Configuring Private VLANs in a BGP EVPN VXLAN Fabric

Restrictions for Private VLANs in a BGP EVPN VXLAN Fabric

Configuration of Private VLANs in a BGP EVPN VXLAN fabric must be done in the following order:

1. Configure VLAN with primary and secondary associations.
2. Enable EVPN separately in each of the primary, community, and isolated VLANs.

   For more information, see Configuring an EVPN Instance on the VLAN on a VTEP.

If there's an EVPN configuration already associated with a VLAN, you can't directly configure the PVLAN associations for this VLAN. First disassociate the EVPN configuration from the VLAN. Next, configure the PVLAN association. Then reconfigure EVPN in each of the newly configured primary, community, and isolated VLANs.

Information About Private VLANs in a BGP EVPN VXLAN Fabric

A private VLAN (PVLAN) divides a regular VLAN into logical partitions, allowing limited broadcast boundaries among selected port-groups on a single Layer 2 Ethernet switch. The single Ethernet switch's PVLAN capabilities can be extended over the BGP EVPN VXLAN enabled network to build partitioned bridge-domain between port-groups across multiple Ethernet switches in the BGP EVPN VXLAN VTEP mode. The integration of PVLAN with a BGP EVPN VXLAN network enables the following benefits:

- Microsegmented Layer 2 network segregation across one or more BGP EVPN VXLAN switches.
- Partitioned and secured user-group Layer 2 network that limits the communication with dynamic or static port configuration assignments.
- IP subnet pool conservation across BGP EVPN VXLAN network while extending segregated Layer 2 network across the fabric.

- Conservation of Layer 2 overlay tunnels and peer networks with a single virtual network identifier (VNI) mapped to Primary VLAN.

Primary and Secondary VLANs

Each subdomain in a PVLAN is represented by a pair of VLANs: a primary VLAN and a secondary VLAN. A PVLAN can have multiple VLAN pairs, one pair for each subdomain. All VLAN pairs in a PVLAN share the same primary VLAN. The secondary VLAN ID differentiates one subdomain from another. A secondary VLAN can either be an isolated VLAN or a community VLAN. Primary and secondary VLANs have the following characteristics:

- Primary VLAN: A PVLAN has only one primary VLAN. Every port in a PVLAN is a member of the primary VLAN. The primary VLAN carries unidirectional traffic downstream from the promiscuous ports to the host (isolated and community) ports and to other promiscuous ports.
- Isolated VLAN: A PVLAN has only one isolated VLAN. An isolated VLAN is a secondary VLAN that carries unidirectional traffic upstream from the hosts towards the promiscuous ports and the gateway.
- Community VLAN: A community VLAN is a secondary VLAN that carries upstream traffic from the community ports to the promiscuous port gateways and to other host ports in the same community. You can configure multiple community VLANs in a PVLAN.

Private VLAN Ports

PVLAN ports are access ports that are one of these types:

- Promiscuous: A promiscuous port belongs to the primary VLAN. It can communicate with all interfaces, including the community and isolated host ports that belong to the secondary VLANs associated with the primary VLAN.
- Isolated: An isolated port is a host port that belongs to an isolated secondary VLAN. It has complete Layer 2 separation from other ports within the same PVLAN, except for the promiscuous ports. PVLANs block all traffic to isolated ports except traffic from promiscuous ports. Likewise, PVLANs forward the traffic from an isolated port only to promiscuous ports.
- Community: A community port is a host port that belongs to a community secondary VLAN. Community ports communicate with other ports in the same community VLAN and with promiscuous ports. Community ports are isolated at Layer 2 from all other interfaces in external communities and also from isolated ports within their private VLAN.

For more information about PVLANs and the steps to configure PVLANs, see "Configuring Private VLANs" module in the ***VLAN Configuration Guide*** for the applicable release.

Extension of Private VLANs in a BGP EVPN VXLAN Fabric

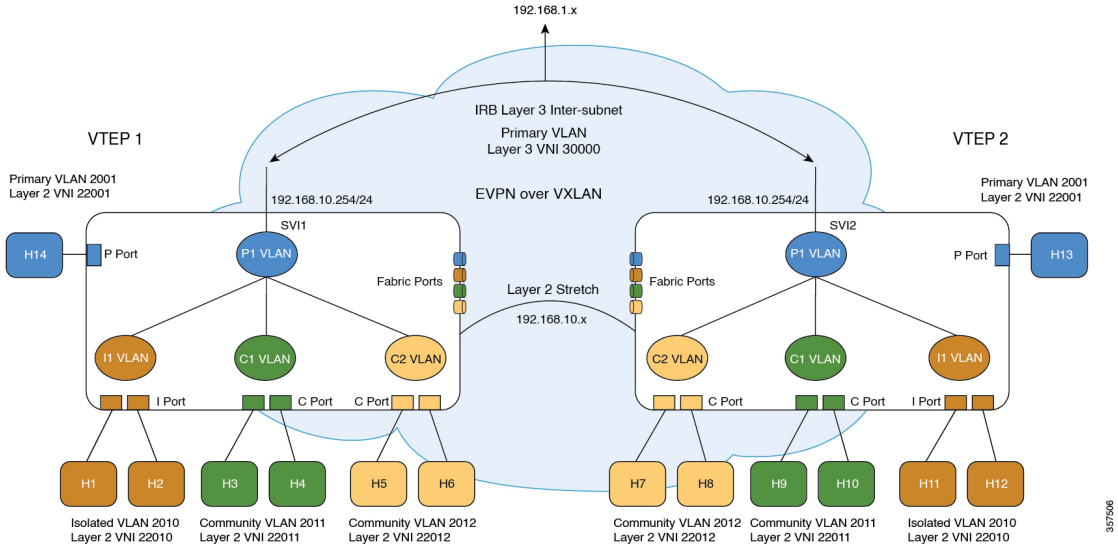
Private VLANs (PVLANs) partition a regular VLAN domain into subdomains and provide Layer 2 isolation between ports within the same PVLAN. Like a regular VLAN, a private VLAN can span multiple Layer 2 switches. In a private VLAN that spans across multiple devices, traffic from an isolated port in Switch A does not reach an isolated port on Switch B. This is achieved by the trunk port carrying the primary VLAN and secondary VLANs to neighboring switches with dot1q tag in a traditional Layer 2 network. With BGP EVPN VXLAN enabled in the PVLANs on the VTEPs, the L2VNI segment preserves the PVLAN semantics and

provides the Layer 2 isolation for the stretched PVLAN segment across the VTEPs in the overlay fabric. PVLAN extension with BGP EVPN VXLAN allows you to:

- Seamlessly migrate and join (or stretch) the PVLAN domain like any regular VLAN.
- Access to centralized common services such as printer or DHCP through the promiscuous port on any VTEP in the EVPN overlay.
- Maintain community and isolated VLAN semantics in the overlay fabric across all the VTEPs. The EVPN fabric provides a logical single switch view for the respective Layer 2 domain.

The following image shows PVLAN extension in a BGP EVPN VXLAN fabric with two VTEPs:

Figure 1: PVLAN Extension in a BGP EVPN VXLAN Fabric



Traffic Forwarding for Private VLANs in a BGP EVPN VXLAN Fabric

You can forward known unicast and broadcast, unknown unicast, and multicast (BUM) traffic between PVLANs in a BGP EVPN VXLAN fabric. On the Source VTEP, the forwarding process on the access PVLAN ports (promiscuous, isolated, community) adheres to the baseline PVLAN forwarding. With BGP EVPN VXLAN enabled in the PVLAN domain, the remote host routes are learned and programmed in the hardware of the respective PVLANs. The following sections illustrate the forwarding scenarios for unicast and BUM traffic between local and remote hosts for each of the secondary VLANs.

Known Unicast Traffic Forwarding

The sending VTEP bridges a known unicast packet with the corresponding secondary VLAN's virtual network identifier (VNI) ID. The packet arrives on the receiving VTEP. After decapsulation, receiving VTEP processes the packet in the same way as a packet from a local PVLAN host port. The packet gets mapped to the respective community, isolated, or primary VLAN.

The following images illustrate the known unicast traffic forwarding scenarios for PVLANs in a BGP EVPN VXLAN fabric:

Figure 2: Unicast Traffic from Promiscuous Port : H14 to H8

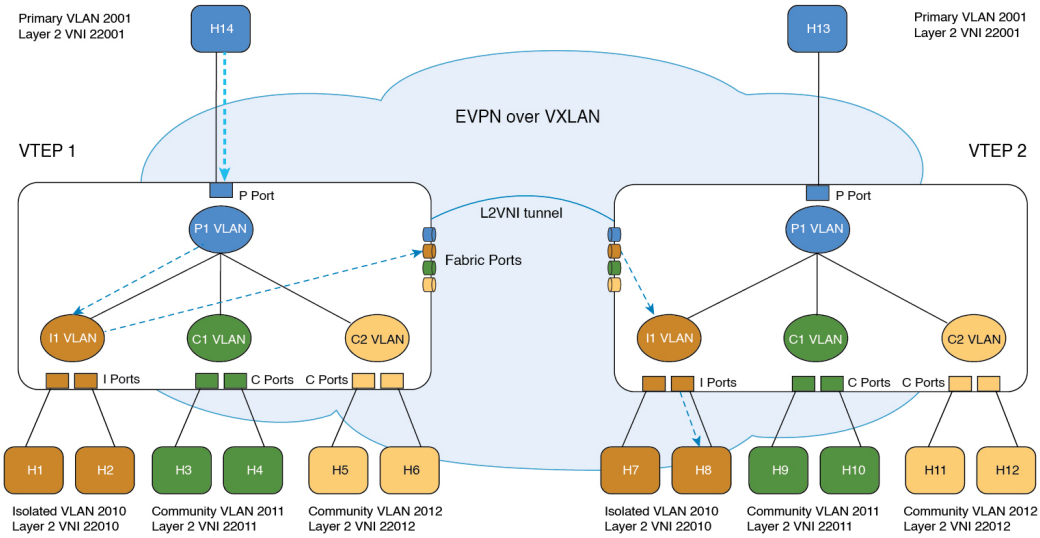


Figure 3: Unicast Traffic from Isolated Port: H1 to H13

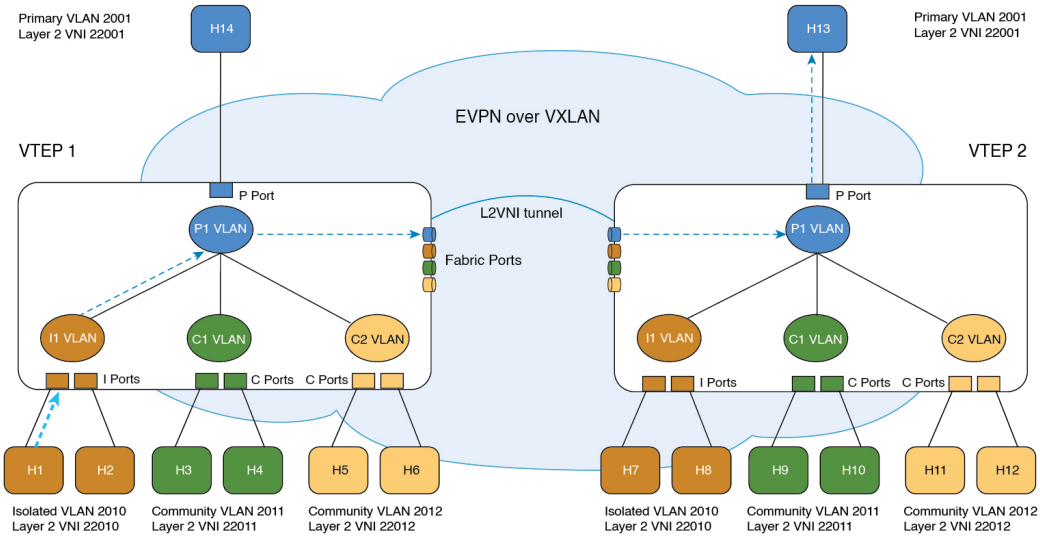
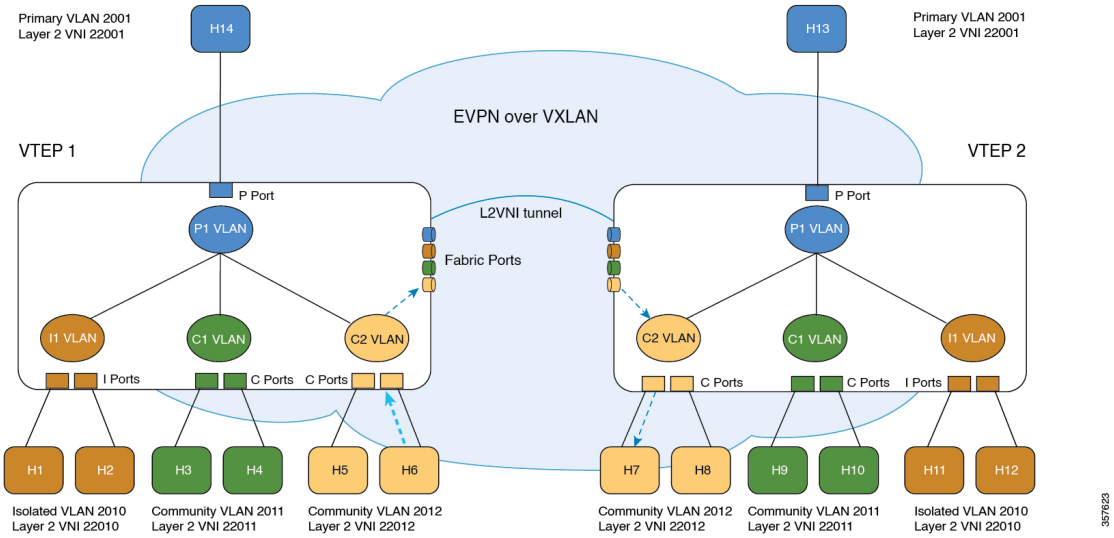


Figure 4: Unicast Traffic from Community Port: H6 to H7



Broadcast, Unknown Unicast, and Multicast Traffic Forwarding

In a regular VLAN, broadcasts are forwarded to all ports in that VLAN. Private VLAN broadcast forwarding depends on the port sending the broadcast:

- An isolated port sends a broadcast only to the promiscuous ports or trunk ports.
- A community port sends a broadcast to all promiscuous ports, trunk ports, and ports in the same community VLAN.
- A promiscuous port sends a broadcast to all ports in the private VLAN (other promiscuous ports, trunk ports, isolated ports, and community ports).

In addition to the above, a copy of the flood packet is sent to the remote VTEPs with the respective L2VNI. (See BUM traffic handling in the L2VNI). On the remote VTEP, the flood copy is again replicated towards the access as per the PVLAN broadcast rules mentioned above. Flood packets received from the fabric are not sent back to fabric with split-horizon check.

During forwarding, if a packet's MAC address isn't available in the lookup, the VTEP replicates the packet with the VNI ID of the forwarding (or incoming) VLAN. The VTEP forwards the BUM packets with the VNI ID of the corresponding VLAN. The receiving VTEP decapsulates the BUM packet and maps the VNI ID to the corresponding secondary VLAN. This mapping ensures that the flood rules remain local. The VTEP then processes the packet in the same way as a packet from a local host port.

For isolated VLANs, after the destination MAC address lookup results in an unknown unicast from the source port, it's not locally known whether the destination MAC address belongs to the remote isolated VLAN host or the remote primary VLAN host. Hence, the BUM packet copy is allowed to go the egress VTEPs with the isolated VLAN VNI ID. On egress VTEPs, this BUM copy gets flooded on local isolated ports and local promiscuous ports. As a result, BUM traffic from remote isolated ports to local isolated ports is unavoidable.

Note Forwarding of unknown unicast traffic from an isolated port to a remote promiscuous port isn't supported.

The following images illustrate the BUM traffic forwarding scenarios for PVLANs in a BGP EVPN VXLAN fabric:

Figure 5: BUM Traffic from Promiscuous Port (H14)

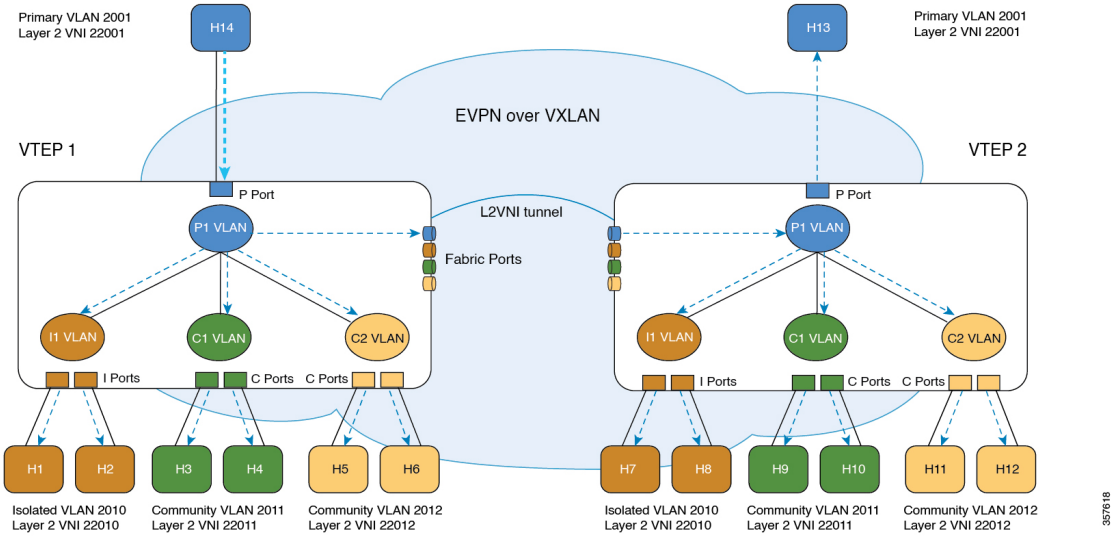


Figure 6: BUM Traffic from Isolated Port (H1)

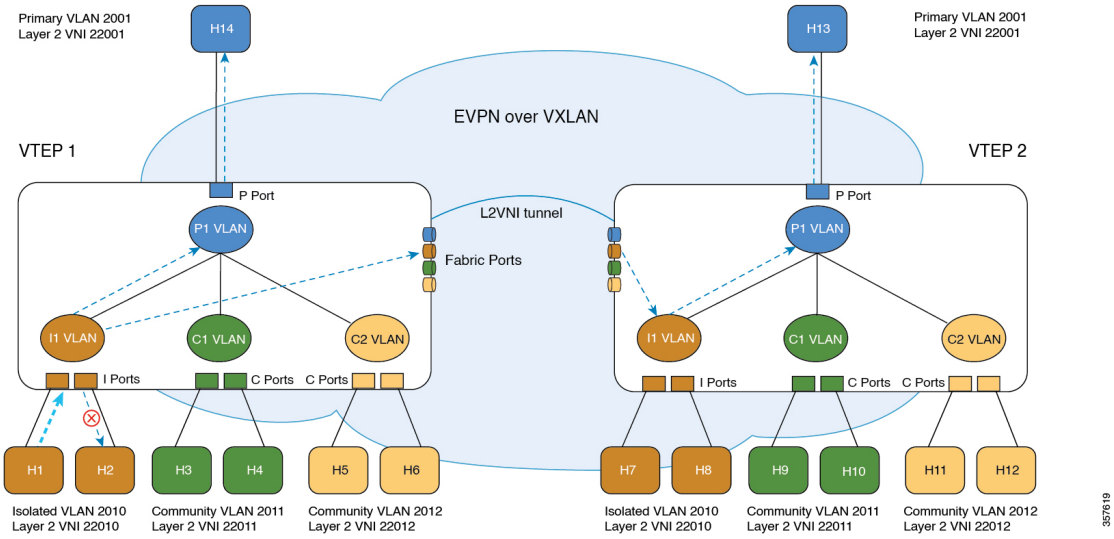
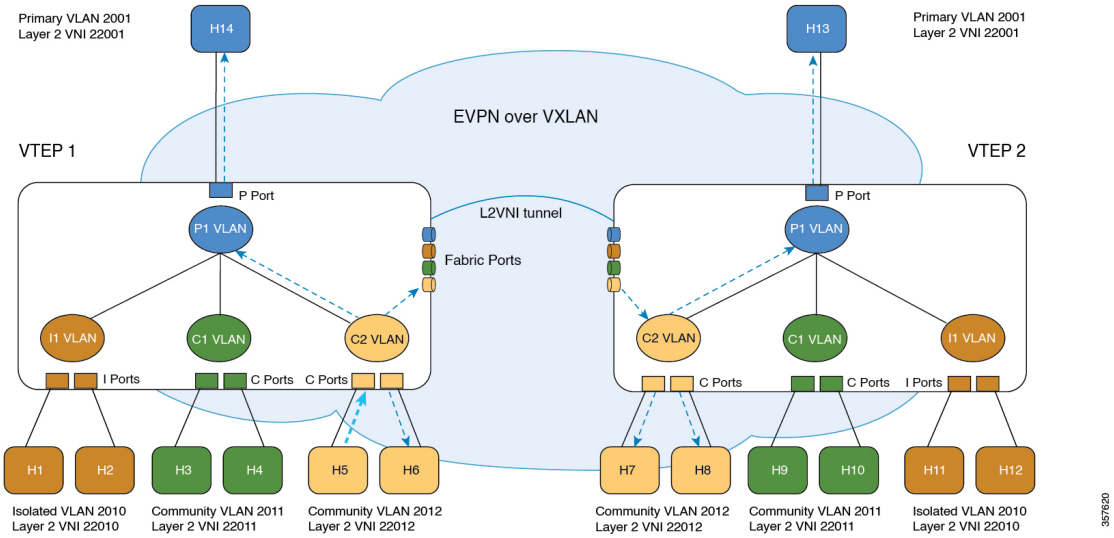


Figure 7: BUM Traffic from Community Port (H5)



Routed Traffic Forwarding

Routed traffic between the hosts in a microsegmented VLAN is through the associated Primary VLAN SVI on the Local VTEP (For more information, see "Configuring Private VLANs" module in the *VLAN Configuration Guide* for the applicable release). When the source and destination hosts are across the EVPN VXLAN fabric, the routed traffic between the microsegmented VLAN hosts follows the Symmetric Integrated Routing and Bridging (IRB) method to cross the fabric (For more information, see Configuring EVPN VXLAN Integrated Routing and Bridging). On the destination VTEP, traffic is routed from the core VLAN SVI to the associated Primary VLAN SVI interface and then bridged in the microsegmented local destination Secondary VLAN.

How to Configure Private VLANs in a BGP EVPN VXLAN Fabric

When you configure PVLANs in a BGP EVPN VXLAN fabric, the existing PVLAN configuration is preserved and the Layer 2 VNI configuration is added to the PVLAN. By adding the Layer 2 VNI configuration, you expand the PVLAN and stretch it over the fabric across the VTEPs in the fabric.

In a BGP EVPN VXLAN fabric, the EVPN control plane distributes the MAC and MAC-IP routes. In addition, PVLANs handle BUM and unicast traffic forwarding differently compared to regular VLANs. Due to these two reasons, you can create and delete PVLANs strictly in the following ways:

- To create a PVLAN, first configure the VLAN with primary and secondary associations. Next, enable EVPN separately in each of the primary, community, and isolated VLANs.

Note If there's an EVPN configuration already associated with a VLAN, you can't directly configure the PVLAN associations for this VLAN. First, use the **member vni** command in VLAN configuration mode to disassociate the EVPN configuration from the VLAN. Next, configure the PVLAN association. Now reconfigure EVPN in each of the newly configured primary, community, and isolated VLANs.

- To delete a PVLAN, ensure that you unconfigure EVPN in the respective VLAN before you modify the PVLAN configuration.

Configuring the Primary and Secondary VLANs for a Private VLAN

To configure the primary and secondary VLANs for a private VLAN, perform the following steps:

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enters privileged EXEC mode. Enter password, if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**vlan** *vlan-id* **Example:** `Device(config)# vlan 101`	Enters VLAN configuration mode for the specified VLAN ID.

Step 4	**private-vlan** {**association** [**add** | **remove**] *secondary-vlan-list* | **community** | **isolated** | **primary**}
	Example:
	`Device(config-vlan)# private-vlan primary`
	`Device(config-vlan)# private-vlan association 102`
		Configures the VLAN as a PVLAN and configures the association between primary and secondary VLANs.
		Use the **primary** keyword to configure the VLAN as a PVLAN.
		Use the **community** keyword to designate the VLAN as a community VLAN.
		Use the **isolated** keyword to designate the VLAN as an isolated VLAN.
		Use the **association** [**add** | **remove**] keyword to add or remove the association between a primary and secondary VLAN.

	Command or Action	Purpose
Step 5	**exit** **Example:** `Device(config-vlan)# exit`	Exits VLAN configuration mode and returns to global configuration mode.
Step 6	Repeat steps 3 to 5 for each primary and secondary VLAN, as needed.	--
Step 7	**end** **Example:** `Device(config)# end`	Exits global configuration mode and enters privileged EXEC mode.

Configuring the Port of a Private VLAN

To configure a port of a PVLAN, perform the following steps:

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enters privileged EXEC mode. Enter password, if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**interface** *interface-id* **Example:** `Device(config)# interface GigabitEthernet1/0/1`	Enters interface configuration mode for the specified interface ID.
Step 4	**switchport mode private-vlan** {**host** | **promiscuous**} **Example:** `Device(config-if)# switchport mode private-vlan host`	Configures the interface as either a host PVLAN port or a promiscuous PVLAN port.
Step 5	**switchport private-vlan** {**host-association** | **mapping** *primary-vlan-id secondary-vlan-id-list*	Associates a PVLAN host port or maps a PVLAN promiscuous port to a primary VLAN.

	Command or Action	Purpose
	Example: `Device(config-if)# switchport private-vlan host-association 101 104`	**Note** If you configure a port as a PVLAN host port and you do not configure a valid PVLAN association with the **switchport private-vlan host-association** command, the interface becomes inactive. **Note** If you configure a port as a PVLAN promiscuous port and you do not configure a valid PVLAN mapping with the **switchport private-vlan mapping** command, the interface becomes inactive.
Step 6	**end** **Example:** `Device(config-if)# end`	Exits interface configuration mode and enters privileged EXEC mode.

Enabling EVPN in a Private VLAN

To enable EVPN in a PVLAN, perform the following steps:

Note Enable EVPN separately in each of the primary, community, and isolated VLANs.

Procedure

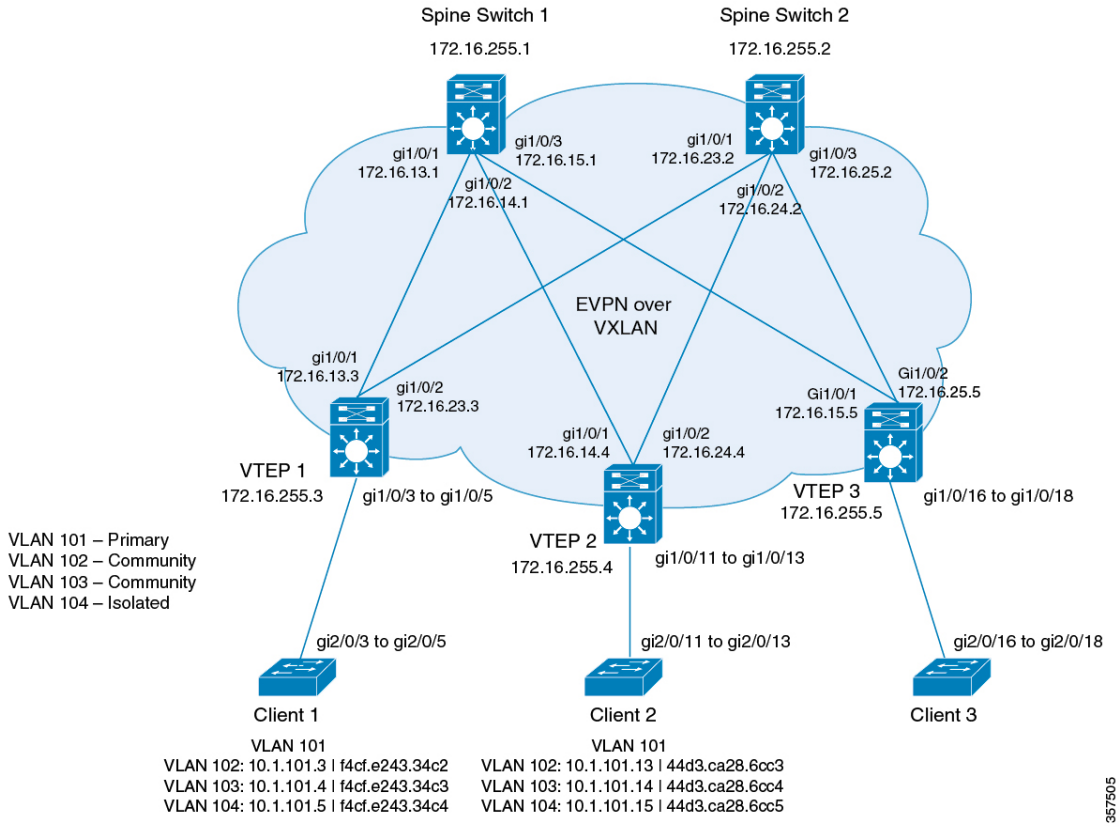
	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enters privileged EXEC mode. Enter password, if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**vlan configuration** *vlan-id* **Example:** `Device(config)# vlan configuration 101`	Enters VLAN configuration mode for the specified PVLAN interface.
Step 4	**member evpn-instance** *evpn-instance-id* **vni** *layer2-vni-id*	Adds EVPN instance as a member of the PVLAN configuration.

	Command or Action	Purpose
	Example: `Device(config-vlan)# member evpn-instance 1 vni 6000`	The VNI here is used as a Layer 2 VNI.
Step 5	**end** **Example:** `Device(config-vlan)# end`	Exits VLAN configuration mode and enters privileged EXEC mode.

Configuration Examples for Private VLANs in a BGP EVPN VXLAN Fabric

This section provides a configuration example for PVLANs in a BGP EVPN VXLAN fabric using the following topology:

Figure 8: Private VLANs in a BGP EVPN VXLAN Fabric



The topology shows an EVPN VXLAN network with two spine switches (Spine Switch 1 and Spine Switch 2) and three VTEPs (VTEP 1, VTEP 2, and VTEP 3). The network has an extended PVLAN with VLAN 101 as the primary VLAN. VLAN 102, VLAN 103, and VLAN 104 are the secondary VLANs. The following tables provide the sample configurations for the devices in this topology:

Table 1: Configuring VTEP 1, VTEP 2, and VTEP 3 for PVLAN Extension in a BGP EVPN VXLAN Fabric

VTEP 1	VTEP 2	VTEP 3
Leaf-01# **show running-config** hostname Leaf-01 ! vrf definition green rd 1:1 ! address-family ipv4 route-target export 1:1 route-target import 1:1 route-target export 1:1 stitching route-target import 1:1 stitching exit-address-family ! address-family ipv6 route-target export 1:1 route-target import 1:1 route-target export 1:1 stitching route-target import 1:1 stitching exit-address-family ! ip routing ! ip multicast-routing ! vtp mode transparent ! l2vpn evpn replication-type static default-gateway advertise ! l2vpn evpn instance 101 vlan-based encapsulation vxlan ! l2vpn evpn instance 102 vlan-based encapsulation vxlan ! l2vpn evpn instance 103 vlan-based encapsulation vxlan ! l2vpn evpn instance 104 vlan-based encapsulation vxlan ! l2vpn evpn instance 201 vlan-based encapsulation vxlan ! l2vpn evpn instance 202 vlan-based encapsulation vxlan	Leaf-02# **show running-config** hostname Leaf-02 ! vrf definition green rd 1:1 ! address-family ipv4 route-target export 1:1 route-target import 1:1 route-target export 1:1 stitching route-target import 1:1 stitching exit-address-family ! address-family ipv6 route-target export 1:1 route-target import 1:1 route-target export 1:1 stitching route-target import 1:1 stitching exit-address-family ! ip routing ! ip multicast-routing ! vtp mode transparent ! l2vpn evpn replication-type static default-gateway advertise ! l2vpn evpn instance 101 vlan-based encapsulation vxlan ! l2vpn evpn instance 102 vlan-based encapsulation vxlan ! l2vpn evpn instance 103 vlan-based encapsulation vxlan ! l2vpn evpn instance 104 vlan-based encapsulation vxlan ! l2vpn evpn instance 201 vlan-based encapsulation vxlan ! l2vpn evpn instance 202 vlan-based encapsulation vxlan	Leaf-03# **show running-config** hostname Leaf-03 ! vrf definition green rd 1:1 ! address-family ipv4 route-target export 1:1 route-target import 1:1 route-target export 1:1 stitching route-target import 1:1 stitching exit-address-family ! address-family ipv6 route-target export 1:1 route-target import 1:1 route-target export 1:1 stitching route-target import 1:1 stitching exit-address-family ! ip routing ! ip multicast-routing ! vtp mode transparent ! l2vpn evpn replication-type static default-gateway advertise ! l2vpn evpn instance 101 vlan-based encapsulation vxlan ! l2vpn evpn instance 102 vlan-based encapsulation vxlan ! l2vpn evpn instance 103 vlan-based encapsulation vxlan ! l2vpn evpn instance 104 vlan-based encapsulation vxlan ! l2vpn evpn instance 201 vlan-based encapsulation vxlan ! l2vpn evpn instance 202 vlan-based encapsulation vxlan

VTEP 1	VTEP 2	VTEP 3
!	!	!
l2vpn evpn instance 203	l2vpn evpn instance 203	l2vpn evpn instance 203
vlan-based	vlan-based	vlan-based
encapsulation vxlan	encapsulation vxlan	encapsulation vxlan
!	!	!
l2vpn evpn instance 204	l2vpn evpn instance 204	l2vpn evpn instance 204
vlan-based	vlan-based	vlan-based
encapsulation vxlan	encapsulation vxlan	encapsulation vxlan
!	!	!
system mtu 9198	system mtu 9198	system mtu 9198
!	!	!
vlan configuration 101	vlan configuration 101	vlan configuration 101
member evpn-instance 101 vni	member evpn-instance 101 vni	member evpn-instance 101 vni
10101	10101	10101
vlan configuration 102	vlan configuration 102	vlan configuration 102
member evpn-instance 102 vni	member evpn-instance 102 vni	member evpn-instance 102 vni
10102	10102	10102
vlan configuration 103	vlan configuration 103	vlan configuration 103
member evpn-instance 103 vni	member evpn-instance 103 vni	member evpn-instance 103 vni
10103	10103	10103
vlan configuration 104	vlan configuration 104	vlan configuration 104
member evpn-instance 104 vni	member evpn-instance 104 vni	member evpn-instance 104 vni
10104	10104	10104
vlan configuration 201	vlan configuration 201	vlan configuration 201
member evpn-instance 201 vni	member evpn-instance 201 vni	member evpn-instance 201 vni
10201	10201	10201
vlan configuration 202	vlan configuration 202	vlan configuration 202
member evpn-instance 202 vni	member evpn-instance 202 vni	member evpn-instance 202 vni
10202	10202	10202
vlan configuration 203	vlan configuration 203	vlan configuration 203
member evpn-instance 203 vni	member evpn-instance 203 vni	member evpn-instance 203 vni
10203	10203	10203
vlan configuration 204	vlan configuration 204	vlan configuration 204
member evpn-instance 204 vni	member evpn-instance 204 vni	member evpn-instance 204 vni
10204	10204	10204
vlan configuration 901	vlan configuration 901	vlan configuration 901
member vni 50901	member vni 50901	member vni 50901
!	!	!
vlan 101	vlan 101	vlan 101
private-vlan primary	private-vlan primary	private-vlan primary
private-vlan association	private-vlan association	private-vlan association
102-104	102-104	102-104
!	!	!
vlan 102	vlan 102	vlan 102
private-vlan community	private-vlan community	private-vlan community
!	!	!
vlan 103	vlan 103	vlan 103
private-vlan community	private-vlan community	private-vlan community
!	!	!
vlan 104	vlan 104	vlan 104
private-vlan isolated	private-vlan isolated	private-vlan isolated
!	!	!
vlan 201	vlan 201	vlan 201
private-vlan primary	private-vlan primary	private-vlan primary
private-vlan association	private-vlan association	private-vlan association
202-204	202-204	202-204
!	!	!
vlan 202	vlan 202	vlan 202
private-vlan community	private-vlan community	private-vlan community
!	!	!

VTEP 1	VTEP 2	VTEP 3
vlan 203 private-vlan community ! vlan 204 private-vlan isolated ! vlan 901 ! interface Loopback0 ip address 172.16.255.3 255.255.255.255 ip pim sparse-mode ip ospf 1 area 0 ! interface Loopback1 ip address 172.16.254.3 255.255.255.255 ip pim sparse-mode ip ospf 1 area 0 ! interface GigabitEthernet1/0/1 no switchport ip address 172.16.13.3 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 ! interface GigabitEthernet1/0/2 no switchport ip address 172.16.23.3 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 ! interface GigabitEthernet1/0/3 switchport access vlan 102 switchport private-vlan host-association 101 102 switchport mode private-vlan host spanning-tree portfast ! interface GigabitEthernet1/0/4 switchport access vlan 103 switchport private-vlan host-association 101 103 switchport mode private-vlan host spanning-tree portfast !	vlan 203 private-vlan community ! vlan 204 private-vlan isolated ! vlan 901 ! interface Loopback0 ip address 172.16.255.4 255.255.255.255 ip pim sparse-mode ip ospf 1 area 0 ! interface Loopback1 ip address 172.16.254.4 255.255.255.255 ip pim sparse-mode ip ospf 1 area 0 ! interface GigabitEthernet1/0/1 no switchport ip address 172.16.14.4 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 ! interface GigabitEthernet1/0/2 no switchport ip address 172.16.24.4 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 ! interface GigabitEthernet1/0/11 switchport access vlan 102 switchport private-vlan host-association 101 102 switchport mode private-vlan host spanning-tree portfast ! interface GigabitEthernet1/0/12 switchport access vlan 103 switchport private-vlan host-association 101 103 switchport mode private-vlan host spanning-tree portfast !	vlan 203 private-vlan community ! vlan 204 private-vlan isolated ! vlan 901 ! interface Loopback0 ip address 172.16.255.5 255.255.255.255 ip pim sparse-mode ip ospf 1 area 0 ! interface Loopback1 ip address 172.16.254.5 255.255.255.255 ip pim sparse-mode ip ospf 1 area 0 ! interface GigabitEthernet0/0 vrf forwarding Mgmt-vrf ip address 10.62.149.183 255.255.255.0 negotiation auto ! interface GigabitEthernet1/0/1 no switchport ip address 172.16.15.5 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 ! interface GigabitEthernet1/0/2 no switchport ip address 172.16.25.5 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 ! interface GigabitEthernet1/0/16 switchport access vlan 202 switchport private-vlan host-association 201 202 switchport mode private-vlan host spanning-tree portfast !

VTEP 1	VTEP 2	VTEP 3
interface GigabitEthernet1/0/5 switchport access vlan 104 switchport private-vlan host-association 101 104 switchport mode private-vlan host spanning-tree portfast ! interface Vlan101 vrf forwarding green ip address 10.1.101.1 255.255.255.0 private-vlan mapping 102-104 ! interface Vlan201 vrf forwarding green ip address 10.1.201.1 255.255.255.0 private-vlan mapping 202-204 ! interface Vlan901 vrf forwarding green ip unnumbered Loopback1 ipv6 enable no autostate ! interface nve1 no ip address source-interface Loopback1 host-reachability protocol bgp member vni 10101 mcast-group 225.1.1.1 member vni 10102 mcast-group 225.1.1.1 member vni 10103 mcast-group 225.1.1.1 member vni 10104 mcast-group 225.1.1.1 member vni 10201 mcast-group 225.1.1.1 member vni 10202 mcast-group 225.1.1.1 member vni 10203 mcast-group 225.1.1.1 member vni 10204 mcast-group 225.1.1.1 member vni 50901 vrf green ! router ospf 1 router-id 172.16.255.3 !	interface GigabitEthernet1/0/13 switchport access vlan 104 switchport private-vlan host-association 101 104 switchport mode private-vlan host spanning-tree portfast ! interface Vlan101 vrf forwarding green ip address 10.1.101.1 255.255.255.0 private-vlan mapping 102-104 ! interface Vlan201 vrf forwarding green ip address 10.1.201.1 255.255.255.0 private-vlan mapping 202-204 ! interface Vlan901 vrf forwarding green ip unnumbered Loopback1 ipv6 enable no autostate ! interface nve1 no ip address source-interface Loopback1 host-reachability protocol bgp member vni 10101 mcast-group 225.1.1.1 member vni 10102 mcast-group 225.1.1.1 member vni 10103 mcast-group 225.1.1.1 member vni 10104 mcast-group 225.1.1.1 member vni 10201 mcast-group 225.1.1.1 member vni 10202 mcast-group 225.1.1.1 member vni 10203 mcast-group 225.1.1.1 member vni 10204 mcast-group 225.1.1.1 member vni 50901 vrf green ! router ospf 1 router-id 172.16.255.4 !	interface GigabitEthernet1/0/17 switchport access vlan 203 switchport private-vlan host-association 201 203 switchport mode private-vlan host spanning-tree portfast ! interface GigabitEthernet1/0/18 switchport access vlan 204 switchport private-vlan host-association 201 204 switchport mode private-vlan host spanning-tree portfast ! interface Vlan101 vrf forwarding green ip address 10.1.101.1 255.255.255.0 private-vlan mapping 102-104 ! interface Vlan201 vrf forwarding green ip address 10.1.201.1 255.255.255.0 private-vlan mapping 202-204 ! interface Vlan901 vrf forwarding green ip unnumbered Loopback1 ipv6 enable no autostate ! interface nve1 no ip address source-interface Loopback1 host-reachability protocol bgp member vni 10101 mcast-group 225.1.1.1 member vni 10102 mcast-group 225.1.1.1 member vni 10103 mcast-group 225.1.1.1 member vni 10104 mcast-group 225.1.1.1 member vni 10201 mcast-group 225.1.1.1 member vni 10202 mcast-group 225.1.1.1 member vni 10203 mcast-group 225.1.1.1 member vni 10204 mcast-group 225.1.1.1 member vni 50901 vrf green !

VTEP 1	VTEP 2	VTEP 3
router bgp 65001 bgp log-neighbor-changes no bgp default ipv4-unicast neighbor 172.16.255.1 remote-as 65001 neighbor 172.16.255.1 update-source Loopback0 neighbor 172.16.255.2 remote-as 65001 neighbor 172.16.255.2 update-source Loopback0 ! address-family ipv4 exit-address-family ! address-family l2vpn evpn neighbor 172.16.255.1 activate neighbor 172.16.255.1 send-community both neighbor 172.16.255.2 activate neighbor 172.16.255.2 send-community both exit-address-family ! address-family ipv4 vrf green advertise l2vpn evpn redistribute connected redistribute static exit-address-family ! ip pim rp-address 172.16.255.255 ! end Leaf-01#	router bgp 65001 bgp log-neighbor-changes no bgp default ipv4-unicast neighbor 172.16.255.1 remote-as 65001 neighbor 172.16.255.1 update-source Loopback0 neighbor 172.16.255.2 remote-as 65001 neighbor 172.16.255.2 update-source Loopback0 ! address-family ipv4 exit-address-family ! address-family l2vpn evpn neighbor 172.16.255.1 activate neighbor 172.16.255.1 send-community both neighbor 172.16.255.2 activate neighbor 172.16.255.2 send-community both exit-address-family ! address-family ipv4 vrf green advertise l2vpn evpn redistribute connected redistribute static exit-address-family ! ip pim rp-address 172.16.255.255 ! end Leaf-02#	router ospf 1 router-id 172.16.255.5 ! router bgp 65001 bgp log-neighbor-changes no bgp default ipv4-unicast neighbor 172.16.255.1 remote-as 65001 neighbor 172.16.255.1 update-source Loopback0 neighbor 172.16.255.2 remote-as 65001 neighbor 172.16.255.2 update-source Loopback0 ! address-family ipv4 exit-address-family ! address-family l2vpn evpn neighbor 172.16.255.1 activate neighbor 172.16.255.1 send-community both neighbor 172.16.255.2 activate neighbor 172.16.255.2 send-community both exit-address-family ! address-family ipv4 vrf green advertise l2vpn evpn redistribute connected redistribute static exit-address-family ! ip pim rp-address 172.16.255.255 ! end Leaf-03#

Table 2: Configuring Spine Switch 1 and Spine Switch 2 for PVLAN Extension in a BGP EVPN VXLAN Fabric

Spine Switch 1	Spine Switch 2
Spine-01# **show running-config** hostname Spine-01 ! ip routing ! ip multicast-routing ! system mtu 9198 ! interface Loopback0 ip address 172.16.255.1 255.255.255.255 ip ospf 1 area 0 ! interface Loopback1 ip address 172.16.254.1 255.255.255.255 ip ospf 1 area 0 ! interface Loopback2 ip address 172.16.255.255 255.255.255.255 ip pim sparse-mode ip ospf 1 area 0 ! interface GigabitEthernet1/0/1 no switchport ip address 172.16.13.1 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 ! interface GigabitEthernet1/0/2 no switchport ip address 172.16.14.1 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 ! interface GigabitEthernet1/0/3 no switchport ip address 172.16.15.1 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 ! router ospf 1 router-id 172.16.255.1 ! router bgp 65001 bgp router-id 172.16.255.1 bgp log-neighbor-changes no bgp default ipv4-unicast neighbor 172.16.255.2 remote-as 65001 neighbor 172.16.255.2 update-source Loopback0 neighbor 172.16.255.3 remote-as 65001 neighbor 172.16.255.3 update-source Loopback0 neighbor 172.16.255.4 remote-as 65001 neighbor 172.16.255.4 update-source Loopback0 neighbor 172.16.255.5 remote-as 65001 neighbor 172.16.255.5 update-source Loopback0 !	Spine-02# **show running-config** hostname Spine-02 ! ip routing ! ip multicast-routing ! system mtu 9198 ! interface Loopback0 ip address 172.16.255.2 255.255.255.255 ip ospf 1 area 0 ! interface Loopback1 ip address 172.16.254.2 255.255.255.255 ip ospf 1 area 0 ! interface Loopback2 ip address 172.16.255.255 255.255.255.255 ip pim sparse-mode ip ospf 1 area 0 ! interface GigabitEthernet1/0/1 no switchport ip address 172.16.23.2 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 ! interface GigabitEthernet1/0/2 no switchport ip address 172.16.24.2 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 ! interface GigabitEthernet1/0/3 no switchport ip address 172.16.25.2 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 ! router ospf 1 router-id 172.16.255.2 ! router bgp 65001 bgp router-id 172.16.255.2 bgp log-neighbor-changes no bgp default ipv4-unicast neighbor 172.16.255.1 remote-as 65001 neighbor 172.16.255.1 update-source Loopback0 neighbor 172.16.255.3 remote-as 65001 neighbor 172.16.255.3 update-source Loopback0 neighbor 172.16.255.4 remote-as 65001 neighbor 172.16.255.4 update-source Loopback0 neighbor 172.16.255.5 remote-as 65001 neighbor 172.16.255.5 update-source Loopback0 !

Spine Switch 1	Spine Switch 2
address-family ipv4 exit-address-family ! address-family l2vpn evpn neighbor 172.16.255.2 activate neighbor 172.16.255.2 send-community both neighbor 172.16.255.2 route-reflector-client neighbor 172.16.255.3 activate neighbor 172.16.255.3 send-community both neighbor 172.16.255.3 route-reflector-client neighbor 172.16.255.4 activate neighbor 172.16.255.4 send-community both neighbor 172.16.255.4 route-reflector-client neighbor 172.16.255.5 activate neighbor 172.16.255.5 send-community both neighbor 172.16.255.5 route-reflector-client exit-address-family ! ip pim rp-address 172.16.255.255 ip msdp peer 172.16.254.2 connect-source Loopback1 remote-as 65001 ip msdp cache-sa-state ! end Spine-01#	address-family ipv4 exit-address-family ! address-family l2vpn evpn neighbor 172.16.255.1 activate neighbor 172.16.255.1 send-community both neighbor 172.16.255.1 route-reflector-client neighbor 172.16.255.3 activate neighbor 172.16.255.3 send-community both neighbor 172.16.255.3 route-reflector-client neighbor 172.16.255.4 activate neighbor 172.16.255.4 send-community both neighbor 172.16.255.4 route-reflector-client neighbor 172.16.255.5 activate neighbor 172.16.255.5 send-community both neighbor 172.16.255.5 route-reflector-client exit-address-family ! ip pim rp-address 172.16.255.255 ip msdp peer 172.16.254.1 connect-source Loopback1 remote-as 65001 ip msdp cache-sa-state ! end Spine-02#

Verifying PVLAN Extension in a BGP EVPN VXLAN Fabric

The following sections provide sample outputs for **show** commands to verify the PVLAN extension on the devices in the topology configured above:

- #unique_196 unique_196_Connect_42_section_ad2_bfg_dqb
- #unique_196 unique_196_Connect_42_section_b4h_bfg_dqb
- #unique_196 unique_196_Connect_42_section_p1l_bfg_dqb
- #unique_196 unique_196_Connect_42_section_cl4_bfg_dqb
- #unique_196 unique_196_Connect_42_section_mbs_bfg_dqb

Outputs to Verify the Configuration on VTEP 1

The following example shows the output for the **show vlan private-vlan** command on VTEP 1:

```
Leaf-01# show vlan private-vlan

Primary Secondary Type              Ports
------- --------- ----------------- ------------------------------------------
101     102       community         Gi1/0/3
101     103       community         Gi1/0/4
101     104       isolated          Gi1/0/5
201     202       community
201     203       community
201     204       isolated

Leaf-01#
```

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

```
Leaf-01# show ip arp vrf green
Protocol  Address          Age (min)  Hardware Addr   Type   Interface
Internet  10.1.101.1             -   10b3.d56a.8fc1  ARPA   Vlan101
Internet  10.1.101.3            95   f4cf.e243.34c2  ARPA   Vlan101 pv 102
Internet  10.1.101.4            95   f4cf.e243.34c3  ARPA   Vlan101 pv 103
Internet  10.1.101.5            95   f4cf.e243.34c4  ARPA   Vlan101 pv 104
Internet  10.1.201.1             -   10b3.d56a.8fcc  ARPA   Vlan201
Internet  172.16.254.3           -   10b3.d56a.8fc8  ARPA   Vlan901

Leaf-01#
```

The following example shows the output for the **show mac address-table vlan** *vlan-id* command on VTEP 1:

```
Leaf-01# show mac address-table vlan 101
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----
 101    10b3.d56a.8fc1    STATIC      Vl101
 101    7c21.0dbd.9541    STATIC      Vl101
 101    f4cf.e243.34c2    DYNAMIC pv  Gi1/0/3
 101    f4cf.e243.34c3    DYNAMIC pv  Gi1/0/4
 101    f4cf.e243.34c4    DYNAMIC pv  Gi1/0/5
Total Mac Addresses for this criterion: 5

Leaf-01#
```

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

```
Leaf-01# show l2vpn evpn peers vxlan

Interface VNI      Peer-IP                 Num routes eVNI     UP time
--------- -------- ----------------------  ---------- -------- --------
nve1      10101    172.16.254.4            8          10101    01:33:29
nve1      10102    172.16.254.4            1          10102    01:33:29
nve1      10103    172.16.254.4            1          10103    01:33:29
nve1      10104    172.16.254.4            1          10104    00:01:37

Leaf-01#
```

The following example shows the output for the **show nve peer** command on VTEP 1:

```
Leaf-01# show nve peer
Interface  VNI      Type Peer-IP          RMAC/Num_RTs   eVNI     state flags UP time
nve1       50901    L3CP 172.16.254.5     7c21.0dbd.2748 50901      UP  A/M/4 01:33:30
nve1       50901    L3CP 172.16.254.4     7c21.0dbd.9548 50901      UP  A/M/4 01:33:29
nve1       10101    L2CP 172.16.254.4     8              10101      UP   N/A  01:33:29
nve1       10102    L2CP 172.16.254.4     1              10102      UP   N/A  01:33:29
nve1       10103    L2CP 172.16.254.4     1              10103      UP   N/A  01:33:29
nve1       10104    L2CP 172.16.254.4     1              10104      UP   N/A  00:01:37

Leaf-01#
```

The following example shows the output for the **show l2vpn evpn mac local** command on VTEP 1:

```
Leaf-01# show l2vpn evpn mac local
MAC Address    EVI   VLAN  ESI                          Ether Tag  Next Hop(s)
-------------- ----- ----- ------------------------- ---------- ---------------
f4cf.e243.34c2 101   101   0000.0000.0000.0000.0000 0          Gi1/0/3:101
f4cf.e243.34c3 101   101   0000.0000.0000.0000.0000 0          Gi1/0/4:101
f4cf.e243.34c4 101   101   0000.0000.0000.0000.0000 0          Gi1/0/5:101
f4cf.e243.34c2 102   102   0000.0000.0000.0000.0000 0          Gi1/0/3:102
f4cf.e243.34c3 103   103   0000.0000.0000.0000.0000 0          Gi1/0/4:103
f4cf.e243.34c4 104   104   0000.0000.0000.0000.0000 0          Gi1/0/5:104

Leaf-01#
```

The following example shows the output for the **show l2vpn evpn mac remote** command on VTEP 1:

```
Leaf-01# show l2vpn evpn mac remote
MAC Address    EVI   VLAN  ESI                          Ether Tag  Next Hop(s)
-------------- ----- ----- ------------------------- ---------- ---------------
44d3.ca28.6cc3 101   101   0000.0000.0000.0000.0000 0          172.16.254.4
44d3.ca28.6cc4 101   101   0000.0000.0000.0000.0000 0          172.16.254.4
44d3.ca28.6cc5 101   101   0000.0000.0000.0000.0000 0          172.16.254.4
44d3.ca28.6cc3 102   102   0000.0000.0000.0000.0000 0          172.16.254.4
44d3.ca28.6cc4 103   103   0000.0000.0000.0000.0000 0          172.16.254.4
44d3.ca28.6cc5 104   104   0000.0000.0000.0000.0000 0          172.16.254.4
44d3.ca28.6cc6 201   201   0000.0000.0000.0000.0000 0          172.16.254.5
44d3.ca28.6cc7 201   201   0000.0000.0000.0000.0000 0          172.16.254.5
44d3.ca28.6cc8 201   201   0000.0000.0000.0000.0000 0          172.16.254.5
44d3.ca28.6cc6 202   202   0000.0000.0000.0000.0000 0          172.16.254.5
44d3.ca28.6cc7 203   203   0000.0000.0000.0000.0000 0          172.16.254.5
44d3.ca28.6cc8 204   204   0000.0000.0000.0000.0000 0          172.16.254.5

Leaf-01#
```

The following example shows the output for the **show l2route evpn mac ip** command on VTEP 1:

```
Leaf-01# show l2route evpn mac ip
  EVI       ETag  Prod    Mac Address         Host IP                Next Hop(s)
----- ---------- ----- -------------- --------------- --------------------------
  101          0 L2VPN 10b3.d56a.8fc1      10.1.101.1                    Vl101:0
  101          0   BGP 44d3.ca28.6cc3     10.1.101.13       V:10101 172.16.254.4
  101          0   BGP 44d3.ca28.6cc4     10.1.101.14       V:10101 172.16.254.4
  101          0   BGP 44d3.ca28.6cc5     10.1.101.15       V:10101 172.16.254.4
  101          0   BGP 7c21.0dbd.9541      10.1.101.1       V:10101 172.16.254.4
  101          0 L2VPN f4cf.e243.34c2      10.1.101.3               Gi1/0/3:101
  101          0 L2VPN f4cf.e243.34c3      10.1.101.4               Gi1/0/4:101
  101          0 L2VPN f4cf.e243.34c4      10.1.101.5               Gi1/0/5:101
  201          0   BGP 44d3.ca28.6cc6      10.1.102.3       V:10201 172.16.254.5
  201          0   BGP 44d3.ca28.6cc7      10.1.102.4       V:10201 172.16.254.5
  201          0   BGP 44d3.ca28.6cc8      10.1.102.5       V:10201 172.16.254.5
  201          0   BGP 7c21.0dbd.274c      10.1.201.1       V:10201 172.16.254.5

Leaf-01#
```

The following example shows the output for the **show bgp l2vpn evpn** command on VTEP 1:

```
Leaf-01# show bgp l2vpn evpn
BGP table version is 70, local router ID is 172.16.255.3
```

```
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: 172.16.255.3:101
 *>   [2][172.16.255.3:101][0][48][10B3D56A8FC1][32][10.1.101.1]/24
                       ::                                    32768 ?
 *>i  [2][172.16.255.3:101][0][48][44D3CA286CC3][32][10.1.101.13]/24
                       172.16.254.4             0    100      0 ?
 *>i  [2][172.16.255.3:101][0][48][44D3CA286CC4][32][10.1.101.14]/24
                       172.16.254.4             0    100      0 ?
 *>i  [2][172.16.255.3:101][0][48][44D3CA286CC5][32][10.1.101.15]/24
                       172.16.254.4             0    100      0 ?
 *>i  [2][172.16.255.3:101][0][48][7C210DBD9541][32][10.1.101.1]/24
                       172.16.254.4             0    100      0 ?
 *>   [2][172.16.255.3:101][0][48][F4CFE24334C2][32][10.1.101.3]/24
                       ::                                    32768 ?
 *>   [2][172.16.255.3:101][0][48][F4CFE24334C3][32][10.1.101.4]/24
                       ::                                    32768 ?
 *>   [2][172.16.255.3:101][0][48][F4CFE24334C4][32][10.1.101.5]/24
                       ::                                    32768 ?
Route Distinguisher: 172.16.255.3:102
 *>i  [2][172.16.255.3:102][0][48][44D3CA286CC3][0][*]/20
                       172.16.254.4             0    100      0 ?
 *>   [2][172.16.255.3:102][0][48][F4CFE24334C2][0][*]/20
                       ::                                    32768 ?
Route Distinguisher: 172.16.255.3:103
 *>i  [2][172.16.255.3:103][0][48][44D3CA286CC4][0][*]/20
                       172.16.254.4             0    100      0 ?
 *>   [2][172.16.255.3:103][0][48][F4CFE24334C3][0][*]/20
                       ::                                    32768 ?
Route Distinguisher: 172.16.255.3:104
 *>i  [2][172.16.255.3:104][0][48][44D3CA286CC5][0][*]/20
                       172.16.254.4             0    100      0 ?
 *>   [2][172.16.255.3:104][0][48][F4CFE24334C4][0][*]/20
                       ::                                    32768 ?
Route Distinguisher: 172.16.255.3:201
 *>i  [2][172.16.255.3:201][0][48][44D3CA286CC6][32][10.1.102.3]/24
                       172.16.254.5             0    100      0 ?
 *>i  [2][172.16.255.3:201][0][48][44D3CA286CC7][32][10.1.102.4]/24
                       172.16.254.5             0    100      0 ?
 *>i  [2][172.16.255.3:201][0][48][44D3CA286CC8][32][10.1.102.5]/24
                       172.16.254.5             0    100      0 ?
     Network          Next Hop            Metric LocPrf Weight Path
 *>i  [2][172.16.255.3:201][0][48][7C210DBD274C][32][10.1.201.1]/24
                       172.16.254.5             0    100      0 ?
Route Distinguisher: 172.16.255.3:202
 *>i  [2][172.16.255.3:202][0][48][44D3CA286CC6][0][*]/20
                       172.16.254.5             0    100      0 ?
Route Distinguisher: 172.16.255.3:203
 *>i  [2][172.16.255.3:203][0][48][44D3CA286CC7][0][*]/20
                       172.16.254.5             0    100      0 ?
Route Distinguisher: 172.16.255.3:204
 *>i  [2][172.16.255.3:204][0][48][44D3CA286CC8][0][*]/20
                       172.16.254.5             0    100      0 ?
Route Distinguisher: 172.16.255.4:101
 *>i  [2][172.16.255.4:101][0][48][44D3CA286CC3][32][10.1.101.13]/24
                       172.16.254.4             0    100      0 ?
 * i                    172.16.254.4             0    100      0 ?
 *>i  [2][172.16.255.4:101][0][48][44D3CA286CC4][32][10.1.101.14]/24
```

```
                     172.16.254.4             0    100      0 ?
 * i                   172.16.254.4             0    100      0 ?
 *>i  [2][172.16.255.4:101][0][48][44D3CA286CC5][32][10.1.101.15]/24
                     172.16.254.4             0    100      0 ?
 * i                   172.16.254.4             0    100      0 ?
 *>i  [2][172.16.255.4:101][0][48][7C210DBD9541][32][10.1.101.1]/24
                     172.16.254.4             0    100      0 ?
 * i                   172.16.254.4             0    100      0 ?
Route Distinguisher: 172.16.255.4:102
 *>i  [2][172.16.255.4:102][0][48][44D3CA286CC3][0][*]/20
                     172.16.254.4             0    100      0 ?
 * i                   172.16.254.4             0    100      0 ?
Route Distinguisher: 172.16.255.4:103
 *>i  [2][172.16.255.4:103][0][48][44D3CA286CC4][0][*]/20
                     172.16.254.4             0    100      0 ?
 * i                   172.16.254.4             0    100      0 ?
Route Distinguisher: 172.16.255.4:104
 * i  [2][172.16.255.4:104][0][48][44D3CA286CC5][0][*]/20
                     172.16.254.4             0    100      0 ?
 *>i                  172.16.254.4             0    100      0 ?
Route Distinguisher: 172.16.255.5:201
 *>i  [2][172.16.255.5:201][0][48][44D3CA286CC6][32][10.1.102.3]/24
                     172.16.254.5             0    100      0 ?
 * i                   172.16.254.5             0    100      0 ?
 *>i  [2][172.16.255.5:201][0][48][44D3CA286CC7][32][10.1.102.4]/24
                     172.16.254.5             0    100      0 ?
 * i                   172.16.254.5             0    100      0 ?
 *>i  [2][172.16.255.5:201][0][48][44D3CA286CC8][32][10.1.102.5]/24
                     172.16.254.5             0    100      0 ?
 * i                   172.16.254.5             0    100      0 ?
 *>i  [2][172.16.255.5:201][0][48][7C210DBD274C][32][10.1.201.1]/24
                     172.16.254.5             0    100      0 ?
     Network          Next Hop            Metric LocPrf Weight Path
 * i                   172.16.254.5             0    100      0 ?
Route Distinguisher: 172.16.255.5:202
 *>i  [2][172.16.255.5:202][0][48][44D3CA286CC6][0][*]/20
                     172.16.254.5             0    100      0 ?
 * i                   172.16.254.5             0    100      0 ?
Route Distinguisher: 172.16.255.5:203
 *>i  [2][172.16.255.5:203][0][48][44D3CA286CC7][0][*]/20
                     172.16.254.5             0    100      0 ?
 * i                   172.16.254.5             0    100      0 ?
Route Distinguisher: 172.16.255.5:204
 *>i  [2][172.16.255.5:204][0][48][44D3CA286CC8][0][*]/20
                     172.16.254.5             0    100      0 ?
 * i                   172.16.254.5             0    100      0 ?
Route Distinguisher: 1:1 (default for vrf green)
 *>   [5][1:1][0][24][10.1.101.0]/17
                     0.0.0.0                  0         32768 ?
 *>i  [5][1:1][0][24][10.1.201.0]/17
                     172.16.254.5             0    100      0 ?
 * i                   172.16.254.5             0    100      0 ?

Leaf-01#
```

Outputs to Verify the Configuration on VTEP 2

The following example shows the output for the **show vlan private-vlan** command on VTEP 2:

```
Leaf-02# show vlan private-vlan
Primary Secondary Type              Ports
------- --------- ----------------- ------------------------------------------
```

```
101     102       community         Gi1/0/11
101     103       community         Gi1/0/12
101     104       isolated          Gi1/0/13
201     202       community
201     203       community
201     204       isolated

Leaf-02#
```

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

```
Leaf-02# show ip arp vrf green
Protocol  Address          Age (min)  Hardware Addr   Type   Interface
Internet  10.1.101.1              -   7c21.0dbd.9541  ARPA   Vlan101
Internet  10.1.101.13            95   44d3.ca28.6cc3  ARPA   Vlan101 pv 102
Internet  10.1.101.14            95   44d3.ca28.6cc4  ARPA   Vlan101 pv 103
Internet  10.1.101.15            95   44d3.ca28.6cc5  ARPA   Vlan101 pv 104
Internet  10.1.201.1              -   7c21.0dbd.954c  ARPA   Vlan201
Internet  172.16.254.4            -   7c21.0dbd.9548  ARPA   Vlan901

Leaf-02#
```

The following example shows the output for the **show mac address-table vlan** *vlan-id* command on VTEP 2:

```
Leaf-02# show mac address-table vlan 101
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----
 101    10b3.d56a.8fc1    STATIC      Vl101
 101    44d3.ca28.6cc3    DYNAMIC pv  Gi1/0/11
 101    44d3.ca28.6cc4    DYNAMIC pv  Gi1/0/12
 101    44d3.ca28.6cc5    DYNAMIC pv  Gi1/0/13
 101    7c21.0dbd.9541    STATIC      Vl101
Total Mac Addresses for this criterion: 5

Leaf-02#
```

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

```
Leaf-02# show l2vpn evpn peers vxlan

Interface VNI      Peer-IP                  Num routes eVNI     UP time
--------- -------- ------------------------ ---------- -------- --------
nve1      10101    172.16.254.3             8          10101    01:34:10
nve1      10102    172.16.254.3             1          10102    01:34:10
nve1      10103    172.16.254.3             1          10103    01:34:10
nve1      10104    172.16.254.3             1          10104    00:02:13

Leaf-02#
```

The following example shows the output for the **show nve peer** command on VTEP 2:

```
Leaf-02# show nve peer
Interface  VNI      Type Peer-IP          RMAC/Num_RTs   eVNI     state flags UP time
nve1       50901    L3CP 172.16.254.3     10b3.d56a.8fc8 50901      UP  A/M/4 01:34:10
nve1       50901    L3CP 172.16.254.5     7c21.0dbd.2748 50901      UP  A/M/4 01:34:10
```

```
nve1       10101    L2CP 172.16.254.3     8              10101      UP   N/A  01:34:10
nve1       10102    L2CP 172.16.254.3     1              10102      UP   N/A  01:34:10
nve1       10103    L2CP 172.16.254.3     1              10103      UP   N/A  01:34:10
nve1       10104    L2CP 172.16.254.3     1              10104      UP   N/A  00:02:13

Leaf-02#
```

The following example shows the output for the **show l2vpn evpn mac local** command on VTEP 2:

```
Leaf-02# show l2vpn evpn mac local
MAC Address    EVI   VLAN  ESI                          Ether Tag  Next Hop(s)
-------------- ----- ----- ------------------------ ---------- ---------------
44d3.ca28.6cc3 101   101   0000.0000.0000.0000.0000 0          Gi1/0/11:101
44d3.ca28.6cc4 101   101   0000.0000.0000.0000.0000 0          Gi1/0/12:101
44d3.ca28.6cc5 101   101   0000.0000.0000.0000.0000 0          Gi1/0/13:101
44d3.ca28.6cc3 102   102   0000.0000.0000.0000.0000 0          Gi1/0/11:102
44d3.ca28.6cc4 103   103   0000.0000.0000.0000.0000 0          Gi1/0/12:103
44d3.ca28.6cc5 104   104   0000.0000.0000.0000.0000 0          Gi1/0/13:104

Leaf-02#
```

The following example shows the output for the **show l2vpn evpn mac remote** command on VTEP 2:

```
Leaf-02# show l2vpn evpn mac remote
MAC Address    EVI   VLAN  ESI                          Ether Tag  Next Hop(s)
-------------- ----- ----- ------------------------ ---------- ---------------
f4cf.e243.34c2 101   101   0000.0000.0000.0000.0000 0          172.16.254.3
f4cf.e243.34c3 101   101   0000.0000.0000.0000.0000 0          172.16.254.3
f4cf.e243.34c4 101   101   0000.0000.0000.0000.0000 0          172.16.254.3
f4cf.e243.34c2 102   102   0000.0000.0000.0000.0000 0          172.16.254.3
f4cf.e243.34c3 103   103   0000.0000.0000.0000.0000 0          172.16.254.3
f4cf.e243.34c4 104   104   0000.0000.0000.0000.0000 0          172.16.254.3
44d3.ca28.6cc6 201   201   0000.0000.0000.0000.0000 0          172.16.254.5
44d3.ca28.6cc7 201   201   0000.0000.0000.0000.0000 0          172.16.254.5
44d3.ca28.6cc8 201   201   0000.0000.0000.0000.0000 0          172.16.254.5
44d3.ca28.6cc6 202   202   0000.0000.0000.0000.0000 0          172.16.254.5
44d3.ca28.6cc7 203   203   0000.0000.0000.0000.0000 0          172.16.254.5
44d3.ca28.6cc8 204   204   0000.0000.0000.0000.0000 0          172.16.254.5

Leaf-02#
```

The following example shows the output for the **show l2route evpn mac ip** command on VTEP 2:

```
Leaf-02# show l2route evpn mac ip
  EVI        ETag  Prod    Mac Address          Host IP                 Next Hop(s)
----- ---------- ----- -------------- --------------- -------------------------
  101           0   BGP 10b3.d56a.8fc1      10.1.101.1       V:10101 172.16.254.3
  101           0 L2VPN 44d3.ca28.6cc3     10.1.101.13               Gi1/0/11:101
  101           0 L2VPN 44d3.ca28.6cc4     10.1.101.14               Gi1/0/12:101
  101           0 L2VPN 44d3.ca28.6cc5     10.1.101.15               Gi1/0/13:101
  101           0 L2VPN 7c21.0dbd.9541      10.1.101.1                    Vl101:0
  101           0   BGP f4cf.e243.34c2      10.1.101.3       V:10101 172.16.254.3
  101           0   BGP f4cf.e243.34c3      10.1.101.4       V:10101 172.16.254.3
  101           0   BGP f4cf.e243.34c4      10.1.101.5       V:10101 172.16.254.3
  201           0   BGP 44d3.ca28.6cc6      10.1.102.3       V:10201 172.16.254.5
  201           0   BGP 44d3.ca28.6cc7      10.1.102.4       V:10201 172.16.254.5
  201           0   BGP 44d3.ca28.6cc8      10.1.102.5       V:10201 172.16.254.5
  201           0   BGP 7c21.0dbd.274c      10.1.201.1       V:10201 172.16.254.5
```

```
Leaf-02#
```

The following example shows the output for the **show bgp l2vpn evpn** command on VTEP 2:

```
Leaf-02# show bgp l2vpn evpn
BGP table version is 65, local router ID is 172.16.255.4
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: 172.16.255.3:101
 * i  [2][172.16.255.3:101][0][48][10B3D56A8FC1][32][10.1.101.1]/24
                     172.16.254.3             0    100      0 ?
 *>i                  172.16.254.3             0    100      0 ?
 * i  [2][172.16.255.3:101][0][48][F4CFE24334C2][32][10.1.101.3]/24
                     172.16.254.3             0    100      0 ?
 *>i                  172.16.254.3             0    100      0 ?
 * i  [2][172.16.255.3:101][0][48][F4CFE24334C3][32][10.1.101.4]/24
                     172.16.254.3             0    100      0 ?
 *>i                  172.16.254.3             0    100      0 ?
 * i  [2][172.16.255.3:101][0][48][F4CFE24334C4][32][10.1.101.5]/24
                     172.16.254.3             0    100      0 ?
 *>i                  172.16.254.3             0    100      0 ?
Route Distinguisher: 172.16.255.3:102
 * i  [2][172.16.255.3:102][0][48][F4CFE24334C2][0][*]/20
                     172.16.254.3             0    100      0 ?
 *>i                  172.16.254.3             0    100      0 ?
Route Distinguisher: 172.16.255.3:103
 * i  [2][172.16.255.3:103][0][48][F4CFE24334C3][0][*]/20
                     172.16.254.3             0    100      0 ?
 *>i                  172.16.254.3             0    100      0 ?
Route Distinguisher: 172.16.255.3:104
 *>i  [2][172.16.255.3:104][0][48][F4CFE24334C4][0][*]/20
                     172.16.254.3             0    100      0 ?
 * i                  172.16.254.3             0    100      0 ?
Route Distinguisher: 172.16.255.4:101
 *>i  [2][172.16.255.4:101][0][48][10B3D56A8FC1][32][10.1.101.1]/24
                     172.16.254.3             0    100      0 ?
 *>   [2][172.16.255.4:101][0][48][44D3CA286CC3][32][10.1.101.13]/24
                     ::                                    32768 ?
 *>   [2][172.16.255.4:101][0][48][44D3CA286CC4][32][10.1.101.14]/24
                     ::                                    32768 ?
 *>   [2][172.16.255.4:101][0][48][44D3CA286CC5][32][10.1.101.15]/24
                     ::                                    32768 ?
 *>   [2][172.16.255.4:101][0][48][7C210DBD9541][32][10.1.101.1]/24
                     ::                                    32768 ?
 *>i  [2][172.16.255.4:101][0][48][F4CFE24334C2][32][10.1.101.3]/24
                     172.16.254.3             0    100      0 ?
 *>i  [2][172.16.255.4:101][0][48][F4CFE24334C3][32][10.1.101.4]/24
     Network          Next Hop            Metric LocPrf Weight Path
                     172.16.254.3             0    100      0 ?
 *>i  [2][172.16.255.4:101][0][48][F4CFE24334C4][32][10.1.101.5]/24
                     172.16.254.3             0    100      0 ?
Route Distinguisher: 172.16.255.4:102
 *>   [2][172.16.255.4:102][0][48][44D3CA286CC3][0][*]/20
                     ::                                    32768 ?
 *>i  [2][172.16.255.4:102][0][48][F4CFE24334C2][0][*]/20
                     172.16.254.3             0    100      0 ?
```

```
Route Distinguisher: 172.16.255.4:103
 *>   [2][172.16.255.4:103][0][48][44D3CA286CC4][0][*]/20
                      ::                                    32768 ?
 *>i  [2][172.16.255.4:103][0][48][F4CFE24334C3][0][*]/20
                      172.16.254.3            0    100      0 ?
Route Distinguisher: 172.16.255.4:104
 *>   [2][172.16.255.4:104][0][48][44D3CA286CC5][0][*]/20
                      ::                                    32768 ?
 *>i  [2][172.16.255.4:104][0][48][F4CFE24334C4][0][*]/20
                      172.16.254.3            0    100      0 ?
Route Distinguisher: 172.16.255.4:201
 *>i  [2][172.16.255.4:201][0][48][44D3CA286CC6][32][10.1.102.3]/24
                      172.16.254.5            0    100      0 ?
 *>i  [2][172.16.255.4:201][0][48][44D3CA286CC7][32][10.1.102.4]/24
                      172.16.254.5            0    100      0 ?
 *>i  [2][172.16.255.4:201][0][48][44D3CA286CC8][32][10.1.102.5]/24
                      172.16.254.5            0    100      0 ?
 *>i  [2][172.16.255.4:201][0][48][7C210DBD274C][32][10.1.201.1]/24
                      172.16.254.5            0    100      0 ?
Route Distinguisher: 172.16.255.4:202
 *>i  [2][172.16.255.4:202][0][48][44D3CA286CC6][0][*]/20
                      172.16.254.5            0    100      0 ?
Route Distinguisher: 172.16.255.4:203
 *>i  [2][172.16.255.4:203][0][48][44D3CA286CC7][0][*]/20
                      172.16.254.5            0    100      0 ?
Route Distinguisher: 172.16.255.4:204
 *>i  [2][172.16.255.4:204][0][48][44D3CA286CC8][0][*]/20
                      172.16.254.5            0    100      0 ?
Route Distinguisher: 172.16.255.5:201
 *>i  [2][172.16.255.5:201][0][48][44D3CA286CC6][32][10.1.102.3]/24
                      172.16.254.5            0    100      0 ?
 * i                   172.16.254.5             0    100      0 ?
 *>i  [2][172.16.255.5:201][0][48][44D3CA286CC7][32][10.1.102.4]/24
                      172.16.254.5            0    100      0 ?
 * i                   172.16.254.5             0    100      0 ?
 *>i  [2][172.16.255.5:201][0][48][44D3CA286CC8][32][10.1.102.5]/24
                      172.16.254.5            0    100      0 ?
 * i                   172.16.254.5             0    100      0 ?
 *>i  [2][172.16.255.5:201][0][48][7C210DBD274C][32][10.1.201.1]/24
                      172.16.254.5            0    100      0 ?
     Network          Next Hop            Metric LocPrf Weight Path
 * i                   172.16.254.5             0    100      0 ?
Route Distinguisher: 172.16.255.5:202
 *>i  [2][172.16.255.5:202][0][48][44D3CA286CC6][0][*]/20
                      172.16.254.5            0    100      0 ?
 * i                   172.16.254.5             0    100      0 ?
Route Distinguisher: 172.16.255.5:203
 *>i  [2][172.16.255.5:203][0][48][44D3CA286CC7][0][*]/20
                      172.16.254.5            0    100      0 ?
 * i                   172.16.254.5             0    100      0 ?
Route Distinguisher: 172.16.255.5:204
 *>i  [2][172.16.255.5:204][0][48][44D3CA286CC8][0][*]/20
                      172.16.254.5            0    100      0 ?
 * i                   172.16.254.5             0    100      0 ?
Route Distinguisher: 1:1 (default for vrf green)
 * i  [5][1:1][0][24][10.1.101.0]/17
                      172.16.254.3            0    100      0 ?
 * i                   172.16.254.3             0    100      0 ?
 *>                    0.0.0.0                  0         32768 ?
 *>i  [5][1:1][0][24][10.1.201.0]/17
                      172.16.254.5            0    100      0 ?
 * i                   172.16.254.5             0    100      0 ?

Leaf-02#
```

Outputs to Verify the Configuration on VTEP 3

The following example shows the output for the **show vlan private-vlan** command on VTEP 3:

```
Leaf-03# show vlan private-vlan

Primary Secondary Type              Ports
------- --------- ----------------- ------------------------------------------
101     102       community
101     103       community
101     104       isolated
201     202       community         Gi1/0/16
201     203       community         Gi1/0/17
201     204       isolated          Gi1/0/18

Leaf-03#
```

The following example shows the output for the **show ip arp vrf green** command on VTEP 3:

```
Leaf-03# show ip arp vrf green
Protocol  Address          Age (min)  Hardware Addr   Type   Interface
Internet  10.1.101.1              -   7c21.0dbd.2741  ARPA   Vlan101
Internet  10.1.201.1              -   7c21.0dbd.274c  ARPA   Vlan201
Internet  172.16.254.5            -   7c21.0dbd.2748  ARPA   Vlan901

Leaf-03#
```

The following example shows the output for the **show mac address-table vlan** *vlan-id* command on VTEP 3:

```
Leaf-03# show mac address-table vlan 101
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----
 101    7c21.0dbd.2741    STATIC      Vl101
Total Mac Addresses for this criterion: 1

Leaf-03#
```

The following example shows the output for the **show l2vpn evpn peers vxlan** command on VTEP 3:

```
Leaf-03# show l2vpn evpn peers vxlan

Leaf-03#
```

The following example shows the output for the **show nve peer** command on VTEP 3:

```
Leaf-03# show nve peer
Interface  VNI      Type Peer-IP          RMAC/Num_RTs   eVNI     state flags UP time
nve1       50901    L3CP 172.16.254.3     10b3.d56a.8fc8 50901      UP  A/M/4 01:34:51
nve1       50901    L3CP 172.16.254.4     7c21.0dbd.9548 50901      UP  A/M/4 01:34:51

Leaf-03#
```

The following example shows the output for the **show l2vpn evpn mac local** command on VTEP 3:

```
Leaf-03# show l2vpn evpn mac local
MAC Address    EVI   VLAN  ESI                          Ether Tag  Next Hop(s)
-------------- ----- ----- ------------------------ ---------- ---------------
44d3.ca28.6cc6 201   201   0000.0000.0000.0000.0000 0          Gi1/0/16:201
44d3.ca28.6cc7 201   201   0000.0000.0000.0000.0000 0          Gi1/0/17:201
44d3.ca28.6cc8 201   201   0000.0000.0000.0000.0000 0          Gi1/0/18:201
44d3.ca28.6cc6 202   202   0000.0000.0000.0000.0000 0          Gi1/0/16:202
44d3.ca28.6cc7 203   203   0000.0000.0000.0000.0000 0          Gi1/0/17:203
44d3.ca28.6cc8 204   204   0000.0000.0000.0000.0000 0          Gi1/0/18:204

Leaf-03#
```

The following example shows the output for the **show l2vpn evpn mac remote** command on VTEP 3:

```
Leaf-03# show l2vpn evpn mac remote
MAC Address    EVI   VLAN  ESI                          Ether Tag  Next Hop(s)
-------------- ----- ----- ------------------------ ---------- ---------------
44d3.ca28.6cc3 101   101   0000.0000.0000.0000.0000 0          172.16.254.4
44d3.ca28.6cc4 101   101   0000.0000.0000.0000.0000 0          172.16.254.4
44d3.ca28.6cc5 101   101   0000.0000.0000.0000.0000 0          172.16.254.4
f4cf.e243.34c2 101   101   0000.0000.0000.0000.0000 0          172.16.254.3
f4cf.e243.34c3 101   101   0000.0000.0000.0000.0000 0          172.16.254.3
f4cf.e243.34c4 101   101   0000.0000.0000.0000.0000 0          172.16.254.3
44d3.ca28.6cc3 102   102   0000.0000.0000.0000.0000 0          172.16.254.4
f4cf.e243.34c2 102   102   0000.0000.0000.0000.0000 0          172.16.254.3
44d3.ca28.6cc4 103   103   0000.0000.0000.0000.0000 0          172.16.254.4
f4cf.e243.34c3 103   103   0000.0000.0000.0000.0000 0          172.16.254.3
44d3.ca28.6cc5 104   104   0000.0000.0000.0000.0000 0          172.16.254.4
f4cf.e243.34c4 104   104   0000.0000.0000.0000.0000 0          172.16.254.3

Leaf-03#
```

The following example shows the output for the **show l2route evpn mac ip** command on VTEP 3:

```
Leaf-03# show l2route evpn mac ip
  EVI       ETag  Prod    Mac Address         Host IP                Next Hop(s)
----- ---------- ----- -------------- --------------- --------------------------
  101          0   BGP 10b3.d56a.8fc1      10.1.101.1       V:10101 172.16.254.3
  101          0   BGP 44d3.ca28.6cc3     10.1.101.13       V:10101 172.16.254.4
  101          0   BGP 44d3.ca28.6cc4     10.1.101.14       V:10101 172.16.254.4
  101          0   BGP 44d3.ca28.6cc5     10.1.101.15       V:10101 172.16.254.4
  101          0   BGP 7c21.0dbd.9541      10.1.101.1       V:10101 172.16.254.4
  101          0   BGP f4cf.e243.34c2      10.1.101.3       V:10101 172.16.254.3
  101          0   BGP f4cf.e243.34c3      10.1.101.4       V:10101 172.16.254.3
  101          0   BGP f4cf.e243.34c4      10.1.101.5       V:10101 172.16.254.3
  201          0 L2VPN 44d3.ca28.6cc6      10.1.102.3               Gi1/0/16:201
  201          0 L2VPN 44d3.ca28.6cc7      10.1.102.4               Gi1/0/17:201
  201          0 L2VPN 44d3.ca28.6cc8      10.1.102.5               Gi1/0/18:201
  201          0 L2VPN 7c21.0dbd.274c      10.1.201.1                    Vl201:0

Leaf-03#
```

The following example shows the output for the **show bgp l2vpn evpn** command on VTEP 3:

```
Leaf-03# show bgp l2vpn evpn
BGP table version is 82, local router ID is 172.16.255.5
```

```
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: 172.16.255.3:101
 * i  [2][172.16.255.3:101][0][48][10B3D56A8FC1][32][10.1.101.1]/24
                      172.16.254.3             0    100      0 ?
 *>i                   172.16.254.3             0    100      0 ?
 * i  [2][172.16.255.3:101][0][48][F4CFE24334C2][32][10.1.101.3]/24
                      172.16.254.3             0    100      0 ?
 *>i                   172.16.254.3             0    100      0 ?
 * i  [2][172.16.255.3:101][0][48][F4CFE24334C3][32][10.1.101.4]/24
                      172.16.254.3             0    100      0 ?
 *>i                   172.16.254.3             0    100      0 ?
 * i  [2][172.16.255.3:101][0][48][F4CFE24334C4][32][10.1.101.5]/24
                      172.16.254.3             0    100      0 ?
 *>i                   172.16.254.3             0    100      0 ?
Route Distinguisher: 172.16.255.3:102
 * i  [2][172.16.255.3:102][0][48][F4CFE24334C2][0][*]/20
                      172.16.254.3             0    100      0 ?
 *>i                   172.16.254.3             0    100      0 ?
Route Distinguisher: 172.16.255.3:103
 * i  [2][172.16.255.3:103][0][48][F4CFE24334C3][0][*]/20
                      172.16.254.3             0    100      0 ?
 *>i                   172.16.254.3             0    100      0 ?
Route Distinguisher: 172.16.255.3:104
 *>i  [2][172.16.255.3:104][0][48][F4CFE24334C4][0][*]/20
                      172.16.254.3             0    100      0 ?
 * i                   172.16.254.3             0    100      0 ?
Route Distinguisher: 172.16.255.4:101
 *>i  [2][172.16.255.4:101][0][48][44D3CA286CC3][32][10.1.101.13]/24
                      172.16.254.4             0    100      0 ?
 * i                   172.16.254.4             0    100      0 ?
 *>i  [2][172.16.255.4:101][0][48][44D3CA286CC4][32][10.1.101.14]/24
                      172.16.254.4             0    100      0 ?
 * i                   172.16.254.4             0    100      0 ?
 *>i  [2][172.16.255.4:101][0][48][44D3CA286CC5][32][10.1.101.15]/24
                      172.16.254.4             0    100      0 ?
 * i                   172.16.254.4             0    100      0 ?
 *>i  [2][172.16.255.4:101][0][48][7C210DBD9541][32][10.1.101.1]/24
                      172.16.254.4             0    100      0 ?
 * i                   172.16.254.4             0    100      0 ?
Route Distinguisher: 172.16.255.4:102
     Network          Next Hop            Metric LocPrf Weight Path
 *>i  [2][172.16.255.4:102][0][48][44D3CA286CC3][0][*]/20
                      172.16.254.4             0    100      0 ?
 * i                   172.16.254.4             0    100      0 ?
Route Distinguisher: 172.16.255.4:103
 *>i  [2][172.16.255.4:103][0][48][44D3CA286CC4][0][*]/20
                      172.16.254.4             0    100      0 ?
 * i                   172.16.254.4             0    100      0 ?
Route Distinguisher: 172.16.255.4:104
 * i  [2][172.16.255.4:104][0][48][44D3CA286CC5][0][*]/20
                      172.16.254.4             0    100      0 ?
 *>i                   172.16.254.4             0    100      0 ?
Route Distinguisher: 172.16.255.5:101
 *>i  [2][172.16.255.5:101][0][48][10B3D56A8FC1][32][10.1.101.1]/24
                      172.16.254.3             0    100      0 ?
 *>i  [2][172.16.255.5:101][0][48][44D3CA286CC3][32][10.1.101.13]/24
                      172.16.254.4             0    100      0 ?
```

```
 *>i  [2][172.16.255.5:101][0][48][44D3CA286CC4][32][10.1.101.14]/24
                      172.16.254.4             0    100      0 ?
 *>i  [2][172.16.255.5:101][0][48][44D3CA286CC5][32][10.1.101.15]/24
                      172.16.254.4             0    100      0 ?
 *>i  [2][172.16.255.5:101][0][48][7C210DBD9541][32][10.1.101.1]/24
                      172.16.254.4             0    100      0 ?
 *>i  [2][172.16.255.5:101][0][48][F4CFE24334C2][32][10.1.101.3]/24
                      172.16.254.3             0    100      0 ?
 *>i  [2][172.16.255.5:101][0][48][F4CFE24334C3][32][10.1.101.4]/24
                      172.16.254.3             0    100      0 ?
 *>i  [2][172.16.255.5:101][0][48][F4CFE24334C4][32][10.1.101.5]/24
                      172.16.254.3             0    100      0 ?
Route Distinguisher: 172.16.255.5:102
 *>i  [2][172.16.255.5:102][0][48][44D3CA286CC3][0][*]/20
                      172.16.254.4             0    100      0 ?
 *>i  [2][172.16.255.5:102][0][48][F4CFE24334C2][0][*]/20
                      172.16.254.3             0    100      0 ?
Route Distinguisher: 172.16.255.5:103
 *>i  [2][172.16.255.5:103][0][48][44D3CA286CC4][0][*]/20
                      172.16.254.4             0    100      0 ?
 *>i  [2][172.16.255.5:103][0][48][F4CFE24334C3][0][*]/20
                      172.16.254.3             0    100      0 ?
Route Distinguisher: 172.16.255.5:104
 *>i  [2][172.16.255.5:104][0][48][44D3CA286CC5][0][*]/20
                      172.16.254.4             0    100      0 ?
 *>i  [2][172.16.255.5:104][0][48][F4CFE24334C4][0][*]/20
                      172.16.254.3             0    100      0 ?
Route Distinguisher: 172.16.255.5:201
 *>   [2][172.16.255.5:201][0][48][44D3CA286CC6][32][10.1.102.3]/24
                      ::                                    32768 ?
 *>   [2][172.16.255.5:201][0][48][44D3CA286CC7][32][10.1.102.4]/24
                      ::                                    32768 ?
     Network          Next Hop            Metric LocPrf Weight Path
 *>   [2][172.16.255.5:201][0][48][44D3CA286CC8][32][10.1.102.5]/24
                      ::                                    32768 ?
 *>   [2][172.16.255.5:201][0][48][7C210DBD274C][32][10.1.201.1]/24
                      ::                                    32768 ?
Route Distinguisher: 172.16.255.5:202
 *>   [2][172.16.255.5:202][0][48][44D3CA286CC6][0][*]/20
                      ::                                    32768 ?
Route Distinguisher: 172.16.255.5:203
 *>   [2][172.16.255.5:203][0][48][44D3CA286CC7][0][*]/20
                      ::                                    32768 ?
Route Distinguisher: 172.16.255.5:204
 *>   [2][172.16.255.5:204][0][48][44D3CA286CC8][0][*]/20
                      ::                                    32768 ?
Route Distinguisher: 1:1 (default for vrf green)
 * i  [5][1:1][0][24][10.1.101.0]/17
                      172.16.254.3             0    100      0 ?
 *>i                   172.16.254.3             0    100      0 ?
 *>   [5][1:1][0][24][10.1.201.0]/17
                      0.0.0.0                  0         32768 ?

Leaf-03#
```

Outputs to Verify the Configuration on Spine Switch 1

The following example shows the output for the **show bgp l2vpn evpn summary** command on Spine Switch 1:

```
Spine-01# show bgp l2vpn evpn summary
BGP router identifier 172.16.255.1, local AS number 65001
```

```
BGP table version is 113, main routing table version 113
23 network entries using 8832 bytes of memory
47 path entries using 10528 bytes of memory
15/14 BGP path/bestpath attribute entries using 4440 bytes of memory
3 BGP rrinfo entries using 120 bytes of memory
15 BGP extended community entries using 720 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
0 BGP filter-list cache entries using 0 bytes of memory
BGP using 24640 total bytes of memory
BGP activity 47/24 prefixes, 107/60 paths, scan interval 60 secs
25 networks peaked at 13:03:03 Feb 19 2021 UTC (03:26:23.575 ago)

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
172.16.255.2    4        65001     259     261      113    0    0 03:27:45        23
172.16.255.3    4        65001     240     250      113    0    0 03:27:49         8
172.16.255.4    4        65001     238     258      113    0    0 03:27:25         8
172.16.255.5    4        65001     236     258      113    0    0 03:27:19         8

Spine-01#
```

The following example shows the output for the **show bgp l2vpn evpn** command on Spine Switch 1:

```
Spine-01# show bgp l2vpn evpn
BGP table version is 113, local router ID is 172.16.255.1
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: 172.16.255.3:101
 * i  [2][172.16.255.3:101][0][48][10B3D56A8FC1][32][10.1.101.1]/24
                     172.16.254.3             0    100      0 ?
 *>i                  172.16.254.3             0    100      0 ?
 * i  [2][172.16.255.3:101][0][48][F4CFE24334C2][32][10.1.101.3]/24
                     172.16.254.3             0    100      0 ?
 *>i                  172.16.254.3             0    100      0 ?
 * i  [2][172.16.255.3:101][0][48][F4CFE24334C3][32][10.1.101.4]/24
                     172.16.254.3             0    100      0 ?
 *>i                  172.16.254.3             0    100      0 ?
 * i  [2][172.16.255.3:101][0][48][F4CFE24334C4][32][10.1.101.5]/24
                     172.16.254.3             0    100      0 ?
 *>i                  172.16.254.3             0    100      0 ?
Route Distinguisher: 172.16.255.3:102
 * i  [2][172.16.255.3:102][0][48][F4CFE24334C2][0][*]/20
                     172.16.254.3             0    100      0 ?
 *>i                  172.16.254.3             0    100      0 ?
Route Distinguisher: 172.16.255.3:103
 * i  [2][172.16.255.3:103][0][48][F4CFE24334C3][0][*]/20
                     172.16.254.3             0    100      0 ?
 *>i                  172.16.254.3             0    100      0 ?
Route Distinguisher: 172.16.255.3:104
 * i  [2][172.16.255.3:104][0][48][F4CFE24334C4][0][*]/20
                     172.16.254.3             0    100      0 ?
 *>i                  172.16.254.3             0    100      0 ?
Route Distinguisher: 172.16.255.4:101
 * i  [2][172.16.255.4:101][0][48][44D3CA286CC3][32][10.1.101.13]/24
                     172.16.254.4             0    100      0 ?
 *>i                  172.16.254.4             0    100      0 ?
 * i  [2][172.16.255.4:101][0][48][44D3CA286CC4][32][10.1.101.14]/24
```

```
                    172.16.254.4             0    100      0 ?
 *>i                 172.16.254.4             0    100      0 ?
 * i  [2][172.16.255.4:101][0][48][44D3CA286CC5][32][10.1.101.15]/24
                    172.16.254.4             0    100      0 ?
 *>i                 172.16.254.4             0    100      0 ?
 * i  [2][172.16.255.4:101][0][48][7C210DBD9541][32][10.1.101.1]/24
                    172.16.254.4             0    100      0 ?
 *>i                 172.16.254.4             0    100      0 ?
Route Distinguisher: 172.16.255.4:102
     Network          Next Hop            Metric LocPrf Weight Path
 * i  [2][172.16.255.4:102][0][48][44D3CA286CC3][0][*]/20
                    172.16.254.4             0    100      0 ?
 *>i                 172.16.254.4             0    100      0 ?
Route Distinguisher: 172.16.255.4:103
 * i  [2][172.16.255.4:103][0][48][44D3CA286CC4][0][*]/20
                    172.16.254.4             0    100      0 ?
 *>i                 172.16.254.4             0    100      0 ?
Route Distinguisher: 172.16.255.4:104
 * i  [2][172.16.255.4:104][0][48][44D3CA286CC5][0][*]/20
                    172.16.254.4             0    100      0 ?
 *>i                 172.16.254.4             0    100      0 ?
Route Distinguisher: 172.16.255.5:201
 * i  [2][172.16.255.5:201][0][48][44D3CA286CC6][32][10.1.102.3]/24
                    172.16.254.5             0    100      0 ?
 *>i                 172.16.254.5             0    100      0 ?
 * i  [2][172.16.255.5:201][0][48][44D3CA286CC7][32][10.1.102.4]/24
                    172.16.254.5             0    100      0 ?
 *>i                 172.16.254.5             0    100      0 ?
 * i  [2][172.16.255.5:201][0][48][44D3CA286CC8][32][10.1.102.5]/24
                    172.16.254.5             0    100      0 ?
 *>i                 172.16.254.5             0    100      0 ?
 * i  [2][172.16.255.5:201][0][48][7C210DBD274C][32][10.1.201.1]/24
                    172.16.254.5             0    100      0 ?
 *>i                 172.16.254.5             0    100      0 ?
Route Distinguisher: 172.16.255.5:202
 * i  [2][172.16.255.5:202][0][48][44D3CA286CC6][0][*]/20
                    172.16.254.5             0    100      0 ?
 *>i                 172.16.254.5             0    100      0 ?
Route Distinguisher: 172.16.255.5:203
 * i  [2][172.16.255.5:203][0][48][44D3CA286CC7][0][*]/20
                    172.16.254.5             0    100      0 ?
 *>i                 172.16.254.5             0    100      0 ?
Route Distinguisher: 172.16.255.5:204
 * i  [2][172.16.255.5:204][0][48][44D3CA286CC8][0][*]/20
                    172.16.254.5             0    100      0 ?
 *>i                 172.16.254.5             0    100      0 ?
Route Distinguisher: 1:1
 * i  [5][1:1][0][24][10.1.101.0]/17
                    172.16.254.4             0    100      0 ?
 * i                 172.16.254.3             0    100      0 ?
 *>i                 172.16.254.3             0    100      0 ?
 * i  [5][1:1][0][24][10.1.201.0]/17
                    172.16.254.5             0    100      0 ?
 *>i                 172.16.254.5             0    100      0 ?

Spine-01#
```

Outputs to Verify the Configuration on Spine Switch 2

The following example shows the output for the **show bgp l2vpn evpn summary** command on Spine Switch 2:

```
Spine-02# show bgp l2vpn evpn summary
BGP router identifier 172.16.255.2, local AS number 65001
BGP table version is 113, main routing table version 113
23 network entries using 8832 bytes of memory
47 path entries using 10528 bytes of memory
15/14 BGP path/bestpath attribute entries using 4440 bytes of memory
3 BGP rrinfo entries using 120 bytes of memory
15 BGP extended community entries using 720 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
0 BGP filter-list cache entries using 0 bytes of memory
BGP using 24640 total bytes of memory
BGP activity 46/23 prefixes, 107/60 paths, scan interval 60 secs
25 networks peaked at 13:03:07 Feb 19 2021 UTC (03:27:53.810 ago)

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
172.16.255.1    4        65001     263     261      113    0    0 03:29:16        23
172.16.255.3    4        65001     243     251      113    0    0 03:29:17         8
172.16.255.4    4        65001     240     259      113    0    0 03:28:48         8
172.16.255.5    4        65001     240     257      113    0    0 03:28:45         8

Spine-02#
```

The following example shows the output for the **show bgp l2vpn evpn** command on Spine Switch 2:

```
Spine-02# show bgp l2vpn evpn
BGP table version is 113, local router ID is 172.16.255.2
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: 172.16.255.3:101
 * i  [2][172.16.255.3:101][0][48][10B3D56A8FC1][32][10.1.101.1]/24
                     172.16.254.3             0    100      0 ?
 *>i                  172.16.254.3             0    100      0 ?
 * i  [2][172.16.255.3:101][0][48][F4CFE24334C2][32][10.1.101.3]/24
                     172.16.254.3             0    100      0 ?
 *>i                  172.16.254.3             0    100      0 ?
 * i  [2][172.16.255.3:101][0][48][F4CFE24334C3][32][10.1.101.4]/24
                     172.16.254.3             0    100      0 ?
 *>i                  172.16.254.3             0    100      0 ?
 * i  [2][172.16.255.3:101][0][48][F4CFE24334C4][32][10.1.101.5]/24
                     172.16.254.3             0    100      0 ?
 *>i                  172.16.254.3             0    100      0 ?
Route Distinguisher: 172.16.255.3:102
 * i  [2][172.16.255.3:102][0][48][F4CFE24334C2][0][*]/20
                     172.16.254.3             0    100      0 ?
 *>i                  172.16.254.3             0    100      0 ?
Route Distinguisher: 172.16.255.3:103
 * i  [2][172.16.255.3:103][0][48][F4CFE24334C3][0][*]/20
                     172.16.254.3             0    100      0 ?
 *>i                  172.16.254.3             0    100      0 ?
Route Distinguisher: 172.16.255.3:104
 * i  [2][172.16.255.3:104][0][48][F4CFE24334C4][0][*]/20
                     172.16.254.3             0    100      0 ?
 *>i                  172.16.254.3             0    100      0 ?
Route Distinguisher: 172.16.255.4:101
 * i  [2][172.16.255.4:101][0][48][44D3CA286CC3][32][10.1.101.13]/24
                     172.16.254.4             0    100      0 ?
```

```
 *>i                    172.16.254.4             0    100      0 ?
 * i  [2][172.16.255.4:101][0][48][44D3CA286CC4][32][10.1.101.14]/24
                       172.16.254.4             0    100      0 ?
 *>i                    172.16.254.4             0    100      0 ?
 * i  [2][172.16.255.4:101][0][48][44D3CA286CC5][32][10.1.101.15]/24
                       172.16.254.4             0    100      0 ?
 *>i                    172.16.254.4             0    100      0 ?
 * i  [2][172.16.255.4:101][0][48][7C210DBD9541][32][10.1.101.1]/24
                       172.16.254.4             0    100      0 ?
 *>i                    172.16.254.4             0    100      0 ?
Route Distinguisher: 172.16.255.4:102
     Network          Next Hop            Metric LocPrf Weight Path
 * i  [2][172.16.255.4:102][0][48][44D3CA286CC3][0][*]/20
                       172.16.254.4             0    100      0 ?
 *>i                    172.16.254.4             0    100      0 ?
Route Distinguisher: 172.16.255.4:103
 * i  [2][172.16.255.4:103][0][48][44D3CA286CC4][0][*]/20
                       172.16.254.4             0    100      0 ?
 *>i                    172.16.254.4             0    100      0 ?
Route Distinguisher: 172.16.255.4:104
 * i  [2][172.16.255.4:104][0][48][44D3CA286CC5][0][*]/20
                       172.16.254.4             0    100      0 ?
 *>i                    172.16.254.4             0    100      0 ?
Route Distinguisher: 172.16.255.5:201
 * i  [2][172.16.255.5:201][0][48][44D3CA286CC6][32][10.1.102.3]/24
                       172.16.254.5             0    100      0 ?
 *>i                    172.16.254.5             0    100      0 ?
 * i  [2][172.16.255.5:201][0][48][44D3CA286CC7][32][10.1.102.4]/24
                       172.16.254.5             0    100      0 ?
 *>i                    172.16.254.5             0    100      0 ?
 * i  [2][172.16.255.5:201][0][48][44D3CA286CC8][32][10.1.102.5]/24
                       172.16.254.5             0    100      0 ?
 *>i                    172.16.254.5             0    100      0 ?
 * i  [2][172.16.255.5:201][0][48][7C210DBD274C][32][10.1.201.1]/24
                       172.16.254.5             0    100      0 ?
 *>i                    172.16.254.5             0    100      0 ?
Route Distinguisher: 172.16.255.5:202
 * i  [2][172.16.255.5:202][0][48][44D3CA286CC6][0][*]/20
                       172.16.254.5             0    100      0 ?
 *>i                    172.16.254.5             0    100      0 ?
Route Distinguisher: 172.16.255.5:203
 * i  [2][172.16.255.5:203][0][48][44D3CA286CC7][0][*]/20
                       172.16.254.5             0    100      0 ?
 *>i                    172.16.254.5             0    100      0 ?
Route Distinguisher: 172.16.255.5:204
 * i  [2][172.16.255.5:204][0][48][44D3CA286CC8][0][*]/20
                       172.16.254.5             0    100      0 ?
 *>i                    172.16.254.5             0    100      0 ?
Route Distinguisher: 1:1
 * i  [5][1:1][0][24][10.1.101.0]/17
                       172.16.254.4             0    100      0 ?
 * i                    172.16.254.3             0    100      0 ?
 *>i                    172.16.254.3             0    100      0 ?
 * i  [5][1:1][0][24][10.1.201.0]/17
                       172.16.254.5             0    100      0 ?
 *>i                    172.16.254.5             0    100      0 ?

Spine-02#
```