



Configuring EVPN VXLAN Layer 2 Overlay Network

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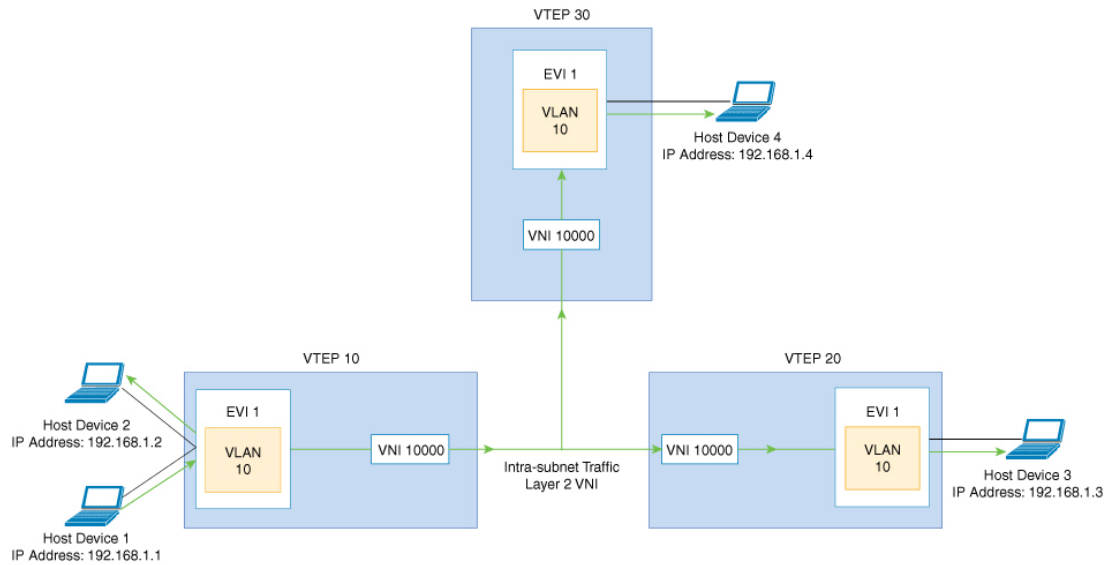
Information About EVPN VXLAN Layer 2 Overlay Network

An EVPN VXLAN Layer 2 overlay network allows host devices in the same subnet to send bridged or Layer 2 traffic to each other. The network forwards the bridged traffic using a Layer 2 virtual network instance (VNI).

Broadcast, Unknown Unicast, and Multicast Traffic

Multidestination Layer 2 traffic in a VXLAN network is typically referred to as broadcast, unknown unicast, and multicast (BUM) traffic. In a BGP EVPN VXLAN fabric, the underlay network forwards the BUM traffic to all the endpoints connected to a common Layer 2 broadcast domain in the VXLAN overlay.

The following image shows the flow of BUM traffic through a Layer 2 VNI. The network forwards BUM traffic from host device 1 to all the VTEPs which in turn send the traffic to all the host devices in the same subnet.



The MP-BGP EVPN control plane uses two different methods to forward BUM traffic in a VXLAN network:

- Underlay Multicast
- Ingress Replication

Underlay Multicast

In underlay multicast, the underlay network replicates the traffic through a multicast group. Forwarding BUM traffic using underlay multicast requires the configuration of IP multicast in the underlay network. A single copy of the BUM traffic moves from the ingress or source VTEP towards the underlay transport network. The network forwards this copy along the multicast tree so that it reaches all egress or destination VTEPs participating in the given multicast group. Various branch points in the network replicate the copy as it travels along the multicast tree. The branch points replicate the copy only if the receivers are part of the multicast group associated with the VNI.

BUM traffic forwarding through underlay multicast is achieved by mapping a Layer 2 VNI to the multicast group. This mapping must be configured on all the VTEPs associated with the Layer 2 VNI. When a VTEP joins the multicast group, it receives all the traffic that is forwarded on that group. If the VTEP receives traffic in a VNI that is not associated with it, it simply drops the traffic. This approach maintains a single link within the network, thus providing an efficient way to forward BUM traffic.

Ingress Replication

Ingress replication, or headend replication, is a unicast approach to handle multidestination Layer 2 overlay BUM traffic. Ingress replication involves an ingress device replicating every incoming BUM packet and sending them as a separate unicast to the remote egress devices. Ingress replication happens through EVPN route type 3, also called as inclusive multicast ethernet tag (IMET) route. BGP EVPN ingress replication uses IMET route for auto-discovery of remote peers in order to set up the BUM tunnels over VXLAN. Using ingress replication to handle BUM traffic can result in scaling issues as an ingress device needs to replicate the BUM traffic as many times as there are VTEPs associated with the Layer 2 VNI.

Ingress Replication Operation

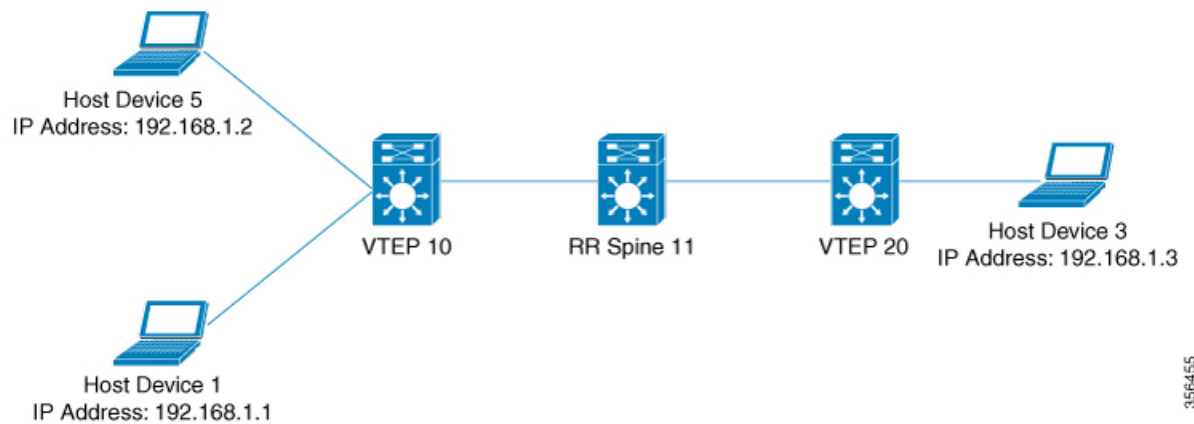
IMET routes carry the remote or egress VNIs advertised from the remote peers, which can be different from the local VNI. The network creates a VXLAN tunnel adjacency when an ingress device receives IMET ingress replication routes from remote NVE peers. The tunnel adjacency is a midchain adjacency which contains IP or UDP encapsulation for the VXLAN Tunnel. If there is more than one VNI along the tunnel, then multiple VNIs share the tunnel. Ingress replication on EVPN can have multiple unicast tunnel adjacencies and different egress VNIs for each remote peer.

The network builds a flooded replication list with the routes advertised by each VTEP. The dynamic replication list stores all the remote destination peers discovered on a BGP IMET route in the same Layer 2 VNI. The replication list gets updated every time you configure the Layer 2 VNI at a remote peer. The network removes the tunnel adjacency and VXLAN encapsulation from the replication list every time a remote NVE peer withdraws the IMET ingress replication route. The network deletes the tunnel adjacency when there is no NVE peer using it.

Any BUM traffic that reaches the ingress device gets replicated after the replication list is built. The ingress device forwards the replicated traffic throughout the network to all the remote peers in the same VNI.

How to Configure EVPN VXLAN Layer 2 Overlay Network

The following figure shows a sample topology of an EVPN VXLAN Network. Host device 1 and host device 3 are part of the same subnet. The network forwards BUM traffic from host device 1 to host device 3 using a Layer 2 VNI through either underlay multicast or ingress replication methods.



Note In a two-VTEP topology, a spine switch is not mandatory. For information about configuration of spine switches in an EVPN VXLAN network, see *Configuring Spine Switches in a BGP EVPN VXLAN Fabric* module.

Perform the following set of procedures to configure an EVPN VXLAN Layer 2 overlay network and forward the BUM traffic:

- Configure Layer 2 VPN EVPN on the VTEPs.
- Configure an EVPN instance in the VLAN on the VTEPs.

- Configure the access-facing interface in the VLAN on the VTEPs.
- Configure the loopback interface on the VTEPs.
- Configure the network virtualization endpoint (NVE) interface on the VTEPs.
- Configure BGP with EVPN address family on the VTEPs.
- Configure underlay multicast, if the specified replication type is static. For more information, see *IP Multicast Routing Configuration Guide*.

Configuring Layer 2 VPN EVPN on a VTEP

To configure the Layer 2 VPN EVPN parameters on a VTEP, perform the following steps:

Procedure

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. Enter your password, if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	l2vpn evpn Example: Device(config)# l2vpn evpn	Enters EVPN configuration mode.
Step 4	replication-type {ingress static} Example: Device(config-evpn)# replication-type static	Configures the Layer 2 VPN EVPN replication type. Note Configure the Layer 2 VPN EVPN replication type as static, if multicast is enabled in the underlay network for EVPN BUM traffic. When the Layer 2 VPN EVPN replication type is configured as static, the IMET route is not advertised and forwarding of BUM traffic relies on underlay multicast being configured on each VTEP.
Step 5	router-id loopback-interface-id Example: Device(config-evpn)# router-id loopback 0	Specifies the interface that will supply the IP addresses to be used in auto-generating route distinguishers.

	Command or Action	Purpose
Step 6	default-gateway advertise Example: Device(config-evpn) # default-gateway advertise	(Optional) Enables default gateway advertisement on the switch. To configure distributed anycast gateway in a VXLAN network using MAC aliasing, enable default gateway advertisement on all the leaf switches in the network. This command is applicable in integrated routing and bridging (IRB) scenarios where Layer 2 and Layer 3 VNIs coexist in a VRF. Refer to <i>Configuring EVPN VXLAN Integrated Routing and Bridging</i> module for more details. This command is mandatory only if the same MAC address is not manually configured on all the access SVIs. Note Use the default-gateway advertise {enable disable} command in EVPN instance configuration mode to override the global default gateway advertisement settings and enable or disable it for a specific EVPN instance.
Step 7	logging peer state Example: Device(config-evpn) # logging peer state	(Optional) Displays syslog message when the first route is received or the last route is withdrawn from a given remote VTEP.
Step 8	mac duplication limit limit-number time time-limit Example: Device(config-evpn) # mac duplication limit 20 time 5	(Optional) Changes parameters for detecting duplicate MAC addresses.
Step 9	ip duplication limit limit-number time time-limit Example: Device(config-evpn) # ip duplication limit 20 time 5	(Optional) Changes parameters for detecting duplicate IP addresses.
Step 10	route-target auto vni Example: Device(config-evpn) # route-target auto vni	(Optional) Specifies to use VNI instead of EVPN instance number to auto-generate route target.
Step 11	exit Example: Device(config-evpn) # exit	Exits EVPN configuration mode and enters global configuration mode.

	Command or Action	Purpose
Step 12	l2vpn evpn instance <i>evpn-instance-number</i> vlan-based Example: <pre>Device(config)# l2vpn evpn instance 1 vlan-based</pre>	<p>Configures a VLAN based EVPN instance in Layer 2 VPN configuration mode.</p> <p>An EVPN instance needs to be explicitly configured only when something needs to be configured per EVPN instance such as a route target.</p>
Step 13	encapsulation vxlan Example: <pre>Device(config-evpn-evi)# encapsulation vxlan</pre>	<p>(Optional) Defines the encapsulation format as VXLAN.</p> <p>The encapsulation format is VXLAN by default.</p>
Step 14	replication-type {ingress static} Example: <pre>Device(config-evpn-evi)# replication-type ingress</pre>	<p>(Optional) Sets the replication type for the EVPN instance.</p> <p>In case a global replication type has already been configured, this overrides the global setting.</p>
Step 15	default-gateway advertise {enable disable} Example: <pre>Device(config-evpn-evi)# default-gateway advertise disable</pre>	<p>(Optional) Enables or disables the default gateway advertisement for the EVPN instance.</p> <p>In case default gateway advertisement has already been globally configured, this overrides the global setting.</p> <p>This command is mandatory only if the same MAC address is not manually configured on all the access SVIs.</p> <p>To configure distributed anycast gateway in a VXLAN network using MAC aliasing, enable default gateway advertisement on all the leaf switches in the network.</p>
Step 16	ip local-learning {enable disable} Example: <pre>Device(config-evpn-evi)# ip local-learning disable</pre>	<p>(Optional) Enables or disables local IP address learning for the specified EVPN instance.</p> <p>In case IP address learning has already been globally configured, this overrides the global setting.</p>
Step 17	no auto-route-target Example: <pre>Device(config-evpn-evi)# no auto-route-target</pre>	<p>(Optional) Disables auto generation of route targets.</p>
Step 18	rd <i>rd-value</i> Example: <pre>Device(config-evpn-evi)# rd 65000:100</pre>	<p>(Optional) Configures a route distinguisher manually.</p>

	Command or Action	Purpose
Step 19	route-target {import export both} <i>rt-value</i> Example: Device(config-evpn-evi) # route-target both 65000:100	(Optional) Configures route targets manually. Note Configure route targets manually if the auto-generated route target values (ASN:EVI or ASN:VNI) are different between the VTEPs.
Step 20	end Example: Device(config-evpn-evi) # end	Returns to privileged EXEC mode.

Configuring an EVPN Instance on the VLAN on a VTEP

To configure an EVPN instance on the VLAN on a VTEP, perform the following steps:

Procedure

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. Enter your password, if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	vlan configuration <i>vlan-id</i> Example: Device(config)# vlan configuration 11	Enters VLAN feature configuration mode for the specified VLAN interface.
Step 4	member evpn-instance <i>evpn-instance-id vni l2-vni-number</i> Example: Device(config-vlan)# member evpn-instance 1 vni 10000	Adds EVPN instance as a member of the VLAN configuration. The VNI here is used as a Layer 2 VNI.
Step 5	end Example: Device(config-vlan) # end	Returns to privileged EXEC mode.

Configuring the Access-Facing Interface in the VLAN on a VTEP

To configure the access-facing interface in the VLAN on a VTEP, perform the following steps:

Procedure

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. Enter your password, if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	interface <i>interface-name</i> Example: Device (config)# interface GigabitEthernet1/0/1	Enters interface configuration mode for the specified interface.
Step 4	switchport access vlan <i>vlan-id</i> Example: Device (config-if)# switchport access vlan 11	Configures the interface as a static-access port of the specified VLAN. Interface can also be configured as a trunk interface, if required.
Step 5	end Example: Device (config-if)# end	Returns to privileged EXEC mode.

Configuring the Loopback Interface on a VTEP

To configure the loopback interface on a VTEP, perform the following steps:

Procedure

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. Enter your password, if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	interface <i>loopback-interface-id</i> Example: Device (config)# interface Loopback0	Enters interface configuration mode for the specified Loopback interface.

	Command or Action	Purpose
Step 4	ip address <i>ipv4-address</i> Example: Device(config-if) # ip address 10.12.11.11	Configures the IP address for the Loopback interface.
Step 5	ip pim sparse mode Example: Device(config-if) # ip pim sparse mode	Enables Protocol Independent Multicast (PIM) sparse mode on the Loopback interface.
Step 6	end Example: Device(config-vlan) # end	Returns to privileged EXEC mode.

Configuring the NVE Interface on a VTEP

To add a VNI member to the NVE interface of a VTEP, perform the following steps:

Procedure

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. Enter your password, if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	interface <i>nve-interface-id</i> Example: Device(config) # interface nve1	Defines the interface to be configured as a trunk, and enters interface configuration mode.
Step 4	no ip address Example: Device(config-if) # no ip address	Disables IP processing on the interface by removing its IP address.
Step 5	source-interface <i>loopback-interface-id</i> Example: Device(config-if) # source-interface loopback0	Sets the IP address of the specified loopback interface as the source IP address.
Step 6	host-reachability protocol bgp Example: Device(config-if) # host-reachability protocol bgp	Configures BGP as the host-reachability protocol on the interface.

	Command or Action	Purpose
Step 7	member vni <i>layer2-vni-id</i> { ingress-replication mcast-group <i>multicast-group-address</i> Example: Device(config-if) # member vni 10000 mcast-group 227.0.0.1	Associates the Layer 2 VNI member with the NVE. The specified replication type must match the replication type that is configured globally or for the specific EVPN instance. Use mcast-group keyword for static replication and ingress-replication keyword for ingress replication.
Step 8	end Example: Device(config-if) # end	Returns to privileged EXEC mode.

Configuring BGP on a VTEP with EVPN Address Family

To configure BGP on a VTEP with EVPN address family and with spine switch as the neighbor, perform the following steps:

Procedure

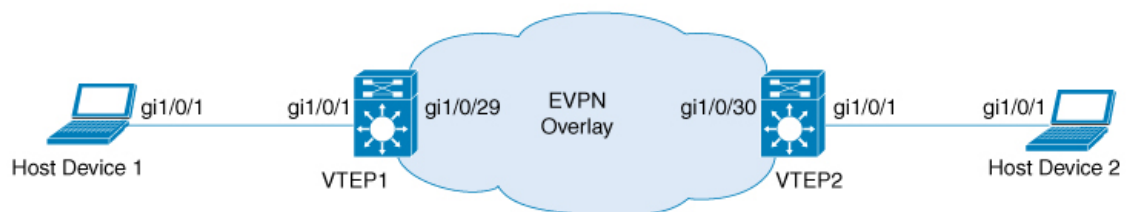
	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. Enter your password, if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	router bgp <i>autonomous-system-number</i> Example: Device(config)# router bgp 1	Enables a BGP routing process, assigns it an autonomous system number, and enters router configuration mode.
Step 4	bgp log-neighbor-changes Example: Device(config-router)# bgp log-neighbor-changes	(Optional) Enables the generation of logging messages when the status of a BGP neighbor changes. For more information, see <i>Configuring BGP</i> module of the <i>IP Routing Configuration Guide</i> .
Step 5	bgp update-delay <i>time-period</i> Example: Device(config-router)# bgp update-delay 1	(Optional) Sets the maximum initial delay period before sending the first update. The range is 1 to 3600 seconds. For more information, see <i>Configuring BGP</i> module of the <i>IP Routing Configuration Guide</i> .

	Command or Action	Purpose
Step 6	bgp graceful-restart Example: Device(config-router)# bgp graceful-restart	(Optional) Enables the BGP graceful restart capability for all BGP neighbors. For more information, see <i>Configuring BGP</i> module of the <i>IP Routing Configuration Guide</i> .
Step 7	no bgp default ipv4-unicast Example: Device(config-router)# no bgp default ipv4-unicast	(Optional) Disables default IPv4 unicast address family for BGP peering session establishment. For more information, see <i>Configuring BGP</i> module of the <i>IP Routing Configuration Guide</i> .
Step 8	neighbor ip-address remote-as number Example: Device(config-router)# neighbor 10.11.11.11 remote-as 1	Defines multiprotocol-BGP neighbors. Under each neighbor, define the Layer 2 Virtual Private Network (L2VPN) EVPN configuration. Use the IP address of the spine switch as the neighbor IP address.
Step 9	neighbor {ip-address group-name} update-source interface Example: Device(config-router)# neighbor 10.11.11.11 update-source Loopback0	Configures update source. Update source can be configured per neighbor or per peer-group. Use the IP address of the spine switch as the neighbor IP address.
Step 10	address-family l2vpn evpn Example: Device(config-router)# address-family l2vpn evpn	Specifies the L2VPN address family and enters address family configuration mode.
Step 11	neighbor ip-address activate Example: Device(config-router-af)# neighbor 10.11.11.11 activate	Enables the exchange information from a BGP neighbor. Use the IP address of the spine switch as the neighbor IP address.
Step 12	neighbor ip-address send-community [both extended standard] Example: Device(config-router-af)# neighbor 10.11.11.11 send-community both	Specifies the communities attribute sent to a BGP neighbor. Use the IP address of the spine switch as the neighbor IP address.
Step 13	exit-address-family Example: Device(config-router-af)# exit-address-family	Exits address family configuration mode and returns to router configuration mode.
Step 14	end Example:	Returns to privileged EXEC mode.

	Command or Action	Purpose
	Device (config-router) # end	

Configuration Examples for EVPN VXLAN Layer 2 Overlay Network

This section provides an example for configuring an EVPN VXLAN Layer 2 overlay network. This example shows a sample configuration for a VXLAN network with 2 VTEPs, VTEP 1 and VTEP 2, connected to perform bridging.



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Table 1: Configuration Example for a VXLAN Network with Two VTEPs Connected to Perform Bridging

VTEP 1	VTEP 2
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VTEP 1	VTEP 2
<pre> VTEP1# show running-config Building configuration... ! hostname VTEP1 ! ip routing ip multicast-routing ! l2vpn evpn replication-type static router-id Loopback0 ! l2vpn evpn instance 1 vlan-based encapsulation vxlan route-target export 103:1 route-target import 104:1 ! system mtu 9150 ! vlan configuration 201 member evpn-instance 1 vni 6000 ! ! interface Loopback0 ip address 10.1.1.10 255.255.255.255 ip pim sparse-mode ! ! interface GigabitEthernet1/0/1 description host1-interface switchport access vlan 201 switchport mode access ! ! interface GigabitEthernet1/0/29 description core-underlay-interface no switchport ip address 172.16.1.29 255.255.255.0 ip pim sparse-mode ! ! interface nve10 no ip address source-interface Loopback0 host-reachability protocol bgp member vni 6000 mcast-group 232.1.1.1 ! router ospf 1 router-id 10.1.1.10 network 10.1.1.0 0.0.0.255 area 0 network 172.16.1.0 0.0.0.255 area 0 ! router bgp 10 bgp router-id interface Loopback0 bgp log-neighbor-changes bgp update-delay 1 no bgp default ipv4-unicast neighbor 10.2.2.20 remote-as 10 neighbor 10.2.2.20 update-source Loopback0 ! address-family ipv4 exit-address-family </pre>	<pre> VTEP2# show running-config Building configuration... ! hostname VTEP2 ! ip routing ip multicast-routing ! l2vpn evpn replication-type static router-id Loopback0 ! l2vpn evpn instance 1 vlan-based encapsulation vxlan route-target export 104:1 route-target import 103:1 ! system mtu 9150 ! vlan configuration 201 member evpn-instance 1 vni 6000 ! ! interface Loopback0 ip address 10.2.2.20 255.255.255.255 ip pim sparse-mode ! ! interface GigabitEthernet1/0/1 description host2-interface switchport access vlan 201 switchport mode access ! ! interface GigabitEthernet1/0/30 description core-underlay-interface no switchport ip address 172.16.1.30 255.255.255.0 ip pim sparse-mode ! ! interface nve10 no ip address source-interface Loopback0 host-reachability protocol bgp member vni 6000 mcast-group 232.1.1.1 ! router ospf 1 router-id 10.2.2.20 network 10.2.2.0 0.0.0.255 area 0 network 172.16.1.0 0.0.0.255 area 0 ! router bgp 10 bgp router-id interface Loopback0 bgp log-neighbor-changes bgp update-delay 1 no bgp default ipv4-unicast neighbor 10.1.1.10 remote-as 10 neighbor 10.1.1.10 update-source Loopback0 ! address-family ipv4 exit-address-family </pre>

VTEP 1	VTEP 2
<pre> ! address-family l2vpn evpn neighbor 10.2.2.20 activate neighbor 10.2.2.20 send-community both exit-address-family ! ip pim rp-address 10.1.1.10 ! end </pre>	<pre> ! address-family l2vpn evpn neighbor 10.1.1.10 activate neighbor 10.1.1.10 send-community both exit-address-family ! ip pim rp-address 10.1.1.10 ! end </pre>

The following examples provide outputs for **show** commands on VTEP 1 and VTEP 2 in the topology configured above.

- [show l2vpn evpn peers vxlan, on page 15](#)
- [show nve peers, on page 15](#)
- [show l2vpn evpn mac, on page 16](#)
- [show bgp l2vpn evpn all, on page 16](#)
- [show platform software fed switch active matm macTable vlan, on page 17](#)

show l2vpn evpn peers vxlan

VTEP 1

This example shows the output for the **show l2vpn evpn peers vxlan** command on VTEP 1:

```

VTEP1# show l2vpn evpn peers vxlan
Interface VNI      Peer-IP              Num routes eVNI      UP time
-----
nve10     6000      10.2.2.20           3          6000     00:12:44

```

VTEP 2

This example shows the output for the **show l2vpn evpn peers vxlan** command on VTEP 2:

```

VTEP2# show l2vpn evpn peers vxlan
Interface VNI      Peer-IP              Num routes eVNI      UP time
-----
nve10     6000      10.1.1.10           3          6000     00:01:41

```

show nve peers

VTEP 1

This example shows the output for the **show nve peers** command on VTEP 1:

```

VTEP1# show nve peers
Interface VNI      Type Peer-IP          RMAC/Num_RTs  eVNI      state flags UP time
-----
nve10     6000      L2CP 10.2.2.20     3           6000     UP   N/A  00:12:48

```

VTEP 2

This example shows the output for the **show nve peers** command on VTEP 2:

```
VTEP2# show nve peers
Interface  VNI      Type Peer-IP          RMAC/Num_RTs  eVNI  state flags UP time
nve10     6000    L2CP 10.1.1.10       3          6000    UP   N/A  00:01:46
```

show l2vpn evpn mac**VTEP 1**

This example shows the output for the **show l2vpn evpn mac** command on VTEP 1:

```
VTEP1# show l2vpn evpn mac
MAC Address  EVI  VLAN  ESI                      Ether Tag  Next Hop(s)
-----
0018.736c.5681 1    201  0000.0000.0000.0000.0000  0          10.2.2.20
0018.736c.56c3 1    201  0000.0000.0000.0000.0000  0          10.2.2.20
0059.dc50.ae01 1    201  0000.0000.0000.0000.0000  0          Gi1/0/1:201
0059.dc50.ae4c 1    201  0000.0000.0000.0000.0000  0          Gi1/0/1:201
```

VTEP 2

This example shows the output for the **show l2vpn evpn mac** command on VTEP 2:

```
VTEP2# show l2vpn evpn mac
MAC Address  EVI  VLAN  ESI                      Ether Tag  Next Hop(s)
-----
0018.736c.5681 1    201  0000.0000.0000.0000.0000  0          Gi1/0/1:201
0018.736c.56c3 1    201  0000.0000.0000.0000.0000  0          Gi1/0/1:201
0059.dc50.ae01 1    201  0000.0000.0000.0000.0000  0          10.1.1.10
0059.dc50.ae4c 1    201  0000.0000.0000.0000.0000  0          10.1.1.10
```

show bgp l2vpn evpn all**VTEP 1**

This example shows the output for the **show bgp l2vpn evpn all** command on VTEP 1:

```
VTEP1# show bgp l2vpn evpn all
BGP table version is 101, local router ID is 10.1.1.10
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
               r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
               x best-external, a additional-path, c RIB-compressed,
               t secondary path, L long-lived-stale,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

      Network          Next Hop          Metric LocPrf Weight Path
Route Distinguisher: 10.1.1.10:1
*>i  [2][10.1.1.10:1][0][48][0018736C5681][0][*]/20
      10.2.2.20          0      100      0 ?
*>i  [2][10.1.1.10:1][0][48][0018736C56C3][0][*]/20
      10.2.2.20          0      100      0 ?
*>i  [2][10.1.1.10:1][0][48][0018736C56C3][32][192.168.1.89]/24
```



```

10.2.2.20          0 100 0 ?
*> [2][10.1.1.10:1][0][48][0059DC50AE01][0][*]/20
      :: 32768 ?
*> [2][10.1.1.10:1][0][48][0059DC50AE4C][0][*]/20
      :: 32768 ?
*> [2][10.1.1.10:1][0][48][0059DC50AE4C][32][192.168.1.81]/24
      :: 32768 ?
Route Distinguisher: 10.2.2.20:1
*>i [2][10.2.2.20:1][0][48][0018736C5681][0][*]/20
      10.2.2.20 0 100 0 ?
*>i [2][10.2.2.20:1][0][48][0018736C56C3][0][*]/20
      10.2.2.20 0 100 0 ?
*>i [2][10.2.2.20:1][0][48][0018736C56C3][32][192.168.1.89]/24
      10.2.2.20 0 100 0 ?

```

VTEP 2

This example shows the output for the **show bgp l2vpn evpn all** command on VTEP 2:

```

VTEP2# show bgp l2vpn evpn all
BGP table version is 99, local router ID is 10.2.2.20
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
               r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
               x best-external, a additional-path, c RIB-compressed,
               t secondary path, L long-lived-stale,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found
      Network          Next Hop          Metric LocPrf Weight Path
Route Distinguisher: 10.1.1.10:1
*>i [2][10.1.1.10:1][0][48][0059DC50AE01][0][*]/20
      10.1.1.10 0 100 0 ?
*>i [2][10.1.1.10:1][0][48][0059DC50AE4C][0][*]/20
      10.1.1.10 0 100 0 ?
*>i [2][10.1.1.10:1][0][48][0059DC50AE4C][32][192.168.1.81]/24
      10.1.1.10 0 100 0 ?
Route Distinguisher: 10.2.2.20:1
*> [2][10.2.2.20:1][0][48][0018736C5681][0][*]/20
      :: 32768 ?
*> [2][10.2.2.20:1][0][48][0018736C56C3][0][*]/20
      :: 32768 ?
*> [2][10.2.2.20:1][0][48][0018736C56C3][32][192.168.1.89]/24
      Network          Next Hop          Metric LocPrf Weight Path
      :: 32768 ?
*>i [2][10.2.2.20:1][0][48][0059DC50AE01][0][*]/20
      10.1.1.10 0 100 0 ?
*>i [2][10.2.2.20:1][0][48][0059DC50AE4C][0][*]/20
      10.1.1.10 0 100 0 ?
*>i [2][10.2.2.20:1][0][48][0059DC50AE4C][32][192.168.1.81]/24
      10.1.1.10 0 100 0 ?

```

show platform software fed switch active matm macTable vlan

VTEP 1

This example shows the output for the **show platform software fed switch active matm mactable vlan** command on VTEP 1:

```

VTEP1# show platform software fed switch active matm macTable vlan 201
VLAN  MAC          Type Seq#  EC_Bi  Flags machandle          siHandle
      riHandle          diHandle          *a_time *e_time  ports

```

```

201 0018.736c.5681 0x1000001 0 0 64 0x7f5d852abaf8 0x7f5d850c1858
    0x7f5d8527def8 0x0 0 0 RLOC 10.2.2.20 adj_id 81

201 0018.736c.56c3 0x1000001 0 0 64 0x7f5d855be2b8 0x7f5d850c1858
    0x7f5d8527def8 0x0 0 0 RLOC 10.2.2.20 adj_id 81

201 0059.dc50.ae01 0x1 22 0 0 0x7f5d855c6388 0x7f5d85035248
    0x0 0x7f5d8517eae8 300 11 GigabitEthernet1/0/1

201 0059.dc50.ae4c 0x1 26 0 0 0x7f5d84fba3c8 0x7f5d85035248
    0x0 0x7f5d8517eae8 300 58 GigabitEthernet1/0/1

```

Total Mac number of addresses:: 4

VTEP 2

This example shows the output for the `show platform software fed switch active matm macTable vlan` command on VTEP 2:

```

VTEP2# show platform software fed switch active matm macTable vlan 201
VLAN  MAC                Type Seq#  EC_Bi  Flags machandle          siHandle
     riHandle                diHandle      *a_time *e_time  ports
-----
201  0018.736c.5681         0x1   38     0      0 0x7f40e196cac8 0x7f40e196cf28
     0x0                   0x7f40e0f6da38      300      12 GigabitEthernet1/0/1

201  0018.736c.56c3         0x1   39     0      0 0x7f40e19b6878 0x7f40e196cf28
     0x0                   0x7f40e0f6da38      300      17 GigabitEthernet1/0/1

201  0059.dc50.ae01         0x1000001 0     0      64 0x7f40e19b88f8 0x7f40e1937b88
     0x7f40e193bd58         0x0           0      17 RLOC 10.1.1.10 adj_id 28

201  0059.dc50.ae4c         0x1000001 0     0      64 0x7f40e194d638 0x7f40e1937b88
     0x7f40e193bd58         0x0           0      17 RLOC 10.1.1.10 adj_id 28

```

Total Mac number of addresses:: 4

Verifying EVPN VXLAN Layer 2 Overlay Network

The following table lists the `show` commands that are used to verify a Layer 2 VXLAN overlay network:

Table 2: Commands to Verify EVPN VXLAN Layer 2 Overlay Network

Command	Purpose
<code>show l2vpn evpn evi [detail]</code>	Displays detailed information for a particular EVPN instance or all EVPN instances.
<code>show l2vpn evpn mac [detail]</code>	Displays the MAC address database for Layer 2 EVPN.
<code>show l2vpn evpn mac ip [detail]</code>	Displays the IP address database for Layer 2 EVPN.

Command	Purpose
show l2vpn evpn summary	Displays a summary of Layer 2 EVPN information.
show l2vpn evpn capabilities	Displays platform capability information for Layer 2 EVPN.
show l2vpn evpn peers	Displays Layer 2 EVPN peer route counts and up time.
show l2vpn evpn route-target	Displays Layer 2 EVPN import route targets.
show l2vpn evpn memory	Displays Layer 2 EVPN memory usage.
show l2route evpn summary	Displays a summary of EVPN routes.
show l2route evpn mac [detail]	Displays MAC address information learnt by the switch in the EVPN control plane.
show l2route evpn mac ip [detail]	Displays MAC and IP address information learnt by the switch in the EVPN control plane.
show l2route evpn imet detail	Displays the IMET route details for Layer 2 EVPN address family. This command shows details only about traffic forwarded using ingress replication.
show bgp l2vpn evpn	Displays BGP information for Layer 2 VPN EVPN address family.
show bgp l2vpn evpn route-type 2	Displays BGP information for route type 2 of L2VPN EVPN address family.
show bgp l2vpn evpn evi context	Displays context information for Layer 2 EVPN instances.
show bgp l2vpn evpn evi <i>evpn-instance-id</i> route-type 3	Displays route type 3 information for the specified Layer 2 EVPN instance. This command shows details only about traffic forwarded using ingress replication.
show l2fib bridge-domain <i>bridge-domain-number</i> detail	Displays detailed information for a Layer 2 forwarding information base bridge domain.
show l2fib bridge-domain <i>bridge-domain-number</i> address unicast	Displays unicast MAC address information for a Layer 2 forwarding information base bridge domain.
show nve vni	Displays information about VXLAN network identifier members associated with an NVE interface.
show nve vni <i>vni-id</i> detail	Displays detailed NVE interface state information for a VXLAN network identifier member.

Command	Purpose
show nve peers	Displays NVE interface state information for peer leaf switches.
show mac address-table vlan <i>vlan-id</i>	Displays MAC addresses for a VLAN.
show platform software fed switch active matm macTable vlan <i>vlan-id</i>	Displays MAC addresses for a VLAN from MAC address table manager database for Forwarding Engine Driver (FED).
show device-tracking database	Displays device tracking database.
show device-tracking database mac	Displays device tracking MAC address database.
show ip mroute	Displays multicast routing table information.