196	Edge P2p
VLAN0106	Desg	FWD	1	128.	4196	Edge P2p
VLAN0107	Desg	FWD	1	128.	4196	Edge P2p
VLAN0108	Desg	FWD	1	128.	4196	Edge P2p

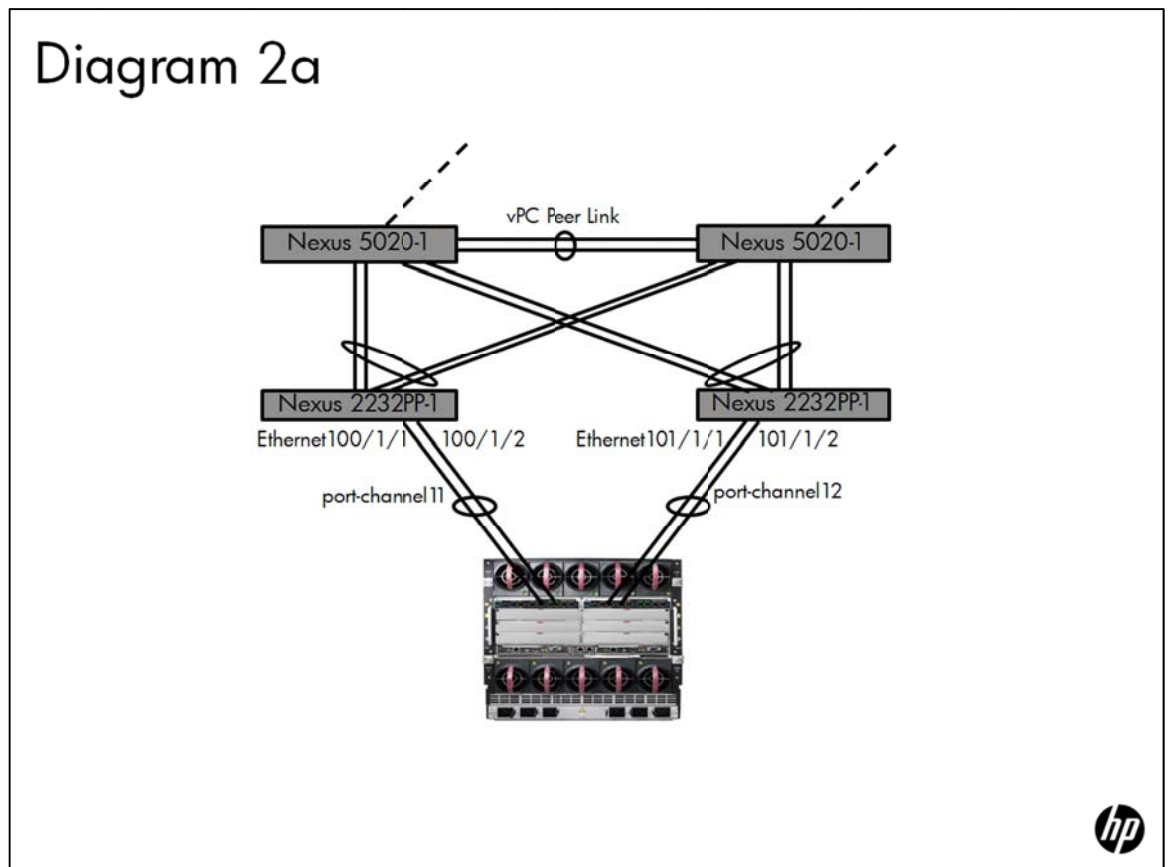
Scenario 2a: Lab Design and Configuration based on Cisco Ether Channel Feature in a Dual Homed Fabric Extender Topology

As shown in the below diagram (diagram2A), the first HP c7000 enclosure has two HP Virtual Connect Flex-10 Interconnect modules in Bay1 and Bay2. HP Virtual Connect Flex-10 in Bay1 and Bay2 are connected using a total of four 10GbE uplink ports to Nexus 2232PP-1 and Nexus 2232PP-2 to support up to 40GbE uplink bandwidth to the enclosure.

In this lab design architecture we will configure Cisco EtherChannel and Cisco Virtual Port Channel (vPC) features using a Dual Homed vPC Fabric Extender Topology and a Dual Homed Server Edge communication Setup.

Only ONE active physical link will be available from the FOUR connected physical interfaces to HP Virtual Connect Flex-10 in Bay1 and HP Virtual Connect Flex-10 in Bay2 as a result for Cisco vPC Dual Home Topology limitations. The other THREE physical interfaces will be in standby state.

Below design architecture in not recommend due to Cisco vPC Dual Homed Topology limitations



Scenario 2b: Lab Design based on Cisco Virtual Port Channel (vPC) Feature in a Single Homed Fabric Extender Topology

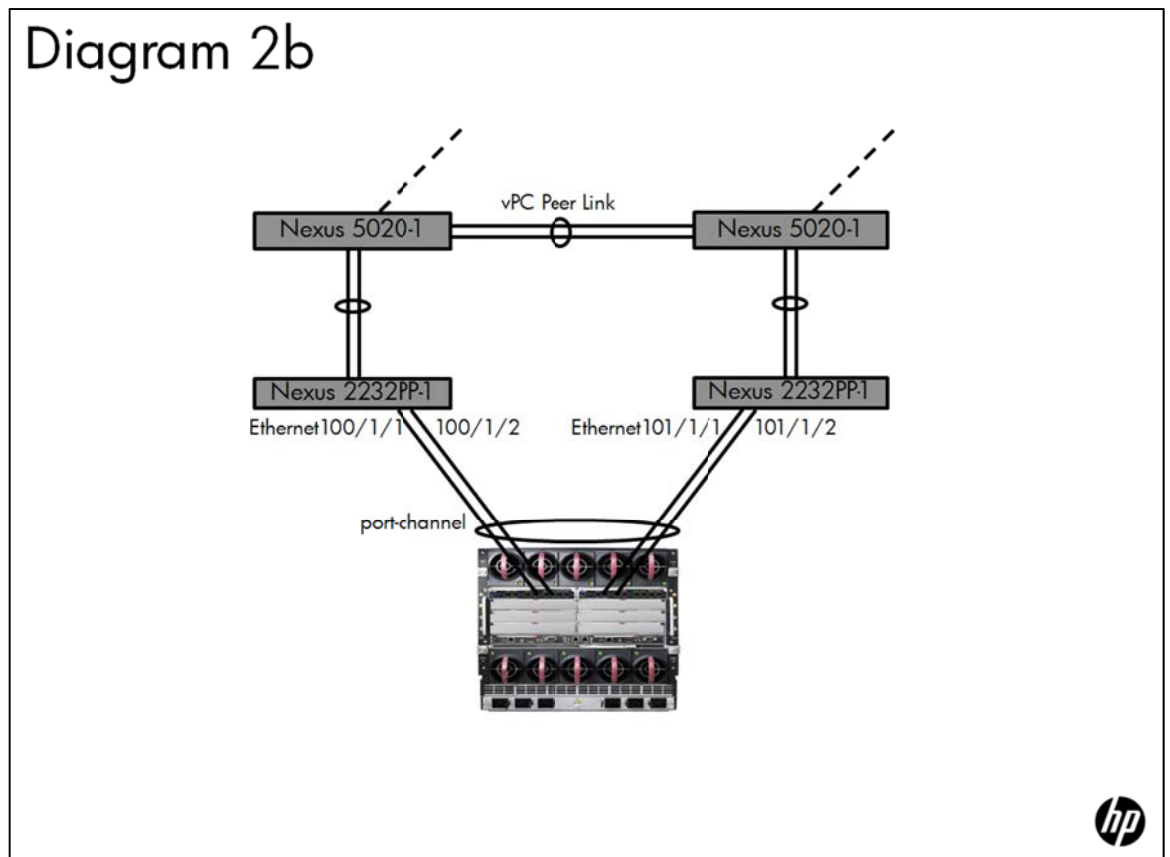
As shown in the below diagram (diagram2B), the first HP c7000 enclosure has two HP Virtual

Connect Flex-10 Interconnect modules in Bay1 and Bay2. HP Virtual Connect Flex-10 in Bay1 and Bay2 are connected using a total of four 10GbE uplink ports to Nexus 2232PP-1 and Nexus 2232PP-2 to support up to 40GbE uplink bandwidth to the enclosure.

In this lab design architecture we will configure Cisco EtherChannel and Cisco Virtual Port Channel (vPC) features using a Single Homed vPC Fabric Extender Topology and a Dual Homed Server Edge communication Setup.

Only ONE active logical EtherChannel link will be available from the TWO connected interfaces to HP Virtual Connect Flex-10 in Bay1 and HP Virtual Connect Flex-10 in Bay2 as a result for Cisco vPC feature limitations.

Below design architecture is not recommended due to Cisco vPC feature limitations.

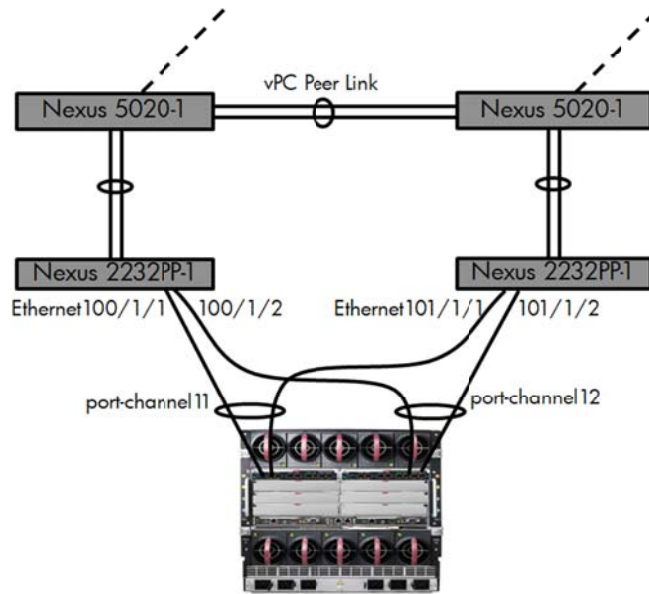


Scenario 3: Lab Design and Configuration based on Cisco Virtual Port Channel (vPC) Feature

As shown in the below diagram (diagram3), the first HP c7000 enclosure has two HP Virtual Connect Flex-10 Interconnect modules in Bay1 and Bay2. HP Virtual Connect Flex-10 in Bay1 and Bay2 are connected using a total of four 10GbE uplink ports to Nexus 2232PP-1 and Nexus 2232PP-2 to support up to 40GbE uplink bandwidth to the enclosure.

In this lab design architecture we will configure vPC using a Single Homed vPC Fabric Extender Topology and a Dual Homed Server Edge communication Setup. You must configure step 2 before step 3 as it is a vPC limitation requirement.

Diagram 3



Step 1. Configuring vPC keepalive L2 VLAN and L3 VLAN interface

```
Nexus-5020-1(config)# feature interface-vlan
Nexus-5020-1(config)# vlan 1000
```

→ Enable Interface vlan feature
→ Dedicated vlan 1000 for vPC keepalive messaging

```
Nexus-5020-1(config-vlan)# name vPCkeepalive
Nexus-5020-1(config-if)# interface vlan 1000
```

→ Dedicated L3 vlan interface to support vPC keepalive configuration

```
Nexus-5020-1(config-if)# ip address 192.168.255.253/30
Nexus-5020-2(config)# feature interface-vlan
Nexus-5020-2(config)# vlan 1000
Nexus-5020-2(config-vlan)# name vPCkeepalive
Nexus-5020-2(config-if)# interface vlan 1000
Nexus-5020-2(config-if)# ip address 192.168.255.254/30
```

```
Nexus-5020-1(config)# show ip interface brief | inc Vlan1000
Vlan1000 192.168.255.253 protocol-up/link-up/admin-up
```

→ Verification

```
Nexus-5020-2(config)# show ip interface brief | inc Vlan1000
Vlan1000 192.168.255.254 protocol-up/link-up/admin-up
```

Step 2. Configuring vPC Domain and vPC Keepalive Link

```
Nexus-5020-1(config)# feature vpc
Nexus-5020-1(config)# vpc domain 1000
Nexus-5020-1(config-vpc-domain)# peer-keepalive destination 192.168.255.254 source
192.168.255.253 vrf default
```

→ Enable vPC feature
→ Create vPC domain 1000
→ L3 vPC Peer IP address

```
Nexus-5020-2(config)# feature vpc
Nexus-5020-2(config)# vpc domain 1000
Nexus-5020-2(config-vpc-domain)# peer-keepalive destination 192.168.255.253 source
```

→ Configure Nexus 5020-2

```
192.168.255.254 vrf default
```

```
Nexus-5020-1(config)# show vpc peer-keepalive
```

→Verify vPC peer status

```
vPC keep-alive status : peer is alive
```

```
Nexus-5020-1(config-vpc-domain)# show vpc
```

```
Legend:
```

```
(*) - local vPC is down, forwarding via vPC peer-link
```

```
vPC domain id : 1000
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 exists
vPC role : none established
Number of vPCs configured : 0
Peer Gateway : Disabled
Dual-active excluded VLANs : -
```

Step 3. Configuring vPC Peer Link

```
Nexus-5020-1(config)# interface port-channel1000
```

→ Create Ether Channel 1000

```
Nexus-5020-1(config-if)# description Connection to Nexus-5020-2
```

```
Nexus-5020-1(config-if)# switchport mode trunk
```

```
Nexus-5020-1(config-if)# vpc peer-link
```

→ Configure EtherChannel as a vPC Peer Link

```
Nexus-5020-1(config-if)# spanning-tree port type network
```

```
Nexus-5020-1(config-if)# speed 10000
```

```
Nexus-5020-1(config-if)# interface Ethernet1/1
```

→ Add E1/1 and E1/2 to the EtherChannel

```
Nexus-5020-1(config-if)# description Connection to Nexus-5020-2
```

```
Nexus-5020-1(config-if)# switchport mode trunk
```

```
Nexus-5020-1(config-if)# channel-group 1000 mode active
```

```
Nexus-5020-1(config-if)# interface Ethernet1/2
```

```
Nexus-5020-1(config-if)# description Connection to Nexus-5020-2
```

```
Nexus-5020-1(config-if)# switchport mode trunk
```

```
Nexus-5020-1(config-if)# channel-group 1000 mode active
```

```
Nexus-5020-2(config)# interface port-channel1000
```

→ Configure Nexus 5020-2

```
Nexus-5020-2(config-if)# description Connection to Nexus-5020-1
```

```
Nexus-5020-2(config-if)# switchport mode trunk
```

```
Nexus-5020-2(config-if)# vpc peer-link
```

```
Nexus-5020-2(config-if)# spanning-tree port type network
```

```
Nexus-5020-2(config-if)# speed 10000
```

```
Nexus-5020-2(config-if)# interface Ethernet1/1
```

```
Nexus-5020-2(config-if)# description Connection to Nexus-5020-1
```

```
Nexus-5020-2(config-if)# switchport mode trunk
```

```
Nexus-5020-2(config-if)# channel-group 1000 mode active
```

```
Nexus-5020-2(config-if)# interface Ethernet1/2
```

```
Nexus-5020-2(config-if)# description Connection to Nexus-5020-1
```

```
Nexus-5020-2(config-if)# switchport mode trunk
```

```
Nexus-5020-2(config-if)# channel-group 1000 mode active
```

! Verification switch 1

```
Nexus-5020-1(config)#
```

```
Nexus-5020-1(config)# show vpc consistency-parameters global
```

```
Legend:
```

```
Type 1 : vPC will be suspended in case of mismatch
```

Name	Type	Local Value	Peer Value
QoS	1	([], [3], [], [], [],	([], [3], [], [], [], []) [])
Network QoS (MTU)	1	(1538, 2240, 0, 0, 0)	(1538, 2240, 0, 0, 0, 0) 0)
Network QoS (Pause)	1	(F, T, F, F, F, F)	(F, T, F, F, F, F)
Input Queuing (Bandwidth)	1	(50, 50, 0, 0, 0, 0)	(50, 50, 0, 0, 0, 0)

```

Input Queuing (Absolute Priority) 1 (F, F, F, F, F, F) (F, F, F, F, F, F)
Output Queuing (Bandwidth) 1 (50, 50, 0, 0, 0, 0) (50, 50, 0, 0, 0, 0)
Output Queuing(Absolute Priority) 1 (F, F, F, F, F, F) (F, F, F, F, F, F)
STP Mode 1 Rapid-PVST Rapid-PVST
STP Disabled 1 None None
STP MST Region Name 1 "" ""
STP MST Region Revision 1 0 0
STP MST Region Instance to 1
VLAN Mapping
STP Loopguard 1 Disabled Disabled
STP Bridge Assurance 1 Enabled Enabled
STP Port Type, Edge 1 Normal, Disabled, Normal, Disabled,
BPDUFilter, Edge BPDUGuard Disabled Disabled
STP MST Simulate PVST 1 Enabled Enabled
Allowed VLANs - -
Local suspended VLANs - -

Nexus-5020-1(config)#
Nexus-5020-1(config)# show vpc consistency-parameters interface po1000

Note: **** Global type-1 parameters will be displayed for peer-link ****
Legend:
Type 1 : vPC will be suspended in case of mismatch
Name Type Local Value Peer Value
-----
QoS 1 ([], [3], [], [], [], ([], [3], [], [], [], []])
Network QoS (MTU) 1 (1538, 2240, 0, 0, 0, 0) (1538, 2240, 0, 0, 0, 0)
Network Qos (Pause) 1 (F, T, F, F, F, F) (F, T, F, F, F, F)
Input Queuing (Bandwidth) 1 (50, 50, 0, 0, 0, 0) (50, 50, 0, 0, 0, 0)
Input Queuing (Absolute Priority) 1 (F, F, F, F, F, F) (F, F, F, F, F, F)
Output Queuing (Bandwidth) 1 (50, 50, 0, 0, 0, 0) (50, 50, 0, 0, 0, 0)
Output Queuing (Absolute Priority) 1 (F, F, F, F, F, F) (F, F, F, F, F, F)
STP Mode 1 Rapid-PVST Rapid-PVST
STP Disabled 1 None None
STP MST Region Name 1 "" ""
STP MST Region Revision 1 0 0
STP MST Region Instance to 1
VLAN Mapping
STP Loopguard 1 Disabled Disabled
STP Bridge Assurance 1 Enabled Enabled
STP Port Type, Edge 1 Normal, Disabled Normal, Disabled,
BPDUFilter, Edge BPDUGuard Disabled Disabled
STP MST Simulate PVST 1 Enabled Enabled
Allowed VLANs - -
Local suspended VLANs - -

Nexus-5020-1(config)#
Nexus-5020-1(config)# show vpc

Legend:
(*) - local vPC is down, forwarding via vPC peer-link

vPC domain id : 1000
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 Po1000 up -

```

! Verification switch 2

```
Nexus-5020-2(config)#  
Nexus-5020-2(config)# show vpc consistency-parameters global
```

Legend:
Type 1 : vPC will be suspended in case of mismatch

Name	Type	Local Value	Peer Value
QoS	1	([], [3], [], [], [])	([], [3], [], [], [], []) []
Network QoS (MTU)	1	(1538, 2240, 0, 0, 0, 0)	(1538, 2240, 0, 0, 0, 0)
Network QoS (Pause)	1	(F, T, F, F, F, F)	(F, T, F, F, F, F)
Input Queuing (Bandwidth)	1	(50, 50, 0, 0, 0, 0)	(50, 50, 0, 0, 0, 0)
Input Queuing (Absolute 1 Priority)	1	(F, F, F, F, F, F)	(F, F, F, F, F, F)
Output Queuing (Bandwidth)	1	(50, 50, 0, 0, 0, 0)	(50, 50, 0, 0, 0, 0)
Output Queuing (Absolute 1 Priority)	1	(F, F, F, F, F, F)	(F, F, F, F, F, F)
STP Mode	1	Rapid-PVST	Rapid-PVST
STP Disabled	1	None	None
STP MST Region Name	1	""	""
STP MST Region Revision1	1	0	0
STP MST Region Instance to VLAN Mapping	1		
STP Loopguard	1	Disabled	Disabled
STP Bridge Assurance	1	Enabled	Enabled
STP Port Type, Edge	1	Normal, Disabled	Normal, Disabled
BPDUFILTER, Edge BPDUGuard	1	Disabled	Disabled
STP MST Simulate PVST 1	1	Enabled	Enabled
Allowed VLANs	-	-	-
Local suspended VLANs	-	-	-

```
Nexus-5020-2(config)#  
Nexus-5020-2(config)# show vpc consistency-parameters interface po1000
```

Note: **** Global type-1 parameters will be displayed for peer-link ****

Legend:
Type 1 : vPC will be suspended in case of mismatch

Name	Type	Local Value	Peer Value
QoS	1	([], [3], [], [], [], [])	([], [3], [], [], [], [])
Network QoS (MTU)	1	(1538, 2240, 0, 0, 0, 0)	(1538, 2240, 0, 0, 0, 0)
Network QoS (Pause)	1	(F, T, F, F, F, F)	(F, T, F, F, F, F)
Input Queuing (Bandwidth)	1	(50, 50, 0, 0, 0, 0)	(50, 50, 0, 0, 0, 0)
Input Queuing (Absolute 1 Priority)	1	(F, F, F, F, F, F)	(F, F, F, F, F, F)
Output Queuing (Bandwidth)	1	(50, 50, 0, 0, 0, 0)	(50, 50, 0, 0, 0, 0)
Output Queuing (Absolute 1 Priority)	1	(F, F, F, F, F, F)	(F, F, F, F, F, F)
STP Mode	1	Rapid-PVST	Rapid-PVST
STP Disabled	1	None	None
STP MST Region Name1	1	""	""
STP MST Region Revision1	1	0	0
STP MST Region Instance to VLAN Mapping	1		
STP Loopguard	1	Disabled	Disabled
STP Bridge Assurance	1	Enabled	Enabled
STP Port Type, Edge	1	Normal, Disabled	Normal, Disabled,
BPDUFILTER, Edge BPDUGuard	1	Disabled	Disabled
STP MST Simulate PVST 1	1	Enabled	Enabled
Allowed VLANs	-	-	-
Local suspended VLANs	-	-	-

```
Nexus-5020-2(config)#  
Nexus-5020-2(config)# show vpc
```

Legend:

```

(*) - local vPC is down, forwarding via vPC peer-link
vPC domain id           : 1000
Peer status              :peer adjacency formed ok
vPC keep-alive status   : peer is alive
Configuration consistency status : success
vPC role                 : secondary
Number of vPCs configured : 0
Peer Gateway             :Disabled
Dual-active excluded VLANs : -

```

```
vPC Peer-link status
```

```
-----
id Port Status Active vlans
-----
```

```
1 Po1000 up -
```

Step 4. Configuring vPC EtherChannel Host Interface

! Create Po11 and add it to vPC 11 on Nexus 5020-1 and Nexus 5020-2

```

Nexus-5020-1(config)# interface port-channel11           → Create EtherChannel 11
Nexus-5020-1(config-if)# description Connection to Encl-Flex10-Bay1
Nexus-5020-1(config-if)# switchport mode trunk
Nexus-5020-1(config-if)# switchport trunk allowed vlan 101-109
Nexus-5020-1(config-if)# spanning-tree port type edge trunk → Consider the interface as edge port
Nexus-5020-1(config-if)# vpc 11                         → Create vPC 11

```

```

Nexus-5020-1(config-if)# interface Ethernet100/1/1       → Add Eth100/1/1 interface to Po11
Nexus-5020-1(config-if)# description Connection to Encl-Flex10-Bay1
Nexus-5020-1(config-if)# lACP rate fast                 → Enable LACP Fast Timeout
Nexus-5020-1(config-if)# switchport mode trunk
Nexus-5020-1(config-if)# switchport trunk allowed vlan 101-109
Nexus-5020-1(config-if)# spanning-tree port type edge trunk
Nexus-5020-1(config-if)# channel-group 11 mode active

```

```

Nexus-5020-2(config)# interface port-channel11           → Configure Nexus 5020-2
Nexus-5020-2(config-if)# description Connection to Encl-Flex10-Bay1
Nexus-5020-2(config-if)# switchport mode trunk
Nexus-5020-2(config-if)# switchport trunk allowed vlan 101-109
Nexus-5020-2(config-if)# spanning-tree port type edge trunk
Nexus-5020-2(config-if)# vpc 11

```

```

Nexus-5020-2(config-if)# interface Ethernet101/1/1
Nexus-5020-2(config-if)# description Connection to Encl-Flex10-Bay1
Nexus-5020-2(config-if)# lACP rate fast
Nexus-5020-2(config-if)# switchport mode trunk
Nexus-5020-2(config-if)# switchport trunk allowed vlan 101-109
Nexus-5020-2(config-if)# spanning-tree port type edge trunk
Nexus-5020-2(config-if)# channel-group 11 mode active

```

! Create Po12 and add it to vPC 12 on Nexus 5020-1 and Nexus 5020-2

```

Nexus-5020-1(config)# interface port-channel12           → Create EtherChannel 12
Nexus-5020-1(config-if)# description Connection to Encl-Flex10-Bay2
Nexus-5020-1(config-if)# switchport mode trunk
Nexus-5020-1(config-if)# switchport trunk allowed vlan 101-109
Nexus-5020-1(config-if)# spanning-tree port type edge trunk → Consider the interface as edge Port
Nexus-5020-1(config-if)# vpc 12                         → Create vPC 12

```

```

Nexus-5020-1(config-if)# interface Ethernet100/1/2       → Add Eth100/1/2 interface to Po12
Nexus-5020-1(config-if)# description Connection to Encl-Flex10-Bay2
Nexus-5020-1(config-if)# lACP rate fast                 → Enable LACP Fast Timeout
Nexus-5020-1(config-if)# switchport mode trunk
Nexus-5020-1(config-if)# switchport trunk allowed vlan 101-109
Nexus-5020-1(config-if)# spanning-tree port type edge trunk
Nexus-5020-1(config-if)# channel-group 12 mode active

```

```

Nexus-5020-2(config)# feature lacp
Nexus-5020-2(config)# interface port-channel12
Nexus-5020-2(config-if)# description Connection to Enc1-Flex10-Bay2
Nexus-5020-2(config-if)# switchport mode trunk
Nexus-5020-2(config-if)# switchport trunk allowed vlan 101-109
Nexus-5020-2(config-if)# spanning-tree port type edge trunk
Nexus-5020-2(config-if)# vpc 12

Nexus-5020-2(config-if)# interface Ethernet101/1/2
Nexus-5020-2(config-if)# description Connection to Enc1-Flex10-Bay2
Nexus-5020-2(config-if)# lacp rate fast
Nexus-5020-2(config-if)# switchport mode trunk
Nexus-5020-2(config-if)# switchport trunk allowed vlan 101-109
Nexus-5020-2(config-if)# spanning-tree port type edge trunk
Nexus-5020-2(config-if)# channel-group 12 mode active

! Verification on Nexus 5020-1: EtherChannel Po11, vPC 11 and Po12, vPC 12

Nexus-5020-1(config-if)# show run interface po12
!Command: show running-config interface port-channel12
!Time: Mon Sep 6 13:19:35 2010

version 4.2(1)N2(1)

interface port-channel12
  switchport mode trunk
  vpc 12
  switchport trunk allowed vlan 101-109
  spanning-tree port type edge trunk

Nexus-5020-1(config-if)# show run interface po11
!Command: show running-config interface port-channel11
!Time: Mon Sep 6 13:19:43 2010

version 4.2(1)N2(1)

interface port-channel11
  switchport mode trunk
  vpc 11
  switchport trunk allowed vlan 101-109
  spanning-tree port type edge trunk

Nexus-5020-1(config-if)# show run interface e100/1/1
!Command: show running-config interface Ethernet100/1/1
!Time: Mon Sep 6 13:19:56 2010

version 4.2(1)N2(1)

interface Ethernet100/1/1
  description connection to Enc1-Flex10-Bay1
  lacp rate fast
  switchport mode trunk
  switchport trunk allowed vlan 101-109
  channel-group 11 mode active

Nexus-5020-1(config-if)# show run interface e100/1/2
!Command: show running-config interface Ethernet100/1/2
!Time: Mon Sep 6 13:20:13 2010

version 4.2(1)N2(1)

interface Ethernet100/1/2
  description connection to Enc1-Flex10-Bay2
  lacp rate fast
  switchport mode trunk
  switchport trunk allowed vlan 101-109
  channel-group 12 mode active

Nexus-5020-1(config-if)# show run int po1000
!Command: show running-config interface port-channel1000
!Time: Mon Sep 6 13:36:14 2010

```



```

version 4.2(1)N2(1)

interface port-channel1000
  description Connection to Nexus 5020-2
  switchport mode trunk
  vpc peer-link
  switchport trunk allowed vlan none
  spanning-tree port type network

```

Nexus-5020-1(config-if)# **show vpc**

Legend:

(*) - local vPC is down, forwarding via vPC peer-link

```

vPC domain id :                1000
Peer status :                  peer adjacency formed ok
vPC keep-alive status :        peer is alive
Configuration consistency status: success
vPC role :                     primary
Number of vPCs configured :    2
Peer Gateway :                 Disabled
Dual-active excluded VLANs :    -

```

vPC Peer-link status

id	Port	Status	Active vlans
1	Po1000	up	-

vPC status

id	Port	Status	Consistency	Reason	Active vlans
11	Po11	up	success	success	-
12	Po12	up	success	success	-

Nexus-5020-1(config-if)# **show run interface po1000**

!Command: show running-config interface port-channel1000

!Time: Mon Sep 6 13:38:44 2010

```

version 4.2(1)N2(1)
interface port-channel1000
  description Connection to Nexus 5020-2
  switchport mode trunk
  vpc peer-link
  switchport trunk allowed vlan 101-109
  spanning-tree port type network

```

Nexus-5020-1(config-if)# **show vpc**

Legend:

(*) - local vPC is down, forwarding via vPC peer-link

```

vPC domain id :                1000
Peer status :                  peer adjacency formed ok
vPC keep-alive status :        peer is alive
Configuration consistency status: success
vPC role :                     primary
Number of vPCs configured :    2
Peer Gateway :                 Disabled
Dual-active excluded VLANs :    -

```

vPC Peer-link status

id	Port	Status	Active vlans
1	Po1000	up	101-108

vPC status

id	Port	Status	Consistency	Reason	Active vlans
11	Po11	up	success	success	101-108
12	Po12	up	success	success	101-108

! Verification on Nexus 5020-2: EtherChannel Po11, vPC 11 and Po12, vPC 12 Verification on Nexus 5020-2

Nexus-5020-2(config)# **show run interface po12**

!Command: show running-config interface port-channel12
!Time: Mon Sep 6 18:57:30 2010

version 4.2(1)N2(1)

```
interface port-channel12
  switchport mode trunk
  vpc 12
  switchport trunk allowed vlan 101-109
  spanning-tree port type edge trunk
```

Nexus-5020-2(config)# **show run interface po11**

!Command: show running-config interface port-channel11
!Time: Mon Sep 6 18:57:38 2010

version 4.2(1)N2(1)

```
interface port-channel11
  switchport mode trunk
  vpc 11
  switchport trunk allowed vlan 101-109
  spanning-tree port type edge trunk
```

Nexus-5020-2(config)# **show run interface e100/1/1**

!Command: show running-config interface Ethernet100/1/1
!Time: Mon Sep 6 18:57:47 2010

version 4.2(1)N2(1)

```
interface Ethernet101/1/1
  description connection to Encl-Flex10-Bay2
  lacp rate fast
  switchport mode trunk
  switchport trunk allowed vlan 101-109
  channel-group 12 mode active
```

Nexus-5020-2(config)# **show run interface e101/1/2**

!Command: show running-config interface Ethernet101/1/2
!Time: Mon Sep 6 18:58:00 2010

version 4.2(1)N2(1)

```
interface Ethernet101/1/2
  description connection to Encl-Flex10-Bay1
  lacp rate fast
  switchport mode trunk
  switchport trunk allowed vlan 101-109
  channel-group 11 mode active
```

Nexus-5020-2(config)# **show run interface po1000**

!Command: show running-config interface port-channel1000

!Time: Mon Sep 6 19:10:17 2010

version 4.2(1)N2(1)

```
interface port-channel1000
  description Connection to Nexus 5020-1
  switchport mode trunk
  vpc peer-link
  switchport trunk allowed vlan 101-109
  spanning-tree port type network
```

Nexus-5020-2(config)# **show vpc**

Legend:

(*) - local vPC is down, forwarding via vPC peer-link

```
vPC domain id :                1000
Peer status :                   peer adjacency formed ok
vPC keep-alive status :         peer is alive
Configuration consistency status: success
vPC role :                       secondary
Number of vPCs configured :     2
Peer Gateway :                   Disabled
Dual-active excluded VLANs :    -
```

vPC Peer-link status

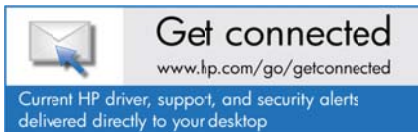
id	Port	Status	Active vlans
1	Po1000	up	101-108

vPC status

	Consistency	Reason	Active vlans	id	Port	Status
11	Po11	up	success	success	101-108	
12	Po12	up	success	success	101-108	

For more information

For more technical information about HP Virtual Connect please visit
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