



# Configuring EVPN VXLAN Layer 3 Overlay Network

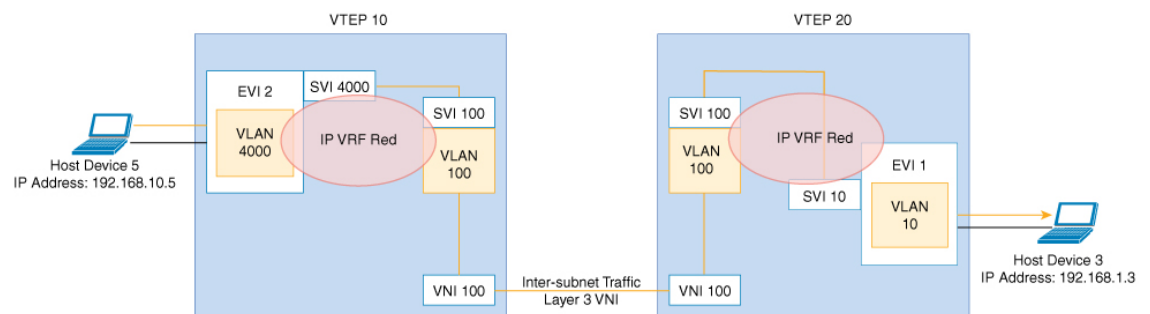
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## Information About EVPN VXLAN Layer 3 Overlay Network

An EVPN VXLAN Layer 3 overlay network allows host devices in different Layer 2 networks to send Layer 3 or routed traffic to each other. The network forwards the routed traffic using a Layer 3 virtual network instance (VNI) and an IP VRF.

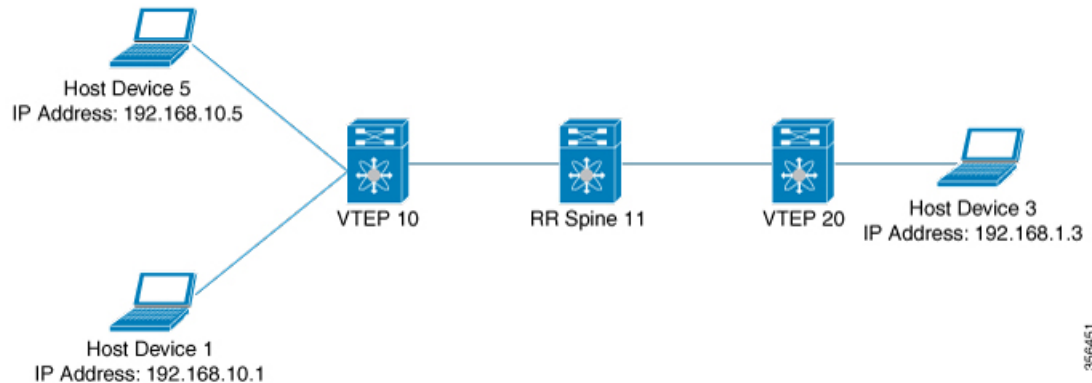
This module provides information only about how to configure a Layer 3 overlay network. You can also configure both Layer 2 and Layer 3 overlay networks together to enable integrated routing and bridging (IRB). For more information about IRB, see *Configuring EVPN VXLAN Integrated Routing and Bridging* module.

The following figure shows the movement of traffic in an EVPN VXLAN Layer 3 overlay network using a Layer 3 VNI:



# How to Configure EVPN VXLAN Layer 3 Overlay Network

The following figure shows a sample topology of an EVPN VXLAN Network. Host device 3 and host device 5 are part of different subnets. The network forwards traffic from host device 1 to host device 3 using a Layer 3 VNI and an IP VRF.



## 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 3 overlay network:

- Configure the IP VRF on the VTEPs.
- Configure the core-facing VLAN on the VTEPs.
- Configure the access-facing VLAN on the VTEPs.
- Configure the switch virtual interface (SVI) for the core-facing VLAN.
- Configure the SVI for the access-facing VLAN.
- Configure the loopback interface on the VTEPs.
- Configure the network virtualization endpoint (NVE) interface on the VTEPs.
- Configure BGP with either IPv4 or IPv6 or both address families on the VTEPs.

## Configuring an IP VRF on a VTEP

To configure an IP VRF on a VTEP, perform the following steps:

### Procedure

	Command or Action	Purpose
Step 1	<code>enable</code>	Enables privileged EXEC mode.

	Command or Action	Purpose
	<b>Example:</b> Device> <b>enable</b>	Enter your password, if prompted.
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Device# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 3</b>	<b>vrf definition</b> <i>vrf-name</i> <b>Example:</b> Device (config)# <b>vrf definition Green</b>	Enters the VRF configuration mode for the specified VRF instance.
<b>Step 4</b>	<b>rd</b> <i>vpn-route-distinguisher</i> <b>Example:</b> Device (config-vrf)# <b>rd 100:1</b>	Specifies the route distinguisher for the VRF instance.
<b>Step 5</b>	<b>address-family ipv4</b> [ <b>multicast</b>   <b>unicast</b> ] <b>Example:</b> Device (config-vrf)# <b>address-family ipv4</b>	Enters the IPv4 address family configuration mode.
<b>Step 6</b>	<b>route-target</b> { <b>export</b>   <b>import</b>   <b>both</b> } <i>route-target-ext-community</i> <b>Example:</b> Device (config-vrf-af)# <b>route-target export 100:1</b> <b>Example:</b> Device (config-vrf-af)# <b>route-target import 100:1</b>	Creates a list of import, export, or both import and export route target communities for the specified VRF.  Enter either an autonomous system number and an arbitrary number (xxx:y), or an IP address and an arbitrary number (A.B.C.D:y).
<b>Step 7</b>	<b>route-target</b> { <b>export</b>   <b>import</b>   <b>both</b> } <i>route-target-ext-community</i> <b>stitching</b> <b>Example:</b> Device (config-vrf-af)# <b>route-target export 100:1 stitching</b> <b>Example:</b> Device (config-vrf-af)# <b>route-target import 100:1 stitching</b>	Configures importing, exporting, or both importing and exporting of EVPN route target communities for the VRF.
<b>Step 8</b>	<b>exit-address-family</b> <b>Example:</b> Device (config-vrf-af)# <b>exit-address-family</b>	Exits VRF address family configuration mode and enters VRF configuration mode.
<b>Step 9</b>	<b>address-family ipv6</b> [ <b>multicast</b>   <b>unicast</b> ] <b>Example:</b> Device (config-vrf)# <b>address-family ipv6</b>	Enters the IPv6 address family configuration mode.

	Command or Action	Purpose
<b>Step 10</b>	<b>route-target {export   import   both}</b> <i>route-target-ext-community</i>  <b>Example:</b> Device (config-vrf-af) # <b>route-target export 100:1</b>  <b>Example:</b> Device (config-vrf-af) # <b>route-target import 100:1</b>	Creates a list of import, export, or both import and export route target communities for the specified VRF.  Enter either an autonomous system number and an arbitrary number (xxx:y), or an IP address and an arbitrary number (A.B.C.D:y).
<b>Step 11</b>	<b>route-target {export   import   both}</b> <i>route-target-ext-community stitching</i>  <b>Example:</b> Device (config-vrf-af) # <b>route-target export 100:1 stitching</b>  <b>Example:</b> Device (config-vrf-af) # <b>route-target import 100:1 stitching</b>	Configures importing, exporting, or both importing and exporting of VXLAN route target communities for the VRF.
<b>Step 12</b>	<b>exit-address-family</b>  <b>Example:</b> Device (config-vrf-af) # <b>exit-address-family</b>	Exits VRF address family configuration mode and enters VRF configuration mode.
<b>Step 13</b>	<b>end</b>  <b>Example:</b> Device (config-vrf) # <b>end</b>	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
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> <b>enable</b>	Enables privileged EXEC mode.  Enter your password, if prompted.
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 3</b>	<b>interface loopback-interface-id</b>  <b>Example:</b>	Enters interface configuration mode for the specified Loopback interface.

	Command or Action	Purpose
	Device(config)# <b>interface Loopback0</b>	
<b>Step 4</b>	<b>ip address</b> <i>ipv4-address</i> <b>Example:</b> Device(config-if)# <b>ip address</b> 10.12.11.11 255.255.255.255	Configures the IP address for the Loopback interface.
<b>Step 5</b>	<b>ip pim sparse mode</b> <b>Example:</b> Device(config-if)# <b>ip pim sparse mode</b>	(Optional) Enables Protocol Independent Multicast (PIM) sparse mode on the Loopback interface.  <b>Note</b> Enable PIM sparse mode only if EVPN VXLAN Layer 2 overlay network is also configured on the VTEP with underlay multicast as the mechanism for forwarding BUM traffic.
<b>Step 6</b>	<b>end</b> <b>Example:</b> Device(config-vlan)# <b>end</b>	Returns to privileged EXEC mode.

## Configuring the Core-facing VLAN on a VTEP

To configure the core-facing VLAN on a VTEP, perform the following steps:

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device> <b>enable</b>	Enables privileged EXEC mode. Enter your password, if prompted.
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Device# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 3</b>	<b>vlan configuration</b> <i>vlan-id</i> <b>Example:</b> Device(config)# <b>vlan configuration</b> 11	Enters VLAN feature configuration mode for the specified VLAN interface.
<b>Step 4</b>	<b>member vni</b> <i>l3-vni-number</i> <b>Example:</b> Device(config-vlan)# <b>member vni</b> 5000	Adds EVPN instance as a member of the VLAN configuration. The VNI here is used as a Layer 3 VNI.

	Command or Action	Purpose
<b>Step 5</b>	<b>end</b>  <b>Example:</b> Device(config-vlan)# <b>end</b>	Returns to privileged EXEC mode.

## Configuring Access-facing VLAN on a VTEP

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

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> <b>enable</b>	Enables privileged EXEC mode. Enter your password, if prompted.
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 3</b>	<b>interface</b> <i>interface-name</i>  <b>Example:</b> Device(config)# <b>interface</b> <b>GigabitEthernet1/0/1</b>	Enters interface configuration mode for the specified interface.
<b>Step 4</b>	<b>switchport access vlan</b> <i>vlan-id</i>  <b>Example:</b> Device(config-if)# <b>switchport access vlan</b> <b>40</b>	Configures the interface as a static-access port of the specified VLAN. Interface can also be configured as a trunk interface, if required.
<b>Step 5</b>	<b>end</b>  <b>Example:</b> Device(config-if)# <b>end</b>	Returns to privileged EXEC mode.

## Configuring Switch Virtual Interface for the Core-facing VLAN

To configure an SVI for the core-facing VLAN on the VTEP:

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b>	Enables privileged EXEC mode. Enter your password, if prompted.

	Command or Action	Purpose
	<code>Device&gt; enable</code>	
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> <code>Device# configure terminal</code>	Enters global configuration mode.
<b>Step 3</b>	<b>interface vlan <i>vlan-id</i></b> <b>Example:</b> <code>Device(config)# interface vlan 11</code>	Enters interface configuration mode for the specified VLAN.
<b>Step 4</b>	<b>vrf forwarding <i>vrf-name</i></b> <b>Example:</b> <code>Device(config-if)# vrf forwarding Green</code>	Configures the SVI for the VLAN.
<b>Step 5</b>	<b>ip unnumbered <i>Loopback-interface</i></b> <b>Example:</b> <code>Device(config-if)# ip unnumbered Loopback0</code>	Enables IP processing on the Loopback interface without assigning an explicit IP address to the interface.
<b>Step 6</b>	<b>no autostate</b> <b>Example:</b> <code>Device(config-if)# no autostate</code>	Disables autostate on the interface.  In EVPN deployments, once a VLAN is used for a core-facing SVI, it should not be allowed in any trunk. For a core-facing SVI to function properly, the <b>no autostate</b> command must be configured under the SVI.
<b>Step 7</b>	<b>end</b> <b>Example:</b> <code>Device(config-if)# end</code>	Returns to privileged EXEC mode.

## Configuring the Switch Virtual Interface for the Access-facing VLANs

To configure the SVI for the access-facing VLAN on a VTEP, perform the following steps:

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> <code>Device&gt; enable</code>	Enables privileged EXEC mode.  Enter your password, if prompted.
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> <code>Device# configure terminal</code>	Enters global configuration mode.

	Command or Action	Purpose
<b>Step 3</b>	<b>interface</b> <i>vlan</i> <i>vlan-id</i> <b>Example:</b> Device(config)# <b>interface</b> <b>vlan</b> <b>40</b>	Enters interface configuration mode for the specified VLAN.
<b>Step 4</b>	<b>vrf forwarding</b> <i>vrf-name</i> <b>Example:</b> Device(config-if)# <b>vrf forwarding</b> <b>Green</b>	Configures the SVI for the VLAN.
<b>Step 5</b>	<b>ip address</b> <i>ip-address</i> <b>Example:</b> Device(config-if)# <b>ip address</b> <b>192.168.10.100 255.255.255.0</b>	Configures the IP address of the SVI.
<b>Step 6</b>	<b>mac-address</b> <i>mac-address-value</i> <b>Example:</b> Device(config-if)# <b>mac-address</b> <b>aabb.cc01.f100</b>	(Optional) Manually sets the MAC address for the VLAN interface.
<b>Step 7</b>	<b>exit</b> <b>Example:</b> Device(config-if)# <b>exit</b>	Returns to global configuration mode.
<b>Step 8</b>	<b>end</b> <b>Example:</b> Device(config-if)# <b>end</b>	Returns to privileged EXEC mode.

## Configuring the NVE Interface on a VTEP

To add a Layer 3 VNI member to the NVE interface on a VTEP, perform the following steps:

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device> <b>enable</b>	Enables privileged EXEC mode. Enter your password, if prompted.
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Device# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 3</b>	<b>interface</b> <i>nve-interface-id</i> <b>Example:</b> Device(config)# <b>interface</b> <b>nve1</b>	Defines the interface to be configured as a trunk, and enters interface configuration mode.



	Command or Action	Purpose
<b>Step 4</b>	<b>no ip address</b> <b>Example:</b> Device(config-if)# <b>no ip address</b>	Disables IP processing on the interface by removing its IP address.
<b>Step 5</b>	<b>source-interface loopback-interface-id</b> <b>Example:</b> Device(config-if)# <b>source-interface loopback0</b>	Sets the IP address of the specified loopback interface as the source IP address.
<b>Step 6</b>	<b>host-reachability protocol bgp</b> <b>Example:</b> Device(config-if)# <b>host-reachability protocol bgp</b>	Configures BGP as the host-reachability protocol on the interface.
<b>Step 7</b>	<b>member vni vni-id vrf vrf-name</b> <b>Example:</b> Device(config-if)# <b>member vni 5000 vrf Green</b>	Associates the Layer 3 VNI id with the NVE interface. <b>Note</b> The Layer 3 VNI id must match with the VNI id configured in the core VLAN on the VTEP.
<b>Step 8</b>	<b>end</b> <b>Example:</b> Device(config-if)# <b>end</b>	Returns to privileged EXEC mode.

## Configuring BGP with IPv4 or IPv6 or Both Address Families on VTEP

To configure BGP on a VTEP with IPv4 or IPv6 or both address families and a spine switch as the neighbor, perform the following steps:

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device> <b>enable</b>	Enables privileged EXEC mode. Enter your password, if prompted.
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Device# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 3</b>	<b>router bgp autonomous-system-number</b> <b>Example:</b> Device(config)# <b>router bgp 1</b>	Enables a BGP routing process, assigns it an autonomous system number, and enters router configuration mode.

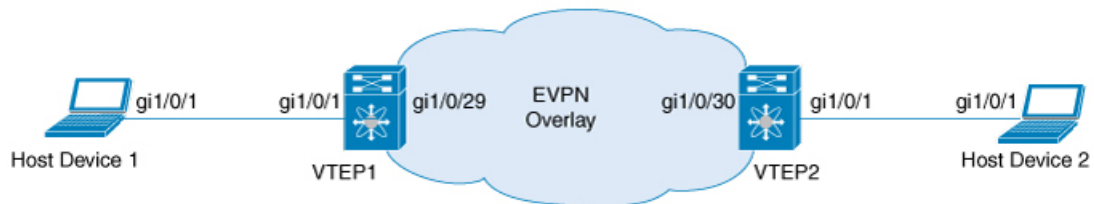
	Command or Action	Purpose
Step 4	<b>bgp log-neighbor-changes</b> <b>Example:</b> Device(config-router)# <b>bgp log-neighbor-changes</b>	(Optional) Enables the generation of logging messages when the status of a BGP neighbor changes.  For more information, see <i>Configuring BGP</i> module of the <i>IP Routing Configuration Guide</i> .
Step 5	<b>bgp update-delay time-period</b> <b>Example:</b> Device(config-router)# <b>bgp update-delay 1</b>	(Optional) Sets the maximum initial delay period before sending the first update.  For more information, see <i>Configuring BGP</i> module of the <i>IP Routing Configuration Guide</i> .
Step 6	<b>bgp graceful-restart</b> <b>Example:</b> Device(config-router)# <b>bgp graceful-restart</b>	(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	<b>no bgp default ipv4-unicast</b> <b>Example:</b> Device(config-router)# <b>no bgp default ipv4-unicast</b>	(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	<b>neighbor ip-address remote-as number</b> <b>Example:</b> Device(config-router)# <b>neighbor 10.11.11.11 remote-as 1</b>	Defines multiprotocol-BGP neighbors. Under each neighbor, define the configuration.  Use the IP address of the spine switch as the neighbor IP address.
Step 9	<b>neighbor {ip-address   group-name} update-source interface</b> <b>Example:</b> Device(config-router)# <b>neighbor 10.11.11.11 update-source Loopback0</b>	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	<b>address-family l2vpn evpn</b> <b>Example:</b> Device(config-router)# <b>address-family l2vpn evpn</b>	Specifies the L2VPN address family and enters address family configuration mode.
Step 11	<b>neighbor ip-address activate</b> <b>Example:</b> Device(config-router-af)# <b>neighbor 10.11.11.11 activate</b>	Enables the exchange information from a BGP neighbor.  Use the IP address of the spine switch as the neighbor IP address.
Step 12	<b>neighbor ip-address send-community [both   extended   standard]</b> <b>Example:</b>	Specifies the communities attribute sent to a BGP neighbor.  Use the IP address of the spine switch as the neighbor IP address.

	Command or Action	Purpose
	Device(config-router-af) # <b>neighbor</b> 10.11.11.11 <b>send-community both</b>	
<b>Step 13</b>	<b>exit-address-family</b>  <b>Example:</b> Device(config-router-af) # <b>exit-address-family</b>	Exits address family configuration mode and returns to router configuration mode.
<b>Step 14</b>	<b>address-family ipv4 vrf vrf-name</b>  <b>Example:</b> Device(config-router) # <b>address-family</b> <b>ipv4 vrf Green</b>	Specifies the IPv4 address family and enters address family configuration mode.
<b>Step 15</b>	<b>advertise l2vpn evpn</b>  <b>Example:</b> Device(config-router-af) # <b>advertise</b> <b>l2vpn evpn</b>	Advertises Layer 2 VPN EVPN routes within a tenant VRF in an EVPN VXLAN fabric.
<b>Step 16</b>	<b>redistribute connected</b>  <b>Example:</b> Device(config-router-af) # <b>redistribute</b> <b>connected</b>	(Optional) Redistributes connected routes to BGP.
<b>Step 17</b>	<b>redistribute static</b>  <b>Example:</b> Device(config-router-af) # <b>redistribute</b> <b>static</b>	(Optional) Redistributes static routes to BGP.
<b>Step 18</b>	<b>exit-address-family</b>  <b>Example:</b> Device(config-router-af) # <b>exit-address-family</b>	Exits address family configuration mode and returns to router configuration mode.
<b>Step 19</b>	<b>address-family ipv6 vrf vrf-name</b>  <b>Example:</b> Device(config-router) # <b>address-family</b> <b>ipv6 vrf green</b>	Specifies the IPv6 address family and enters address family configuration mode.
<b>Step 20</b>	<b>advertise l2vpn evpn</b>  <b>Example:</b> Device(config-router-af) # <b>advertise</b> <b>l2vpn evpn</b>	Advertises Layer 2 VPN EVPN routes within a tenant VRF in an EVPN VXLAN fabric.
<b>Step 21</b>	<b>redistribute connected</b>  <b>Example:</b> Device(config-router-af) # <b>redistribute</b> <b>connected</b>	(Optional) Redistributes connected routes to BGP.

	Command or Action	Purpose
<b>Step 22</b>	<b>redistribute static</b>  <b>Example:</b> Device (config-router-af) # <b>redistribute static</b>	(Optional) Redistributes static routes to BGP.
<b>Step 23</b>	<b>exit-address-family</b>  <b>Example:</b> Device (config-router-af) # <b>exit-address-family</b>	Exits address family configuration mode and returns to router configuration mode.
<b>Step 24</b>	<b>end</b>  <b>Example:</b> Device (config-router) # <b>end</b>	Returns to privileged EXEC mode.

## Configuration Examples for EVPN VXLAN Layer 3 Overlay Network

This section provides an example for configuring an EVPN VXLAN Layer 3 overlay network. This example shows a sample configuration for a VXLAN network with 2 VTEPs, VTEP 1 and VTEP 2, connected to perform routing.



**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.

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

VTEP 1	VTEP 2
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VTEP 1	VTEP 2
<pre> VTEP1# show running-config ! hostname VTEP1 ! ! vrf definition green  rd 103:2  !  address-family ipv4   route-target export 103:2   route-target import 104:2   route-target export 103:2 stitching   route-target import 104:2 stitching  exit-address-family !  address-family ipv6   route-target export 103:2   route-target import 104:2   route-target export 103:2 stitching   route-target import 104:2 stitching  exit-address-family ! ip multicast-routing ipv6 unicast-routing ! ! system mtu 9150 ! vlan configuration 200  member vni 5000 ! ! interface Loopback0  ip address 10.1.1.10 255.255.255.255  ip pim sparse-mode ! interface Loopback13  description demo only (for rt5 distribution)  vrf forwarding green  ip address 10.1.13.13 255.255.255.0 ! interface GigabitEthernet1/0/1  description access 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 Vlan200  description core svi for l3vni  vrf forwarding green  ip unnumbered Loopback0  ipv6 enable  no autostate ! interface Vlan201 </pre>	<pre> VTEP2# show running-config ! hostname VTEP2 ! ! vrf definition green  rd 104:2  !  address-family ipv4   route-target export 104:2   route-target import 103:2   route-target export 104:2 stitching   route-target import 103:2 stitching  exit-address-family !  address-family ipv6   route-target export 104:2   route-target import 103:2   route-target export 104:2 stitching   route-target import 103:2 stitching  exit-address-family ! ip multicast-routing ipv6 unicast-routing ! ! system mtu 9150 ! vlan configuration 200  member vni 5000 ! ! interface Loopback0  ip address 10.2.2.20 255.255.255.255  ip pim sparse-mode ! interface Loopback14  description demo only (for rt5 distribution)  vrf forwarding green  ip address 10.1.14.14 255.255.255.0 ! interface GigabitEthernet1/0/1  description access interface  switchport access vlan 202  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 Vlan200  description core svi for l3vni  vrf forwarding green  ip unnumbered Loopback0  ipv6 enable  no autostate ! interface Vlan202 </pre>

VTEP 1	VTEP 2
<pre> description access-svi vrf forwarding green ip address 192.168.1.201 255.255.255.0 ipv6 address 2001:DB8:201::201/64 ipv6 enable ! interface nve10 no ip address source-interface Loopback0 host-reachability protocol bgp member vni 5000 vrf green ! 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 ! address-family l2vpn evpn neighbor 10.2.2.20 activate neighbor 10.2.2.20 send-community both exit-address-family ! address-family ipv4 vrf green advertise l2vpn evpn redistribute connected redistribute static exit-address-family ! address-family ipv6 vrf green redistribute connected redistribute static advertise l2vpn evpn exit-address-family ! ip pim rp-address 10.1.1.10 ! ! end </pre>	<pre> description access-svi vrf forwarding green ip address 192.168.2.202 255.255.255.0 ipv6 address 2001:DB8:202::202/64 ipv6 enable ! interface nve10 no ip address source-interface Loopback0 host-reachability protocol bgp member vni 5000 vrf green ! 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 ! address-family l2vpn evpn neighbor 10.1.1.10 activate neighbor 10.1.1.10 send-community both exit-address-family ! address-family ipv4 vrf green advertise l2vpn evpn redistribute connected redistribute static exit-address-family ! address-family ipv6 vrf green redistribute connected redistribute static advertise l2vpn evpn 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 nve peers, on page 16](#)
- [show bgp l2vpn evpn all, on page 16](#)
- [show ip route vrf, on page 17](#)
- [show platform software fed switch active matm mactable vlan, on page 18](#)

**show nve peers****VTEP 1**

The following 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    5000    L3CP 10.2.2.20      380e.4d9b.6a4a 5000    UP  A/M/4 00:38:37
nve10    5000    L3CP 10.2.2.20      380e.4d9b.6a4a 5000    UP  A/-/6 00:03:16
```

**VTEP 2**

The following 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    5000    L3CP 10.1.1.10      a0f8.4910.bce2 5000    UP  A/-/4 00:38:53
nve10    5000    L3CP 10.1.1.10      a0f8.4910.bce2 5000    UP  A/M/6 00:38:53
```

**show bgp l2vpn evpn all****VTEP 1**

The following 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 26, 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: 103:2 (default for vrf green)
*> [5][103:2][0][24][10.1.13.0]/17
      0.0.0.0          0          32768 ?
*> [5][103:2][0][24][192.168.1.0]/17
      0.0.0.0          0          32768 ?
*> [5][103:2][0][64][2001:DB8:201::]/29
      ::              0          32768 ?
Route Distinguisher: 104:2
*>i [5][104:2][0][24][10.1.14.0]/17
      10.2.2.20        0    100    0 ?
*>i [5][104:2][0][24][192.168.2.0]/17
      10.2.2.20        0    100    0 ?
*>i [5][104:2][0][64][2001:DB8:202::]/29
      10.2.2.20        0    100    0 ?
```

**VTEP 2**

The following 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 12, 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: 103:2
 *>i  [5][103:2][0][24][10.1.13.0]/17
                10.1.1.10                0    100    0 ?
 *>i  [5][103:2][0][24][192.168.1.0]/17
                10.1.1.10                0    100    0 ?
 *>i  [5][103:2][0][64][2001:DB8:201::]/29
                10.1.1.10                0    100    0 ?
Route Distinguisher: 104:2 (default for vrf green)
 *>   [5][104:2][0][24][10.1.14.0]/17
                0.0.0.0                    0          32768 ?
 *>   [5][104:2][0][24][192.168.2.0]/17
                0.0.0.0                    0          32768 ?
 *>   [5][104:2][0][64][2001:DB8:202::]/29
      Network          Next Hop          Metric LocPrf Weight Path
      ::                ::                0          32768 ?

```

## show ip route vrf

### VTEP 1

The following example shows the output for the **show ip route vrf** command on VTEP 1:

```

VTEP1# show ip route vrf green
Routing Table: green
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, m - OMP
       n - NAT, Ni - NAT inside, No - NAT outside, Nd - NAT DIA
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       H - NHRP, G - NHRP registered, g - NHRP registration summary
       o - ODR, P - periodic downloaded static route, l - LISP
       a - application route
       + - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

      10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
C       10.1.13.0/24 is directly connected, Loopback13
L       10.1.13.13/32 is directly connected, Loopback13
B       10.1.14.0/24 [200/0] via 10.2.2.20, 00:42:01, Vlan200
      192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/24 is directly connected, Vlan201
L       192.168.1.201/32 is directly connected, Vlan201
B       192.168.2.0/24 [200/0] via 10.2.2.20, 00:06:00, Vlan200

```

### VTEP 2

The following example shows the output for the **show ip route vrf** command on VTEP 2:

```

VTEP2# show ip route vrf green
Routing Table: green
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2, m - OMP
        n - NAT, Ni - NAT inside, No - NAT outside, Nd - NAT DIA
        i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
        ia - IS-IS inter area, * - candidate default, U - per-user static route
        H - NHRP, G - NHRP registered, g - NHRP registration summary
        o - ODR, P - periodic downloaded static route, l - LISP
        a - application route
        + - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

    10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
B       10.1.13.0/24 [200/0] via 10.1.1.10, 00:42:38, Vlan200
C       10.1.14.0/24 is directly connected, Loopback14
L       10.1.14.14/32 is directly connected, Loopback14
B       192.168.1.0/24 [200/0] via 10.1.1.10, 00:42:38, Vlan200
        192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.2.0/24 is directly connected, Vlan202
L       192.168.2.202/32 is directly connected, Vlan202

```

### show platform software fed switch active matm mactable vlan

#### VTEP 1

The following example shows the output for the **show platform software fed switch active matm mactable vlan 200** command on VTEP 1:



**Note** The MAC address of the peer's core SVI interface must be present in the core VLAN.

```

VTEP1# show platform software fed switch active matm macTable vlan 200
VLAN  MAC                               Type Seq#  EC_Bi  Flags machandle      siHandle
      riHandle                           diHandle *a_time *e_time  ports
-----
200   a0f8.4910.bce2                         0x8002   0 19880   64 0x7f5d8503fd48      0x7f5d852b6d28
      0x0                                 0x5234   0      0      0      0 Vlan200
200   380e.4d9b.6a4a                         0x1000001 0      0      64 0x7f5d85117598      0x7f5d85110f78
      0x7f5d851b9648                       0x0      0      0      0      0 RLOC 10.2.2.20 adj_id 22

```

Total Mac number of addresses:: 2

#### VTEP 2

The following example shows the output for the **show platform software fed switch active matm mactable vlan 200** command on VTEP 2:



**Note** The MAC address of the peer's core SVI interface must be present in the core VLAN.

```
VTEP2# show platform software fed switch active matm macTable vlan 200
VLAN   MAC                               Type  Seq#  EC_Bi  Flags  machandle          siHandle
      riHandle                       diHandle                *a_time  *e_time  ports

-----
200    380e.4d9b.6a4a                    0x8002  0  42949  64  0x7f40e15fd308    0x7f40e15f49d8
      0x0                               0x0                                0          0  vlan200

200    a0f8.4910.bce2                    0x1000001  0    0    64  0x7f40e193c478    0x7f40e1938168
      0x7f40e1937bf8                    0x0                                0          0  RLOC 10.1.1.10 adj_id 86

Total Mac number of addresses:: 2
```

## Verifying EVPN VXLAN Layer 3 Overlay Network

The following table lists the **show** commands that are used to verify a Layer 3 VXLAN overlay network:

**Table 2: Commands to Verify EVPN VXLAN Layer 3 Overlay Network**

Command	Purpose
<b>show nve vni</b>	Displays information about VXLAN network identifier members associated with an NVE interface.
<b>show nve vni vni-id detail</b>	Displays detailed NVE interface state information for a VXLAN network identifier member.
<b>show nve peers</b>	Displays NVE interface state information for peer leaf switches.
<b>show mac address-table vlan vlan-id</b>	Displays MAC addresses for a VLAN.
<b>show platform software fed switch active matm macTable vlan vlan-id</b>	Displays MAC addresses for a VLAN from MAC address table manager database for Forwarding Engine Driver (FED).
<b>show ip route vrf vrf-name</b>	Displays the IP routing table associated with a specific VRF.
<b>show ip cef vrf vrf-name</b>	Displays entries in the Cisco Express Forwarding (CEF) table associated with a VRF.
<b>show arp vrf vrf-name</b>	Displays entries in the Address Resolution Protocol (ARP) table associated with a VRF.
<b>show bgp l2vpn evpn route-type 5</b>	Displays BGP information for route type 5 of Layer 2 VPN EVPN address family.

Command	Purpose
<b>show bgp l2vpn evpn all</b>	Displays all BGP information for L2VPN EVPN address family.