



Configure VXLAN Cross Connect

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VXLAN cross connect

VXLAN cross connect is a tunneling mechanism used on VXLAN fabric which

- provides point-to-point data tunneling,
- control packets such as CDP, LLDP, LACP, STP, BFD, and PAGP from one VTEP to another, and
- often referred to as **xConnect**.

BGP EVPN signaling identifies endpoints based on how the provider VNI is stretched in the fabric. Every attachment circuit will be part of a unique provider VNI. All inner customer tags will be preserved, as is, and packets are encapsulated in the provider VNI using **dot1q-tunnel**. On the decapsulation endpoint, the provider VNI will forward the packet to its attachment circuit while preserving all customer dot1q tags in the packets.

Supported xConnect tunnel combinations

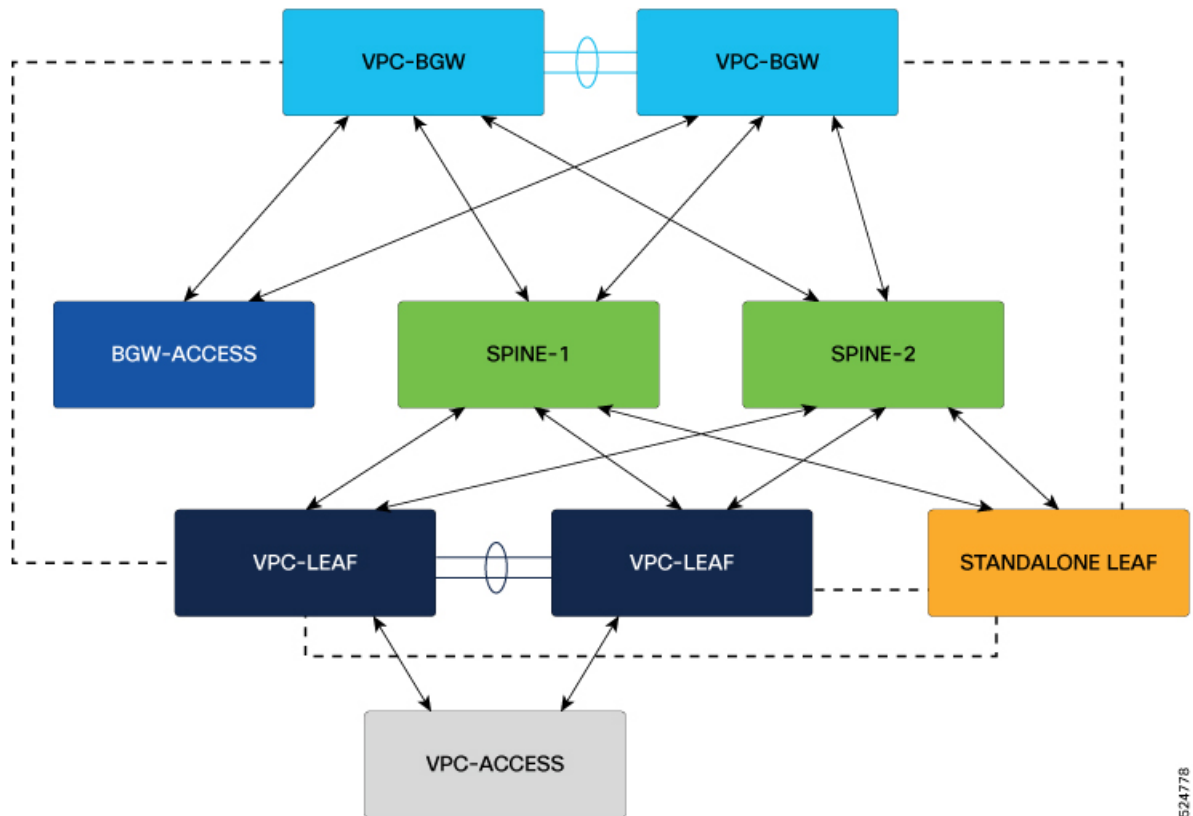
The supported tunnel combinations for VXLAN cross connect are

- physical interface to physical interface,
- port-channel to port-channel,
- mixed combinations of physical interface and port-channel, and
- additionally, this is supported over both underlay types (ingress replication and multicast) or a combination of both.

Topology of VXLAN Cross Connect

The following figure represents the **NGOAM xConnect** configuration on a VXLAN fabric. NGOAM xConnect is used to establish **pseudo-wire tunnels between VTEPs (VXLAN Tunnel Endpoints)**, which helps in

- proactive failure detection across the network fabric, and
- monitoring the enabled tunnels end-to-end connectivity across the fabric.



The dashed line in the diagram represents the NGOAM xConnect pseudo-wire, which is implemented between specific nodes to detect and react to failures.

Guidelines and Limitations of VXLAN Cross Connect

Generic guidelines and limitations of VXLAN Cross Connect

- MAC learning will be disabled on the xConnect VNIs and none of the host MAC will be learned on the tunnel access ports.
- Only one attachment circuit can be configured for a provider VNI on a given VTEP.
- A VNI can only be stretched in a point-to-point fashion. Point-to-multipoint is not supported.

- The scale of xConnect VLANs depends on the number of ports available on the switch. Every xConnect VLAN can tunnel all 4k customer VLANs.
- On vPC VTEP, cross connect needs backup SVI as native VLAN on the vPC peer-link.
- On vPC VTEP, spanning tree must be disabled on both vPC peers for xConnect VLANs.

ISSU and patch guidelines and limitations of VXLAN Cross Connect

- When an upgrade is performed non-disruptively from Cisco NX-OS Release 7.0(3)I7(4) to Cisco NX-OS Release 9.2(x) code, and if a VLAN is created and configured as xConnect, you must enter the **copy running-config startup-config** command and reload the switch. If the box was upgraded disruptively to Cisco NX-OS Release 9.2(x) code, a reload is not needed on configuring a VLAN as xConnect.
- Make sure that the **ngoam xconnect hb-interval** is set to 5000 milliseconds on all VTEPs before attempting ISSU/patch activation to avoid link flaps.
- Before activating the patch for the cfs process, you must move the NGOAM xConnect hb-interval to the maximum value of 5000 milliseconds. This prevents interface flaps during the patch activation.

Configuration and port guidelines and limitations of VXLAN Cross Connect

- If ARP Suppression is enabled on a VLAN, and you enable xConnect on the VLAN, the xConnect feature takes precedence.
- xConnect enabled VLANs are accessible only through switch port access mode.
- Configuring a static MAC on xConnect tunnel interfaces is not supported.
- The vPC orphan tunneled port per VNI should be either on the vPC primary switch or secondary switch, but not both.
- xConnect is not supported on FEX ports.
- xConnect access ports must be flapped after disabling NGOAM on all the VTEPs.
- After deleting and adding a VLAN, or removing xConnect from a VLAN, physical ports must be flapped with NGOAM.

Supported Features of VXLAN Cross Connect

- Supported only on BGP EVPN topology.
- Supported on vPC fabric peering.
- Does not support LACP bundling of attachment circuits.
- Does not support SVI on an xconnect VLAN.
- Does not support multi-site solution.

Supported platform and release of VXLAN cross connect

SupportedRelease	SupportedPlatform
9.3(3) and later	CiscoNexus 9300-FX/FX2/GX Series switches
9.3(5) and later	CiscoNexus 9300-FX3 Series switches
10.2(3)F and later	CiscoNexus 9300-GX2 Series switches
10.4(1)F and later	CiscoNexus 9332D-H2R switches
10.4(2)F and later	CiscoNexus 93400LD-H1 switches
10.4(3)F and later	CiscoNexus 9364C-H1 switches

Prerequisites

Result

- Before you begin, verify that the **feature ngoam** is enabled. For more information on how to enable, see [feature ngoam](#).

```
switch# configure terminal
switch(config)# feature ngoam
```

- (Optional) Use the **ngoam xconnect hb-interval interval** command in global configuration mode, only if user wants to configure non-default heartbeat interval. Range: 150 to 5000. Default: 190.

```
switch(config)# ngoam xconnect hb-interval 200
```

Configure the VXLAN Cross Connect

Use this procedure to configure the VXLAN Cross Connect feature on Cisco Nexus 9000 devices.

Procedure

Step 1 Follow these steps to create and configure xConnect VLANs:

- Enter the **vlan session-num** command in global configuration mode, to create a VLAN.

Example:

```
switch(config)# vlan 550
switch(config-vlan)#
```

- Enter the **vn-segment segment-num** command in VLAN configuration mode, to specify VXLAN VNID (Virtual Network Identifier).

Example:

```
switch(config-vlan)# vn-segment 5555
```

- c) Enter the **xconnect** command in VLAN configuration mode, to define the provider VLAN with the attached VNI to be in cross connect mode.

Example:

```
switch(config-vlan)# xconnect
```

- d) Enter the **exit** command in VLAN configuration mode, to exit the config mode and apply the configuration to the switch.

Example:

```
switch(config-vlan)# exit  
switch(config)#
```

Step 2

Follow these steps to configure xConnect on a interface access ports:

- a) Enter the **interface** [*physical-interface* | *port-channel*] command in global configuration mode, to create a VLAN.

Example:

For physical interface:

```
switch(config)# interface Ethernet1/30/3
```

For port-channel:

```
switch(config)# interface port-channel 550
```

- b) Enter the **switchport** command in interface configuration mode, to enable the switchport mode.

Example:

```
switch(config-if)# switchport
```

- c) Enter the **switchport mode dot1q-tunnel** command in interface configuration mode, to create a 802.1Q tunnel on the port.

Example:

```
switch(config-if)# switchport mode dot1q-tunnel
```

- d) Enter the **switchport access vlan** *vlan-id* command in interface configuration mode, to specify the port assigned to a xConnect VLAN.

Example:

```
switch(config-if)# switchport access vlan 660
```

- e) Enter the **exit** command to exit the config mode and apply the configuration to the switch.

Example:

```
switch(config-if)# exit  
switch(config)#
```

Step 3

Run the **show running-config vlan session-num** command to verify the VLAN information.

Example:

```
switch# show running-config vlan 550
```

```
!Command: show running-config vlan 550  
!Running configuration last done at: Sun Feb 23 16:34:03 2025  
!Time: Mon Feb 24 13:53:01 2025
```

```
version 10.5(2) Bios:version 05.51  
vlan 550
```

```
vlan 550
  vn-segment 5555
  xconnect
```

Step 4 Run the **show running-config interface port-channel *pc-num*** command to verify interface port channel information.

Example:

```
switch# show running-config interface port-channel 550

!Command: show running-config interface port-channel550
!Running configuration last done at: Sun Feb 23 16:34:03 2025
!Time: Mon Feb 24 13:53:30 2025

version 10.5(2) Bios:version 05.51

interface port-channel550
  switchport
  switchport mode dot1q-tunnel
  switchport access vlan 550
  spanning-tree bpdufilter enable
switch#
```

Step 5 Run the **show running-config interface Ethernet *port-num*** command to verify interface access ports information.

Example:

```
switch# show running-config interface Ethernet1/30/3

!Command: show running-config interface port-channel550
!Running configuration last done at: Sun Feb 23 16:34:03 2025
!Time: Mon Feb 24 13:53:30 2025

version 10.5(2) Bios:version 05.51

interface port-channel550
  switchport
  switchport mode dot1q-tunnel
  switchport access vlan 550
  spanning-tree bpdufilter enable
switch#
```

Verification of VXLAN Cross Connect Configuration

To display the status for the VXLAN Cross Connect configuration, enter one of the following commands:

Command	Purpose
show nve vni	Displays list of all VXLAN VNI and its status.
show nve vni <i>vlan-id</i>	Displays VNI status for specified VNI.
show ngoam xconnect session all	Displays all the xConnect session and its status.
show ngoam xconnect session <i>vlan-id</i>	Displays the specified xConnect session with details.

- Example of **show nve vni** command: Once the xConnect enabled VLANs are tagged on the NVE interface, you can see the **Conn** flag for the xConnect enabled VLANs.

```
switch# show nve vni
```

```
Codes: CP - Control Plane      DP - Data Plane
       UC - Unconfigured      SA - Suppress ARP
       S-ND - Suppress ND
       SU - Suppress Unknown Unicast
       Xconn - Crossconnect
       MS-IR - Multisite Ingress Replication
       HYB - Hybrid IRB mode
```

Interface	VNI	Multicast-group	State	Mode	Type [BD/VRF]	Flags
nve1	5555	225.5.5.5	Up	CP	L2 [550]	Xconn
nve1	6666	225.6.6.6	Up	CP	L2 [660]	Xconn
nve1	7777	225.7.7.7	Up	CP	L2 [770]	Xconn
nve1	10101	225.1.1.1	Up	CP	L2 [101]	SA
nve1	10102	225.1.1.2	Up	CP	L2 [102]	SA
nve1	10103	225.1.1.3	Up	CP	L2 [103]	SA
nve1	10104	225.1.1.4	Up	CP	L2 [104]	SA
nve1	10105	225.1.1.5	Up	CP	L2 [105]	SA
nve1	10106	225.1.1.6	Up	CP	L2 [106]	SA
nve1	10107	225.1.1.7	Up	CP	L2 [107]	SA
nve1	10108	225.1.1.8	Up	CP	L2 [108]	SA
nve1	10109	225.1.1.9	Up	CP	L2 [109]	SA
nve1	10110	225.1.1.10	Up	CP	L2 [110]	SA
nve1	20201	225.1.1.1	Up	CP	L2 [201]	SA
nve1	20202	225.1.1.2	Up	CP	L2 [202]	SA
nve1	20203	225.1.1.3	Up	CP	L2 [203]	SA
nve1	20204	225.1.1.4	Up	CP	L2 [204]	SA
nve1	20205	225.1.1.5	Up	CP	L2 [205]	SA
nve1	20206	225.1.1.6	Up	CP	L2 [206]	SA
nve1	20207	225.1.1.7	Up	CP	L2 [207]	SA
nve1	20208	225.1.1.8	Up	CP	L2 [208]	SA
nve1	20209	225.1.1.9	Up	CP	L2 [209]	SA
nve1	20210	225.1.1.10	Up	CP	L2 [210]	SA
nve1	202020	UnicastBGP	Up	CP	L2 [20]	Xconn
nve1	1001001	225.1.1.1	Up	CP	L2 [1001]	SA
nve1	1001002	225.1.1.2	Up	CP	L2 [1002]	SA
nve1	1001003	225.1.1.3	Up	CP	L2 [1003]	SA
nve1	1001004	225.1.1.4	Up	CP	L2 [1004]	SA
nve1	1001005	225.1.1.5	Up	CP	L2 [1005]	SA
nve1	1001006	225.1.1.6	Up	CP	L2 [1006]	SA
nve1	1001007	225.1.1.7	Up	CP	L2 [1007]	SA
nve1	1001008	225.1.1.8	Up	CP	L2 [1008]	SA
nve1	1001009	225.1.1.9	Up	CP	L2 [1009]	SA
nve1	1001010	225.1.1.10	Up	CP	L2 [1010]	SA
nve1	2002001	225.1.1.1	Up	CP	L2 [2001]	SA
nve1	2002002	225.1.1.2	Up	CP	L2 [2002]	SA
nve1	2002003	225.1.1.3	Up	CP	L2 [2003]	SA
nve1	2002004	225.1.1.4	Up	CP	L2 [2004]	SA
nve1	2002005	225.1.1.5	Up	CP	L2 [2005]	SA
nve1	2002006	225.1.1.6	Up	CP	L2 [2006]	SA
nve1	2002007	225.1.1.7	Up	CP	L2 [2007]	SA
nve1	2002008	225.1.1.8	Up	CP	L2 [2008]	SA
nve1	2002009	225.1.1.9	Up	CP	L2 [2009]	SA
nve1	2002010	225.1.1.10	Up	CP	L2 [2010]	SA
nve1	5005001	n/a	Up	CP	L3 [vxlan-5001]	
nve1	5005002	n/a	Up	CP	L3 [vxlan-5002]	
nve1	5005003	n/a	Up	CP	L3 [vxlan-5003]	
nve1	5005004	n/a	Up	CP	L3 [vxlan-5004]	
nve1	5005005	n/a	Up	CP	L3 [vxlan-5005]	
nve1	5005006	n/a	Up	CP	L3 [vxlan-5006]	
nve1	5005007	n/a	Up	CP	L3 [vxlan-5007]	
nve1	5005008	n/a	Up	CP	L3 [vxlan-5008]	
nve1	5005009	n/a	Up	CP	L3 [vxlan-5009]	

```
nve1      5005010  n/a                Up    CP    L3 [vxlan-5010]
switch#
```

- Example of **show ngoam xconnect session all** command: use the command to check all the NGOAM xConnect session on the switch.

```
switch# show ngoam xconnect session all
```

```
States: LD = Local interface down, RD = Remote interface Down
        HB = Heartbeat lost, DB = Database/Routes not present
        * - Showing Vpc-peer interface info
```

Vlan	Peer-ip/vni	XC-State	Local-if/State	Rmt-if/State
20	100.100.100.8 / 202020	Active	Eth1/7/1 / UP	Eth1/50 / UP
550	200.200.200.200 / 5555	Active	Po550 / UP	Eth1/63/4 / UP
660	100.100.100.8 / 6666	Active	Eth1/30/3 / UP	Eth1/48 / UP
770	200.200.200.200 / 7777	Active	Po770 / UP	Po770 / UP

```
switch#
```

- Use the following commands to check the details of the specific NGOAM xConnect session on the switch.

- The below example shows the output of vPC pairs as local interface and remote interface.

```
switch# sh ngoam xconnect session 550
Vlan ID: 550
Peer IP: 200.200.200.200 VNI : 5555
State: Active
Last state update: 02/23/2025 22:21:01.958
Local interface: Po550 State: UP
Local vpc interface: Po550 State: UP
Remote interface: Eth1/63/4 State: UP
Remote vpc interface: Eth1/63/2 State: UP
```

- The below example shows the local interface as vPC and the remote interface as non-vPC pairs.

```
switch# sh ngoam xconnect session 660
Vlan ID: 660
Peer IP: 100.100.100.8 VNI : 6666
State: Active
Last state update: 02/23/2025 15:58:14.735
Local interface: Eth1/30/3 State: UP
Local vpc interface: Eth1/30/3 State: UP
Remote interface: Eth1/48 State: UP
Remote vpc interface: Unknown State: DOWN
switch#
```

Remove a Cross Connect VNI

Use this procedure to remove the cross connect tag on the VLAN of Cisco Nexus switches.

Procedure

- Step 1** Enter the **vlan session-num** command in global configuration mode, to remove the VNI under NVE.

Example:

```
switch# configure terminal
switch(config)# vlan 550
switch(config-vlan)#
```

Step 2 Enter the **no xconnect** command in VLAN configuration mode, to remove the xconnect tag from the VLAN configurations.

Example:

```
switch(config-vlan)# no xconnect
```

Note

Removing the xconnect tag is mandatory before removing the vn-segment for the xconnect enabled VLANs. Otherwise, you can see the below syslog that indicates the procedure.

xconnect is enabled on vlan 550, please disable xconnect before removing vn-segment
Cannot run commands in the mode at this moment. Please try again.

Step 3 Enter the **no vn-segment** *segment-num* command in VLAN configuration mode, to remove the VNI.

Example:

```
switch(config-vlan)# no vn-segment
```

Step 4 Enter the **no vlan** *session-num* command in VLAN configuration mode, to remove the VLAN.

Example:

```
switch(config-vlan)# no vlan 550
```
