

Configuring Tenant Routed Multicast

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Restrictions for Tenant Routed Multicast

- Layer 2 tenant routed multicast (TRM) is not supported. Only Layer 3 TRM is supported.
- TRM uses only default multicast distribution tree (MDT).
- TRM is supported for IPv4 and IPv6 traffic in the overlay network and on IPv4 underlay network.
- In the underlay network, TRM is supported only in the PIM-SM mode.
- In the underlay network, the spine switch should be configured as the rendezvous point (RP).

The RP for the underlay network can also be elected using PIM Bootstrap Router (BSR) or Auto-RP.

Information about Tenant Routed Multicast

TRM enables multicast forwarding in a VXLAN fabric that uses a BGP-based EVPN control plane. TRM provides multi-tenancy aware multicast forwarding between senders and receivers within the same or different subnets local or across VTEPs.

TRM enables the delivery of a customer's IP multicast traffic in a multi-tenant fabric in an efficient and resilient manner. The delivery of TRM improves Layer 3 overlay multicast functionality in the networks. With TRM enabled, multicast forwarding in the underlay is leveraged to replicate VXLAN-encapsulated routed multicast traffic. A default MDT is built per-VRF. This is in addition to the existing multicast groups for broadcast and unknown unicast traffic in a Layer 2 virtual network instance (VNI), and for Layer 2 multicast replication group. The individual multicast group addresses in the overlay are mapped to the respective underlay multicast address for replication and transport. The advantage of using a BGP-based approach is that it allows the BGP EVPN VXLAN fabric with TRM to operate as fully distributed overlay rendezvous point (RP), with the RP presence on every edge device or VTEP.

A multicast-enabled data center fabric is typically part of an overall multicast network. Multicast sources, receivers, and multicast rendezvous points, might reside inside the data center but might also be inside the campus or externally reachable via the WAN. Thus, TRM allows a seamless integration with existing multicast networks with newer enterprise fabric.

Figure 1: Tenant Routed Multicast Topology



For IPv4 and IPv6 multicast traffic, TRM uses BGP EVPN and multicast virtual private network (MVPN) routes to perform multicast routing. All the VTEPs in the network do not need to be BGP peers. There can be BGP peering between the VTEPs and the spine switches with the spine switches acting as route reflectors. Source reachability is distributed via EVPN route type 2 and EVPN route type 5 in the fabric. RPF is installed based on these routes. Source-active and receiver-join information is carried in the MVPN address family using route types 5, 6, and 7.

In an EVPN VXLAN network, TRM is supported in the overlay network in PIM sparse mode and PIM source specific multicast (SSM) mode. VTEPs have BGP peering in MVPN as well as EVPN address families to exchange routes for TRM.

TRM in PIM Sparse Mode

PIM-SM distributes information about active sources by forwarding data packets on the shared tree. Because PIM-SM uses shared trees, it requires the use of a rendezvous point (RP). An RP is used for the initial convergence of multicast traffic between sources and receivers.

The following section describes the different ways the RP can be configured for TRM in PIM sparse mode.

RP Placement

For TRM in PIM sparse mode, the overlay RP can be configured either within the BGP EVPN VXLAN fabric, or outside of the fabric.

Anycast RP in the Overlay Network

In Anycast RP in the overlay network, every VTEP acts as an RP.

Figure 2: Anycast RP in the Overlay Network



RP Inside the BGP EVPN VXLAN Fabric

In a TRM scenario where all sources and receivers are within the EVPN VXLAN network, the overlay RP can be placed on a border spine or on a VTEP.





Figure 4: VTEP as an RP



RP Outside the BGP EVPN VXLAN Fabric

In a TRM scenario where sources and receivers need to interwork with the overlay network and the EVPN VXLAN network, the RP can be placed on an external router connected to a VTEP.

Figure 5: RP Outside the BGP EVPN VXLAN Fabric



In PIM sparse mode, TRM can be configured in three different ways depending on how the RP is configured:

- PIM Sparse Mode with Anycast RP
- PIM Sparse Mode with RP Inside the BGP EVPN VXLAN Fabric
- PIM Sparse Mode with RP Outside the BGP EVPN VXLAN Fabric

PIM Sparse Mode with Anycast RP

In PIM sparse mode with anycast RP, every VTEP in the EVPN VXLAN network acts as an RP in the overlay network for its respective multicast group. The RPs in the underlay network must be configured on the spine switches.

When a VTEP discovers a source device, it sends Source A-D Routes (MVPN route type 5) to all the other VTEPs. Based on these Source A-D routes, the other VTEPs send (S,G) join requests as MVPN route type 7 to the source VTEP.

Figure 6: PIM Sparse Mode with Anycast RP



In PIM sparse mode with anycast RP, the following sequence of events occurs:

- 1. Receiver sends (*,G) IGMP Join to VTEP 3. Since VTEP 3 is an RP, (*,G) is created at VTEP 3.
- 2. The source device starts streaming data and (S,G) is created on VTEP 1.
- 3. VTEP 1 performs self-source-registration since it is also an RP.

The source VTEP (VTEP 1) advertises Source A-D Routes (also called MVPN route type 5) for the (S,G) to all the other VTEPs which are BGP peers in the MVPN address family.

4. VTEP 2 and VTEP 3 receive and install the Source A-D Route for the (S,G).

(S,G) is created at VTEP 3. VTEP 3 now has an overlay route for the (S,G) and also has a unicast route to the source device from the EVPN Control plane. It then sends an MVPN route type 7 (S,G) BGP join to VTEP 1 and starts accepting traffic.

5. VTEP 1 receives and installs MVPN route type 7 from VTEP 3. It uses the Layer 3 VNI's SVI as the forwarding interface for the (S,G) and starts forwarding traffic.

PIM Sparse Mode with RP Inside the BGP EVPN VXLAN Fabric

In PIM sparse mode with RP inside the BGP EVPN VXLAN Fabric, the RP can be any VTEP in the EVPN VXLAN network.



Figure 7: PIM Sparse Mode with RP Inside the BGP EVPN VXLAN Fabric

The following sequence of events occurs when TRM is enabled in PIM sparse mode with the RP inside the fabric:

- 1. Receiver sends (*,G) IGMP Join to VTEP 3. (*,G) is created at VTEP 3.
- 2. VTEP 3 sends MVPN route type 6 to VTEP 2 which is the RP. (*,G) is created at VTEP 2.
- 3. The source device starts streaming data and (S,G) is created on VTEP 1.

- 4. VTEP 1 performs source-registration at VTEP 2 since it is the RP. (S,G) is created at VTEP 2.
- 5. Since the RP has a receiver for (S,G), it sends an MVPN route type 7 to VTEP 1 and forwards PIM-register traffic towards receivers in the (*,G) tree.
- **6.** VTEP 1 receives and installs MVPN route type 7 from VTEP 2. It uses the Layer 3 VNI's SVI as the forwarding interface for (S,G).

The source VTEP (VTEP 1) advertises Source A-D Routes for (S,G) to all the other VTEPs which are BGP peers in the MVPN address family.

VTEP 2 and VTEP 3 receive and install the Source A-D Routes for (S,G).

7. (S,G) is created at VTEP 3. VTEP 3 now has an overlay route for (S,G) and also has a unicast route to the source device from the EVPN Control plane. It then sends an MVPN route type 7 to VTEP 1 and starts accepting traffic.

VTEP 1 receives and installs MVPN route type 7 from VTEP 3 and starts forwarding traffic.



Note For the receiver VTEP to be able to send an MVPN route type 7 to the source VTEP, there can be two triggers:

- The (*,G) packets being forwarded to the receiver VTEP from the RP.
- The Source A-D route received from the source VTEP.

Once either of these are received, the receiver VTEP sends MVPN route type 7 to the source VTEP.

PIM Sparse Mode with RP Outside the BGP EVPN VXLAN Fabric

In PIM sparse mode with RP outside the BGP EVPN VXLAN Fabric, the RP can be a PIM router behind any VTEP in the EVPN VXLAN network.



Note

When the RP is configured outside the BGP EVPN VXLAN fabric, TRM in PIM sparse mode functions the same way as it does when the RP is inside the fabric.



Figure 8: PIM Sparse Mode with RP Outside the BGP EVPN VXLAN Fabric

The chronological traffic flow from the image above is as follows:

- 1. Receiver sends (*,G) IGMP Join to VTEP 3. (*,G) is created at VTEP 3.
- 2. VTEP3 sends and MVPN route type 6 to VTEP 2 which has the RP in its overlay network. This route is converted to a (*,G) join towards the RP by VTEP2.
- 3. The source device starts streaming data and (S,G) is created on VTEP 1.
- 4. VTEP1 performs source registration with RP. (S,G) join from RP creates (S,G) state at VTEP 2.
- 5. Since the RP has a receiver for (S,G), it sends an MVPN route type 7 to VTEP 1 and forwards PIM-register traffic towards receivers in the (*,G) tree.
- **6.** VTEP 1 receives and installs MVPN route type 7 from VTEP 2. It uses the Layer 3 VNI's SVI as the forwarding interface for (S,G).

The source VTEP (VTEP 1) advertises Source A-D Routes for (S,G) to all the other VTEPs which are BGP peers in the MVPN address family.

VTEP 2 and VTEP 3 receive and install the Source A-D Routes for (S,G).

7. (S,G) is created at VTEP 3. VTEP 3 now has an overlay route for (S,G) and also has a unicast route to the source device from the EVPN Control plane. It then sends an MVPN route type 7 to VTEP 1 and starts accepting traffic.

VTEP 1 receives and installs MVPN route type 7 from VTEP 3 and starts forwarding traffic.



Note For the receiver VTEP to be able to send an MVPN route type 7 to the source VTEP, there can be two triggers:

- The (*,G) packets being forwarded to the receiver VTEP from the RP.
- The Source A-D route received from the source VTEP.

Once either of these are received, the receiver VTEP sends MVPN route type 7 to the source VTEP.

See PIM Sparse Mode with RP Inside the BGP EVPN VXLAN Fabric, on page 7 for the sequence of events that happen when TRM is enabled in PIM sparse mode with the RP outside the fabric.

TRM in PIM Source Specific Mode

In PIM source specific mode, the Source A-D route (MVPN route type 5) is not needed for the multicast convergence to happen. The receiver VTEP does not wait to receive the Source A-D route to send the MVPN route type 7.



Figure 9: PIM Source Specific Mode

In PIM Source Specific Mode, the following sequence of events occurs:

1. When the source device sends a unicast packet, VTEP 1 sends out EVPN routes to all the other VTEPs, letting them know that the packet is from the source device.

The receiver sends an (S,G) IGMP join towards VTEP 3 and an (S,G) entry is created.

- 2. VTEP 3 performs an RPF lookup for the source device. If the SVI of the Layer 3 VNI is found to be the RPF interface, VTEP 3 sends MVPN route type 7 towards VTEP 1.
- **3.** VTEP 1 receives and installs the MVPN route type 7. VTEP 1 creates an (S,G) entry, using the Layer 3 VNI's SVI as the forwarding interface for (S,G).

The source device sends (S,G) data to VTEP 1.

4. VTEP 1 starts forwarding the traffic to VTEP 3.

How to Configure Tenant Routed Multicast

Prerequisites to Configuring TRM

Before configuring TRM, ensure that EVPN VXLAN Layer 2 and Layer 3 Overlay networks have been configured. See How to Configure EVPN VXLAN Integrated Routing and Bridging for detailed steps to configure Layer 2 and Layer 3 overlay networks.

Perform the following set of procedures to configure TRM in an EVPN VXLAN network:

Configuring TRM with PIM Sparse Mode

To configure TRM with PIM Sparse Mode, perform the following tasks:

- Configuring the TRM Multicast Distribution Tree in the VRF, on page 12
- Configuring Multicast Routing on the Overlay VRF, on page 13
- Configuring Multicast on Switch Virtual Interfaces for the Core-facing and Access-facing VLANs, on page 14
- Configuring BGP with MVPN Address Family on VTEP, on page 15
- Configuring RP for Underlay Network, on page 16
- Configuring RP for Overlay Network, on page 17

Configuring the TRM Multicast Distribution Tree in the VRF

To configure the TRM MDT, perform the following steps:

	Command or Action	Purpose
Step 1	enable	Enables privileged EXEC mode.
	Example: Device> enable	Enter your password, if prompted.
Step 2	<pre>configure terminal Example: Device# configure terminal</pre>	Enters global configuration mode.
Step 3	<pre>vrf definition vrf-name Example: Device(config)# vrf definition green</pre>	Names the VRF and enters VRF configuration mode.
Step 4	<pre>address-family {ipv4 ipv6 } Example: Device(config-vrf)# address-family ipv4</pre>	 Specifies the VRF and enters VRF address family configuration mode. Use the <i>ipv4</i> keyword to configure IPv4 address family. Use the <i>ipv6</i> keyword to configure IPv6 address family.
Step 5	<pre>mdt default vxlan group-address Example: Device(config-vrf-af)# mdt default vxlam 225.2.2</pre>	Configures the multicast group address range for default MDT groups for a VRF in a VXLAN.

	Command or Action	Purpose
Step 6	mdt auto-discovery vxlan [inter-as]	Enables VXLAN with BGP auto-discovery.
	Example: Device(config-vrf-af)# mdt auto-discovery vxlan	Use the inter-as keyword for the MVPN address family routes to cross the BGP autonomous system (AS) boundaries.
Step 7	<pre>mdt overlay use-bgp [spt-only] Example: Device(config-vrf-af)# mdt overlay use-bgp spt-only</pre>	Configures the mechanism that is used by TRM in PIM sparse mode to operate within the BGP EVPN VXLAN fabric. Specifies BGP as the overlay protocol.
		 Use the mdt overlay use-bgp spt-only command to configure PIM sparse mode with anycast RP. Use the mdt overlay use-bgp command to configure PIM sparse mode with a single RP either inside or outside the BGP EVPN VXLAN fabric.
Step 8	<pre>exit-address-family Example: Device(config-vrf-af)# exit-address-family</pre>	Exits VRF address family configuration mode and returns to VRF configuration mode.
Step 9	end	Returns to privileged EXEC mode.
	Example:	
	Device(config-vrf)# end	

Configuring Multicast Routing on the Overlay VRF

To enable multicast routing on the overlay VRF, perform the following steps:

	Command or Action	Purpose
Step 1	enable	Enables privileged EXEC mode.
	Example:	Enter your password, if prompted.
	Device> enable	
Step 2	configure terminal	Enters global configuration mode.
	Example:	
	Device# configure terminal	
Step 3ip multicast-routing vrf vrf-nameEnables IP rExample:VRF.	Enables IP multicast forwarding on the overlay	
	Example:	VRF.

	Command or Action	Purpose
	Device(config)# ip multicast-routing vrf green	
Step 4	ipv6 unicast-routing	Enables IPv6 unicast forwarding.
	Example:	
	Device(config)# ipv6 unicast-routing	
Step 5 ij	ipv6 multicast-routing vrf vrf-name	Enables IPv6 multicast forwarding on the
	Example:	overlay VRF.
	Device(config)# ipv6 multicast-routing vrf green	
Step 6	end	Returns to privileged EXEC mode.
	Example:	
	Device(config)# end	

Configuring Multicast on Switch Virtual Interfaces for the Core-facing and Access-facing VLANs

To configure multicast on SVIs for the core-facing and access-facing VLANs on the VTEP, perform the following steps:

	Command or Action	Purpose
Step 1	enable	Enables privileged EXEC mode.
	Example:	Enter your password, if prompted.
	Device> enable	
Step 2	configure terminal	Enters global configuration mode.
	Example:	
	Device# configure terminal	
Step 3	interface vlan core-facing-vlan-id	Enters interface configuration mode for the specified VLAN.
	Example:	
	Device(config)# interface vlan 200	
Step 4	ip pim sparse-mode	Enables IPv4 multicast on the core-facing SVI.
	Example:	
	Device(config-if) # ip pim sparse-mode	
Step 5	exit	Returns to privileged EXEC mode.
	Example:	
	Device(config-if)# end	

		P
	Command or Action	Purpose
Step 6	interface vlan access-facing-vlan-id	Enters interface configuration mode for the
	Example:	specified VLAN.
	Device(config) # interface vlan 202	
Step 7	ip pim sparse-mode	Enables IPv4 multicast on the access-facing
	Example:	SVI where sources or receivers are connected.
	Device(config-if) # ip pim sparse-mode	Repeat this step for all the access-facing SVIs that are part of the Layer 2 VNI where sources and receivers are connected.
Step 8	end	Returns to privileged EXEC mode.
	Example:	
	Device(config-if)# end	

Configuring BGP with MVPN Address Family on VTEP

To configure BGP on a VTEP with MVPN address family, perform the following steps:

	Command or Action	Purpose
Step 1	enable	Enables privileged EXEC mode.
	Example:	Enter your password, if prompted.
	Device> enable	
Step 2	configure terminal	Enters global configuration mode.
	Example: Device# configure terminal	
Step 3	<pre>router bgp autonomous-system-number Example: Device(config)# router bgp 1</pre>	Enables a BGP routing process, assigns it an autonomous system number, and enters router configuration mode.
Step 4	<pre>address-family {ipv4 ipv6 } mvpn Example: Device(config-router)# address-family ipv4 mvpn</pre>	 Specifies the MVPN address family and enters address family configuration mode. Use the ipv4 keyword to configure IPv4 MVPN address family. Use the ipv6 keyword to configure IPv6 MVPN address family.
Step 5	<pre>neighbor ip-address activate Example: Device(config-router-af)# neighbor 10.2.2.20 activate</pre>	Enables the exchange of information with a BGP neighbor. Use the IP address of the spine switch as the neighbor IP address.

	Command or Action	Purpose
Step 6	neighbor <i>ip-address</i> send-community extended	Specifies the communities attribute sent to a BGP neighbor.
	Example: Device(config-router-af)# neighbor 10.2.2.20 send-community both	Use the IP address of the spine switch as the neighbor IP address.
Step 7	neighbor <i>ip-address</i> advertisement-interval <i>seconds</i>	(Optional) Sets the minimum route advertisement interval (MRAI) between the
	Example:	sending of BGP routing updates.
	Device(config-router-af)# neighbor 10.2.2.20 advertisement-interval 10	
Step 8	exit-address-family	Exits address family configuration mode and
	Example:	returns to router configuration mode.
	<pre>Device(config-router-af)# exit-address-family</pre>	
Step 9	end	Returns to privileged EXEC mode.
	Example:	
	Device(config-router)# end	

Configuring RP for Underlay Network

To configure RP for the underlay network, perform the following steps:



Note

It is recommended that you configure the Spine Switch as the RP for the underlay network.

	Command or Action	Purpose
Step 1	enable	Enables privileged EXEC mode.
	Example:	Enter your password, if prompted.
	Device> enable	
Step 2	configure terminal	Enters global configuration mode.
	Example:	
	Device# configure terminal	
Step 3	ip pim rp-address ip-address-of-rp	Configures the RP in the underlay network.
	Example:	For information about RP redundancy, see to
	<pre>Device(config)# ip pim rp-address <rp-ip-address></rp-ip-address></pre>	IP Multicast Routing Configuration Guide.

	Command or Action	Purpose
Step 4	end	Returns to privileged EXEC mode.
	Example:	
	Device(config)# end	

Configuring RP for Overlay Network

To configure RP for the overlay network, perform the following steps:

	Command or Action	Purpose
Step 1	enable	Enables privileged EXEC mode.
	Example:	Enter your password, if prompted.
	Device> enable	
Step 2	configure terminal	Enters global configuration mode.
	Example:	
	Device# configure terminal	
Step 3	interface loopback-interface	Enters interface configuration mode for the
	Example:	specified Loopback interface.
	Device(config) # interface Loopback 13	
Step 4	vrf forwarding vrf-name	Configures forwarding table for the Loopback
	Example:	interface.
	Device(config-if) # vrf forwarding green	
Step 5	ip-address ip-address subnet-mask	Configures the IP address for the Loopback
	Example:	interface.
	Device(config-if)# ip address 10.1.13.13 255.255.255.255	
Step 6	ip pim sparse-mode	Enables IPv4 multicast on the Loopback
	Example:	interface.
	<pre>Device(config-if)# ip pim sparse-mode</pre>	Note Enable PIM sparse mode only if EVPN VXI AN Laver 2 overlay
		network is also configured on the
		VTEP with underlay multicast as
		BUM traffic.
Step 7	exit	Returns to global configuration mode.
	Example:	
	Device(config-if)# exit	

	Command or Action	Purpose
Step 8	{ ip ipv6 } pim vrf <i>vrf-name</i> rp-address <i>rp-address</i>	Configures the address of the local VTEP as the PIM RP for the multicast group.
	Example: Device(config)# ip pim vrf green rp-address 10.1.13.13	• In PIM-SM with Anycast RP mode, use the address of the loopback interface of the local VTEP.
		 In PIM-SM with RP either inside or outside the BGP EVPN VXLAN fabric, use the IP address of the RP. Note The loopback interface specified must be part of the same VRF.
Step 9	<pre>{ip ipv6 } pim vrf vrf-name register-source loopback-address-of-vtep Example: Device(config)# ip pim vrf green register-source loopback901</pre>	Configures a unique IP address for the loopback interface of the VTEP that acts as the first hop router to multicast traffic.
Step 10	end	Returns to privileged EXEC mode.
	Example: Device(config)# end	

Configuring TRM with PIM Source Specific Mode

To configure TRM with PIM Source Specific Mode, perform the following tasks:

- Configuring the TRM Multicast Distribution Tree in the VRF, on page 12
- Configuring Multicast Routing on the Overlay VRF, on page 13
- Configuring Multicast on Switch Virtual Interfaces for the Core-facing and Access-facing VLANs, on page 14
- Configuring BGP with MVPN Address Family on VTEP, on page 15
- Configuring RP for Underlay Network, on page 16
- Configuring SSM for Overlay Network, on page 18

Configuring SSM for Overlay Network

To configure SSM for the overlay network, perform the following steps:

	Command or Action	Purpose			
Step 1	enable	Enables privileged EXEC mode.			

	Command or Action	Purpose			
	Example:	Enter your password, if prompted.			
	Device> enable				
Step 2	configure terminal	Enters global configuration mode.			
	Example:				
	Device# configure terminal				
Step 3	ip pim [vrf vrf-name] ssm { default	Configures an SSM range for TRM.			
	range access-list }	The default keyword defines the SSM range access list as 232/8.			
	Example:				
	Device(config)# ip pim vrf green ssm default	The range keyword specifies the standard IP access list number or name that defines the SSM range.			
Step 4	end	Returns to privileged EXEC mode.			
	Example:				
	Device(config)# end				

Verifying Tenant Routed Multicast

The following table lists the **show** commands that are used to verify TRM:

Command	Purpose
show nve peers	Displays NVE interface state information for peer leaf switches.
show l2vpn evpn peers vxlan	Displays Layer 2 EVPN peer route counts in the VXLAN and up time.
show ip igmp vrf green groups	Displays the multicast groups with receivers that are directly connected to the router pertaining to the specific Multicast Virtual Routing and Forwarding (MVRF) instance and that were learned through IGMP.
show bgp ipv4 mvpn all	Displays the MVPN options for BGP MVPN C-route signaling.
show ip mroute vrf green	Displays the contents of the mroute table that pertain to a specific MVRF instance.
show ip mfib vrf green	Displays forwarding entries and interfaces in the IPv4 Multicast Forwarding Information Base (MFIB) associated with MVRF instances.
show ip mroute	Displays multicast routing table information.

Command	Purpose
show ip mfib	Displays the forwarding entries and interfaces in the IPv4 MFIB.

Troubleshooting Tenant Routed Multicast

See Troubleshoot EVPN VxLAN TRM on Catalyst 9000 Switches document to learn how to troubleshoot issues with TRM in a BGP EVPN VXLAN fabric.

Configuration Examples for Tenant Routed Multicast

The following sections provide configuration examples for TRM in different scenarios.

Example: Configuring TRM in PIM Sparse Mode with Anycast RP

This example shows how to configure and verify Layer 3 TRM with PIM-SM for IPv4 and IPv6 multicast traffic when the every VTEP is an RP is inside the BGP EVPN VXLAN fabric.



The topology shows an EVPN VXLAN network with a receiver device and a source device connected to VTEP 1 and VTEP 2 respectively. The IPv4 multicast group is 226.1.1.1 and the IPv6 multicast group is FF06:1::1 in this topology. The following tables provide sample configurations for the devices in this topology:

Table 1: Configuring VTEP 1, VTEP 2, and VTEP 3 to Configure TRM in PIM-SM with Anycast RP for IPv4 and IPv6 Multicast Traffic

VTEP 1	VTEP 2	VTEP 3
Leaf-01# show running-config	Leaf-02# show running-config	Leaf-03# show running-config
!	!	!
vrf definition green	vrf definition green	vrf definition green
rd 1:1	rd 1:1	rd 1:1
address-Iamliy 1pv4	address-Iamliy 1pv4	address-Iamliy 1pv4
mdt default uvlan 239 1 1 1	mdt default uvlan 239 1 1 1	mdt default uvlan 230 1 1 1
mdt overlav use-bop spt-only	mdt overlav use-bop spt-only	mdt overlav use-bop spt-only
route-target export 1:1	route-target export 1:1	route-target export 1:1
route-target import 1:1	route-target import 1:1	route-target import 1:1
route-target export 1:1 stitching	route-target export 1:1 stitching	route-target export 1:1 stitching
route-target import 1:1 stitching	route-target import 1:1 stitching	route-target import 1:1 stitching
exit-address-family	exit-address-family	exit-address-family
!	!	!
address-family ipv6	address-family ipv6	address-family ipv6
mdt auto-discovery vxlan	mdt auto-discovery vxlan	mdt auto-discovery vxlan
mdt default vxlan 239.1.1.1	mdt default vxlan 239.1.1.1	mdt default vxlan 239.1.1.1
mat overlay use-bgp spt-only	mat overlay use-bgp spt-only	mat overlay use-bgp spt-only
route-target export 1:1	route-target export 1:1	route-target export 1:1
route-target export 1:1 stitching	route-target export 1:1 stitching	route-target export 1:1
route-target import 1:1 stitching	route-target import 1:1 stitching	route-target import 1:1 stitching
exit-address-family	exit-address-family	exit-address-family
!	!	
ip routing	ip routing	ip routing
ip multicast-routing	ip multicast-routing	ip multicast-routing
ip multicast-routing vri green	ip multicast-routing vri green	ip multicast-routing vri green
inv6 unicast-routing	ipv6 upicast-routing	ipv6 upicast-routing
ipv6 multicast-routing vrf green	ipv6 multicast-routing vrf green	ipv6 multicast-routing vrf green
!	!	!
12vpn evpn	12vpn evpn	12vpn evpn
replication-type static	replication-type static	replication-type static
router-id Loopback1	router-id Loopback1	router-id Loopback1
default-gateway advertise	default-gateway advertise	default-gateway advertise
!	!	!
12vpn evpn instance 101 vlan-based	12vpn evpn instance 101 vlan-based	12vpn evpn instance 101 vlan-based
encapsulation vxlan	encapsulation vxlan	encapsulation vxlan
12mp emp instance 102 mlan-based	12 yon eyon instance 102 ylan-based	12 yon eyon instance 102 ylan-based
encansulation vylan	encansulation vylan	encansulation vylan
system mtu 9198	system mtu 9198	system mtu 9198
!	!	!
vlan configuration 101	vlan configuration 101	vlan configuration 101
member evpn-instance 101 vni 10101	member evpn-instance 101 vni 10101	member evpn-instance 101 vni 10101
vlan configuration 102	vlan configuration 102	vlan configuration 102
member evpn-instance 102 vni 10102	member evpn-instance 102 vni 10102	member evpn-instance 102 vni 10102
vlan configuration 901	vlan configuration 901	vlan configuration 901
member vni 50901	member vni 50901	member vni 50901
!	1	1

VTEP 1	VTEP 2	VTEP 3
<pre>interface Loopback0 ip address 172.16.255.3 255.255.255.255 ip pim sparse-mode ip ospf 1 area 0 </pre>	<pre>interface Loopback0 ip address 172.16.255.4 255.255.255.255 ip pim sparse-mode ip ospf 1 area 0 </pre>	<pre>interface Loopback0 ip address 172.16.255.6 255.255.255.255 ip pim sparse-mode ip ospf 1 area 0 </pre>
interface Loopback1 ip address 172.16.254.3 255.255.255.255 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 Loopback1 ip address 172.16.254.6 255.255.255.255 ip pim sparse-mode ip ospf 1 area 0
<pre>interface Loopback255 vrf forwarding green ip address 10.2.255.255 255.255.255.255 ip pim sparse-mode ipv6 address FC00:2:255::255/128 ipv6 enable</pre>	<pre>interface Loopback255 vrf forwarding green ip address 10.2.255.255 255.255.255.255 ip pim sparse-mode ipv6 address FC00:2:255::2/128 ipv6 enable</pre>	interface Loopback255 vrf forwarding green ip address 10.2.255.255 255.255.255.255 ip pim sparse-mode ipv6 address FC00:2:255::255/128 ipv6 enable
<pre>interface Loopback901 vrf forwarding green ip address 10.1.255.1 255.255.255.255 ip pim sparse-mode ipv6 address FC00:1:255::1/128 ipv6 enable</pre>	<pre>interface Loopback901 vrf forwarding green ip address 10.1.255.2 255.255.255.255 ip pim sparse-mode ipv6 address FC00:1:255::2/128 ipv6 enable</pre>	<pre>interface Loopback901 vrf forwarding green ip address 10.1.255.3 255.255.255.255 ip pim sparse-mode ipv6 address FC00:1:255::3/128 ipv6 enable</pre>
<pre>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 </pre>	<pre>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 '</pre>	: interface TenGigabitEthernet1/0/1 no switchport ip address 172.16.16.6 255.255.255.0 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 GigabitEthernet1/0/2 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 TenGigabitEthernet1/0/2 no switchport ip address 172.16.26.6 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0
: interface GigabitEthernet1/0/10 switchport access vlan 101 switchport mode access !	: interface GigabitEthernet1/0/10 switchport access vlan 102 switchport mode access !	: interface TenGigabitEthernet1/0/10 switchport access vlan 102 switchport mode access !

VTEP 1	VTEP 2	VTEP 3
<pre>interface Vlan101 vrf forwarding green ip address 10.1.101.1 255.255.255.0 ip pim sparse-mode ipv6 address FC00:1:101::1/64 ipv6 enable ! interface Vlan102 vrf forwarding green ip address 10.1.102.1 255.255.255.0 ip pim sparse-mode ipv6 address FC00:1:102::1/64</pre>	<pre>interface Vlan101 vrf forwarding green ip address 10.1.101.1 255.255.255.0 ip pim sparse-mode ipv6 address FC00:1:101::1/64 ipv6 enable ! interface Vlan102 vrf forwarding green ip address 10.1.102.1 255.255.255.0 ip pim sparse-mode ipv6 address FC00:1:102::1/64</pre>	<pre>interface Vlan101 vrf forwarding green ip address 10.1.101.1 255.255.255.0 ip pim sparse-mode ipv6 address FC00:1:101::1/64 ipv6 enable ! interface Vlan102 vrf forwarding green ip address 10.1.102.1 255.255.255.0 ip pim sparse-mode</pre>
<pre>ipv6 address recorrection in the ipv6 enable ! interface Vlan901 vrf forwarding green ip unnumbered Loopback1 ip pim sparse-mode ipv6 enable no autostate</pre>	<pre>ipv6 address rcooline2) of ipv6 enable ! interface Vlan901 vrf forwarding green ip unnumbered Loopback1 ip pim sparse-mode ipv6 enable no autostate</pre>	<pre>ip pin sparse mode ipv6 address FC00:1:102::1/64 ipv6 enable ! interface Vlan901 vrf forwarding green ip unnumbered Loopback1 ip pim sparse-mode ipv6 enable</pre>
<pre>! interface nve1 no ip address source-interface Loopback1 host-reachability protocol bgp member vni 10101 mcast-group 225.0.0.101 member vni 50901 vrf green member vni 10102 mcast-group 225.0.0.102 !</pre>	<pre>interface nve1 no ip address source-interface Loopback1 host-reachability protocol bgp member vni 10101 mcast-group 225.0.0.101 member vni 50901 vrf green member vni 10102 mcast-group 225.0.0.102 </pre>	no autostate ! interface nvel no ip address source-interface Loopback1 host-reachability protocol bgp member vni 10101 mcast-group 225.0.0.101 member vni 50901 vrf green member vni 10102 mcast-group 225.0.0.102
router ospf 1 router-id 172.16.255.3 ! router bgp 65001 bgp log-neighbor-changes no bgp default ipv4-unicast neighbor 172.16.255.1 remote-as 65001 neighbor 172.16.255.2 remote-as 65001 neighbor 172.16.255.2 update-source Loopback0 !	router ospf 1 router-id 172.16.255.4 ! router bgp 65001 bgp log-neighbor-changes no bgp default ipv4-unicast neighbor 172.16.255.1 remote-as 65001 neighbor 172.16.255.2 remote-as 65001 neighbor 172.16.255.2 update-source Loopback0 !	<pre>! router ospf 1 router-id 172.16.255.6 ! router bgp 65001 bgp log-neighbor-changes no bgp default ipv4-unicast neighbor 172.16.255.1 remote-as 65001 neighbor 172.16.255.2 remote-as 65001 neighbor 172.16.255.2 update-source Loopback0 !</pre>

VTEP 1	VTEP 2	VTEP 3
address-family ipv4 exit-address-family !	address-family ipv4 exit-address-family !	address-family ipv4 exit-address-family !
address-family ipv4 mvpn neighbor 172.16.255.1 activate neighbor 172.16.255.1 send-community	address-family ipv4 mvpn neighbor 172.16.255.1 activate neighbor 172.16.255.1 send-community	address-family ipv4 mvpn neighbor 172.16.255.1 activate neighbor 172.16.255.1 send-community
neighbor 172.16.255.2 activate neighbor 172.16.255.2 send-community both	neighbor 172.16.255.2 activate neighbor 172.16.255.2 send-community both	neighbor 172.16.255.2 activate neighbor 172.16.255.2 send-community both
exit-address-family !	exit-address-family !	exit-address-family !
address-family ipv6 mvpn neighbor 172.16.255.1 activate neighbor 172.16.255.1 send-community both	address-family ipv6 mvpn neighbor 172.16.255.1 activate neighbor 172.16.255.1 send-community both	address-family ipv6 mvpn 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	neighbor 172.16.255.2 activate neighbor 172.16.255.2 send-community both	neighbor 172.16.255.2 activate neighbor 172.16.255.2 send-community both
exit-address-family	exit-address-family	exit-address-family
address-family l2vpn evpn	address-family l2vpn evpn	address-family 12vpn evpn
neighbor 172.16.255.1 activate	neighbor 172.16.255.1 activate	neighbor 172.16.255.1 activate
neighbor 172.16.255.1 send-community both	neighbor 172.16.255.1 send-community both	neighbor 172.16.255.1 send-community both
<pre>neighbor 172.16.255.2 activate neighbor 172.16.255.2 send-community both</pre>	<pre>neighbor 172.16.255.2 activate neighbor 172.16.255.2 send-community both</pre>	<pre>neighbor 172.16.255.2 activate neighbor 172.16.255.2 send-community both</pre>
exit-address-family	exit-address-family !	exit-address-family !
address-family ipv4 vrf green	address-family ipv4 vrf green	address-family ipv4 vrf green
advertise 12vpn evpn	advertise l2vpn evpn	advertise 12vpn evpn
redistribute connected	redistribute connected	redistribute connected
redistribute static	redistribute static	redistribute static
exit-address-family !	exit-address-family !	exit-address-family !
address-family ipv6 vrf green	address-family ipv6 vrf green	address-family ipv6 vrf green
redistribute connected	redistribute connected	redistribute connected
redistribute static	redistribute static	redistribute static
advertise l2vpn evpn exit-address-family	advertise l2vpn evpn exit-address-family	advertise l2vpn evpn exit-address-family
!	!	!
ip pim rp-address 172.16.255.255 ip pim vrf green rp-address	ip pim rp-address 172.16.255.255 ip pim vrf green rp-address	ip pim rp-address 172.16.255.255 ip pim vrf green rp-address
10.2.255.255	10.2.255.255	10.2.255.255
ipv6 pim vrf green rp-address	ipv6 pim vrf green rp-address	ipv6 pim vrf green rp-address
ipv6 pim vrf green register-source	ipv6 pim vrf green register-source	ipv6 pim vrf green register-source
Loopback901	Loopback901	Loopback901
! end	! end	! end
Leaf-01#	Leaf-02#	Leaf-03#

Table 2: Configuring Spine Switch 1 and Spine Switch 2 to Configure TRM in PIM-SM with Anycast RP for IPv4 and IPv6 Multicast Traffic

Spine Switch 1	Spine Switch 2

Spine Switch 1	Spine Switch 2
Spine-01# show running-config	Spine-02# show running-config
hostname Spine-01	hostname Spine-02
: ip routing !	: ip routing !
ip multicast-routing !	ip multicast-routing !
ipv6 unicast-routing !	ipv6 unicast-routing !
system mtu 9198 !	system mtu 9198 !
<pre>interface Loopback0 ip address 172.16.255.1 255.255.255.255 ip ospf 1 area 0 !</pre>	<pre>interface Loopback0 ip address 172.16.255.2 255.255.255.255 ip ospf 1 area 0 !</pre>
interface Loopback1 ip address 172.16.254.1 255.255.255.255 ip ospf 1 area 0 !	interface Loopback1 ip address 172.16.254.2 255.255.255.255 ip ospf 1 area 0 !
<pre>interface Loopback2 ip address 172.16.255.255 255.255.255.255 ip pim sparse-mode ip ospf 1 area 0 !</pre>	interface Loopback2 ip address 172.16.255.255 255.255.255.255 ip pim sparse-mode ip ospf 1 area 0 !
<pre>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 ''''''''''''''''''''''''''''''''''''</pre>	<pre>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 </pre>
<pre>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</pre>	<pre>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</pre>
<pre>interface GigabitEthernet1/0/4 no switchport ip address 172.16.16.1 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 ! router ospf 1 router-id 172.16.255.1</pre>	: interface GigabitEthernet1/0/4 no switchport ip address 172.16.26.2 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 ! router ospf 1 router ospf 1 router-id 172.16.255.2
<pre>! 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 172.16.255.3 remote-as 65001 neighbor 172.16.255.4 remote-as 65001 neighbor 172.16.255.4 update-source Loopback0 neighbor 172.16.255.6 remote-as 65001 neighbor 172.16.255.6 update-source Loopback0 neighbor 172.16.255.6 update-source Loopback0 !</pre>	<pre>! 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 172.16.255.4 remote-as 65001 neighbor 172.16.255.4 update-source Loopback0 neighbor 172.16.255.6 remote-as 65001 neighbor 172.16.255.6 update-source Loopback0 !</pre>

Spine Switch 1	Spine Switch 2
address-family ipv4	address-family ipv4
exit-address-family	exit-address-family
!	!
address-family ipv4 mvpn	address-family ipv4 mvpn
neighbor 172.16.255.2 activate	neighbor 172.16.255.1 activate
neighbor 172.16.255.2 send-community both	neighbor 172.16.255.1 send-community both
neighbor 172 16.255.2 route-reflector-client	neighbor 172 16.255.1 route-reflector-client
neighbor 172.16.255.3 activate	neighbor 172.16.255.3 activate
neighbor 172.16.255.3 send-community both	neighbor 172.16.255.3 send-community both
neighbor 172.16.255.3 route-reflector-client	neighbor 172.16.255.3 route-reflector-client
neighbor 172.16.255.4 activate	neighbor 172.16.255.4 activate
neighbor 172.16.255.4 send-community both	neighbor 172.16.255.4 send-community both
neighbor 172.16.255.4 route-reflector-client	neighbor 172.16.255.4 route-reflector-client
neighbor 172.16.255.6 activate	neighbor 172.16.255.6 activate
neighbor 172.16.255.6 send-community both	neighbor 172.16.255.6 send-community both
neighbor 172.16.255.6 route-reflector-client	neighbor 172.16.255.6 route-reflector-client
exit-address-family	exit-address-family
!	!
address-family ipv6 mvpn	address-family ipv6 mvpn
neighbor 172.16.255.2 activate	neighbor 172.16.255.1 activate
neighbor 172.16.255.2 send-community both	neighbor 172.16.255.1 send-community both
neighbor 172.16.255.2 route-reflector-client	neighbor 172.16.255.1 route-reflector-client
neighbor 172.16.255.3 activate	neighbor 172.16.255.3 activate
neighbor 172.16.255.3 send-community both	neighbor 172.16.255.3 send-community both
neighbor 172.16.255.3 route-reflector-client	neighbor 172.16.255.3 route-reflector-client
neighbor 172.16.255.4 activate	neighbor 172.16.255.4 activate
neighbor 172.16.255.4 send-community both	neighbor 172.16.255.4 send-community both
neighbor 172.16.255.4 route-reflector-client	neighbor 172.16.255.4 route-reflector-client
neighbor 172.16.255.6 activate	neighbor 172.16.255.6 activate
neighbor 172.16.255.6 send-community both	neighbor 172.16.255.6 send-community both
neighbor 172.16.255.6 route-reflector-client	neighbor 172.16.255.6 route-reflector-client
exit-address-family	exit-address-family
!	!
address-family 12vpn evpn	address-family 12vpn evpn
neighbor 172.16.255.2 activate	neighbor 172.16.255.1 activate
neighbor 172.16.255.2 send-community both	neighbor 172.16.255.1 send-community both
neighbor 172.16.255.2 route-reflector-client	neighbor 172.16.255.1 route-reflector-client
neighbor 172.16.255.3 activate	neighbor 172.16.255.3 activate
neighbor 172.16.255.3 send-community both	neighbor 172.16.255.3 send-community both
neighbor 172.16.255.3 route-reflector-client	neighbor 172.16.255.3 route-reflector-client
neighbor 172.16.255.4 activate	neighbor 172.16.255.4 activate
neighbor 172.16.255.4 send-community both	neighbor 172.16.255.4 send-community both
neighbor 172.16.255.4 route-reflector-client	neighbor 172.16.255.4 route-reflector-client
neighbor 172.16.255.6 activate	neighbor 172.16.255.6 activate
neighbor 172.16.255.6 send-community both	neighbor 172.16.255.6 send-community both
neighbor 172.16.255.6 route-reflector-client	neighbor 172.16.255.6 route-reflector-client
exit-address-family	exit-address-family
ip pim rp-address 172.16.255.255	ip pim rp-address 172.16.255.255
ip msdp peer 172.16.254.2 connect-source Loopback1	ip msdp peer 172.16.254.1 connect-source Loopback1
remote-as 65001	remote-as 65001
ip msdp cache-sa-state	ip msdp cache-sa-state
!	!
end	end
Spine-01#	Spine-02#

Verifying TRM in PIM-SM with Anycast RP for IPv4 and IPv6 Multicast Traffic

The following sections provide sample outputs for **show** commands to verify TRM with PIM-SM on the devices in the topology configured above:

- Outputs to Verify the Configuration on VTEP 1, on page 28
- Outputs to Verify the Configuration on VTEP 2, on page 35
- Outputs to Verify the Configuration on VTEP 3, on page 42
- Outputs to Verify the Configuration on Spine Switch 1, on page 50
- Outputs to Verify the Configuration on Spine Switch 2, on page 55

Outputs to Verify the Configuration on VTEP 1

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

Leaf-01# s	how nve	peers						
Interface	VNI	Туре	Peer-IP	RMAC/Num_RTs	eVNI	state	flags	UP time
nvel	50901	L3CP	172.16.254.6	0c75.bd67.ef48	50901	UP	A/-/4	01:47:43
nvel	50901	L3CP	172.16.254.4	7c21.0dbd.9548	50901	UP	A/-/4	01:47:43
nvel	50901	L3CP	172.16.254.6	0c75.bd67.ef48	50901	UP	A/M/6	01:47:43
nvel	50901	L3CP	172.16.254.4	7c21.0dbd.9548	50901	UP	A/M/6	01:47:43
nvel	10102	L2CP	172.16.254.4	7	10102	UP	N/A	01:47:43
nvel	10102	L2CP	172.16.254.6	7	10102	UP	N/A	01:47:43
Leaf-01#								

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

Leaf-01# show 12vpn evpn peers vxlan								
Interface	VNI	Peer-IP	Num routes	eVNI	UP time			
nvel	10102	172.16.254.4	7	10102	01:47:43			
nvel	10102	172.16.254.6	7	10102	01:47:43			

```
Leaf-01#show bgp ipv6 mvpn all summary
BGP router identifier 172.16.255.3, local AS number 65001
BGP table version is 8, main routing table version 8
3 network entries using 1176 bytes of memory
4 path entries using 640 bytes of memory
2/2 BGP path/bestpath attribute entries using 608 bytes of memory
4 BGP rrinfo entries using 160 bytes of memory
1 BGP community entries using 24 bytes of memory
14 BGP extended community entries using 1848 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 4456 total bytes of memory
BGP activity 69/0 prefixes, 92/2 paths, scan interval 60 secs
3 networks peaked at 11:32:31 Sep 16 2020 UTC (01:42:43.716 ago)

        Neighbor
        V
        AS MsgRcvd MsgSent
        TblVer
        InQ OutQ Up/Down
        State/Pfx

        172.16.255.1
        4
        65001
        140
        127
        8
        0
        0
        01:48:48
        1

        172.16.255.2
        4
        65001
        146
        128
        8
        0
        0
        01:48:40
        1

                                  AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd
```

The following example shows the output for the **show bgp ipv6 mvpn all** command on VTEP 1:

Leaf-01#

```
Leaf-01# show bgp ipv6 mvpn all
BGP table version is 8, 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
                                       Metric LocPrf Weight Path
    Network
                    Next Hop
Route Distinguisher: 1:1 (default for vrf green)
 *>
     [5][1:1][FC00:1:101::11][FF06:1::1]/42
                                                      32768 ?
                     ::
 *>i [7][1:1][65001][FC00:1:101::11][FF06:1::1]/46
                     172.16.255.4 0 100
                                                         0 ?
Route Distinguisher: 172.16.254.3:101
* i [7][172.16.254.3:101][65001][FC00:1:101::11][FF06:1::1]/46
                     172.16.255.4
                                    0
                                               100
                                                        0 ?
*>i
                                                          0 ?
                     172.16.255.4
                                             0
                                                 100
Leaf-01#
```

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

Leaf-01# show bgp 12vpn evpn summary BGP router identifier 172.16.255.3, local AS number 65001 BGP table version is 65, main routing table version 65 42 network entries using 16128 bytes of memory 60 path entries using 12720 bytes of memory 11/11 BGP path/bestpath attribute entries using 3168 bytes of memory 4 BGP rrinfo entries using 160 bytes of memory 1 BGP community entries using 24 bytes of memory 14 BGP extended community entries using 1848 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 34048 total bytes of memory BGP activity 69/0 prefixes, 92/2 paths, scan interval 60 secs 42 networks peaked at 11:27:30 Sep 16 2020 UTC (01:47:45.010 ago)

 Neighbor
 V
 AS MsgRcvd MsgSent
 TblVer
 InQ OutQ Up/Down
 State/PfxRcd

 172.16.255.1
 4
 65001
 140
 127
 65
 0
 01:48:48
 18

 172.16.255.2
 4
 65001
 146
 128
 65
 0
 01:48:40
 18

 Leaf-01#
 5
 5
 128
 128
 128
 128
 128

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

		:: 32768 ?	
>	[2][172.16.254	.3:101][0][48][F4CFE24334C1][0][]/20	
		:: 32768 ?	
*>	[2][172.16.254	.3:101][0][48][F4CFE24334C1][32][10.1.101.11]/24	
* \	1011170 16 254	32/68 ? 3.1011[0][49][E40EE2433401][120][E000.1.10111]/36	
~/	[2][1/2.10.234	·· 32768 2	
*>	[2][172.16.254	.3:101][0][48][F4CFE24334C1][128][FE80::F6CF:E2FF:FE43:34C1]/36	
		:: 32768 ?	
Route	Distinguisher:	172.16.254.3:102	
*>i	[2][172.16.254	.3:102][0][48][0C75BD67EF4D][32][10.1.102.1]/24	
	1011170 16 054		
*>1	[2][1/2.16.254	.3:102][0][48][0C/5BD6/EF4D][128][FC00:1:102::1]/36	
*>i	[2][172 16 254	3·1021[0][48][44D3CA286CC51[0][*1/20	
· ±	[2][1,2,10,10,10]	172.16.254.4 0 100 0 ?	
*>i	[2][172.16.254	.3:102][0][48][44D3CA286CC5][32][10.1.102.12]/24	
		172.16.254.4 0 100 0 ?	
*>i	[2][172.16.254	.3:102][0][48][44D3CA286CC5][128][FC00:1:102::12]/36	
+ \ 2	1011170 10 054	1/2.16.254.4 0 100 0 ?	
^>1	[2][1/2.10.254	.3:102][0][48][44D3CA286CC5][128][FE80::46D3:CAFF:FE28:6CC5]/36	
*>i	[2][172.16.254	.3:1021[0][48][7C210DBD954D][321[10.1.102.1]/24	
. –		172.16.254.4 0 100 0 ?	
*>i	[2][172.16.254	.3:102][0][48][7C210DBD954D][128][FC00:1:102::1]/36	
		172.16.254.4 0 100 0 ?	
>i	[2][172.16.254	.3:102][0][48][ECE1A93792C5][0][]/20	
* \ -	1011170 16 054	1/2.16.254.6 U 100 U ?	
~/1	[2][1/2.10.234	$172 \ 16 \ 254 \ 6 \ 0 \ 100 \ 0 \ 2$	
*>i	[2][172.16.254	.3:102][0][48][ECE1A93792C5][128][FC00:1:102::13]/36	
		172.16.254.6 0 100 0 ?	
*>i	[2][172.16.254	.3:102][0][48][ECE1A93792C5][128][FE80::EEE1:A9FF:FE37:92C5]/36	
		172.16.254.6 0 100 0 ?	
Douteo			
*>;	Distinguisher:	172.16.254.4:102	
>i	Distinguisher: [2][172.16.254	172.16.254.4:102 .4:102][0][48][44D3CA286CC5][0][]/20 172.16.254.4 0 100 0.2	
*>i * i	Distinguisher: [2][172.16.254	172.16.254.4:102 .4:102][0][48][44D3CA286CC5][0][*]/20 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ?	
*>i * i *>i	Distinguisher: [2][172.16.254 [2][172.16.254	172.16.254.4:102 .4:102][0][48][44D3CA286CC5][0][*]/20 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? .4:102][0][48][44D3CA286CC5][32][10.1.102.12]/24	
*>i * i *>i	Distinguisher: [2][172.16.254 [2][172.16.254	172.16.254.4:102 .4:102][0][48][44D3CA286CC5][0][*]/20 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? .4:102][0][48][44D3CA286CC5][32][10.1.102.12]/24 172.16.254.4 0 100 0 ?	
*>i * i *>i	Distinguisher: [2][172.16.254 [2][172.16.254	172.16.254.4:102 .4:102][0][48][44D3CA286CC5][0][*]/20 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? .4:102][0][48][44D3CA286CC5][32][10.1.102.12]/24 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ?	
*>i *>i *>i *>i *>i	Distinguisher: [2][172.16.254 [2][172.16.254 [2][172.16.254	172.16.254.4:102 .4:102][0][48][44D3CA286CC5][0][*]/20 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? .4:102][0][48][44D3CA286CC5][32][10.1.102.12]/24 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? .4:102][0][48][44D3CA286CC5][128][FC00:1:102::12]/36 172.16.254.4 0 0 0 0 2	
*>i * i *>i *>i *>i *>i	Distinguisher: [2][172.16.254 [2][172.16.254 [2][172.16.254	172.16.254.4:102 .4:102][0][48][44D3CA286CC5][0][*]/20 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? .4:102][0][48][44D3CA286CC5][32][10.1.102.12]/24 172.16.254.4 0 100 0 ? .172.16.254.4 0 100 0 ? .4:102][0][48][44D3CA286CC5][128][FC00:11:102::12]/36 172.16.254.4 0 100 0 ? .172.16.254.4 0 100 0 ? .172.16.254.4 0 100 0 ?	
*>i * i *>i *>i *>i *>i *>i	Distinguisher: [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254	172.16.254.4:102 .4:102][0][48][44D3CA286CC5][0][*]/20 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? .4:102][0][48][44D3CA286CC5][32][10.1.102.12]/24 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? .4:102][0][48][44D3CA286CC5][128][FC00:1:102::12]/36 172.16.254.4 0 100 0 ? .172.16.254.4 0 100 0 ? .172.16.254.4 0 100 0 ? .4:102][0][48][44D3CA286CC5][128][FE80::46D3:CAFF:FE28:6CC5]/36	
*>i * i *>i *>i *>i *>i	Distinguisher: [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254	172.16.254.4:102 .4:102][0][48][44D3CA286CC5][0][*]/20 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? .4:102][0][48][44D3CA286CC5][32][10.1.102.12]/24 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? .4:102][0][48][44D3CA286CC5][128][FC00:1:102::12]/36 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? .4:102][0][48][44D3CA286CC5][128][FE80::46D3:CAFF:FE28:6CC5]/36 172.16.254.4 0 100 0 ?	
<pre>*>i * i * i *>i * i *>i * i *>i * i * i * i * i * i</pre>	Distinguisher: [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254	172.16.254.4:102 4:102][0][48][44D3CA286CC5][0][*]/20 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? 4:102][0][48][44D3CA286CC5][32][10.1.102.12]/24 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? 4:102][0][48][44D3CA286CC5][128][FC00:1:102::12]/36 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ?	
<pre>*>i * i * i *>i * i *>i * i *>i * i *>i * i *>i</pre>	Distinguisher: [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254	172.16.254.4:102 4:102][0][48][44D3CA286CC5][0][*]/20 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? 4:102][0][48][44D3CA286CC5][32][10.1.102.12]/24 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? 4:102][0][48][44D3CA286CC5][128][FC00:1:102::12]/36 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? 4:102][0][48][44D3CA286CC5][128][FE80::46D3:CAFF:FE28:6CC5]/36 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? 4:102][0][48][44D3CA286CC5][128][FE80::46D3:CAFF:FE28:6CC5]/36 172.16.254.4 0 100 0 ? 4:102][0][48][7C210DED954D][32][10.1.102.1]/24	
*>i * i *>i *>i *>i *>i *>i *>i *>i	Distinguisher: [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254	172.16.254.4:102 .4:102][0][48][44D3CA286CC5][0][*]/20 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? .4:102][0][48][44D3CA286CC5][32][10.1.102.12]/24 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? .4:102][0][48][44D3CA286CC5][128][FC00:1:102::12]/36 172.16.254.4 0 100 0 ? .4:102][0][48][44D3CA286CC5][128][FE80::46D3:CAFF:FE28:6CC5]/36 172.16.254.4 0 100 0 ? .4:102][0][48][44D3CA286CC5][128][FE80::46D3:CAFF:FE28:6CC5]/36 172.16.254.4 0 100 0 ? .4:102][0][48][4210CA286CC5][128][FE80::46D3:CAFF:FE28:6CC5]/36 172.16.254.4 0 100 0 ? .4:102][0][48][7C210DBD954D][32][10.1.102.1]/24 172.16.254.4 0 100 0 ? .4:102][0][48][7C210DBD954D][32][10.1.102.1]/24	
<pre>*>i * i *>i * i *>i</pre>	Distinguisher: [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254	172.16.254.4:102 .4:102][0][48][44D3CA286CC5][0][*]/20 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? .4:102][0][48][44D3CA286CC5][32][10.1.102.12]/24 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? .4:102][0][48][44D3CA286CC5][128][FC00:1:102::12]/36 172.16.254.4 0 100 0 ? .4:102][0][48][44D3CA286CC5][128][FE80::46D3:CAFF:FE28:6CC5]/36 172.16.254.4 0 100 0 ? .4:102][0][48][44D3CA286CC5][128][FE80::46D3:CAFF:FE28:6CC5]/36 172.16.254.4 0 100 0 ? .4:102][0][48][7C210DBD954D][32][10.1.102.1]/24 172.16.254.4 0 100 0 ? .4:102][0][48][7C210DBD954D][128][FC00:1:102::1]/36	
<pre>*>i * i *>i * i *>i</pre>	Distinguisher: [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254	172.16.254.4:102 4:102][0][48][44D3CA286CC5][0][*]/20 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? 4:102][0][48][44D3CA286CC5][32][10.1.102.12]/24 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? 4:102][0][48][44D3CA286CC5][128][FC00:1:102::12]/36 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? 4:102][0][48][44D3CA286CC5][128][FE80::46D3:CAFF:FE28:6CC5]/36 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? 4:102][0][48][7C210DBD954D][32][10.1.102.1]/24 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ? 172.16.254.4 0 100 0 ?	
<pre>*>i * i *>i * i * i * i * i * i * i * i * i * i *</pre>	Distinguisher: [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
<pre>*>i *>i * i *>i *>i *>i *>i *>i *>i *>i *>i *>i *></pre>	Distinguisher: [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 Distinguisher:	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
<pre>*>i *>i * i *>i *>i *>i *>i *>i *>i *>i *>i *>i *></pre>	Distinguisher: [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 Distinguisher: [2][172.16.254	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
<pre>*>i *>i * i *>i *>i *>i *>i *>i *>i *>i *>i *>i *></pre>	Distinguisher: [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 Distinguisher: [2][172.16.254	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
<pre>*>i *>i * i *>i *</pre>	Distinguisher: [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 Distinguisher: [2][172.16.254 [2][172.16.254 [2][172.16.254	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
<pre>*>i *>i * i *>i *</pre>	Distinguisher: [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 [2][172.16.254 Distinguisher: [2][172.16.254 [2][172.16.254	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
<pre>*>i *>i * i *</pre>	Distinguisher: [2] [172.16.254 [2] [172.16.254 [2] [172.16.254 [2] [172.16.254 [2] [172.16.254 [2] [172.16.254 Distinguisher: [2] [172.16.254 [2] [172.16.254	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
<pre>*>i *>i * i *>i * i *>i * i *>i * i *>i *>i *>i *>i *>i *>i *>i *>i *>i *></pre>	Distinguisher: [2] [172.16.254 [2] [172.16.254 [2] [172.16.254 [2] [172.16.254 [2] [172.16.254 [2] [172.16.254 Distinguisher: [2] [172.16.254 [2] [172.16.254 [2] [172.16.254	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
<pre>*>i *>i * i *</pre>	Distinguisher: [2] [172.16.254 [2] [172.16.254 [2] [172.16.254 [2] [172.16.254 [2] [172.16.254 [2] [172.16.254 Distinguisher: [2] [172.16.254 [2] [172.16.254 [2] [172.16.254	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
<pre>*>i *>i * i *>i *>i *>i *>i *>i *>i *>i *>i *>i *></pre>	Distinguisher: [2] [172.16.254 [2] [172.16.254 [2] [172.16.254 [2] [172.16.254 [2] [172.16.254 [2] [172.16.254 Distinguisher: [2] [172.16.254 [2] [172.16.254 [2] [172.16.254 [2] [172.16.254	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	

	172.16.254.6	0	100	0 ?	
* i	172.16.254.6	0	100	0 ?	
*>i	[2][172.16.254.6:102][0][48][ECE1A9379	2C5][12	28][FC	00:1:102::13]/3	6
	172.16.254.6	0	100	0 ?	
* i	172.16.254.6	0	100	0 ?	
*>i	[2][172.16.254.6:102][0][48][ECE1A9379	2C5][12	28][FE8	80::EEE1:A9FF:F	E37:92C5]/36
	172.16.254.6	0	100	0 ?	
* i	172.16.254.6	0	100	0 ?	
Route	Distinguisher: 1:1 (default for vrf gr	een)			
*>	[5] [1:1] [0] [24] [10.1.101.0] /17				
	0.0.0	0		32768 ?	
*>i	[5][1:1][0][24][10.1.102.0]/17				
	172.16.254.4	0	100	0 ?	
* i	172.16.254.4	0	100	0 ?	
*>	[5][1:1][0][32][10.1.255.1]/17				
	0.0.0	0		32768 ?	
*>i	[5][1:1][0][32][10.1.255.2]/17				
	172.16.254.4	0	100	0 ?	
* i	172.16.254.4	0	100	0 ?	
*>i	[5][1:1][0][32][10.1.255.3]/17				
	172.16.254.6	0	100	0 ?	
* i	172.16.254.6	0	100	0 ?	
*>	[5][1:1][0][32][10.2.255.255]/17				
	0.0.0	0		32768 ?	
*>	[5][1:1][0][64][FC00:1:101::]/29				
	::	0		32768 ?	
*>i	[5][1:1][0][64][FC00:1:102::]/29				
	172.16.254.4	0	100	0 ?	
* i	172.16.254.4	0	100	0 ?	
*>	[5][1:1][0][128][FC00:1:255::1]/29				
	::	0		32768 ?	
*>i	[5][1:1][0][128][FC00:1:255::2]/29				
	172.16.254.4	0	100	0 ?	
* i	172.16.254.4	0	100	0 ?	
*>i	[5][1:1][0][128][FC00:1:255::3]/29				
	172.16.254.6	0	100	0 ?	
* i	172.16.254.6	0	100	0 ?	
*>	[5][1:1][0][128][FC00:2:255::255]/29				
	::	0		32768 ?	
Leaf-	01#				

The following example shows the output for the **show ipv6 pim vrf** *vrf*-name **group-map** command on VTEP 1:

```
Leaf-01# show ipv6 pim vrf green group-map ff06:1::1
IP PIM Group Mapping Table
(* indicates group mappings being used)
FF00::/8*
   SM, RP: FC00:2:255::255
   RPF: Tu2,FC00:2:255::255 (us)
   Info source: Static
   Uptime: 01:49:05, Groups: 1
Leaf-01#
```

The following example shows the output for the **show ipv6 route vrf** command on VTEP 1:

```
Leaf-01# show ipv6 route vrf green FC00:2:255::255
Routing entry for FC00:2:255::255/128
Known via "connected", distance 0, metric 0, type receive, connected
Redistributing via bgp 65001
```

```
Route count is 1/1, share count 0
Routing paths:
receive via Loopback255
Last updated 01:49:06 ago
Leaf-01#
```

The following example shows the output for the **show ipv6 mld vrf** *vrf-name* **groups** command on VTEP 1:

```
Leaf-01# show ipv6 mld vrf green groups
No groups found.
Leaf-01#
```

The following example shows the output for the **show ipv6 mroute vrf** *vrf-name* command on VTEP 1:

```
Leaf-01# show ipv6 mroute vrf green
Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group,
      C - Connected, L - Local, I - Received Source Specific Host Report,
       P - Pruned, R - RP-bit set, F - Register flag, T - SPT-bit set,
       J - Join SPT, Y - Joined MDT-data group,
       y - Sending to MDT-data group
          - BGP signal originated, G - BGP Signal received,
       α-
      N - BGP Shared-Tree Prune received, n - BGP C-Mroute suppressed,
      q - BGP Src-Active originated, Q - BGP Src-Active received
      E - Extranet
Timers: Uptime/Expires
Interface state: Interface, State
(FC00:1:101::11, FF06:1::1), 01:42:44/00:03:19, flags: SFTGg
  Incoming interface: Vlan101
  RPF nbr: FE80::F6CF:E2FF:FE43:34C1
  Immediate Outgoing interface list:
   Vlan901, Forward, 01:42:44/never
Leaf-01#
```

The following example shows the output for the **show ipv6 mfib vrf** *vrf-name* command on VTEP 1:

```
Leaf-01# show ipv6 mfib vrf green
Entry Flags:
               C - Directly Connected, S - Signal, IA - Inherit A flag,
               ET - Data Rate Exceeds Threshold, K - Keepalive
                DDE - Data Driven Event, HW - Hardware Installed
               ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB
               MoFRR Primary, RP - MRIB MoFRR Primary, P - MoFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
               e - Encap helper tunnel flag.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
               NS - Negate Signalling, SP - Signal Present,
                A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
                MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
Other counts: Total/RPF failed/Other drops
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
VRF green
 (FC00:1:101::11,FF06:1::1) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 1/0/1
  HW Forwarding: 3161/0/118/0, Other: 0/0/0
```

```
Vlan101 Flags: A
Vlan901, VXLAN v4 Encap (50901, 239.1.1.1) Flags: F
Pkts: 0/0/0 Rate: 0 pps
Leaf-01#
```

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

```
Leaf-01# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
      L - Local, P - Pruned, R - RP-bit set, F - Register flag,
      T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
       X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
      U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
       Y - Joined MDT-data group, y - Sending to MDT-data group,
      G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
      Q - Received BGP S-A Route, q - Sent BGP S-A Route,
       V - RD & Vector, v - Vector, p - PIM Joins on route,
       x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf,
       e - encap-helper tunnel flag
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
Interface state: Interface, Next-Hop or VCD, State/Mode
(*, 239.1.1.1), 01:48:56/stopped, RP 172.16.255.255, flags: SJCFx
 Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2
  Outgoing interface list:
   Tunnel0, Forward/Sparse, 01:48:56/00:02:56
(172.16.254.3, 239.1.1.1), 01:42:42/00:03:20, flags: FTx
  Incoming interface: Loopback1, RPF nbr 0.0.0.0
  Outgoing interface list:
   GigabitEthernet1/0/2, Forward/Sparse, 01:42:42/00:03:03
(*, 224.0.1.40), 01:49:06/00:02:55, RP 172.16.255.255, flags: SJCL
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2
  Outgoing interface list:
   Loopback0, Forward/Sparse, 01:49:05/00:02:55
(*, 225.0.0.102), 01:48:56/stopped, RP 172.16.255.255, flags: SJCx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2
  Outgoing interface list:
   Tunnel0, Forward/Sparse, 01:48:56/00:02:56
(172.16.254.4, 225.0.0.102), 01:48:17/00:01:19, flags: JTx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 01:48:17/00:02:56
(172.16.254.6, 225.0.0.102), 01:48:23/00:01:18, flags: Tx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 01:48:23/00:02:56
(*, 225.0.0.101), 01:49:01/stopped, RP 172.16.255.255, flags: SJCFx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2
  Outgoing interface list:
   Tunnel0, Forward/Sparse, 01:48:56/00:02:56
(172.16.254.3, 225.0.0.101), 01:49:01/00:02:45, flags: FTx
```

```
Incoming interface: Loopback1, RPF nbr 0.0.0.0
Outgoing interface list:
   GigabitEthernet1/0/2, Forward/Sparse, 01:48:25/00:03:12
Leaf-01#
```

The following example shows the output for the show ip mfib command on VTEP 1:

```
Leaf-01# show ip mfib
Entry Flags:
               C - Directly Connected, S - Signal, IA - Inherit A flag,
                ET - Data Rate Exceeds Threshold, K - Keepalive
               DDE - Data Driven Event, HW - Hardware Installed
               ME - MOFRR ECMP entry, MNE - MOFRR Non-ECMP entry, MP - MFIB
                MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
                   - Encap helper tunnel flag.
                е
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
               NS - Negate Signalling, SP - Signal Present,
               A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
                  Total/RPF failed/Other drops
Other counts:
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
Default
 (*,224.0.0.0/4) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
   HW Forwarding: 0/0/0/0, Other: 0/0/0
   GigabitEthernet1/0/2 Flags: A NS
  Loopback0 Flags: F IC NS
    Pkts: 0/0/0 Rate: 0 pps
 (*,225.0.0.101) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
   HW Forwarding: 0/0/0/0, Other: 0/0/0
   GigabitEthernet1/0/2 Flags: A NS
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
 (172.16.254.3,225.0.0.101) Flags: HW
   SW Forwarding: 2/0/125/0, Other: 1/0/1
   HW Forwarding:
                   554/0/163/0, Other: 0/0/0
  NullO Flags: A
  GigabitEthernet1/0/2 Flags: F NS
     Pkts: 0/0/1 Rate: 0 pps
 (*,225.0.0.102) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
   HW Forwarding: 1/0/172/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A NS
  Tunnel0, VXLAN Decap Flags: F NS
    Pkts: 0/0/0
                  Rate: 0 pps
 (172.16.254.4,225.0.0.102) Flags: HW
   SW Forwarding: 1/0/154/0, Other: 0/0/0
  HW Forwarding: 561/0/176/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A
  Tunnel0, VXLAN Decap Flags: F NS
    Pkts: 0/0/1 Rate: 0 pps
 (172.16.254.6,225.0.0.102) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 1/1/0
  HW Forwarding: 504/0/205/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A
   TunnelO, VXLAN Decap Flags: F NS
```

```
Pkts: 0/0/0
                   Rate: 0 pps
 (*,232.0.0.0/8) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,239.1.1.1) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A NS
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
 (172.16.254.3,239.1.1.1) Flags: HW
  SW Forwarding: 1/0/150/0, Other: 1/1/0
  HW Forwarding:
                  3071/0/156/0, Other: 0/0/0
  NullO Flags: A
  GigabitEthernet1/0/2 Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
Leaf-01#
```

Return to Verifying TRM in PIM-SM with Anycast RP for IPv4 and IPv6 Multicast Traffic, on page 28

Outputs to Verify the Configuration on VTEP 2

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

Leaf-02# :	show nve	peers						
Interface	VNI	Туре	Peer-IP	RMAC/Num RTs	eVNI	state	flags	UP time
nvel	50901	L3CP	172.16.254.6	0c75.bd67.ef48	50901	UP	A/-/4	01:52:57
nve1	50901	L3CP	172.16.254.3	10b3.d56a.8fc8	50901	UP	A/-/4	01:52:57
nvel	50901	L3CP	172.16.254.6	0c75.bd67.ef48	50901	UP	A/M/6	01:52:57
nvel	50901	L3CP	172.16.254.3	10b3.d56a.8fc8	50901	UP	A/M/6	01:52:57
nve1	10101	L2CP	172.16.254.3	7	10101	UP	N/A	01:52:57
nvel	10102	L2CP	172.16.254.6	7	10102	UP	N/A	01:52:57
Leaf-02#								

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

Leaf-02# show 12vpn evpn peers vxlan

Interface	VNI	Peer-IP	Num routes	eVNI	UP time
nvel	10101	172.16.254.3	7	10101	01:52:57
nve1	10102	172.16.254.6	7	10102	01:52:57
Leaf-02#					

The following example shows the output for the **show bgp ipv6 mvpn all summary** command on VTEP 2:

```
Leaf-02# show bgp ipv6 mvpn all summary
BGP router identifier 172.16.255.4, local AS number 65001
BGP table version is 5, main routing table version 5
2 network entries using 784 bytes of memory
3 path entries using 480 bytes of memory
2/2 BGP path/bestpath attribute entries using 608 bytes of memory
4 BGP rrinfo entries using 160 bytes of memory
1 BGP community entries using 24 bytes of memory
14 BGP extended community entries using 1848 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 3904 total bytes of memory BGP activity 70/0 prefixes, 101/6 paths, scan interval 60 secs 2 networks peaked at 11:37:07 Sep 16 2020 UTC (01:47:58.150 ago) Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd 172.16.255.1 4 65001 150 133 5 0 001:53:34 1 172.16.255.2 4 65001 151 134 5 0 001:53:30 1 Leaf-02#

The following example shows the output for the show bgp ipv6 mvpn all command on VTEP 2:

```
Leaf-02# show bgp ipv6 mvpn all
BGP table version is 5, 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: 1:1 (default for vrf green)
 * i [5][1:1][FC00:1:101::11][FF06:1::1]/42
                                                   100
                    172.16.255.3
                                              0
                                                            0 2
*>i
                      172.16.255.3
                                               0
                                                    100
                                                            0 ?
Route Distinguisher: 172.16.254.3:101
*> [7][172.16.254.3:101][65001][FC00:1:101::11][FF06:1::1]/46
                                                        32768 ?
                     ::
Leaf-02#
```

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

```
Leaf-02# show bgp 12vpn evpn summary
BGP router identifier 172.16.255.4, local AS number 65001
BGP table version is 43, main routing table version 43
42 network entries using 16128 bytes of memory
64 path entries using 13568 bytes of memory
12/12 BGP path/bestpath attribute entries using 3456 bytes of memory
4 BGP rrinfo entries using 160 bytes of memory
1 BGP community entries using 24 bytes of memory
14 BGP extended community entries using 1848 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 35184 total bytes of memory
BGP activity 70/0 prefixes, 101/6 paths, scan interval 60 secs
42 networks peaked at 11:32:07 Sep 16 2020 UTC (01:52:58.436 ago)
                           AS MsgRcvd MsgSent
                                                 TblVer InQ OutQ Up/Down State/PfxRcd
Neighbor
              V
172.16.255.1 4

        65001
        150
        133
        43
        0
        0 01:53:35
        20

                       65001
                                                   43 0 0 01:53:31
172.16.255.2 4
                                  151
                                         134
                                                                                2.0
Leaf-02#
```

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

```
Leaf-02# show bgp 12vpn evpn
BGP table version is 43, 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 Next Hop Metric LocPrf Weight Path Network Route Distinguisher: 172.16.254.3:101 *>i [2][172.16.254.3:101][0][48][10B3D56A8FC1][32][10.1.101.1]/24 172.16.254.3 0 100 0 ? * i 172.16.254.3 0 100 0 2 [2] [172.16.254.3:101] [0] [48] [10B3D56A8FC1] [128] [FC00:1:101::1]/36 *>i 0 100 0 100 172.16.254.3 0 ? * i 172.16.254.3 0 2 *>i [2][172.16.254.3:101][0][48][F4CFE24334C1][0][*]/20 0 ? 172.16.254.3 0 100 * i 172.16.254.3 0 100 0 ? [2][172.16.254.3:101][0][48][F4CFE24334C1][32][10.1.101.11]/24 *>i 172.16.254.3 0 100 0 ? * i 0 100 172.16.254.3 0 ? *>i [2] [172.16.254.3:101] [0] [48] [F4CFE24334C1] [128] [FC00:1:101::11]/36 0 ? 172.16.254.3 0 100 * i 172.16.254.3 0 100 0 ? *>i [2] [172.16.254.3:101] [0] [48] [F4CFE24334C1] [128] [FE80::F6CF:E2FF:FE43:34C1]/36 172.16.254.3 0 100 0 ? * i 172.16.254.3 0 100 0 ? Route Distinguisher: 172.16.254.4:101 [2][172.16.254.4:101][0][48][10B3D56A8FC1][32][10.1.101.1]/24 *>i 172.16.254.3 0 100 0 ? *>i [2][172.16.254.4:101][0][48][10B3D56A8FC1][128][FC00:1:101::1]/36 172.16.254.3 0 100 0 ? *>i [2] [172.16.254.4:101] [0] [48] [F4CFE24334C1] [0] [*]/20 172.16.254.3 0 100 0 ? [2][172.16.254.4:101][0][48][F4CFE24334C1][32][10.1.101.11]/24 *>i 172.16.254.3 0 100 0 ? [2] [172.16.254.4:101] [0] [48] [F4CFE24334C1] [128] [FC00:1:101::11]/36 *>i 0 100 172.16.254.3 0 ? *>i [2][172.16.254.4:101][0][48][F4CFE24334C1][128][FE80::F6CF:E2FF:FE43:34C1]/36 172.16.254.3 0 100 0 2 Route Distinguisher: 172.16.254.4:102 [2][172.16.254.4:102][0][48][0C75BD67EF4D][32][10.1.102.1]/24 *>i 172.16.254.6 0 100 0 ? [2][172.16.254.4:102][0][48][0C75BD67EF4D][128][FC00:1:102::1]/36 *>i 0 100 172.16.254.6 0 ? *> [2][172.16.254.4:102][0][48][44D3CA286CC5][0][*]/20 32768 ? :: [2][172.16.254.4:102][0][48][44D3CA286CC5][32][10.1.102.12]/24 *> 32768 ? :: [2][172.16.254.4:102][0][48][44D3CA286CC5][128][FC00:1:102::12]/36 *> 32768 ? :: *> [2] [172.16.254.4:102] [0] [48] [44D3CA286CC5] [128] [FE80::46D3:CAFF:FE28:6CC5] /36 32768 ? :: *> [2] [172.16.254.4:102] [0] [48] [7C210DBD954D] [32] [10.1.102.1]/24 :: 32768 ? [2] [172.16.254.4:102] [0] [48] [7C210DBD954D] [128] [FC00:1:102::1]/36 *> 32768 ? :: *>i [2][172.16.254.4:102][0][48][ECE1A93792C5][0][*]/20 172.16.254.6 0 100 0 ? [2] [172.16.254.4:102] [0] [48] [ECE1A93792C5] [32] [10.1.102.13] /24 *>i 0 100 0 ? 172.16.254.6 *>i [2] [172.16.254.4:102] [0] [48] [ECE1A93792C5] [128] [FC00:1:102::13]/36 172.16.254.6 0 100 0 ? *>i [2] [172.16.254.4:102] [0] [48] [ECE1A93792C5] [128] [FE80::EEE1:A9FF:FE37:92C5]/36 172.16.254.6 0 100 0 ?

Route	Distinguisher: 172.16.254.6:102				
*>i	[2][172.16.254.6:102][0][48][0C75BD67EH	F4D][32][10.1	.102.1]/24	
	172.16.254.6	0	100	0 ?	
* i	172.16.254.6	0	100	0 ?	
*>i	[2][172.16.254.6:102][0][48][0C75BD67EH	F4D][12	8][FC0	0:1:102::1]/3	6
	172.16.254.6	0	100	0 ?	
* i	172.16.254.6	0	100	0 ?	
>i	[2][172.16.254.6:102][0][48][ECE1A93792	2C5][0]	[]/20)	
	172.16.254.6	0	100	0 ?	
* i	172.16.254.6	0	100	0 ?	
*>i	[2][172.16.254.6:102][0][48][ECE1A93792	205][32][10.1	.102.13]/24	
	172.16.254.6	0	100	0 ?	
* 1	172.16.254.6	0	100	0 ?	200
^>1	[2][1/2.16.254.6:102][0][48][ECEIA93/92	205][12	8][FCU	0 2	36
* -	1/2.16.254.6	0	100	0.2	
~ ⊥ *∖:	1/2.10.234.0	0	01 [TOO	U :	EE27.020E1/26
~/1	[2][1/2.10.234.0:102][0][40][ECEIR93/92	0	0][FEC	0::EEEI:A9FF:	FE3/:92CJ]/30
* i	172 16 254 6	0	100	0 2	
Route	Distinguisher: 1:1 (default for wrf gre	an)	100	0.	
*>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] [10.1.102.0]/17				
	0.0.0	0		32768 ?	
*>i	[5][1:1][0][32][10.1.255.1]/17				
	172.16.254.3	0	100	0 ?	
* i	172.16.254.3	0	100	0 ?	
*>	[5][1:1][0][32][10.1.255.2]/17				
	0.0.0	0		32768 ?	
*>i	[5][1:1][0][32][10.1.255.3]/17				
	172.16.254.6	0	100	0 ?	
* i	172.16.254.6	0	100	0 ?	
* i				0.0	
	172.16.254.3	0	100	0 ?	
^ 1 +>	1/2.16.254.3	0	100	20760.2	
*>->		0		32/08 :	
~/1	[J][1:1][U][04][FCUU:1:1U1::]/29 172 16 254 3	0	100	0.2	
* i	172 16 254 3	0	100	0.2	
*>	[5][1:1][0][64][FC00:1:102::1/29	0	100	0.	
	::	0		32768 ?	
*>i	[5][1:1][0][128][FC00:1:255::1]/29				
	172.16.254.3	0	100	0 ?	
* i	172.16.254.3	0	100	0 ?	
*>	[5][1:1][0][128][FC00:1:255::2]/29				
	::	0		32768 ?	
*>i	[5][1:1][0][128][FC00:1:255::3]/29				
	172.16.254.6	0	100	0 ?	
* i	172.16.254.6	0	100	0 ?	
* i	[5][1:1][0][128][FC00:2:255::255]/29				
	172.16.254.3	0	100	0 ?	
* i	172.16.254.3	0	100	0 ?	
*>	::	0		32768 ?	
eai-(J∠冊				

The following example shows the output for the **show ipv6 pim vrf** *vrf*-*name* **group-map** command on VTEP 2:

Leaf-02# **show ipv6 pim vrf green group-map ff06:1::1** IP PIM Group Mapping Table (* indicates group mappings being used)

```
FF00::/8*
    SM, RP: FC00:2:255::255
    RPF: Tu2,FC00:2:255::255 (us)
    Info source: Static
    Uptime: 01:54:21, Groups: 1
Leaf-02#
```

The following example shows the output for the **show ipv6 route vrf** command on VTEP 2:

```
Leaf-02# show ipv6 route vrf green FC00:2:255::255
Routing entry for FC00:2:255::255/128
Known via "connected", distance 0, metric 0, type receive, connected
Redistributing via bgp 65001
Route count is 1/1, share count 0
Routing paths:
    receive via Loopback255
    Last updated 01:54:21 ago
Leaf-02#
```

The following example shows the output for the **show ipv6 mld vrf** *vrf-name* **groups** command on VTEP 2:

```
Leaf-02# show ipv6 mld vrf green groups

MLD Connected Group Membership

Group Address Interface

Uptime Expires

FF06:1::1 Vlan102

01:53:45 00:03:52

Leaf-02#
```

The following example shows the output for the **show ipv6 mroute vrf** *vrf-name* command on VTEP 2:

```
Leaf-02# show ipv6 mroute vrf green
Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group,
       C - Connected, L - Local, I - Received Source Specific Host Report,
       P - Pruned, R - RP-bit set, F - Register flag, T - SPT-bit set,
       J - Join SPT, Y - Joined MDT-data group,
       y - Sending to MDT-data group
       g - BGP signal originated, G - BGP Signal received,
       N - BGP Shared-Tree Prune received, n - BGP C-Mroute suppressed,
       q - BGP Src-Active originated, Q - BGP Src-Active received E - Extranet
Timers: Uptime/Expires
Interface state: Interface, State
(*, FF06:1::1), 01:53:45/never, RP FC00:2:255::255, flags: SCJ
  Incoming interface: Tunnel2
  RPF nbr: FC00:2:255::255
  Immediate Outgoing interface list:
    Vlan102, Forward, 01:53:45/never
(FC00:1:101::11, FF06:1::1), 01:47:58/never, flags: STgQ
  Incoming interface: Vlan901
  RPF nbr: ::FFFF:172.16.254.3
  Inherited Outgoing interface list:
    Vlan102, Forward, 01:53:45/never
Leaf-02#
```

The following example shows the output for the **show ipv6 mfib vrf** *vrf-name* command on VTEP 2:

```
Leaf-02# show ipv6 mfib vrf green
Entry Flags:
               C - Directly Connected, S - Signal, IA - Inherit A flag,
               ET - Data Rate Exceeds Threshold, K - Keepalive
               DDE - Data Driven Event, HW - Hardware Installed
               ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB
               MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
               e - Encap helper tunnel flag.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
               NS - Negate Signalling, SP - Signal Present,
               A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
                  Total/RPF failed/Other drops
Other counts:
I/O Item Counts:
                 HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
VRF green
 (*,FF06:1::1) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnel2 Flags: A NS
  Vlan102 Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
 (FC00:1:101::11,FF06:1::1) Flags: HW
   SW Forwarding: 1/0/100/0, Other: 0/0/0
  HW Forwarding: 3225/0/126/0, Other: 0/0/0
   Vlan901, VXLAN Decap Flags: A
  Vlan102 Flags: F NS
    Pkts: 0/0/1 Rate: 0 pps
Leaf-02#
```

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

```
Leaf-02# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
       L - Local, P - Pruned, R - RP-bit set, F - Register flag,
       T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
       X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
      U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
      Y - Joined MDT-data group, y - Sending to MDT-data group,
       G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
       V - RD & Vector, v - Vector, p - PIM Joins on route,
      x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf,
       e - encap-helper tunnel flag
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
 Interface state: Interface, Next-Hop or VCD, State/Mode
(*, 239.1.1.1), 01:54:12/stopped, RP 172.16.255.255, flags: SJCx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 01:54:12/00:00:41
```

```
(172.16.254.3, 239.1.1.1), 01:47:56/00:02:39, flags: JTx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 01:47:56/00:00:03
(*, 224.0.1.40), 01:54:21/00:02:39, RP 172.16.255.255, flags: SJCL
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
  Outgoing interface list:
   Loopback0, Forward/Sparse, 01:54:20/00:02:39
(*, 225.0.0.102), 01:54:12/stopped, RP 172.16.255.255, flags: SJCFx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 01:54:12/00:00:41
(172.16.254.6, 225.0.0.102), 01:53:36/00:00:58, flags: Tx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
  Outgoing interface list:
   Tunnel0, Forward/Sparse, 01:53:36/00:00:41
(172.16.254.4, 225.0.0.102), 01:53:47/00:02:53, flags: FTx
  Incoming interface: Loopback1, RPF nbr 0.0.0.0
  Outgoing interface list:
    GigabitEthernet1/0/2, Forward/Sparse, 01:53:36/00:02:40, A
(*, 225.0.0.101), 01:54:12/stopped, RP 172.16.255.255, flags: SJCx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 01:54:12/00:00:41
(172.16.254.3, 225.0.0.101), 01:53:11/00:01:39, flags: JTx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 01:53:11/00:00:48
Leaf-02#
```

The following example shows the output for the show ip mfib command on VTEP 2:

Leaf-02# show i	p mfib
Entry Flags:	C - Directly Connected, S - Signal, IA - Inherit A flag,
	ET - Data Rate Exceeds Threshold, K - Keepalive
	DDE - Data Driven Event, HW - Hardware Installed
	ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB
	MoFRR Primary, RP - MRIB MoFRR Primary, P - MoFRR Primary
	MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
	e - Encap helper tunnel flag.
I/O Item Flags:	IC - Internal Copy, NP - Not platform switched,
-	NS - Negate Signalling, SP - Signal Present,
	A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
	MA - MFIB Accept, A2 - Accept backup,
	RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Coun	ts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
Other counts:	Total/RPF failed/Other drops
I/O Item Counts	: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
Default	
(*,224.0.0.0/4) Flags: C HW
SW Forwardin	g: 0/0/0/0, Other: 0/0/0
HW Forwardin	g: 0/0/0/0, Other: 0/0/0
(*,224.0.1.40)	Flags: C HW
SW Forwardin	g: 0/0/0/0, Other: 0/0/0
HW Forwardin	g: 0/0/0/0, Other: 0/0/0

GigabitEthernet1/0/2 Flags: A NS Loopback0 Flags: F IC NS Pkts: 0/0/0 Rate: 0 pps (*,225.0.0.101) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 1/0/190/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A NS TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.3,225.0.0.101) Flags: HW SW Forwarding: 1/0/172/0, Other: 0/0/0 HW Forwarding: 529/0/177/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/1 Rate: 0 pps (*,225.0.0.102) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A NS TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.4,225.0.0.102) Flags: HW SW Forwarding: 2/0/163/0, Other: 3/1/2 HW Forwarding: 631/0/163/0, Other: 0/0/0 NullO Flags: A GigabitEthernet1/0/2 Flags: F Pkts: 0/0/2 Rate: 0 pps (172.16.254.6,225.0.0.102) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 530/0/205/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (*,232.0.0.0/8) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,239.1.1.1) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 1/0/168/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A NS TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.3,239.1.1.1) Flags: HW SW Forwarding: 1/0/150/0, Other: 0/0/0 3224/0/168/0, Other: 0/0/0 HW Forwarding: GigabitEthernet1/0/2 Flags: A Tunnel0, VXLAN Decap Flags: F NS Pkts: 0/0/1 Rate: 0 pps Leaf-02#

Return to Verifying TRM in PIM-SM with Anycast RP for IPv4 and IPv6 Multicast Traffic, on page 28

Outputs to Verify the Configuration on VTEP 3

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

Leaf-03# show nve peers										
Interface	VNI	Туре	Peer-IP	RMAC/Num_RTs	eVNI	state	flags	UP time		
nvel	50901	L3CP	172.16.254.3	10b3.d56a.8fc8	50901	UP	A/-/4	02:01:22		
nvel	50901	L3CP	172.16.254.4	7c21.0dbd.9548	50901	UP	A/-/4	02:01:22		
nvel	50901	L3CP	172.16.254.3	10b3.d56a.8fc8	50901	UP	A/M/6	02:01:22		
nvel	50901	L3CP	172.16.254.4	7c21.0dbd.9548	50901	UP	A/M/6	02:01:22		
nvel	10101	L2CP	172.16.254.3	7	10101	UP	N/A	02:01:22		

nvel 10102 L2CP 172.16.254.4 7 10102 UP N/A 02:01:22 Leaf-03#

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

Leaf-03# show 12vpn evpn peers vxlan

 Interface
 VNI
 Peer-IP
 Num routes
 eVNI
 UP time

 nve1
 10101
 172.16.254.3
 7
 10101
 02:01:23

 nve1
 10102
 172.16.254.4
 7
 10102
 02:01:23

 Leaf-03#
 ----- ------ ------ ------ ------

The following example shows the output for the **show bgp ipv6 mvpn all summary** command on VTEP 3:

Leaf-03# show bgp ipv6 mvpn all summary BGP router identifier 172.16.255.6, local AS number 65001 BGP table version is 5, main routing table version 5 2 network entries using 784 bytes of memory 3 path entries using 480 bytes of memory 2/2 BGP path/bestpath attribute entries using 608 bytes of memory 4 BGP rrinfo entries using 160 bytes of memory 1 BGP community entries using 24 bytes of memory 14 BGP extended community entries using 1848 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 3904 total bytes of memory BGP activity 66/0 prefixes, 97/0 paths, scan interval 60 secs 2 networks peaked at 11:29:08 Sep 16 2020 UTC (01:56:22.908 ago)

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
172.16.255.1	4	65001	160	143	5	0	0	02:01:59	1
172.16.255.2	4	65001	159	142	5	0	0	02:01:59	1
Leaf-03#									

The following example shows the output for the **show bgp ipv6 mvpn all** command on VTEP 3:

Leaf-03# show bgp ipv6 mvpn all BGP table version is 5, local router ID is 172.16.255.6 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: 1:1 (default for vrf green) * i [5][1:1][FC00:1:101::11][FF06:1::1]/42 172.16.255.3 100 0 ? 0 *>i 172.16.255.3 0 100 0 ? Route Distinguisher: 172.16.254.3:101 *> [7][172.16.254.3:101][65001][FC00:1:101::11][FF06:1::1]/46 32768 ? ::

```
Leaf-03#
```

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

Leaf-03# show bgp 12vpn evpn summary BGP router identifier 172.16.255.6, local AS number 65001 BGP table version is 51, main routing table version 51 42 network entries using 16128 bytes of memory 68 path entries using 14416 bytes of memory 12/12 BGP path/bestpath attribute entries using 3456 bytes of memory 4 BGP rrinfo entries using 160 bytes of memory 1 BGP community entries using 24 bytes of memory 14 BGP extended community entries using 1848 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 36032 total bytes of memory BGP activity 66/0 prefixes, 97/0 paths, scan interval 60 secs 42 networks peaked at 11:24:07 Sep 16 2020 UTC (02:01:24.200 ago)

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
172.16.255.1	4	65001	160	143	51	0	0	02:02:00	22
172.16.255.2	4	65001	159	142	51	0	0	02:01:59	22
Leaf-03#									

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

```
Leaf-03# show bgp 12vpn evpn
BGP table version is 51, local router ID is 172.16.255.6
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
                      Next Hop
    Network
                                           Metric LocPrf Weight Path
Route Distinguisher: 172.16.254.3:101
 *>i [2][172.16.254.3:101][0][48][10B3D56A8FC1][32][10.1.101.1]/24

    172.16.254.3
    0
    100
    0 ?

    172.16.254.3
    0
    100
    0 ?

 * i
                                                                0 ?
 *>i [2][172.16.254.3:101][0][48][10B3D56A8FC1][128][FC00:1:101::1]/36

    172.16.254.3
    0
    100
    0

    172.16.254.3
    0
    100
    0

                                                 0 100
 * i
                       172.16.254.3
                                                                0 ?
 *>i [2][172.16.254.3:101][0][48][F4CFE24334C1][0][*]/20
                                                             0 ?

    172.16.254.3
    0
    100

    172.16.254.3
    0
    100

 * i
                        172.16.254.3
                                                 0
                                                       100
                                                                0 ?
 *>i [2][172.16.254.3:101][0][48][F4CFE24334C1][32][10.1.101.11]/24

    172.16.254.3
    0
    100
    0

    172.16.254.3
    0
    100
    0

 * i
                                                0 100
                       172.16.254.3
                                                                0 ?
 *>i [2][172.16.254.3:101][0][48][F4CFE24334C1][128][FC00:1:101::11]/36
                       172.16.254.30100172.16.254.30100
                                                             0 ?
0 ?
 * i
 *>i [2][172.16.254.3:101][0][48][F4CFE24334C1][128][FE80::F6CF:E2FF:FE43:34C1]/36
                      172.16.254.3
                                                0 100
                                                              0 ?
 * i
                       172.16.254.3
                                                 0 100
                                                                 0 ?
Route Distinguisher: 172.16.254.4:102
 *>i [2][172.16.254.4:102][0][48][44D3CA286CC5][0][*]/20
                                                                0 2
                      172.16.254.4 0 100
 * i
                        172.16.254.4
                                                 0 100
                                                               0 ?
 *>i [2][172.16.254.4:102][0][48][44D3CA286CC5][32][10.1.102.12]/24
                                                            0 ?
                      172.16.254.40100172.16.254.40100
 * i
                                                                0 ?
 *>i [2][172.16.254.4:102][0][48][44D3CA286CC5][128][FC00:1:102::12]/36
```

		170 16 054 4		0	100	0.2	
+		170 16 054	4	0	100	0.2	
^ _		1/2.10.234.	4	0	100		
^ > I	[2][1/2.10.254.	.4:IUZ][U][48] 170 16 054 4	[44D3CA286CC5][128][FE8U::	46D3:CAFF:FE2	8:0003/30
+		170 16 054	4	0	100	0.2	
^	1011170 10 054	1/2.10.234.	4	0	100 10110	0 2	
^ > I	[2][1/2.10.254.	170 16 054	[/CZIUDBD954D	0	100.1.10	2.1]/24	
		172.16.254.4	4	0	100	0 ?	
× 1	1011100 10 054	1/2.16.254.	4	0	100	0 ?	
*>1	[2][1/2.16.254.	4:102][0][48]	[/C210DBD954D][128][FC00:1	:102::1]/36	
		172.16.254.4		0	100	0 ?	
_ * 1		1/2.16.254.	4	0	100	0 ?	
Route	Distinguisher:	172.16.254.6:	101				
*>1	[2][172.16.254.	.6:101][0][48]	[I0B3D56A8FCI][32]	[10.1.10	1.1]/24	
		1/2.16.254.3		0	100	0 ?	
*>1	[2][172.16.254.	.6:101][0][48]	[I0B3D56A8FCI][128][FC00:1	:101::1]/36	
		1/2.16.254.3		0	100	0 2	
*>1	[2][172.16.254.	.6:101][0][48]	[F4CFE24334C1][0][*]/20		
		172.16.254.3		0	100	0 ?	
*>1	[2][172.16.254.	.6:101][0][48]	[F4CFE24334C1][32]	[10.1.10	1.11]/24	
		172.16.254.3		0	100	0 ?	
*>1	[2][172.16.254.	.6:101][0][48]	[F4CFE24334C1][128][FC00:1	:101::11]/36	
		172.16.254.3		0	100	0 ?	
*>i	[2][172.16.254.	.6:101][0][48]	[F4CFE24334C1][128][FE80::	F6CF:E2FF:FE4	3:34C1]/36
		172.16.254.3		0	100	0 ?	
Route	Distinguisher:	172.16.254.6:	102	1		0 11 /04	
*>	[2][1/2.16.254.	6:102][0][48]	LOC/2BD6/EF4D][32]	[10.1.10	2.1]/24	
	1011100 10 054	::	1007555C75545	1 1 1 0 0	327	68 ?	
^ >	[2][1/2.10.254.	.6 : 102][0][48]	LOC/2BD0/EF4D][128][FCUU:1	:102::1]/36	
ш. , ,		::	[4 4 D 2 G 3 0 0 C G G 5	1 6 0 1 6	3Z/	68 :	
^>1	[2][1/2.16.254.	.6:1UZ][U][48]	[44D3CA286CC5][0][^]/20 100	0 0	
* \ -	1011170 16 054	L/2.10.2J4.4	[/ / D 2 C 3 2 9 6 C C 5	11221	100 100 1 10	0 : 0 101/04	
~ >1	[2][1/2.10.234.	170 10 054 4	[44D3CA200CC3][32]	100	2.12]/24	
* \ -	1011170 16 054	1/2.10.234.4	[/ / D 2 C 3 2 9 6 C C 5	U 1 [1 2 0	100	.102121/26	
~/1	[2][1/2.10.234.	172 16 254 A	[44D3CA200CCJ)[120	100	.102::12]/30	
* \ -	1011170 16 254	6,1021[01[49]	[110303296005	11120	115500	0 : 46D3•C7EE•EE?	9.60051/36
~1	[2][1/2.10.234.	172 16 254 A	[44D3CA200CC3)[120	100	0 2	0.0003/30
*>i	[2][172 16 254	6.1021[01[48]	[7C2100809540	1 [3 2]	100 1 10	2 11/24	
~ 1	[2][1/2.10.234.	172 16 254 4	[/021000000000	0	100	0 2	
*>i	[2][172 16 254	6.1021[01[48]	[7C210DBD954D	1 [1 2 8	1[FC00.1	•102••11/36	
~ 1	[2][1/2.10.234.	172 16 254 4	[/021000000000	0	100	0 2	
*>	[2][172 16 254	6.1021[01[48]	[ECE1A93792C5	1 [0] [*1/20	•••	
-	[2][1/2.10.201.	••	[10111133/3203][0][327	68 2	
*>	[2][172.16.254.	.6:1021[01[48]	[ECE1A93792C5	1[32]	[10.1.10	2.131/24	
	[5][1]5.10.201		[2022113073200][02]	327	68 ?	
*>	[2][172.16.254.	.6:1021[01[48]	[ECE1A93792C5	1[128	1[FC00:1	:102::131/36	
	[_][::] [= = •	327	68 ?	
*>	[2][172.16.254.	6:1021[0][48]	[ECE1A93792C5	1[128][FE80::	EEE1:A9FF:FE3	7:92C51/36
		::			327	68 ?	
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 ?	
* i	[5][1:1][0][24]	[10.1.102.0]/	17				
		172.16.254.4		0	100	0 ?	
* i		172.16.254.	4	0	100	0 ?	
*>		0.0.0.0		0	32	768 ?	
*>i	[5][1:1][0][32]	[10.1.255.1]/	17				
		172.16.254.3		0	100	0 ?	
* i		172.16.254.	3	0	100	0 ?	
*>i	[5][1:1][0][32]	[10.1.255.2]/	17				
		172.16.254.4		0	100	0 ?	
* i		172.16.254.	4	0	100	0 ?	
*>	[5][1:1][0][32]	[10.1.255.3]/	17				

	0.0.0	0		32768 ?
* i	[5][1:1][0][32][10.2.255.255]/17			
	172.16.254.3	0	100	0 ?
* i	172.16.254.3	0	100	0 ?
*>	0.0.0	0		32768 ?
*>i	[5][1:1][0][64][FC00:1:101::]/29			
	172.16.254.3	0	100	0 ?
* i	172.16.254.3	0	100	0 ?
* i	[5][1:1][0][64][FC00:1:102::]/29			
	172.16.254.4	0	100	0 ?
* i	172.16.254.4	0	100	0 ?
*>	::	0		32768 ?
*>i	[5][1:1][0][128][FC00:1:255::1]/29			
	172.16.254.3	0	100	0 ?
* i	172.16.254.3	0	100	0 ?
*>i	[5][1:1][0][128][FC00:1:255::2]/29			
	172.16.254.4	0	100	0 ?
* i	172.16.254.4	0	100	0 ?
*>	[5][1:1][0][128][FC00:1:255::3]/29			
	::	0		32768 ?
* i	[5][1:1][0][128][FC00:2:255::255]/29			
	172.16.254.3	0	100	0 ?
* i	172.16.254.3	0	100	0 ?
*>	::	0		32768 ?
Leaf-	03#			

The following example shows the output for the **show ipv6 pim vrf** *vrf-name* **group-map** command on VTEP 3:

```
Leaf-03# show ipv6 pim vrf green group-map ff06:1::1
IP PIM Group Mapping Table
(* indicates group mappings being used)
FF00::/8*
   SM, RP: FC00:2:255::255
   RPF: Tu2,FC00:2:255::255 (us)
   Info source: Static
   Uptime: 02:02:54, Groups: 1
Leaf-03#
```

The following example shows the output for the **show ipv6 route vrf** command on VTEP 3:

```
Leaf-03# show ipv6 route vrf green FC00:2:255::255
Routing entry for FC00:2:255::255/128
Known via "connected", distance 0, metric 0, type receive, connected
Redistributing via bgp 65001
Route count is 1/1, share count 0
Routing paths:
    receive via Loopback255
    Last updated 02:02:55 ago
Leaf-03#
```

The following example shows the output for the **show ipv6 mld vrf** *vrf-name* **groups** command on VTEP 3:

```
Leaf-03# show ipv6 mld vrf green groups
MLD Connected Group Membership
Group Address Interface
Uptime Expires
FF06:1::1 Vlan102
```

02:02:06 00:03:50 Leaf-03#

The following example shows the output for the **show ipv6 mroute vrf** *vrf-name* command on VTEP 3:

```
Leaf-03# show ipv6 mroute vrf green
Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group,
       C - Connected, L - Local, I - Received Source Specific Host Report,
       P - Pruned, R - RP-bit set, F - Register flag, T - SPT-bit set,
       J - Join SPT, Y - Joined MDT-data group,
       y - Sending to MDT-data group
       g - BGP signal originated, G - BGP Signal received,
      N - BGP Shared-Tree Prune received, n - BGP C-Mroute suppressed,
       q - BGP Src-Active originated, Q - BGP Src-Active received
      E - Extranet
Timers: Uptime/Expires
Interface state: Interface, State
(*, FF06:1::1), 02:02:06/never, RP FC00:2:255::255, flags: SCJ
  Incoming interface: Tunnel2
  RPF nbr: FC00:2:255::255
  Immediate Outgoing interface list:
   Vlan102, Forward, 02:02:06/never
(FC00:1:101::11, FF06:1::1), 01:56:23/never, flags: STgQ
  Incoming interface: Vlan901
  RPF nbr: ::FFFF:172.16.254.3
  Inherited Outgoing interface list:
   Vlan102, Forward, 02:02:06/never
Leaf-03#
```

The following example shows the output for the **show ipv6 mfib vrf** *vrf-name* command on VTEP 3:

```
Leaf-03# show ipv6 mfib vrf green
               C - Directly Connected, S - Signal, IA - Inherit A flag,
Entry Flags:
               ET - Data Rate Exceeds Threshold, K - Keepalive
               DDE - Data Driven Event, HW - Hardware Installed
               ME - MOFRR ECMP entry, MNE - MOFRR Non-ECMP entry, MP - MFIB
               MoFRR Primary, RP - MRIB MoFRR Primary, P - MoFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
                e - Encap helper tunnel flag.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
                NS - Negate Signalling, SP - Signal Present,
               A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
Other counts:
                  Total/RPF failed/Other drops
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
VRF green
 (*,FF06:1::1) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding:
                  0/0/0/0, Other: 0/0/0
  Tunnel2 Flags: A NS
  Vlan102 Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
 (FC00:1:101::11,FF06:1::1) Flags: HW
  SW Forwarding: 1/0/100/0, Other: 0/0/0
```

Leaf-03# show ip mroute

```
HW Forwarding: 3475/0/126/0, Other: 0/0/0
Vlan901, VXLAN Decap Flags: A
Vlan102 Flags: F NS
Pkts: 0/0/1 Rate: 0 pps
Leaf-03#
```

The following example shows the output for the **show ip mroute** command on VTEP 3:

```
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
       L - Local, P - Pruned, R - RP-bit set, F - Register flag,
       T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
      X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
      U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
      Y - Joined MDT-data group, y - Sending to MDT-data group,
       G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
      V - RD & Vector, v - Vector, p - PIM Joins on route,
      x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf,
       e - encap-helper tunnel flag
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
Interface state: Interface, Next-Hop or VCD, State/Mode
(*, 239.1.1.1), 02:02:45/stopped, RP 172.16.255.255, flags: SJCx
  Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
  Outgoing interface list:
   Tunnel0, Forward/Sparse, 02:02:45/00:01:07
(172.16.254.3, 239.1.1.1), 01:56:21/00:02:07, flags: JTx
  Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 01:56:21/00:00:37
(*, 224.0.1.40), 02:02:55/00:02:10, RP 0.0.0.0, flags: DCL
  Incoming interface: Null, RPF nbr 0.0.0.0
  Outgoing interface list:
    Loopback0, Forward/Sparse, 02:02:54/00:02:10
(*, 225.0.0.102), 02:02:45/stopped, RP 172.16.255.255, flags: SJCFx
  Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
  Outgoing interface list:
   Tunnel0, Forward/Sparse, 02:02:45/00:01:07
(172.16.254.4, 225.0.0.102), 02:01:56/00:02:46, flags: JTx
  Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 02:01:56/00:01:07
(172.16.254.6, 225.0.0.102), 02:02:08/00:02:37, flags: FTx
  Incoming interface: Loopback1, RPF nbr 0.0.0.0
  Outgoing interface list:
   TenGigabitEthernet1/0/2, Forward/Sparse, 02:01:58/00:02:59
(*, 225.0.0.101), 02:02:45/stopped, RP 172.16.255.255, flags: SJCx
  Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 02:02:45/00:01:07
```

```
(172.16.254.3, 225.0.0.101), 02:01:36/00:01:06, flags: JTx
Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
Outgoing interface list:
    Tunnel0, Forward/Sparse, 02:01:36/00:01:23
Leaf-03#
```

The following example shows the output for the show ip mfib command on VTEP 3:

```
Leaf-03# show ip mfib
               C - Directly Connected, S - Signal, IA - Inherit A flag,
Entry Flags:
                ET - Data Rate Exceeds Threshold, K - Keepalive
               DDE - Data Driven Event, HW - Hardware Installed
               ME - MOFRR ECMP entry, MNE - MOFRR Non-ECMP entry, MP - MFIB
               MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
               e - Encap helper tunnel flag.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
               NS - Negate Signalling, SP - Signal Present,
                A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
Other counts:
                  Total/RPF failed/Other drops
I/O Item Counts:
                 HW Pkt Count/FS Pkt Count/PS Pkt Count
                                                           Egress Rate in pps
Default
 (*,224.0.0.0/4) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding:
                  0/0/0/0, Other: 0/0/0
  TunnelO, VXLAN Decap Flags: NS
 (*,224.0.1.40) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Loopback0 Flags: F IC NS
    Pkts: 0/0/0
                 Rate: 0 pps
 (*,225.0.0.0/8) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,225.0.0.101) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 1/0/190/0, Other: 0/0/0
  TenGigabitEthernet1/0/2 Flags: A NS
  Tunnel0, VXLAN Decap Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
 (172.16.254.3,225.0.0.101) Flags: HW
   SW Forwarding: 1/0/172/0, Other: 0/0/0
  HW Forwarding: 568/0/177/0, Other: 0/0/0
  TenGigabitEthernet1/0/2 Flags: A
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/1
                  Rate: 0 pps
 (*,225.0.0.102) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 1/0/172/0, Other: 0/0/0
  TenGigabitEthernet1/0/2 Flags: A NS
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/0
                 Rate: 0 pps
 (172.16.254.4,225.0.0.102) Flags: HW
   SW Forwarding: 1/0/154/0, Other: 0/0/0
  HW Forwarding: 632/0/176/0, Other: 0/0/0
  TenGigabitEthernet1/0/2 Flags: A
  TunnelO, VXLAN Decap Flags: F NS
```

```
Pkts: 0/0/1
                 Rate: 0 pps
 (172.16.254.6,225.0.0.102) Flags: HW
  SW Forwarding: 2/0/180/0, Other: 3/0/3
  HW Forwarding: 610/0/189/0, Other: 0/0/0
  Null0 Flags: A
  TenGigabitEthernet1/0/2 Flags: F NS
    Pkts: 0/0/1 Rate: 0 pps
 (*,232.0.0.0/8) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,239.1.1.1) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 1/0/168/0, Other: 0/0/0
  TenGigabitEthernet1/0/2 Flags: A NS
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
 (172.16.254.3,239.1.1.1) Flags: HW
   SW Forwarding: 1/0/150/0, Other: 0/0/0
  HW Forwarding: 3474/0/168/0, Other: 0/0/0
  TenGigabitEthernet1/0/2 Flags: A
   TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/1 Rate: 0 pps
Leaf-03#
```

Return to Verifying TRM in PIM-SM with Anycast RP for IPv4 and IPv6 Multicast Traffic, on page 28

Outputs to Verify the Configuration on Spine Switch 1

The following example shows the output for the **show bgp ipv6 mvpn all summary** command on Spine Switch 1:

```
Spine-01# show bgp ipv6 mvpn all summary
BGP router identifier 172.16.255.1, local AS number 65001
BGP table version is 20, main routing table version 20
2 network entries using 784 bytes of memory
5 path entries using 800 bytes of memory
2/2 BGP path/bestpath attribute entries using 608 bytes of memory
3 BGP rrinfo entries using 120 bytes of memory
1 BGP community entries using 24 bytes of memory
13 BGP extended community entries using 1808 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 4144 total bytes of memory
BGP activity 1001/969 prefixes, 7359/7288 paths, scan interval 60 secs
2 networks peaked at 11:16:15 Sep 16 2020 UTC (02:20:36.059 ago)
Neighbor
                           AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd
                V
   16 255 2
                                         167
                        65001
                              161
                                                    20
```

1/2.10.255.2	4	6200I	101	10/	20	0	0 02:07:55	2
172.16.255.3	4	65001	148	161	20	0	0 02:08:00	1
172.16.255.4	4	65001	148	165	20	0	0 02:07:32	1
172.16.255.6 Spine-01#	4	65001	149	166	20	0	0 02:07:32	1

The following example shows the output for the **show bgp ipv6 mvpn all** command on Spine Switch 1:

```
Spine-01# show bgp ipv6 mvpn all
```

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: 1:1 * i [5][1:1][FC00:1:101::11][FF06:1::1]/42 0 100 172.16.255.3 0 ? *>i 100 172.16.255.3 0 0 ? Route Distinguisher: 172.16.254.3:101 * i [7][172.16.254.3:101][65001][FC00:1:101::11][FF06:1::1]/46 100 172.16.255.4 0 0 ? *>i 172.16.255.4 0 100 0 ? * i 172.16.255.6 0 100 0 ? Spine-01#

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

Spine-01# show bgp 12vpn evpn summary BGP router identifier 172.16.255.1, local AS number 65001 BGP table version is 785, main routing table version 785 30 network entries using 10320 bytes of memory 66 path entries using 13728 bytes of memory 11/11 BGP path/bestpath attribute entries using 3168 bytes of memory 3 BGP rrinfo entries using 120 bytes of memory 1 BGP community entries using 24 bytes of memory 13 BGP extended community entries using 1808 bytes of memory 0 BGP route-map cache entries using 0 bytes of memory O BGP filter-list cache entries using O bytes of memory BGP using 29168 total bytes of memory BGP activity 1001/969 prefixes, 7359/7288 paths, scan interval 60 secs 44 networks peaked at 10:13:07 Aug 6 2020 UTC (5w6d ago) V Neighbor AS MsgRcvd MsgSent TblVer InO OutO Up/Down State/PfxRcd

-			-	-			=	
172.16.255.2	4	65001	161	167	785	0	0 02:07:55	30
172.16.255.3	4	65001	148	161	785	0	0 02:08:00	12
172.16.255.4	4	65001	148	165	785	0	0 02:07:33	12
172.16.255.6	4	65001	149	166	785	0	0 02:07:33	12
Spine-01#								

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

```
Spine-01# show bgp 12vpn evpn
BGP table version is 785, 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: 172.16.254.3:101
 * i [2][172.16.254.3:101][0][48][10B3D56A8FC1][32][10.1.101.1]/24
                    172.16.254.301000 ?172.16.254.301000 ?
 *>i
                                                          0 ?
 * i [2][172.16.254.3:101][0][48][10B3D56A8FC1][128][FC00:1:101::1]/36
                   172.16.254.3 0 100 0 ?
 *>i
                      172.16.254.3
                                             0
                                                 100
                                                           0 2
```

[2][172.16.254.3:101][0][48][F4CFE24334C1][0][*]/20 172.16.254.3 0 100 0 100 0 2 *>i 172.16.254.3 0 ? * i [2] [172.16.254.3:101] [0] [48] [F4CFE24334C1] [32] [10.1.101.11]/24 172.16.254.3 0 100 0 ? *>i 172.16.254.3 0 100 0 ? * i [2][172.16.254.3:101][0][48][F4CFE24334C1][128][FC00:1:101::11]/36 172.16.254.301000 ?172.16.254.301000 ? *>i 172.16.254.3 0 ? * i [2] [172.16.254.3:101] [0] [48] [F4CFE24334C1] [128] [FE80::F6CF:E2FF:FE43:34C1]/36 0 ? 0 100 172.16.254.3 0 *>i 172.16.254.3 100 0 ? Route Distinguisher: 172.16.254.4:102 * i [2][172.16.254.4:102][0][48][44D3CA286CC5][0][*]/20 172.16.254.4 0 100 0 ? 0 100 *>i 172.16.254.4 0 ? * i [2] [172.16.254.4:102] [0] [48] [44D3CA286CC5] [32] [10.1.102.12]/24 172.16.254.40100172.16.254.40100 0 ? *>i 0 2 [2] [172.16.254.4:102] [0] [48] [44D3CA286CC5] [128] [FC00:1:102::12]/36 * i 172.16.254.401000 ?172.16.254.401000 ? *>i 172.16.254.4 0 ? * i [2] [172.16.254.4:102] [0] [48] [44D3CA286CC5] [128] [FE80::46D3:CAFF:FE28:6CC5] /36 172.16.254.4 0 100 0 100 0? *>i 172.16.254.4 * i [2][172.16.254.4:102][0][48][7C210DBD954D][32][10.1.102.1]/24 172.16.254.4 0 100 0 ? *>i 172.16.254.4 0 100 0 ? * i [2][172.16.254.4:102][0][48][7C210DBD954D][128][FC00:1:102::1]/36 172.16.254.4 0 100 0 ? *>i 172.16.254.4 0 100 0 ? Route Distinguisher: 172.16.254.6:102 * i [2][172.16.254.6:102][0][48][0C75BD67EF4D][32][10.1.102.1]/24 0 ? 0 100 0 100 172.16.254.6 *>i 172.16.254.6 0 2 * i [2][172.16.254.6:102][0][48][0C75BD67EF4D][128][FC00:1:102::1]/36 172.16.254.6 0 100 0 ? *>i 172.16.254.6 0 100 0 ? * i [2] [172.16.254.6:102] [0] [48] [ECE1A93792C5] [0] [*]/20 172.16.254.60100172.16.254.60100 0 ? *>i 0 ? * i [2] [172.16.254.6:102] [0] [48] [ECE1A93792C5] [32] [10.1.102.13]/24 0 ? 172.16.254.60100172.16.254.60100 *>i 0 ? [2][172.16.254.6:102][0][48][ECE1A93792C5][128][FC00:1:102::13]/36 * i 0 100 0 ? 0 100 0 ? 172.16.254.6 *>i 172.16.254.6 0 ? * i [2] [172.16.254.6:102] [0] [48] [ECE1A93792C5] [128] [FE80::EEE1:A9FF:FE37:92C5] /36 172.16.254.6 0 100 0 ? *>i 172.16.254.6 0 100 0 ? Route Distinguisher: 1:1 * 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 ? *>i [5] [1:1] [0] [24] [10.1.102.0] /17 172.16.254.4 0 100 0 ? * i 100 0 ? 172.16.254.4 0 * i 172.16.254.6 100 0 ? 0 * i [5] [1:1] [0] [32] [10.1.255.1]/17 100 0 0 2 172.16.254.3 0 *>i 100 0 ? 172.16.254.3 * i [5][1:1][0][32][10.1.255.2]/17 172.16.254.4 0 100 0 ? *>i 0 100 172.16.254.4 0 ?

L

* i	[5][1:1][0][32][10.1.255.3]/17			
	172.16.254.6	0	100	0 ?
*>i	172.16.254.6	0	100	0 ?
* i	[5][1:1][0][32][10.2.255.255]/17			
	172.16.254.4	0	100	0 ?
* i	172.16.254.6	0	100	0 ?
* i	172.16.254.3	0	100	0 ?
*>i	172.16.254.3	0	100	0 ?
* i	[5][1:1][0][64][FC00:1:101::]/29			
	172.16.254.3	0	100	0 ?
*>i	172.16.254.3	0	100	0 ?
*>i	[5][1:1][0][64][FC00:1:102::]/29			
	172.16.254.4	0	100	0 ?
* i	172.16.254.4	0	100	0 ?
* i	172.16.254.6	0	100	0 ?
* i	[5][1:1][0][128][FC00:1:255::1]/29			
	172.16.254.3	0	100	0 ?
*>i	172.16.254.3	0	100	0 ?
* i	[5][1:1][0][128][FC00:1:255::2]/29			
	172.16.254.4	0	100	0 ?
*>i	172.16.254.4	0	100	0 ?
* i	[5][1:1][0][128][FC00:1:255::3]/29			
	172.16.254.6	0	100	0 ?
*>i	172.16.254.6	0	100	0 ?
* i	[5][1:1][0][128][FC00:2:255::255]/29			
	172.16.254.4	0	100	0 ?
* i	172.16.254.6	0	100	0 ?
* i	172.16.254.3	0	100	0 ?
*>i	172.16.254.3	0	100	0 ?
Spine	-01#			

The following example shows the output for the **show ip pim rp mapping** command on Spine Switch 1:

```
Spine-01# show ip pim rp mapping
PIM Group-to-RP Mappings
Group(s): 224.0.0.0/4, Static
    RP: 172.16.255.255 (?)
Spine-01#
```

The following example shows the output for the **show ip mroute** command on Spine Switch 1:

```
Spine-01# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
       L - Local, P - Pruned, R - RP-bit set, F - Register flag,
       T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
       X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
      U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
       Y - Joined MDT-data group, y - Sending to MDT-data group,
       G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
      V - RD & Vector, v - Vector, p - PIM Joins on route,
       x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
 Timers: Uptime/Expires
 Interface state: Interface, Next-Hop or VCD, State/Mode
```

```
(*, 224.0.1.40), 1w2d/00:02:38, RP 172.16.255.255, flags: SJCL
Incoming interface: Null, RPF nbr 0.0.0.0
Outgoing interface list:
Loopback2, Forward/Sparse, 1w2d/00:02:38
(*, 225.0.0.102), 1w2d/stopped, RP 172.16.255.255, flags: SP
Incoming interface: Null, RPF nbr 0.0.0.0
Outgoing interface list: Null
(172.16.254.4, 225.0.0.102), 02:04:11/00:02:37, flags: PA
Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.14.4
Outgoing interface list: Null
(172.16.254.6, 225.0.0.102), 02:07:34/00:00:34, flags: PTA
Incoming interface: GigabitEthernet1/0/4, RPF nbr 172.16.16.6
Outgoing interface list: Null
Spine-01#
```

The following example shows the output for the **show ip mfib** command on Spine Switch 1:

```
Spine-01# show ip mfib
               C - Directly Connected, S - Signal, IA - Inherit A flag,
Entry Flags:
                ET - Data Rate Exceeds Threshold, K - Keepalive
                DDE - Data Driven Event, HW - Hardware Installed
                ME - MOFRR ECMP entry, MNE - MOFRR Non-ECMP entry, MP - MFIB
                MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
               NS - Negate Signalling, SP - Signal Present,
                A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
                MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
Other counts:
                  Total/RPF failed/Other drops
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Eqress Rate in pps
Default
 (*,224.0.0.0/4) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 84/84/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
  Loopback2 Flags: F IC NS
                 Rate: 0 pps
    Pkts: 0/0/0
 (*,225.0.0.102) Flags: C HW
   SW Forwarding: 4/0/193/0, Other: 41/0/41
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
 (172.16.254.4,225.0.0.102) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
   HW Forwarding:
                  0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
  GigabitEthernet1/0/2 Flags: NS
 (172.16.254.6,225.0.0.102) Flags: HW
   SW Forwarding: 1/0/206/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
   GigabitEthernet1/0/4 Flags: A NS
 (*,232.0.0.0/8) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
```

```
HW Forwarding: 0/0/0/0, Other: 0/0/0
Spine-01#
```

Return to Verifying TRM in PIM-SM with Anycast RP for IPv4 and IPv6 Multicast Traffic, on page 28

Outputs to Verify the Configuration on Spine Switch 2

The following example shows the output for the **show bgp ipv6 mvpn all summary** command on Spine Switch 2:

```
Spine-02# show bgp ipv6 mvpn all summary
BGP router identifier 172.16.255.2, local AS number 65001
BGP table version is 20, main routing table version 20
2 network entries using 784 bytes of memory
5 path entries using 800 bytes of memory
2/2 BGP path/bestpath attribute entries using 608 bytes of memory
3 BGP rrinfo entries using 120 bytes of memory
1 BGP community entries using 24 bytes of memory
13 BGP extended community entries using 1808 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
O BGP filter-list cache entries using O bytes of memory
BGP using 4144 total bytes of memory
BGP activity 1031/999 prefixes, 7443/7372 paths, scan interval 60 secs
2 networks peaked at 11:17:12 Sep 16 2020 UTC (02:22:21.833 ago)
                          AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd
Neighbor
              V
172.16.255.1 4

        65001
        169
        163
        20
        0
        02:09:41
        2

172.16.255.3 4
                      65001
                                 150
                                        169
                                                  20 0 0 02:09:38
                                                                                1
                                 151 168
150 167
                      65001
172.16.255.4 4
                                                 20 0 0 02:09:14
                                                                                1
172.16.255.6 4
                      65001
                                                  20
                                                       0 0 02:09:18
                                                                                1
Spine-02#
```

The following example shows the output for the **show bgp ipv6 mvpn all** command on Spine Switch 2:

	Network	Next Hop	Metric	LocPrf	Weight Path	
Route	e Distinguisher: 1	1:1				
* i	[5][1:1][FC00:1:	:101::11][FF06:1::1]	/42			
		172.16.255.3	0	100	0 ?	
*>i		172.16.255.3	0	100	0 ?	
Route	e Distinguisher: 1	172.16.254.3:101				
*>i	[7][172.16.254.3	3:101][65001][FC00:1	:101::11][FF06:	1::1]/46	
		172.16.255.4	0	100	0 ?	
* i		172.16.255.4	0	100	0 ?	
* i		172.16.255.6	0	100	0 ?	
Spine	-02#					

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

Spine-02# show bgp 12vpn evpn summary BGP router identifier 172.16.255.2, local AS number 65001 BGP table version is 712, main routing table version 712 30 network entries using 10320 bytes of memory 66 path entries using 13728 bytes of memory 11/11 BGP path/bestpath attribute entries using 3168 bytes of memory 3 BGP rrinfo entries using 120 bytes of memory 1 BGP community entries using 24 bytes of memory 13 BGP extended community entries using 1808 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 29168 total bytes of memory BGP activity 1031/999 prefixes, 7443/7372 paths, scan interval 60 secs 44 networks peaked at 10:13:54 Aug 6 2020 UTC (5w6d ago) Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd

172.16.255.1	4	65001	169	163	712	0	0	02:09:41	30
172.16.255.3	4	65001	150	169	712	0	0	02:09:38	12
172.16.255.4	4	65001	151	168	712	0	0	02:09:15	12
172.16.255.6	4	65001	150	167	712	0	0	02:09:18	12
Spine-02#									

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

```
Spine-02# show bgp 12vpn evpn
BGP table version is 712, 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
                                      Metric LocPrf Weight Path
    Network
                    Next Hop
Route Distinguisher: 172.16.254.3:101
 * i [2][172.16.254.3:101][0][48][10B3D56A8FC1][32][10.1.101.1]/24
                    172.16.254.3
                                           0 100
                                                       0 ?
 *>i
                                            0
                     172.16.254.3
                                                100
                                                         0 2
 * i
     [2] [172.16.254.3:101] [0] [48] [10B3D56A8FC1] [128] [FC00:1:101::1]/36
                    172.16.254.30100172.16.254.30100
                                                         0 ?
 *>i
                     172.16.254.3
                                                         0 ?
 * i [2][172.16.254.3:101][0][48][F4CFE24334C1][0][*]/20
                                   0 100
                                                         0 2
                    172.16.254.3
 *>i
                     172.16.254.3
                                            0
                                                100
                                                         0 2
     [2][172.16.254.3:101][0][48][F4CFE24334C1][32][10.1.101.11]/24
 * i
                                           0 100
0 100
                    172.16.254.3
                                                      0 ?
 *>i
                     172.16.254.3
                                                         0 ?
 * i
     [2][172.16.254.3:101][0][48][F4CFE24334C1][128][FC00:1:101::11]/36
                                                      0 ?
                   172.16.254.3 0 100
                                            0
 *>i
                     172.16.254.3
                                                 100
                                                          0 2
 * i [2][172.16.254.3:101][0][48][F4CFE24334C1][128][FE80::F6CF:E2FF:FE43:34C1]/36
                    172.16.254.3
                                   0 100 0 ?
 *>i
                     172.16.254.3
                                            0
                                               100
                                                          0 ?
Route Distinguisher: 172.16.254.4:102
 * i [2][172.16.254.4:102][0][48][44D3CA286CC5][0][*]/20
                                          0 100
0 100
                    172.16.254.4
                                                         0 ?
 *>i
                     172.16.254.4
                                                        0 ?
 * i
     [2] [172.16.254.4:102] [0] [48] [44D3CA286CC5] [32] [10.1.102.12]/24
                                                      0 ?
                    172.16.254.4
                                          0 100
                                            0 100
 *>i
                     172.16.254.4
                                                         0 2
 * i [2][172.16.254.4:102][0][48][44D3CA286CC5][128][FC00:1:102::12]/36
                    172.16.254.4
                                           0
                                               100
                                                         0 ?
```

*>i	172.16.254.4	0	100	0 ?
* i	[2][172.16.254.4:102][0][48][44D3CA286CC	5][128	3][FE80::	46D3:CAFF:FE28:6CC5]/36
	172.16.254.4	0	100	0 ?
*>i	172.16.254.4	0	100	0 ?
* i	[2][172.16.254.4:102][0][48][7C210DBD954]	D1 [32]	[10.1.10	2.11/24
	172.16.254.4	0	100	0 ?
*>i	172 16 254 4	0	100	0 ?
* i	1/2.10.2017 1/2.10.2017 1/2.10.2017 1/2.10.2017 1/2.10.2017 1/2.10.2017	0 1122 וח	1 (FC00 • 1	•102••11/36
Ŧ	172 16 254 4	0][120	100	0.2
+ \ 2	170.10.234.4	0	100	0.2
^/L	1/2.10.204.4	0	100	0 2
Roule	Distinguisher: 1/2.16.254.6:102			0 11 /04
* 1	[2][1/2.16.254.6:102][0][48][0C/5BD6/EF4]	D][32]		2.1]/24
	172.16.254.6	0	100	0 ?
*>i	172.16.254.6	0	100	0 ?
* i	[2][172.16.254.6:102][0][48][0C75BD67EF4]	D][128	3][FC00:1	:102::1]/36
	172.16.254.6	0	100	0 ?
*>i	172.16.254.6	0	100	0 ?
* i	[2][172.16.254.6:102][0][48][ECE1A93792C	5][0]	[*]/20	
	172.16.254.6	0	100	0 ?
*>i	172.16.254.6	0	100	0 ?
* i	[2][172.16.254.6:102][0][48][ECE1A93792C	5][32]	[10.1.10	2.13]/24
	172.16.254.6	0	100	0 ?
*>i	172.16.254.6	0	100	0 ?
* i	[2][172.16.254.6:102][0][48][ECE1A93792C	5][128	3][FC00:1	:102::13]/36
	172.16.254.6	0	100	0 ?
*>i	172.16.254.6	0	100	0 ?
* i	[2][172 16 254 6·102][0][48][ECE1A93792C	51 [1 28	••0833][8	EEE1 · A9FF · FE37 · 92051 / 36
-	172 16 254 6	0	100	0 2
*>i	172.16.254.6	0	100	
Pouto	Distinguisher: 1:1	0	100	0 :
Koule	LELII.1.1.0.1.24.1.10 1 101 01/17			
~ I		0	100	0.0
	172.10.234.3	0	100	
*>1	1/2.16.254.3	0	100	0 2
*>1	[5][1:1][0][24][10.1.102.0]/1/			
	172.16.254.4	0	100	0 ?
* i	172.16.254.4	0	100	0 ?
* i	172.16.254.6	0	100	0 ?
* i	[5][1:1][0][32][10.1.255.1]/17			
	172.16.254.3	0	100	0 ?
*>i	172.16.254.3	0	100	0 ?
* i	[5][1:1][0][32][10.1.255.2]/17			
	172.16.254.4	0	100	0 ?
*>i	172.16.254.4	0	100	0 ?
* i	[5][1:1][0][32][10.1.255.3]/17			
	172.16.254.6	0	100	0 ?
*>i	172.16.254.6	0	100	0 ?
* i	[5][1:1][0][32][10.2.255.255]/17			
	172.16.254.4	0	100	0 ?
* i	172.16.254.6	0	100	0 ?
* i	172.16.254.3	0	100	0 ?
*>i	172.16.254.3	0	100	0 ?
* i	[5][1·1][0][64][FC00·1·101·1]/29	Ũ	100	•••
1		0	100	0.2
*>i	172.16.254.3	0	100	
*>:	±12,10,234,5	0	TOO	· ·
~ > T	[J][I.I][U][U4][FCUU:I:IU2::]/29	0	100	0.0
÷ '	170 16 054 4	0	100	
^ l	170.16.254.4	0	100	
× 1	L/2.16.254.6	U	TUU	0 ?
* l	[5][1:1][0][128][FC00:1:255::1]/29	0	100	
	172.16.254.3	0	T00	0 ?
*>i	172.16.254.3	0	100	0 ?
* i	[5][1:1][0][128][FC00:1:255::2]/29			
	172.16.254.4	0	100	0 ?
*>i	172.16.254.4	0	100	0 ?

```
* i [5][1:1][0][128][FC00:1:255::3]/29
                                         0 100
                                                     0 ?
                   172.16.254.6
*>i
                                          0 100
                    172.16.254.6
                                                       0 ?
* i
    [5][1:1][0][128][FC00:2:255::255]/29
                                         0
                                             100
                                                       0 2
                   172.16.254.4
                                         0
0
* i
                    172.16.254.6
                                               100
                                                       0 ?
* i
                    172.16.254.3
                                               100
                                                        0 ?
                                         0
                                             100
*>i
                    172.16.254.3
                                                       0 ?
Spine-02#
```

The following example shows the output for the **show ip pim rp mapping** command on Spine Switch 2:

```
Spine-02# show ip pim rp mapping
PIM Group-to-RP Mappings
Group(s): 224.0.0.0/4, Static
    RP: 172.16.255.255 (?)
Spine-02#
```

The following example shows the output for the **show ip mroute** command on Spine Switch 2:

```
Spine-02# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
      L - Local, P - Pruned, R - RP-bit set, F - Register flag,
       т -
          · SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
      X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
      U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
      Y - Joined MDT-data group, y - Sending to MDT-data group,
       G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
      V - RD & Vector, v - Vector, p - PIM Joins on route,
       x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
Interface state: Interface, Next-Hop or VCD, State/Mode
(*, 239.1.1.1), 22:51:54/00:03:26, RP 172.16.255.255, flags: S
  Incoming interface: Null, RPF nbr 0.0.0.0
  Outgoing interface list:
    GigabitEthernet1/0/1, Forward/Sparse, 02:09:47/00:03:26
    GigabitEthernet1/0/2, Forward/Sparse, 02:09:20/00:02:34
   GigabitEthernet1/0/4, Forward/Sparse, 02:09:16/00:03:12
(172.16.254.3, 239.1.1.1), 02:03:40/00:02:43, flags: TA
  Incoming interface: GigabitEthernet1/0/1, RPF nbr 172.16.23.3
  Outgoing interface list:
    GigabitEthernet1/0/4, Forward/Sparse, 02:03:40/00:03:12
    GigabitEthernet1/0/2, Forward/Sparse, 02:03:40/00:02:46
(*, 224.0.1.40), 1w2d/00:03:18, RP 172.16.255.255, flags: SJCL
  Incoming interface: Null, RPF nbr 0.0.0.0
  Outgoing interface list:
    GigabitEthernet1/0/2, Forward/Sparse, 00:02:09/00:03:18
    GigabitEthernet1/0/1, Forward/Sparse, 00:02:10/00:03:17
    Loopback2, Forward/Sparse, 1w2d/00:02:45
(*, 225.0.0.102), 1w2d/00:03:22, RP 172.16.255.255, flags: S
```

```
Incoming interface: Null, RPF nbr 0.0.0.0
 Outgoing interface list:
   GigabitEthernet1/0/1, Forward/Sparse, 02:09:47/00:02:35
   GigabitEthernet1/0/2, Forward/Sparse, 02:09:20/00:03:16
   GigabitEthernet1/0/4, Forward/Sparse, 02:09:16/00:03:22
(172.16.254.6, 225.0.0.102), 02:09:47/00:01:33, flags: MT
 Incoming interface: GigabitEthernet1/0/4, RPF nbr 172.16.26.6
 Outgoing interface list:
   GigabitEthernet1/0/2, Forward/Sparse, 02:09:16/00:03:16
   GigabitEthernet1/0/1, Forward/Sparse, 02:09:16/00:03:05
(172.16.254.4, 225.0.0.102), 02:09:47/00:02:06, flags: MT
 Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.4
 Outgoing interface list:
   GigabitEthernet1/0/1, Forward/Sparse, 02:09:19/00:03:10
   GigabitEthernet1/0/4, Forward/Sparse, 02:09:16/00:03:22
(*, 225.0.0.101), 1w2d/00:03:29, RP 172.16.255.255, flags: S
  Incoming interface: Null, RPF nbr 0.0.0.0
 Outgoing interface list:
   GigabitEthernet1/0/1, Forward/Sparse, 02:09:47/00:03:29
   GigabitEthernet1/0/2, Forward/Sparse, 02:09:20/00:02:31
   GigabitEthernet1/0/4, Forward/Sparse, 02:09:16/00:03:29
(172.16.254.3, 225.0.0.101), 02:09:22/00:03:25, flags: TA
 Incoming interface: GigabitEthernet1/0/1, RPF nbr 172.16.23.3
 Outgoing interface list:
   GigabitEthernet1/0/2, Forward/Sparse, 02:09:20/00:02:39
   GigabitEthernet1/0/4, Forward/Sparse, 02:09:16/00:03:29
Spine-02#
```

The following example shows the output for the **show ip mfib** command on Spine Switch 2:

```
Spine-02# show ip mfib
Entry Flags:
               C - Directly Connected, S - Signal, IA - Inherit A flag,
                ET - Data Rate Exceeds Threshold, K - Keepalive
                DDE - Data Driven Event, HW - Hardware Installed
                ME - MOFRR ECMP entry, MNE - MOFRR Non-ECMP entry, MP - MFIB
               MOFRR Primary, RP - MRIB MOFRR Primary, P - MoFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
                NS - Negate Signalling, SP - Signal Present,
                A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
                MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
                  Total/RPF failed/Other drops
Other counts:
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count
                                                          Egress Rate in pps
Default
 (*,224.0.0.0/4) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 1/1/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
   Tunnell Flags: A
   GigabitEthernet1/0/1 Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
   GigabitEthernet1/0/2 Flags: F NS
     Pkts: 0/0/0
                 Rate: 0 pps
```

Loopback2 Flags: F IC NS Pkts: 0/0/0 Rate: 0 pps (*,225.0.0.101) Flags: C HW SW Forwarding: 2/0/140/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 Tunnell Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/4 Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.3,225.0.0.101) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 604/0/178/0, Other: 0/0/0 GigabitEthernet1/0/1 Flags: A NS GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/4 Flags: F NS Pkts: 0/0/0 Rate: 0 pps (*,225.0.0.102) Flags: C HW SW Forwarding: 4/0/124/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 Tunnell Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/4 Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.4,225.0.0.102) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 668/0/176/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/4 Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.6,225.0.0.102) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 600/0/205/0, Other: 0/0/0 GigabitEthernet1/0/4 Flags: A GigabitEthernet1/0/1 Flags: F NS Rate: 0 pps Pkts: 0/0/0 GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/0 Rate: 0 pps (*,232.0.0.0/8) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,239.1.1.1) Flags: C HW SW Forwarding: 17/0/397/0, Other: 4/4/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 Tunnell Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/4 Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.3,239.1.1.1) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 3693/0/168/0, Other: 0/0/0 GigabitEthernet1/0/1 Flags: A GigabitEthernet1/0/2 Flags: F NS

```
Pkts: 0/0/0 Rate: 0 pps
GigabitEthernet1/0/4 Flags: F NS
Pkts: 0/0/0 Rate: 0 pps
Spine-02#
```

Return to Verifying TRM in PIM-SM with Anycast RP for IPv4 and IPv6 Multicast Traffic, on page 28

Example: Configuring TRM with PIM-SM for IPv4 Multicast Traffic when the RP is Inside the BGP EVPN VXLAN Fabric

This example shows how to configure and verify Layer 3 TRM with PIM-SM for IPv4 multicast traffic when the RP is inside the BGP EVPN VXLAN fabric. The example uses the following topology:

Figure 10: TRM with PIM-SM when the RP is Inside the BGP EVPN VXLAN Fabric



The topology shows an EVPN VXLAN network, with two spine switches and three VTEPs, connected to an external network with three routers. VTEP 1 inside the BGP EVPN VXLAN fabric acts as the RP in this topology and Border VTEP connects the fabric to the external network through Router 1. The IPv4 multicast group is 226.1.1.1 in this topology. The following tables provide sample configurations for the devices in this topology:

VTEP 1	Border VTEP	VTEP 2
Leaf-01# show running-config	Border# show running-config	Leaf-02# show running-config
hostname Leaf-01	hostname Border	hostname Leaf-02
!	!	!
vrf definition green	vrf definition green	vrf definition green
rd 1:1	rd 1:1	rd 1:1
!	!	!
address-family ipv4	address-family ipv4	address-family ipv4
mdt auto-discovery vxlan	mdt auto-discovery vxlan	mdt auto-discovery vxlan
mdt default vxlan 239.1.1.1	mdt default vxlan 239.1.1.1	mdt default vxlan 239.1.1.1
mdt overlay use-bgp	mdt overlay use-bgp	mdt overlay use-bgp
route-target export 1:1	route-target export 1:1	route-target export 1:1
route-target import 1:1	route-target import 1:1	route-target import 1:1
stitching	stitching	stitching
route-target import 1:1	route-target import 1:1	route-target import 1:1
etitching	etitching	etitching
exit-address-family	exit-address-family	exit-address-famil
!	!	!
ip routing	ip routing	ip routing
<pre>! ip multicast-routing ip multicast-routing vrf green !</pre>	! ip multicast-routing ip multicast-routing vrf green !	! ip multicast-routing ip multicast-routing vrf green !
l2vpn evpn	l2vpn evpn	l2vpn evpn
replication-type static	replication-type static	replication-type static
router-id Loopback1	router-id Loopback1	router-id Loopback1
default-gateway advertise	default-gateway advertise	default-gateway advertise
!	!	!
12vpn evpn instance 101	12vpn evpn instance 101	12vpn evpn instance 101
vlan-based	vlan-based	vlan-based
l2vpn evpn instance 102	l2vpn evpn instance 102	l2vpn evpn instance 102
vlan-based	vlan-based	vlan-based
encapsulation vxlan ! system mtu 9198	encapsulation vxlan ! system mtu 9198	encapsulation vxlan ! system mtu 9198 !
vlan configuration 101 member evpn-instance 101 vni 10101 vlan configuration 102 member evpn-instance 102 vni 10102 vlan configuration 901 member vni 50901 ! interface Loopback0	vlan configuration 101 member evpn-instance 101 vni 10101 vlan configuration 102 member evpn-instance 102 vni 10102 vlan configuration 901 member vni 50901 ! vlan 2001	vlan configuration 101 member evpn-instance 101 vni 10101 vlan configuration 102 member evpn-instance 102 vni 10102 vlan configuration 901 member vni 50901 !
ip address 172.16.255.3 255.255.255.255 ip pim sparse-mode ip ospf 1 area 0	!	

Table 3: Configuring VTEP 1, Border VTEP, and VTEP 2 to Configure TRM with PIM-SM for IPv4 Multicast Traffic when the RP is Inside the BGP EVPN VXLAN Fabric

VTEP 1	Border VTEP	VTEP 2
!	interface Loopback0	interface Loopback0
interface Loopback1	ip address 172.16.255.6	ip address 172.16.255.4
ip address 172.16.254.3	255.255.255.255	255.255.255.255
255.255.255.255	ip pim sparse-mode	ip pim sparse-mode
ip pim sparse-mode	ip ospf 1 area 0	ip ospf 1 area 0
ip ospf 1 area 0	!	!
!	interface Loopback1	interface Loopback1
interface Loopback255	ip address 172.16.254.6	ip address 172.16.254.4
vrf forwarding green	255.255.255.255	255.255.255.255
ip address 10.2.255.255	ip pim sparse-mode	ip pim sparse-mode
255.255.255.255	ip ospf 1 area 0	ip ospf 1 area 0
ip pim sparse-mode	!	!
!	interface	interface GigabitEthernet1/0/1
interface GigabitEthernet1/0/1	TenGigabitEthernet1/0/1	no switchport
no switchport	no switchport	ip address 172.16.14.4
ip address 172.16.13.3	ip address 172.16.16.6	255.255.255.0
255.255.255.0	255.255.255.0	ip pim sparse-mode
ip pim sparse-mode	ip pim sparse-mode	ip ospf network point-to-point
ip ospf network point-to-point	ip ospf network point-to-point	ip ospf 1 area 0
ip ospf 1 area 0	ip ospf 1 area 0	!
!	!	interface GigabitEthernet1/0/2
interface GigabitEthernet1/0/2	interface	no switchport
no switchport	TenGigabitEthernet1/0/2	ip address 172.16.24.4
ip address 172.16.23.3	no switchport	255.255.255.0
255.255.255.0	ip address 172.16.26.6	ip pim sparse-mode
ip pim sparse-mode	255.255.255.0	ip ospf network point-to-point
ip ospf network point-to-point	ip pim sparse-mode	ip ospf 1 area 0
ip ospf 1 area 0	ip ospf network point-to-point	!
!	ip ospf 1 area 0	interface
interface	1	GigabitEthernet1/0/10
GigabitEthernet1/0/10	interface	switchport access vlan 102
switchport access vian 101	TenGigabitEthernet1/0/5	switchport mode access
switchport mode access	switchport trunk allowed vian	
!		interface Vianiui
interface vianiui	switchport mode trunk	vri forwarding green
vri iorwarding green	!	1p address 10.1.101.1
1p address 10.1.101.1	Interface Vianiui	255.255.255.0
200.200.200.0	vii iorwarding green	ip pim sparse-mode
ip pim sparse-mode	1p address 10.1.101.1 255 255 255 0	: interface Wlan102
: interface Vlan102	in nim sparse-mode	unf forwarding groop
urf forwarding green	ip pim sparse-mode	in address 10 1 102 1
in address 10 1 102 1	: interface Vlan102	255 255 255 0
255 255 255 0	wrf forwarding green	in nim sparse-mode
in nim sparse-mode	in address 10 1 102 1	ip pim sparse mode
	255 255 255 0	interface Vlan901
interface Vlan901	ip pim sparse-mode	vrf forwarding green
vrf forwarding green		ip unnumbered Loopback1
ip unnumbered Loopback1	interface Vlan901	ip pim sparse-mode
ip pim sparse-mode	vrf forwarding green	no autostate
no autostate	ip unnumbered Loopback1	
!	ip pim sparse-mode	
	no autostate	
	1	

I

!	VTEP 1	Border VTEP	VTEP 2
! Border#	<pre>! address-family ipv4 vrf green advertise l2vpn evpn redistribute connected redistribute static exit-address-family ! ip pim rp-address 172.16.255.255 ip pim ssm default ip pim vrf green rp-address 10.2.255.255 ! end ! Leaf-01#</pre>	<pre>! address-family 12vpn 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 12vpn evpn redistribute connected redistribute ospf 2 match internal external 1 external 2 exit-address-family ! ip pim rp-address 172.16.255.255 ip pim ssm default ip pim vrf green rp-address 10.2.255.255 ! end ! Border#</pre>	<pre>address-family ipv4 vrf green advertise l2vpn evpn redistribute connected redistribute static exit-address-family ! ip pim rp-address 172.16.255.255 ip pim ssm default ip pim vrf green rp-address 10.2.255.255 ! end ! Leaf-02#</pre>

Spine Switch 1	Spine Switch 2
Spine-01# show running-config	Spine-02# show running-config
hostname Spine-01	hostname Spine-02
! ip routing	ip routing
ip multicast-routing	ip multicast-routing
: system mtu 9198 !	: system mtu 9198 !
interface Loopback0 ip address 172.16.255.1 255.255.255.255 ip ospf 1 area 0	interface Loopback0 ip address 172.16.255.2 255.255.255.255 ip ospf 1 area 0
interface Loopback1 ip address 172.16.254.1 255.255.255.255 ip ospf 1 area 0 !	interface 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	<pre>interface Loopback2 ip address 172.16.255.255 255.255.255.255 ip pim sparse-mode ip ospf 1 area 0 </pre>
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	<pre>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</pre>
<pre>! 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</pre>	! 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
<pre>! interface GigabitEthernet1/0/4 no switchport ip address 172.16.16.1 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 </pre>	! interface GigabitEthernet1/0/4 no switchport ip address 172.16.26.2 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0
router ospf 1 router-id 172.16.255.1 !	router ospf 1 router-id 172.16.255.2 !
router bgp 65001 bgp router-id 172.16.255.1 bgp log-neighbor-changes no bgp default ipv4-unicast	router bgp 65001 bgp router-id 172.16.255.2 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 172.16.255.4 update-source Loopback0 neighbor 172.16.255.4 remote-as 65001 neighbor 172.16.255.6 remote-as 65001 neighbor 172.16.255.6 remote-as 65001 neighbor 172.16.255.6 update-source Loopback0	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 172.16.255.4 update-source Loopback0 neighbor 172.16.255.4 update-source Loopback0 neighbor 172.16.255.6 remote-as 65001 neighbor 172.16.255.6 remote-as 65001 neighbor 172.16.255.6 update-source Loopback0

Table 4: Configuring Spine Switch 1 and Spine Switch 2 to Configure TRM with PIM-SM for IPv4 Multicast Traffic when the RP is Inside the BGP EVPN VXLAN Fabric

Spine Switch 1	Spine Switch 2					
address-family ipv4 exit-address-family !	address-family ipv4 exit-address-family !					
address-family ipv4 mvpn 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 172.16.255.4 activate neighbor 172.16.255.4 send-community both neighbor 172.16.255.4 route-reflector-client neighbor 172.16.255.4 route-reflector-client neighbor 172.16.255.6 activate neighbor 172.16.255.6 send-community both neighbor 172.16.255.6 route-reflector-client exit-address-family	address-family ipv4 mvpn 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 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 172.16.255.4 route-reflector-client neighbor 172.16.255.6 activate neighbor 172.16.255.6 send-community both neighbor 172.16.255.6 route-reflector-client exit-address-family					
address-family 12vpn 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 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 172.16.255.6 activate neighbor 172.16.255.6 send-community both neighbor 172.16.255.6 route-reflector-client neighbor 172.16.255.6 route-reflector-client exit-address-family ! ip pim rp-address 172.16.255.255 ip pim ssm default ip msdp per 172.16.254.2 connect-source	<pre>! 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 route-reflector-client neighbor 172.16.255.4 activate neighbor 172.16.255.4 send-community both neighbor 172.16.255.6 activate neighbor 172.16.255.6 send-community both neighbor 172.16.255.6 route-reflector-client exit-address-family ! ip pim rp-address 172.16.255.255 ip pim ssm default </pre>					
Loopbackl remote-as 65001 ip msdp cache-sa-state ! end ! Spine-01#	<pre>ip msap peer 1/2.16.294.1 connect-source Loopback1 remote-as 65001 ip msdp cache-sa-state ! end ! Spine-02#</pre>					

Table 5: Configuring Router 1, Router 2, and Router 3 to Configure TRM with PIM-SM for IPv4 Multicast Traffic when the RP is Inside the BGP EVPN VXLAN Fabric

Verifying TRM with PIM-SM for IPv4 Multicast Traffic when the RP is Inside the BGP EVPN VXLAN Fabric

The following sections provide sample outputs for show commands to verify TRM with PIM-SM on the devices in the topology configured above:

- Outputs to Verify the Configuration on VTEP 1 (RP Inside the BGP EVPN VXLAN Fabric), on page 69
- Outputs to Verify the Configuration on VTEP 2, on page 75
- Outputs to Verify the Configuration on Border VTEP, on page 80

- Outputs to Verify the Configuration on Spine Switch 1, on page 86
- Outputs to Verify the Configuration on Spine Switch 2, on page 89

Outputs to Verify the Configuration on VTEP 1 (RP Inside the BGP EVPN VXLAN Fabric)

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

Leaf-01#	show nve	peers						
Interface	VNI	Туре	Peer-IP	RMAC/Num_RTs	eVNI	state	flags	UP time
nvel	50901	L3CP	172.16.254.6	0c75.bd67.ef48	50901	UP	A/-/4	1d05h
nvel	50901	L3CP	172.16.254.4	7c21.0dbd.9548	50901	UP	A/-/4	1d05h
nvel	50901	L3CP	172.16.254.6	0c75.bd67.ef48	50901	UP	A/M/6	1d05h
nvel	50901	L3CP	172.16.254.4	7c21.0dbd.9548	50901	UP	A/M/6	1d05h
nvel	10102	L2CP	172.16.254.4	7	10102	UP	N/A	1d05h
nvel	10102	L2CP	172.16.254.6	5	10102	UP	N/A	1d05h
Leaf-01#								

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

Leaf-01# s	show 12vpr	n evpn peers vxlan			
Interface	VNI	Peer-IP	Num routes	eVNI	UP time
nvel	10102	172.16.254.4	7	10102	1d05h
nvel	10102	172.16.254.6	5	10102	1d05h
Leaf-01#					

The following example shows the output for the **show bgp ipv4 mvpn all summary** command on VTEP 1:

```
Leaf-01# show bgp ipv4 mvpn all summary
BGP router identifier 172.16.255.4, local AS number 65001
BGP table version is 111, main routing table version 111
7 network entries using 2128 bytes of memory
9 path entries using 1224 bytes of memory
5/5 BGP path/bestpath attribute entries using 1560 bytes of memory
4 BGP rrinfo entries using 160 bytes of memory
1 BGP community entries using 24 bytes of memory
18 BGP extended community entries using 2396 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
O BGP filter-list cache entries using O bytes of memory
BGP using 7492 total bytes of memory
BGP activity 140/45 prefixes, 240/112 paths, scan interval 60 secs
9 networks peaked at 12:22:24 Aug 6 2020 UTC (1d05h ago)
                        AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd
Neighbor
               V
       r
```

1/2.16.255.1	4	65001	2104	1988		0	0 1d05h	2
172.16.255.2	4	65001	2099	1988	111	0	0 1d05h	2
Leaf-01#								

The following example shows the output for the **show ip pim vrf** *vrf-name* **rp mapping** command on VTEP 1:

Leaf-01# **show ip pim vrf green rp mapping** PIM Group-to-RP Mappings

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

```
Leaf-01# show ip routing vrf green 10.2.255.255
Routing Table: green
Routing entry for 10.2.255.255/32
Known via "connected", distance 0, metric 0 (connected, via interface)
Redistributing via bgp 65001
Advertised by bgp 65001
Routing Descriptor Blocks:
 * directly connected, via Loopback255
Route metric is 0, traffic share count is 1
Leaf-01#
```

The following example shows the output for the **show ip igmp vrf** *vrf-name* **groups** command on VTEP 1:

Leaf-01# show ip igmp vrf green groups IGMP Connected Group Membership								
Group Address	Interface	Uptime	Expires L	ast Reporter	Group Accounted			
226.1.1.1	Vlan102	1d05h	00:02:50	10.1.102.12				
224.0.1.40	Vlan901	1d05h	00:02:03	172.16.254.4				
Leaf-01#								

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

```
Leaf-01# show ip mroute vrf green
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
      L - Local, P - Pruned, R - RP-bit set, F - Register flag,
       T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
      X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
      U-
          URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
      Y - Joined MDT-data group, y - Sending to MDT-data group,
      G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
      V - RD & Vector, v - Vector, p - PIM Joins on route,
      x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf,
       e - encap-helper tunnel flag
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
Interface state: Interface, Next-Hop or VCD, State/Mode
(*, 226.1.1.1), 1d01h/stopped, RP 10.2.255.255, flags: SJCGx
  Incoming interface: Null, RPF nbr 0.0.0.0
  Outgoing interface list:
    Vlan101, Forward/Sparse, 1d01h/00:02:33
   Vlan901, Forward/Sparse, 03:54:15/stopped
(10.2.255.1, 226.1.1.1), 00:01:13/00:01:50, flags: Tgx
  Incoming interface: Vlan901, RPF nbr 172.16.254.6
  Outgoing interface list:
   Vlan101, Forward/Sparse, 00:01:13/00:02:33
```

```
(10.1.102.12, 226.1.1.1), 00:01:36/00:01:24, flags: Tgx
Incoming interface: Vlan901, RPF nbr 172.16.254.4
Outgoing interface list:
    Vlan101, Forward/Sparse, 00:01:36/00:02:33
(*, 224.0.1.40), 1d05h/00:02:09, RP 10.2.255.255, flags: SJCLGx
Incoming interface: Null, RPF nbr 0.0.0.0
Outgoing interface list:
    Loopback901, Forward/Sparse, 1d05h/00:02:09
    Vlan901, Forward/Sparse, 03:54:15/stopped
Leaf-01#
```

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

```
Leaf-01# show ip mfib vrf green
               C - Directly Connected, S - Signal, IA - Inherit A flag,
Entry Flags:
               ET - Data Rate Exceeds Threshold, K - Keepalive
               DDE - Data Driven Event, HW - Hardware Installed
               ME - MOFRR ECMP entry, MNE - MOFRR Non-ECMP entry, MP - MFIB
               MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
               e - Encap helper tunnel flag.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
               NS - Negate Signalling, SP - Signal Present,
               A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
                  Total/RPF failed/Other drops
Other counts:
                  HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
I/O Item Counts:
VRF green
 (*,224.0.0.0/4) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 2/2/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnel6 Flags: A
  Loopback901 Flags: F IC NS
    Pkts: 0/0/0
                 Rate: 0 pps
   Vlan901, VXLAN v4 Encap (50901, 239.1.1.1) Flags: F
     Pkts: 0/0/0 Rate: 0 pps
 (*,226.1.1.1) Flags: C HW
   SW Forwarding: 1/0/100/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
   Tunnel6 Flags: A
  Vlan101 Flags: F NS
    Pkts: 0/0/1
                 Rate: 0 pps
  Vlan901, VXLAN v4 Encap (50901, 239.1.1.1) Flags: F
    Pkts: 0/0/1 Rate: 0 pps
 (10.1.102.12,226.1.1.1) Flags: HW
   SW Forwarding: 2/0/100/0, Other: 0/0/0
  HW Forwarding: 44/0/126/0, Other: 0/0/0
  Vlan901, VXLAN Decap Flags: A
  Vlan101 Flags: F NS
    Pkts: 0/0/2 Rate: 0 pps
 (10.2.255.1,226.1.1.1) Flags: HW
   SW Forwarding: 5/0/100/0, Other: 12576/1/12575
  HW Forwarding: 3801/1/126/0, Other: 0/0/0
  Vlan901, VXLAN Decap Flags: A
  Vlan901 Flags: SP
```

```
Vlan101 Flags: F NS
Pkts: 0/0/5 Rate: 0 pps
Leaf-01#
```

The following example shows the output for the **show bgp ipv4 mvpn all** command on VTEP 1:

Network Next Hop Metric LocPrf Weight Path Route Distinguisher: 1:1 (default for vrf green) * i [5][1:1][10.1.102.12][226.1.1.1]/18 100 172.16.255.4 0 0 ? *>i 172.16.255.4 0 100 0 ? [5][1:1][10.2.255.1][226.1.1.1]/18 *>i 172.16.255.6 100 0 0 2 * i 172.16.255.6 0 100 0 ? * i [6][1:1][65001][10.2.255.255/32][224.0.1.40/32]/22 172.16.255.4 0 100 0 2 0 *>i 172.16.255.4 100 0 ? * i [6][1:1][65001][10.2.255.255/32][226.1.1.1/32]/22 0 ? 172.16.255.4 0 100 *>i 172.16.255.4 0 100 0 ? *> [7][1:1][65001][10.2.255.1/32][226.1.1.1/32]/22 32768 ? 0.0.0.0 Route Distinguisher: 172.16.254.4:102 *> [7][172.16.254.4:102][65001][10.1.102.12/32][226.1.1.1/32]/22 0.0.0.0 32768 ? Leaf-01#

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

```
Leaf-01# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
       L - Local, P - Pruned, R - RP-bit set, F - Register flag,
       T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
       X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
      U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
       Y - Joined MDT-data group, y - Sending to MDT-data group,
      G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
       V - RD & Vector, v - Vector, p - PIM Joins on route,
       x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf,
       e - encap-helper tunnel flag
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
Interface state: Interface, Next-Hop or VCD, State/Mode
(*, 239.1.1.1), 1d05h/stopped, RP 172.16.255.255, flags: SJCFx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2
  Outgoing interface list:
```

```
Tunnel0, Forward/Sparse, 1d05h/00:02:10
```
```
(172.16.254.6, 239.1.1.1), 00:01:11/00:01:48, flags: JTx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2
  Outgoing interface list:
   Tunnel0, Forward/Sparse, 00:01:11/00:01:48
(172.16.254.3, 239.1.1.1), 00:01:37/00:01:22, flags: FTx
  Incoming interface: Loopback1, RPF nbr 0.0.0.0, Registering
  Outgoing interface list:
    GigabitEthernet1/0/2, Forward/Sparse, 00:01:37/00:02:51, A
(172.16.254.4, 239.1.1.1), 04:17:32/00:02:31, flags: JTx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2
  Outgoing interface list:
   Tunnel0, Forward/Sparse, 04:17:32/00:00:27
(*, 224.0.1.40), 1d05h/00:02:12, RP 172.16.255.255, flags: SJCL
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2
  Outgoing interface list:
   Loopback0, Forward/Sparse, 1d05h/00:02:12
(*, 225.0.0.102), 1d05h/stopped, RP 172.16.255.255, flags: SJCx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 1d05h/00:02:10
(172.16.254.4, 225.0.0.102), 1d05h/00:01:20, flags: JTx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2
  Outgoing interface list:
   Tunnel0, Forward/Sparse, 1d05h/00:01:32
(172.16.254.6, 225.0.0.102), 1d05h/00:02:44, flags: JTx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2
  Outgoing interface list:
   Tunnel0, Forward/Sparse, 1d05h/00:02:10
(*, 225.0.0.101), 1d05h/stopped, RP 172.16.255.255, flags: SJCFx
 Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2
 Outgoing interface list:
   Tunnel0, Forward/Sparse, 1d05h/00:02:10
(172.16.254.3, 225.0.0.101), 1d05h/00:02:36, flags: FTx
  Incoming interface: Loopback1, RPF nbr 0.0.0.0
  Outgoing interface list:
    GigabitEthernet1/0/2, Forward/Sparse, 1d05h/00:03:20
Leaf-01#
```

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

Leaf-01# show ip mfib Entry Flags: C - Directly Connected, S - Signal, IA - Inherit A flag, ET - Data Rate Exceeds Threshold, K - Keepalive DDE - Data Driven Event, HW - Hardware Installed ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB MoFRR Primary, RP - MRIB MOFRR Primary, P - MoFRR Primary MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client, e - Encap helper tunnel flag. I/O Item Flags: IC - Internal Copy, NP - Not platform switched, NS - Negate Signalling, SP - Signal Present, A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward, MA - MFIB Accept backup, RA2 - MRIB Accept backup, MA2 - MFIB Accept backup

```
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
Other counts: Total/RPF failed/Other drops
I/O Item Counts:
                 HW Pkt Count/FS Pkt Count/PS Pkt Count Eqress Rate in pps
Default
 (*,224.0.0.0/4) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
   HW Forwarding: 0/0/0/0, Other: 0/0/0
   GigabitEthernet1/0/2 Flags: A NS
   Loopback0 Flags: F IC NS
    Pkts: 0/0/0 Rate: 0 pps
 (*,225.0.0.101) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
   HW Forwarding: 1/0/114/0, Other: 0/0/0
   GigabitEthernet1/0/2 Flags: A NS
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
 (172.16.254.3,225.0.0.101) Flags: HW
   SW Forwarding: 13/0/127/0, Other: 2/2/0
   HW Forwarding:
                   12525/0/165/0, Other: 0/0/0
  NullO Flags: A
  GigabitEthernet1/0/2 Flags: F NS
    Pkts: 0/0/1
                  Rate: 0 pps
 (*,225.0.0.102) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 2/0/172/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A NS
  Tunnel0, VXLAN Decap Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
 (172.16.254.4,225.0.0.102) Flags: HW
   SW Forwarding: 1/0/154/0, Other: 0/0/0
  HW Forwarding: 9155/0/176/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/1 Rate: 0 pps
 (172.16.254.6,225.0.0.102) Flags: HW
   SW Forwarding: 1/0/154/0, Other: 0/0/0
  HW Forwarding: 3762/0/163/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/1
                 Rate: 0 pps
 (*,232.0.0.0/8) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,239.1.1.1) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 2/2/0
   HW Forwarding: 15/0/168/0, Other: 0/0/0
   GigabitEthernet1/0/2 Flags: A NS
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
 (172.16.254.3,239.1.1.1) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 2/1/1
   HW Forwarding:
                   0/0/0/0, Other: 0/0/0
  NullO Flags: A
  GigabitEthernet1/0/2 Flags: F
    Pkts: 0/0/0
                   Rate: 0 pps
  Tunnel4 Flags: F
                 Rate: 0 pps
    Pkts: 0/0/0
 (172.16.254.4,239.1.1.1) Flags: HW
   SW Forwarding: 1/0/150/0, Other: 0/0/0
   HW Forwarding: 7707/0/167/0, Other: 0/0/0
```

```
GigabitEthernet1/0/2 Flags: A
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/1 Rate: 0 pps
 (172.16.254.6,239.1.1.1) Flags: HW
  SW Forwarding: 2/0/150/0, Other: 0/0/0
  HW Forwarding: 68/1/168/1, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/2 Rate: 0 pps
Leaf-01#
```

Return to Verifying TRM with PIM-SM for IPv4 Multicast Traffic when the RP is Inside the BGP EVPN VXLAN Fabric, on page 68

Outputs to Verify the Configuration on VTEP 2

c 0.0 ll

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

Leai-UZ# \$	snow nve	peers						
Interface	VNI	Туре	Peer-IP	RMAC/Num_RTs	eVNI	state	flags	UP time
nvel	50901	L3CP	172.16.254.6	0c75.bd67.ef48	50901	UP	A/-/4	1d05h
nvel	50901	L3CP	172.16.254.3	10b3.d56a.8fc8	50901	UP	A/-/4	1d05h
nvel	50901	L3CP	172.16.254.6	0c75.bd67.ef48	50901	UP	A/M/6	1d05h
nvel	50901	L3CP	172.16.254.3	10b3.d56a.8fc8	50901	UP	A/M/6	1d05h
nvel	10101	L2CP	172.16.254.3	6	10101	UP	N/A	1d05h
nvel	10102	L2CP	172.16.254.6	5	10102	UP	N/A	1d05h
Leaf-02#								

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

Leaf-02# show 12vpn evpn peers vxlan					
Interface	VNI	Peer-IP	Num routes	eVNI	UP time
nvel	10101	172.16.254.3	6	10101	1d05h
nvel	10102	172.16.254.6	5	10102	1d05h
Leaf-02#					

The following example shows the output for the **show bgp ipv4 mvpn all summary** command on VTEP 2:

```
Leaf-02# show bgp ipv4 mvpn all summary
BGP router identifier 172.16.255.4, local AS number 65001
BGP table version is 62, main routing table version 62
7 network entries using 2128 bytes of memory
9 path entries using 1224 bytes of memory
4/4 BGP path/bestpath attribute entries using 1248 bytes of memory
4 BGP rrinfo entries using 160 bytes of memory
1 BGP community entries using 24 bytes of memory
17 BGP extended community entries using 2372 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
O BGP filter-list cache entries using O bytes of memory
BGP using 7156 total bytes of memory
BGP activity 121/28 prefixes, 202/77 paths, scan interval 60 secs
9 networks peaked at 12:22:24 Aug 6 2020 UTC (16:43:21.423 ago)
Neighbor
               V
                          AS MsgRcvd MsgSent
                                               TblVer InQ OutQ Up/Down State/PfxRcd
                                               .er
62
172.16.255.1
172.16.255.146500112291151172.16.255.246500112271152
                                                         0 0 16:57:50
                                                                                2
```

1152

0 0 16:57:51

62

Leaf-02#

The following example shows the output for the **show ip pim vrf** *vrf-name* **rp mapping** command on VTEP 2:

```
Leaf-02# show ip pim vrf green rp mapping
PIM Group-to-RP Mappings
Group(s): 224.0.0.0/4, Static
    RP: 10.2.255.255 (?)
Leaf-02#
```

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

```
Leaf-02# show ip routing vrf green 10.2.255.255
Routing Table: green
Routing entry for 10.2.255.255/32
Known via "bgp 65001", distance 200, metric 0, type internal
Last update from 172.16.254.3 on Vlan901, 03:59:59 ago
Routing Descriptor Blocks:
 * 172.16.254.3 (default), from 172.16.255.1, 03:59:59 ago, via Vlan901
            opaque_ptr 0x7F65B8B9E9F0
            Route metric is 0, traffic share count is 1
            AS Hops 0
            MPLS label: none
Leaf-02#
```

The following example shows the output for the **show ip igmp vrf** *vrf-name* **groups** command on VTEP 2:

```
Leaf-02# show ip igmp vrf green groups
IGMP Connected Group Membership
Group Address Interface Uptime Expires Last Reporter Group Accounted
226.1.1.1 Vlan102 16:58:00 00:02:11 10.1.102.12
224.0.1.40 Vlan901 16:58:37 00:02:33 172.16.254.4
Leaf-02#
```

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

```
Leaf-02# show ip mroute vrf green
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
       L - Local, P - Pruned, R - RP-bit set, F - Register flag,
      T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
       X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
      U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
       Y - Joined MDT-data group, y - Sending to MDT-data group,
       G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
      V - RD & Vector, v - Vector, p - PIM Joins on route,
       x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf,
       e - encap-helper tunnel flag
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
```

Interface state: Interface, Next-Hop or VCD, State/Mode

```
(*, 226.1.1.1), 1d05h/stopped, RP 10.2.255.255, flags: SJCFg
  Incoming interface: Vlan901, RPF nbr 172.16.254.3
  Outgoing interface list:
   Vlan102, Forward/Sparse, 1d05h/00:02:50
(10.2.255.1, 226.1.1.1), 00:06:57/00:02:09, flags: TgQ
  Incoming interface: Vlan901, RPF nbr 172.16.254.6
  Outgoing interface list:
   Vlan102, Forward/Sparse, 00:06:57/00:02:50
(10.1.102.12, 226.1.1.1), 00:07:21/00:01:45, flags: FTGqx
  Incoming interface: Vlan102, RPF nbr 0.0.0.0
  Outgoing interface list:
   Vlan901, Forward/Sparse, 00:07:21/stopped
(*, 224.0.1.40), 1d05h/00:02:03, RP 10.2.255.255, flags: SJPCLgx
  Incoming interface: Vlan901, RPF nbr 172.16.254.3
 Outgoing interface list: Null
Leaf-02#
```

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

```
Leaf-02# show ip mfib vrf green
Entry Flags:
                C - Directly Connected, S - Signal, IA - Inherit A flag,
                ET - Data Rate Exceeds Threshold, K - Keepalive
                DDE - Data Driven Event, HW - Hardware Installed
                ME - MOFRR ECMP entry, MNE - MOFRR Non-ECMP entry, MP - MFIB
                MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
                e - Encap helper tunnel flag.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
                NS - Negate Signalling, SP - Signal Present,
                A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
                MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
Other counts: Total/RPF failed/Other drops
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
VRF green
 (*,224.0.0.0/4) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Vlan901, VXLAN Decap Flags: A IC NS
 (*,226.1.1.1) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 3/0/126/0, Other: 0/0/0
  Vlan901, VXLAN Decap Flags: A NS
  Vlan102 Flags: F NS
     Pkts: 0/0/0
                   Rate: 0 pps
 (10.1.102.12,226.1.1.1) Flags: HW
   SW Forwarding: 2/0/100/0, Other: 0/0/0
  HW Forwarding: 215/0/118/0, Other: 0/0/0
  Vlan102 Flags: A
  Vlan901, VXLAN v4 Encap (50901, 239.1.1.1) Flags: F
    Pkts: 0/0/2
                  Rate: 0 pps
 (10.2.255.1,226.1.1.1) Flags: HW
  SW Forwarding: 2/0/100/0, Other: 0/0/0
Leaf-02#
```

The following example shows the output for the **show bgp ipv4 mvpn all** command on VTEP 2:

```
Leaf-02# show bgp ipv4 mvpn all
BGP table version is 94, 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: 1:1 (default for vrf green)
 * i [5][1:1][10.1.102.12][226.1.1.1]/18
                    172.16.255.4
                                            0
                                               100
                                                          0 ?
 *>i
                     172.16.255.4
                                           0 100
                                                         0 ?
 *>i [5][1:1][10.2.255.1][226.1.1.1]/18
                                               100
                                                         0 2
                    172.16.255.6
                                           0
 * i
                                            0 100
                     172.16.255.6
                                                          0 2
 * i [6][1:1][65001][10.2.255.255/32][224.0.1.40/32]/22
                    172.16.255.4 0 100
                                                         0 ?
                                            0
 *>i
                     172.16.255.4
                                                 100
                                                          0 ?
 * i
     [6] [1:1] [65001] [10.2.255.255/32] [226.1.1.1/32]/22
                    172.16.255.4 0 100
                                                         0 2
 *>i
                     172.16.255.4
                                            0 100
                                                         0 ?
     [7][1:1][65001][10.2.255.1/32][226.1.1.1/32]/22
 *>
                                                      32768 ?
                    0.0.0.0
Route Distinguisher: 172.16.254.4:102
 *> [7][172.16.254.4:102][65001][10.1.102.12/32][226.1.1.1/32]/22
                    0.0.0.0
                                                      32768 2
Leaf-02#
```

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

Leaf-02# show ip mroute

```
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
       L - Local, P - Pruned, R - RP-bit set, F - Register flag,
       T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
       X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
       U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
       Y - Joined MDT-data group, y - Sending to MDT-data group, G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
       N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
       V - RD & Vector, v - Vector, p - PIM Joins on route,
       x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf,
       e - encap-helper tunnel flag
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
Interface state: Interface, Next-Hop or VCD, State/Mode
(*, 239.1.1.1), 1d05h/stopped, RP 172.16.255.255, flags: SJCFx
 Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 1d05h/00:01:59
(172.16.254.6, 239.1.1.1), 00:06:55/00:01:59, flags: JTx
 Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
  Outgoing interface list:
   Tunnel0, Forward/Sparse, 00:06:55/00:02:04
```

```
(172.16.254.4, 239.1.1.1), 04:23:16/00:03:29, flags: FTx
Incoming interface: Loopback1, RPF nbr 0.0.0.0
Outgoing interface list:
GigabitEthernet1/0/2, Forward/Sparse, 04:23:16/00:02:57
(*, 224.0.1.40), 1d05h/00:02:02, RP 172.16.255.255, flags: SJCL
Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
Outgoing interface list:
Loopback0, Forward/Sparse, 1d05h/00:02:02
Leaf-02#
```

The following example shows the output for the show ip mfib command on VTEP 2:

```
Leaf-02# show ip mfib
               C - Directly Connected, S - Signal, IA - Inherit A flag,
Entry Flags:
                ET - Data Rate Exceeds Threshold, K - Keepalive
                DDE - Data Driven Event, HW - Hardware Installed
                ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB
                MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
                e - Encap helper tunnel flag.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
               NS - Negate Signalling, SP - Signal Present,
                A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
                MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
                  Total/RPF failed/Other drops
Other counts:
                  HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
I/O Item Counts:
Default
 (*,224.0.0.0/4) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A NS
  Loopback0 Flags: F IC NS
    Pkts: 0/0/0
                 Rate: 0 pps
 (*,225.0.0.101) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 2/0/170/0, Other: 0/0/0
   GigabitEthernet1/0/2 Flags: A NS
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
 (172.16.254.3,225.0.0.101) Flags: HW
  SW Forwarding: 1/0/150/0, Other: 0/0/0
   HW Forwarding: 12469/0/177/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A
   TunnelO, VXLAN Decap Flags: F NS
     Pkts: 0/0/1
                   Rate: 0 pps
 (*,225.0.0.102) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 1/0/224/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A NS
  Tunnel0, VXLAN Decap Flags: F NS
    Pkts: 0/0/0
                 Rate: 0 pps
 (172.16.254.4,225.0.0.102) Flags: HW
   SW Forwarding: 2/0/163/0, Other: 3/1/2
   HW Forwarding: 9233/0/164/0, Other: 0/0/0
```

```
NullO Flags: A
  GigabitEthernet1/0/2 Flags: F NS
    Pkts: 0/0/1 Rate: 0 pps
 (172.16.254.6,225.0.0.102) Flags: HW
  SW Forwarding: 1/0/206/0, Other: 0/0/0
  HW Forwarding: 3767/0/163/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A NS
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/1 Rate: 0 pps
 (*,232.0.0.0/8) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,239.1.1.1) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 8/0/168/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A NS
  Tunnel0, VXLAN Decap Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
 (172.16.254.4,239.1.1.1) Flags: HW
  SW Forwarding: 1/0/150/0, Other: 22/18/4
  HW Forwarding: 7870/0/156/0, Other: 0/0/0
  NullO Flags: A
  GigabitEthernet1/0/2 Flags: F NS
    Pkts: 0/0/1 Rate: 0 pps
 (172.16.254.6,239.1.1.1) Flags: HW
   SW Forwarding: 2/0/150/0, Other: 0/0/0
  HW Forwarding: 412/1/168/1, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A
  Tunnel0, VXLAN Decap Flags: F NS
    Pkts: 0/0/2 Rate: 0 pps
Leaf-02#
```

Return to Verifying TRM with PIM-SM for IPv4 Multicast Traffic when the RP is Inside the BGP EVPN VXLAN Fabric, on page 68

Outputs to Verify the Configuration on Border VTEP

The following example shows the output for the **show nve peers** command on Border VTEP:

Border# snc	ow nve	peers						
Interface	VNI	Туре	Peer-IP	RMAC/Num_RTs	eVNI	state	flags	UP time
nvel	50901	L3CP	172.16.254.3	10b3.d56a.8fc8	50901	UP	A/-/4	1d05h
nvel	50901	L3CP	172.16.254.4	7c21.0dbd.9548	50901	UP	A/-/4	1d05h
nvel	50901	L3CP	172.16.254.3	10b3.d56a.8fc8	50901	UP	A/M/6	1d05h
nvel	50901	L3CP	172.16.254.4	7c21.0dbd.9548	50901	UP	A/M/6	1d05h
nvel	10101	L2CP	172.16.254.3	6	10101	UP	N/A	1d05h
nvel	10102	L2CP	172.16.254.4	7	10102	UP	N/A	1d05h
Border#								

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

Border# sl	now 12vpn	evpn peers vxlan			
Interface	VNI	Peer-IP	Num routes	eVNI	UP time
nve1	10101	172.16.254.3	6	10101	1d05h
nve1	10102	172.16.254.4	7	10102	1d05h
Border#					

The following example shows the output for the **show bgp ipv4 mvpn all summary** command on Border VTEP:

Border# show bgp ipv4 mvpn all summary BGP router identifier 172.16.255.6, local AS number 65001 BGP table version is 102, main routing table version 102 6 network entries using 1824 bytes of memory 8 path entries using 1088 bytes of memory 5/5 BGP path/bestpath attribute entries using 1560 bytes of memory 4 BGP rrinfo entries using 24 bytes of memory 1 BGP community entries using 24 bytes of memory 20 BGP extended community entries using 2706 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 7362 total bytes of memory BGP activity 133/39 prefixes, 265/144 paths, scan interval 60 secs 8 networks peaked at 12:14:22 Aug 6 2020 UTC (1d05h ago)

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
172.16.255.1	4	65001	2114	1995	102	0	0	1d05h	2
172.16.255.2	4	65001	2112	1990	102	0	0	1d05h	2
Border#									

The following example shows the output for the **show ip pim vrf** *vrf-name* **rp mapping** command on Border VTEP:

```
Border# show ip pim vrf green rp mapping
PIM Group-to-RP Mappings
Group(s): 224.0.0.0/4, Static
    RP: 10.2.255.255 (?)
Border#
```

The following example shows the output for the **show ip routing vrf** *vrf-name* command on Border VTEP:

```
Border# show ip routing vrf green 10.2.255.255
Routing Table: green
Routing entry for 10.2.255.255/32
Known via "bgp 65001", distance 200, metric 0, type internal
Redistributing via ospf 2
Advertised by ospf 2 subnets
Last update from 172.16.254.3 on Vlan901, 04:02:51 ago
Routing Descriptor Blocks:
* 172.16.254.3 (default), from 172.16.255.1, 04:02:51 ago, via Vlan901
opaque_ptr 0x7FEF6836D190
Route metric is 0, traffic share count is 1
AS Hops 0
MPLS label: none
Border#
```

The following example shows the output for the **show ip igmp vrf** *vrf-name* **groups** command on Border VTEP:

Border# show ip	o igmp vrf green groups					
IGMP Connected	Group Membership					
Group Address	Interface	Uptime	Expires	Last Reporter	Group	Accounted
224.0.1.40	Vlan901	1d05h	00:01:	58 172.16.254.6		
Border#						

The following example shows the output for the **show ip mroute vrf** *vrf-name* command on Border VTEP:

```
Border# show ip mroute vrf green
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
       L - Local, P - Pruned, R - RP-bit set, F - Register flag,
       T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
       X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
      U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
       Y - Joined MDT-data group, y - Sending to MDT-data group,
       G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      Ν-
          - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
      V - RD & Vector, v - Vector, p - PIM Joins on route,
      x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf,
       e - encap-helper tunnel flag
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
Interface state: Interface, Next-Hop or VCD, State/Mode
(*, 226.1.1.1), 1d05h/00:03:07, RP 10.2.255.255, flags: SJgx
  Incoming interface: Vlan901, RPF nbr 172.16.254.3
  Outgoing interface list:
   Vlan2001, Forward/Sparse, 04:02:51/00:03:07
(10.2.255.1, 226.1.1.1), 00:09:51/00:01:02, flags: TGqx
  Incoming interface: Vlan2001, RPF nbr 10.2.1.2
  Outgoing interface list:
   Vlan901, Forward/Sparse, 00:09:49/stopped
(10.1.102.12, 226.1.1.1), 00:10:12/00:03:09, flags: TgQx
  Incoming interface: Vlan901, RPF nbr 172.16.254.4
  Outgoing interface list:
   Vlan2001, Forward/Sparse, 00:10:12/00:03:07
(*, 224.0.1.40), 1d05h/00:03:10, RP 10.2.255.255, flags: SJCLgx
  Incoming interface: Vlan901, RPF nbr 172.16.254.3
  Outgoing interface list:
    Vlan2001, Forward/Sparse, 04:02:51/00:03:10
Border#
```

The following example shows the output for the **show ip mfib vrf** *vrf-name* command on Border VTEP:

```
Border# show ip mfib vrf green
Entry Flags: C - Directly Connected, S - Signal, IA - Inherit A flag,
ET - Data Rate Exceeds Threshold, K - Keepalive
DDE - Data Driven Event, HW - Hardware Installed
ME - MOFRR ECMP entry, MNE - MOFRR Non-ECMP entry, MP - MFIB
MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
MS - MOFRR Entry in Sync, MC - MOFRR entry in MOFRR Client,
e - Encap helper tunnel flag.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
NS - Negate Signalling, SP - Signal Present,
A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
MA - MFIB Accept backup,
RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
```

Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second

```
Total/RPF failed/Other drops
Other counts:
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
VRF green
 (*,224.0.0.0/4) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Vlan901, VXLAN Decap Flags: A IC NS
  Vlan2001 Flags: F NS
    Pkts: 0/0/0
                  Rate: 0 pps
 (*,226.1.1.1) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 6/0/122/0, Other: 0/0/0
  Vlan901, VXLAN Decap Flags: A NS
  Vlan2001 Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
 (10.1.102.12,226.1.1.1) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 304/0/126/0, Other: 0/0/0
  Vlan901, VXLAN Decap Flags: A
  Vlan2001 Flags: F NS
    Pkts: 0/0/0
                  Rate: 0 pps
 (10.2.255.1,226.1.1.1) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 1/0/1
  HW Forwarding: 582/1/122/0, Other: 0/0/0
  Vlan2001 Flags: A
  Vlan901, VXLAN v4 Encap (50901, 239.1.1.1) Flags: F
                 Rate: 0 pps
    Pkts: 0/0/0
Border#
```

The following example shows the output for the **show bgp ipv4 mvpn all** command on Border VTEP:

```
Border# show bqp ipv4 mvpn allBGP table version is 102, local router ID is 172.16.255.6
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: 1:1 (default for vrf green)
     [5][1:1][10.1.102.12][226.1.1.1]/18
 * i
                                                   100
                                                           0 2
                     172.16.255.4
                                              0
 *>i
                                               0
                                                  100
                                                            0 ?
                      172.16.255.4
 *>
      [5][1:1][10.2.255.1][226.1.1.1]/18
                                                        32768 ?
                     0.0.0.0
      [6] [1:1] [65001] [10.2.255.255/32] [224.0.1.40/32]/22
 *>
                                                        32768 2
                     0.0.0.0
 *>
      [6][1:1][65001][10.2.255.255/32][226.1.1.1/32]/22
                     0.0.0.0
                                                        32768 ?
 *>i
     [7][1:1][65001][10.2.255.1/32][226.1.1.1/32]/22
                     172.16.255.3
                                    0 100
                                                            0 ?
 * i
                      172.16.255.3
                                               0
                                                   100
                                                            0 ?
Route Distinguisher: 172.16.254.4:102
 *> [7][172.16.254.4:102][65001][10.1.102.12/32][226.1.1.1/32]/22
                     0.0.0.0
                                                        32768 ?
Border#
```

The following example shows the output for the **show ip mroute** command on Border VTEP:

```
Border# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
       L - Local, P - Pruned, R - RP-bit set, F - Register flag,
       T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
      X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
      U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
       Y - Joined MDT-data group, y - Sending to MDT-data group,
       G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
      Q - Received BGP S-A Route, q - Sent BGP S-A Route,
      V - RD & Vector, v - Vector, p - PIM Joins on route,
      x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf,
       e - encap-helper tunnel flag
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
Interface state: Interface, Next-Hop or VCD, State/Mode
(*, 239.1.1.1), 1d05h/stopped, RP 172.16.255.255, flags: SJCFx
  Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 1d05h/00:01:56
(172.16.254.6, 239.1.1.1), 00:09:47/00:02:24, flags: FTx
  Incoming interface: Loopback1, RPF nbr 0.0.0.0
  Outgoing interface list:
    TenGigabitEthernet1/0/2, Forward/Sparse, 00:09:47/00:02:33
(172.16.254.4, 239.1.1.1), 04:26:08/00:02:10, flags: JTx
  Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 04:26:08/00:00:51
(*, 224.0.1.40), 1d05h/00:02:56, RP 172.16.255.255, flags: SJCL
  Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
  Outgoing interface list:
   Loopback0, Forward/Sparse, 1d05h/00:02:56
(*, 225.0.0.102), 1d05h/stopped, RP 172.16.255.255, flags: SJCFx
  Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 1d05h/00:01:56
(172.16.254.4, 225.0.0.102), 1d05h/00:01:27, flags: JTx
  Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 1d05h/00:01:56
(172.16.254.6, 225.0.0.102), 1d05h/00:01:53, flags: FTx
  Incoming interface: Loopback1, RPF nbr 0.0.0.0
  Outgoing interface list:
    TenGigabitEthernet1/0/2, Forward/Sparse, 1d05h/00:02:43, A
(*, 225.0.0.101), 1d05h/stopped, RP 172.16.255.255, flags: SJCx
  Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 1d05h/00:01:56
(172.16.254.3, 225.0.0.101), 1d05h/00:01:10, flags: JTx
  Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
```

```
Outgoing interface list:
Tunnel0, Forward/Sparse, 1d05h/00:02:08
Border#
```

```
The following example shows the output for the show ip mfib command on Border VTEP:
```

```
Border# show ip mfib
                C - Directly Connected, S - Signal, IA - Inherit A flag,
Entry Flags:
                ET - Data Rate Exceeds Threshold, K - Keepalive
                DDE - Data Driven Event, HW - Hardware Installed
                ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB
               MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
                е
                    - Encap helper tunnel flag.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
               NS - Negate Signalling, SP - Signal Present,
                A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
                MA - MFIB Accept, A2 - Accept backup,
                RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
                 Total/RPF failed/Other drops
Other counts:
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
Default
 (*,224.0.0.0/4) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
   HW Forwarding: 0/0/0/0, Other: 0/0/0
  TenGigabitEthernet1/0/2 Flags: A NS
  Loopback0 Flags: F IC NS
     Pkts: 0/0/0
                 Rate: 0 pps
 (*,225.0.0.101) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
   HW Forwarding: 8/0/146/0, Other: 0/0/0
  TenGigabitEthernet1/0/2 Flags: A NS
   Tunnel0, VXLAN Decap Flags: F NS
     Pkts: 0/0/0
                  Rate: 0 pps
 (172.16.254.3,225.0.0.101) Flags: HW
   SW Forwarding: 7/0/125/0, Other: 0/0/0
   HW Forwarding: 12570/0/177/0, Other: 0/0/0
  TenGigabitEthernet1/0/2 Flags: A
   TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/7 Rate: 0 pps
 (*,225.0.0.102) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 1/0/172/0, Other: 0/0/0
   TenGigabitEthernet1/0/2 Flags: A NS
  Tunnel0, VXLAN Decap Flags: F NS
                  Rate: 0 pps
    Pkts: 0/0/0
 (172.16.254.4,225.0.0.102) Flags: HW
   SW Forwarding: 1/0/154/0, Other: 0/0/0
  HW Forwarding: 9199/0/176/0, Other: 0/0/0
  TenGigabitEthernet1/0/2 Flags: A
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/1 Rate: 0 pps
 (172.16.254.6,225.0.0.102) Flags: HW
  SW Forwarding: 17/0/174/0, Other: 10/9/1
                  3789/0/151/0, Other: 0/0/0
   HW Forwarding:
  NullO Flags: A
```

```
TenGigabitEthernet1/0/2 Flags: F
    Pkts: 0/0/16 Rate: 0 pps
 (*,232.0.0.0/8) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,239.1.1.1) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 9/0/168/0, Other: 0/0/0
  TenGigabitEthernet1/0/2 Flags: A NS
  Tunnel0, VXLAN Decap Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
 (172.16.254.4,239.1.1.1) Flags: HW
   SW Forwarding: 1/0/150/0, Other: 0/0/0
  HW Forwarding: 7961/0/167/0, Other: 0/0/0
  TenGigabitEthernet1/0/2 Flags: A
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/1 Rate: 0 pps
 (172.16.254.6,239.1.1.1) Flags: HW
  SW Forwarding: 2/0/150/0, Other: 2/2/0
  HW Forwarding: 580/1/156/1, Other: 0/0/0
  NullO Flags: A
  TenGigabitEthernet1/0/2 Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
Border#
```

Return to Verifying TRM with PIM-SM for IPv4 Multicast Traffic when the RP is Inside the BGP EVPN VXLAN Fabric, on page 68

Outputs to Verify the Configuration on Spine Switch 1

The following example shows the output for the **show bgp ipv4 mvpn all summary** command on Spine Switch 1:

```
Spine-01# show bgp ipv4 mvpn all summary
BGP router identifier 172.16.255.1, local AS number 65001
BGP table version is 204, main routing table version 204
6 network entries using 1824 bytes of memory
16 path entries using 2176 bytes of memory
4/4 BGP path/bestpath attribute entries using 1216 bytes of memory
3 BGP rrinfo entries using 120 bytes of memory
1 BGP community entries using 24 bytes of memory
17 BGP extended community entries using 2356 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 7716 total bytes of memory
BGP activity 266/218 prefixes, 3029/2926 paths, scan interval 60 secs
8 networks peaked at 12:20:11 Aug 6 2020 UTC (1d05h ago)
Neighbor
                 V
                              AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd
NeighborVAS MsgRcvd MsgSentTblverIng Outg Up/Down172.16.255.246500124962445204001d08h172.16.255.346500119852115204001d05h172.16.255.446500119952111204001d05h172.16.255.646500119992118204001d05h
                                                                0 0 1d08h
                                                                                    6
                                                                                           2
                                                                                           4
                                                                                           4
Spine-01#
```

The following example shows the output for the **show ip pim rp mapping** command on Spine Switch 1:

Spine-01# show ip pim rp mapping PIM Group-to-RP Mappings

```
Group(s): 224.0.0.0/4, Static
    RP: 172.16.255.255 (?)
Spine-01#
```

The following example shows the output for the **show bgp ipv4 mvpn all** command on Spine Switch 1:

```
Spine-01# show bgp ipv4 mvpn all
BGP table version is 204, 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
                                      Metric LocPrf Weight Path
    Network
                    Next Hop
Route Distinguisher: 1:1
 * i [5][1:1][10.1.102.12][226.1.1.1]/18
                    172.16.255.4
                                           0
                                              100
                                                        0 ?
                                          0
                                               100
 *>i
                    172.16.255.4
                                                        0 2
 * i
     [5][1:1][10.2.255.1][226.1.1.1]/18
                    172.16.255.6
                                           0
                                              100
                                                        0 ?
                                               100
 *>i
                                           0
                    172.16.255.6
                                                        0 ?
 * i [6][1:1][65001][10.2.255.255/32][224.0.1.40/32]/22
                    172.16.255.4
                                         0 100
                                                       0 2
                                               100
 *>i
                     172.16.255.4
                                           0
                                                        0 ?
 * i
                     172.16.255.6
                                                 100
                                                         0 ?
                                            0
 * i
     [6] [1:1] [65001] [10.2.255.255/32] [226.1.1.1/32]/22
                                  0 100
                   172.16.255.4
                                                        0 2
                                          0
 *>i
                    172.16.255.4
                                               100
                                                        0 ?
 * i
                     172.16.255.6
                                           0
                                                100
                                                        0 ?
 * i
     [7][1:1][65001][10.2.255.1/32][226.1.1.1/32]/22
                    172.16.255.4
                                           0
                                              100
                                                        0 ?
 * i
                                               100
                                                        0 ?
                     172.16.255.3
                                           0
 *>i
                     172.16.255.3
                                                        0 ?
                                           0 100
Route Distinguisher: 172.16.254.4:102
 * i [7][172.16.254.4:102][65001][10.1.102.12/32][226.1.1.1/32]/22
                   172.16.255.601000 ?172.16.255.301000
 * i
                                                        0 ?
                     172.16.255.3
 *>i
                    172.16.255.3
                                           0
                                               100
                                                         0 2
Spine-01#
```

The following example shows the output for the **show ip mroute** command on Spine Switch 1:

```
Spine-01# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
L - Local, P - Pruned, R - RP-bit set, F - Register flag,
T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
U - URD, I - Received Source Specific Host Report,
Z - Multicast Tunnel, z - MDT-data group sender,
Y - Joined MDT-data group, y - Sending to MDT-data group,
G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
Q - Received BGP S-A Route, q - Sent BGP S-A Route,
V - RD & Vector, v - Vector, p - PIM Joins on route,
x - VxLAN group, c - PFP-SA cache created entry,
* - determined by Assert, # - iif-starg configured on rpf intf
```

Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join Timers: Uptime/Expires Interface state: Interface, Next-Hop or VCD, State/Mode (*, 239.1.1.1), 04:29:40/stopped, RP 172.16.255.255, flags: SP Incoming interface: Null, RPF nbr 0.0.0.0 Outgoing interface list: Null (172.16.254.6, 239.1.1.1), 00:13:17/00:02:24, flags: PA Incoming interface: GigabitEthernet1/0/4, RPF nbr 172.16.16.6 Outgoing interface list: Null (172.16.254.4, 239.1.1.1), 04:27:38/00:02:41, flags: PTA Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.14.4 Outgoing interface list: Null (*, 224.0.1.40), 1w0d/00:02:43, RP 172.16.255.255, flags: SJCL Incoming interface: Null, RPF nbr 0.0.0.0 Outgoing interface list: Loopback2, Forward/Sparse, 1w0d/00:02:43 (*, 225.0.0.102), 1w0d/stopped, RP 172.16.255.255, flags: SP Incoming interface: Null, RPF nbr 0.0.0.0 Outgoing interface list: Null Spine-01#

The following example shows the output for the show ip mfib command on Spine Switch 1:

```
Spine-01# show ip mfib
Entry Flags:
             C - Directly Connected, S - Signal, IA - Inherit A flag,
                ET - Data Rate Exceeds Threshold, K - Keepalive
                DDE - Data Driven Event, HW - Hardware Installed
               ME - MOFRR ECMP entry, MNE - MOFRR Non-ECMP entry, MP - MFIB
               MOFRR Primary, RP - MRIB MOFRR Primary, P - MoFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
                NS - Negate Signalling, SP - Signal Present,
                A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
Other counts:
                  Total/RPF failed/Other drops
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
Default
 (*,224.0.0.0/4) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 83/83/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
   Loopback2 Flags: F IC NS
    Pkts: 0/0/0 Rate: 0 pps
 (*,225.0.0.102) Flags: C HW
   SW Forwarding: 1/0/206/0, Other: 282/0/282
  HW Forwarding: 0/0/0/0, Other: 0/0/0
   Tunnell Flags: A
 (172.16.254.4,225.0.0.102) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
```

```
GigabitEthernet1/0/2 Flags: NS
 (172.16.254.6,225.0.0.102) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
  GigabitEthernet1/0/4 Flags: NS
 (*,232.0.0.0/8) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,239.1.1.1) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 4/3/1
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
 (172.16.254.4,239.1.1.1) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 7/0/158/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A NS
 (172.16.254.6,239.1.1.1) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
  GigabitEthernet1/0/4 Flags: NS
Spine-01#
```

Return to Verifying TRM with PIM-SM for IPv4 Multicast Traffic when the RP is Inside the BGP EVPN VXLAN Fabric, on page 68

Outputs to Verify the Configuration on Spine Switch 2

The following example shows the output for the **show bgp ipv4 mvpn all summary** command on Spine Switch 2:

```
Spine-02# show bgp ipv4 mvpn all summary
BGP router identifier 172.16.255.2, local AS number 65001
BGP table version is 164, main routing table version 164
6 network entries using 1824 bytes of memory
16 path entries using 2176 bytes of memory
4/4 BGP path/bestpath attribute entries using 1216 bytes of memory
3 BGP rrinfo entries using 120 bytes of memory
1 BGP community entries using 24 bytes of memory
17 BGP extended community entries using 2356 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
O BGP filter-list cache entries using O bytes of memory
BGP using 7716 total bytes of memory
BGP activity 297/249 prefixes, 3131/3028 paths, scan interval 60 secs
8 networks peaked at 12:20:59 Aug 6 2020 UTC (1d05h ago)
                         AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd
Neighbor
               V
172.16.255.1 4
172.16.255.3 4
                      65001 2448 2499
65001 1988 2114
                                             164 0 0 1d08h 6
                                        2114
                                                 164
                                                       0
                                                            0 1d05h
                                                                              2
             4
                      65001 1998 2110
                                                 164 0 0 1d05h
172.16.255.4
                                                                              4
172.16.255.6 4
                     65001 1996 2119 164 0 0 1d05h
                                                                              4
Spine-02#
```

The following example shows the output for the **show ip pim rp mapping** command on Spine Switch 2:

Spine-02# **show ip pim rp mapping** PIM Group-to-RP Mappings Group(s): 224.0.0.0/4, Static
 RP: 172.16.255.255 (?)
Spine-02#

The following example shows the output for the **show bgp ipv4 mvpn all** command on Spine Switch 2:

1	Network	Next Hop	Metric 1	LocPrf	Weight Path		
Route	te Distinguisher: 1:1						
* i	[5][1:1][10.1.1	02.12][226.1.1.1]/18					
		172.16.255.4	0	100	0 ?		
*>i		172.16.255.4	0	100	0 ?		
* i	[5][1:1][10.2.2	55.1][226.1.1.1]/18					
		172.16.255.6	0	100	0 ?		
*>i		172.16.255.6	0	100	0 ?		
*>i	[6][1:1][65001]	[10.2.255.255/32] [22	4.0.1.40	/32]/22			
		172.16.255.4	0	100	0 ?		
* i		172.16.255.4	0	100	0 ?		
* i		172.16.255.6	0	100	0 ?		
*>i	[6][1:1][65001]	[10.2.255.255/32] [22	6.1.1.1/3	32]/22			
		172.16.255.4	0	100	0 ?		
* i		172.16.255.4	0	100	0 ?		
* i		172.16.255.6	0	100	0 ?		
* i	[7][1:1][65001]	[10.2.255.1/32][226.	1.1.1/32	/22			
		172.16.255.4	0	100	0 ?		
* i		172.16.255.3	0	100	0 ?		
*>i		172.16.255.3	0	100	0 ?		
Route	Distinguisher:	172.16.254.4:102					
* i	[7][172.16.254.	4:102][65001][10.1.1	02.12/32	[226.1	.1.1/32]/22		
		172.16.255.6	0	100	0 ?		
* i		172.16.255.3	0	100	0 ?		
*>i		172.16.255.3	0	100	0 ?		
Spine-	-02#						

The following example shows the output for the **show ip mroute** command on Spine Switch 2:

Spine-02# show ip mroute

```
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
       L - Local, P - Pruned, R - RP-bit set, F - Register flag,
      T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
      X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
      U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
       Y - Joined MDT-data group, y - Sending to MDT-data group,
       G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
      V - RD & Vector, v - Vector, p - PIM Joins on route,
      x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
```

Interface state: Interface, Next-Hop or VCD, State/Mode (*, 239.1.1.1), 3d12h/00:03:14, RP 172.16.255.255, flags: S Incoming interface: Null, RPF nbr 0.0.0.0 Outgoing interface list: GigabitEthernet1/0/2, Forward/Sparse, 1d05h/00:02:31 GigabitEthernet1/0/1, Forward/Sparse, 1d05h/00:03:14 GigabitEthernet1/0/4, Forward/Sparse, 1d05h/00:03:09 (172.16.254.6, 239.1.1.1), 00:15:48/00:01:26, flags: T Incoming interface: GigabitEthernet1/0/4, RPF nbr 172.16.26.6 Outgoing interface list: GigabitEthernet1/0/1, Forward/Sparse, 00:15:48/00:03:24 GigabitEthernet1/0/2, Forward/Sparse, 00:15:48/00:03:26 (172.16.254.4, 239.1.1.1), 04:32:09/00:01:28, flags: T Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.4 Outgoing interface list: GigabitEthernet1/0/4, Forward/Sparse, 04:32:09/00:03:09 GigabitEthernet1/0/1, Forward/Sparse, 04:32:09/00:03:14 (*, 224.0.1.40), 1w0d/00:03:29, RP 172.16.255.255, flags: SJCL Incoming interface: Null, RPF nbr 0.0.0.0 Outgoing interface list: GigabitEthernet1/0/2, Forward/Sparse, 1d05h/00:02:48 GigabitEthernet1/0/1, Forward/Sparse, 1d05h/00:03:29 GigabitEthernet1/0/4, Forward/Sparse, 1d05h/00:03:17 Loopback2, Forward/Sparse, 1w0d/00:02:34 (*, 225.0.0.102), 1w0d/00:03:28, RP 172.16.255.255, flags: S Incoming interface: Null, RPF nbr 0.0.0.0 Outgoing interface list: GigabitEthernet1/0/2, Forward/Sparse, 1d05h/00:02:55 GigabitEthernet1/0/1, Forward/Sparse, 1d05h/00:03:00 GigabitEthernet1/0/4, Forward/Sparse, 1d05h/00:03:28 (172.16.254.4, 225.0.0.102), 1d05h/00:02:09, flags: MT Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.4 Outgoing interface list: GigabitEthernet1/0/4, Forward/Sparse, 1d05h/00:03:28 GigabitEthernet1/0/1, Forward/Sparse, 1d05h/00:03:17 (172.16.254.6, 225.0.0.102), 1d05h/00:01:40, flags: MT Incoming interface: GigabitEthernet1/0/4, RPF nbr 172.16.26.6 Outgoing interface list: GigabitEthernet1/0/2, Forward/Sparse, 1d05h/00:02:59 GigabitEthernet1/0/1, Forward/Sparse, 1d05h/00:03:05 (*, 225.0.0.101), 3d12h/00:03:21, RP 172.16.255.255, flags: S Incoming interface: Null, RPF nbr 0.0.0.0 Outgoing interface list: GigabitEthernet1/0/2, Forward/Sparse, 1d05h/00:02:33 GigabitEthernet1/0/1, Forward/Sparse, 1d05h/00:03:21 GigabitEthernet1/0/4, Forward/Sparse, 1d05h/00:02:47 (172.16.254.3, 225.0.0.101), 1d05h/00:02:05, flags: TA Incoming interface: GigabitEthernet1/0/1, RPF nbr 172.16.23.3 Outgoing interface list: GigabitEthernet1/0/2, Forward/Sparse, 1d05h/00:02:57 GigabitEthernet1/0/4, Forward/Sparse, 1d05h/00:02:47 Spine-02#

The following example shows the output for the **show ip mfib** command on Spine Switch 2:

```
Spine-02# show ip mfib
Entry Flags:
               C - Directly Connected, S - Signal, IA - Inherit A flag,
               ET - Data Rate Exceeds Threshold, K - Keepalive
               DDE - Data Driven Event, HW - Hardware Installed
               ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB
               MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
               NS - Negate Signalling, SP - Signal Present,
               A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
                  Total/RPF failed/Other drops
Other counts:
I/O Item Counts:
                 HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
Default
 (*,224.0.0.0/4) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
  GigabitEthernet1/0/1 Flags: F NS
     Pkts: 0/0/0
                  Rate: 0 pps
   GigabitEthernet1/0/2 Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
   GigabitEthernet1/0/4 Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
  Loopback2 Flags: F IC NS
    Pkts: 0/0/0
                 Rate: 0 pps
 (*,225.0.0.101) Flags: C HW
   SW Forwarding: 9/0/112/0, Other: 0/0/0
   HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
   GigabitEthernet1/0/1 Flags: F NS
    Pkts: 0/0/2 Rate: 0 pps
   GigabitEthernet1/0/2 Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
  GigabitEthernet1/0/4 Flags: F NS
    Pkts: 0/0/2 Rate: 0 pps
 (172.16.254.3,225.0.0.101) Flags: HW
   SW Forwarding: 4/0/132/0, Other: 0/0/0
  HW Forwarding: 12607/0/177/0, Other: 0/0/0
   GigabitEthernet1/0/1 Flags: A
  GigabitEthernet1/0/2 Flags: F NS
     Pkts: 0/0/0
                   Rate: 0 pps
   GigabitEthernet1/0/4 Flags: F NS
    Pkts: 0/0/4 Rate: 0 pps
 (*,225.0.0.102) Flags: C HW
   SW Forwarding: 27/0/101/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
   Tunnell Flags: A
  GigabitEthernet1/0/1 Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
   GigabitEthernet1/0/2 Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
   GigabitEthernet1/0/4 Flags: F NS
     Pkts: 0/0/0
                  Rate: 0 pps
 (172.16.254.4,225.0.0.102) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
```

9232/0/176/0, Other: 0/0/0 HW Forwarding: GigabitEthernet1/0/2 Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/4 Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.6,225.0.0.102) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0HW Forwarding: 3789/0/163/0, Other: 0/0/0 GigabitEthernet1/0/4 Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/0 Rate: 0 pps (*,232.0.0.0/8) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,239.1.1.1) Flags: C HW SW Forwarding: 10/0/150/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 Tunnell Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/4 Rate: 0 pps GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/4 Rate: 0 pps GigabitEthernet1/0/4 Flags: F NS Pkts: 0/0/4 Rate: 0 pps (172.16.254.4,239.1.1.1) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 8144/0/167/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/4 Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.6,239.1.1.1) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 942/1/168/1, Other: 0/0/0 GigabitEthernet1/0/4 Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/0 Rate: 0 pps Spine-02#

Return to Verifying TRM with PIM-SM for IPv4 Multicast Traffic when the RP is Inside the BGP EVPN VXLAN Fabric, on page 68

Example: Configuring TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Inside the BGP EVPN VXLAN Fabric

This example shows how to configure and verify Layer 3 TRM with PIM-SM for IPv4 and IPv6 multicast traffic when the RP is inside the BGP EVPN VXLAN fabric. The example uses the topology in the Figure 10: TRM with PIM-SM when the RP is Inside the BGP EVPN VXLAN Fabric, on page 61 figure.

The topology shows an EVPN VXLAN network, with two spine switches and three VTEPs, connected to an external network with three routers. VTEP 1 inside the BGP EVPN VXLAN fabric acts as the RP in this topology and Border VTEP connects the fabric to the external network through Router 1. The IPv4 multicast

group is 226.1.1.1 and the IPv6 multicast group is FF06:1::1 in this topology. The following tables provide sample configurations for the devices in this topology:

Table 6: Configuring VTEP 1, Border VTEP, and VTEP 2 to Configure TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Inside the BGP EVPN VXLAN Fabric

VTEP 1	Border VTEP	VTEP 2
Leaf-01# show running-config	Border# show running-config	Leaf-02# show running-config
hostname Leaf-01	hostname Border	hostname Leaf-02
!	!	!
vrf definition green	vrf definition green	vrf definition green
rd 1:1	rd 1:1	rd 1:1
!	!	!
address-family ipv4	address-family ipv4	address-family ipv4
mdt auto-discovery vxlan	mdt auto-discovery vxlan	mdt auto-discovery vxlan
mdt default vxlan 239.1.1.1	mdt default vxlan 239.1.1.1	mdt default vxlan 239.1.1.1
mdt overlay use-bgp	mdt overlay use-bgp	mdt overlay use-bgp
route-target export 1:1	route-target export 1:1	route-target export 1:1
route-target import 1:1	route-target import 1:1	route-target import 1:1
route-target export 1:1 stitching	route-target export 1:1 stitching	route-target export 1:1 stitching
route-target import 1:1 stitching	route-target import 1:1 stitching	route-target import 1:1 stitching
exit-address-family	exit-address-family	exit-address-family
!	!	!
address-family 19v6	address-family 19v6	address-family 1pv6
mdt auto-discovery vxlan	mdt auto-discovery vxlan	mdt auto-discovery vxlan
mdt default vxlan 239.1.1.1	mdt default vxlan 239.1.1.1	mdt default vxlan 239.1.1.1
mdt overlay use-bgp	mdt overlay use-bgp	mdt overlay use-bgp
route-target export 1:1	route-target export 1:1	route-target export 1:1
route-target import 1:1	route-target import 1:1	route-target import 1:1
route-target export 1:1 stitching	route-target export 1:1 stitching	route-target export 1:1 stitching
route-target import 1:1 stitching	route-target import 1:1 stitching	route-target import 1:1 stitching
exit-address-family	exit-address-family	exit-address-family
<pre>! ip routing ! ip multicast-routing in multicast working out for the second secon</pre>	<pre>! ip routing ! ip multicast-routing in multicast working out for the second secon</pre>	<pre>! ip routing ! ip multicast-routing in multicast wouting out of another </pre>
<pre>ipv6 unicast-routing vrf green ipv6 multicast-routing vrf green !</pre>	<pre>ipv6 unicast-routing vrf green ipv6 multicast-routing vrf green !</pre>	<pre>ipv6 unicast-routing vrf green ipv6 multicast-routing vrf green !</pre>
12vpn evpn replication-type static router-id Loopback1 default-gateway advertise !	12vpn evpn replication-type static router-id Loopback1 default-gateway advertise	12vpn evpn replication-type static router-id Loopback1 default-gateway advertise
12vpn evpn instance 101 vlan-based	12vpn evpn instance 101 vlan-based	12vpn evpn instance 101 vlan-based
encapsulation vxlan	encapsulation vxlan	encapsulation vxlan
12vpn evpn instance 102 vlan-based	12vpn evpn instance 102 vlan-based	12vpn evpn instance 102 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 10101	member evpn-instance 101 vni 10101	member evpn-instance 101 vni 10101
vlan configuration 102	vlan configuration 102	vlan configuration 102
member evpn-instance 102 vni 10102	member evpn-instance 102 vni 10102	member evpn-instance 102 vni 10102
vlan configuration 901	vlan configuration 901	vlan configuration 901
member vni 50901	member vni 50901	member vni 50901
!	!	!

VTEP 1	Border VTEP	VTEP 2
interface Loopback0	vlan 2001	interface Loopback0
ip address 172.16.255.3	!	ip address 172.16.255.4
255.255.255.255	interface Loopback0	255.255.255.255
ip pim sparse-mode	ip address 172.16.255.6	ip pim sparse-mode
ip ospf 1 area 0	255.255.255.255	ip ospf 1 area 0
	ip pim sparse-mode	
interface Loopback1	ip ospf 1 area 0	interface Loopbackl
ip address 172.16.254.3		ip address 172.16.254.4
255.255.255.255	interface Loopback1	255.255.255.255
ip pim sparse-mode	ip address 172.16.254.6	ip pim sparse-mode
ip ospf 1 area 0	255.255.255.255	ip ospf 1 area 0
!	ip pim sparse-mode	!
interface Loopback255	ip ospf 1 area 0	interface Loopback901
vrf forwarding green	!	vrf forwarding green
ip address 10.2.255.255	interface Loopback901	ip address 10.1.255.2 255.255.255.255
255.255.255.255	vrf forwarding green	ip pim sparse-mode
ip pim sparse-mode	ip address 10.1.255.4 255.255.255.255	ipv6 address FC00:1:255::2/128
ipv6 address FC00:2:255::255/128	ip pim sparse-mode	ipv6 enable
ipv6 enable	ipv6 address FC00:1:255::4/128	!
!	ipv6 enable	interface GigabitEthernet1/0/1
interface Loopback901	!	no switchport
vrf forwarding green	interface TenGigabitEthernet1/0/1	ip address 172.16.14.4 255.255.255.0
ip address 10.1.255.1 255.255.255.255	no switchport	ip pim sparse-mode
ip pim sparse-mode	ip address 172.16.16.6 255.255.255.0	ip ospf network point-to-point
ipv6 address FC00:1:255::1/128	ip pim sparse-mode	ip ospf 1 area 0
ipv6 enable	ip ospf network point-to-point	!
!	ip ospf 1 area 0	interface GigabitEthernet1/0/2
interface GigabitEthernet1/0/1	!	no switchport
no switchport	interface TenGigabitEthernet1/0/2	ip address 172.16.24.4 255.255.255.0
ip address 172.16.13.3 255.255.255.0	no switchport	ip pim sparse-mode
ip pim sparse-mode	ip address 172.16.26.6 255.255.255.0	ip ospf network point-to-point
ip ospf network point-to-point	ip pim sparse-mode	ip ospf 1 area 0
ip ospf 1 area 0	ip ospf network point-to-point	1
!	ip ospf 1 area 0	interface GigabitEthernet1/0/10
interface GigabitEthernet1/0/2	!	switchport access vlan 101
no switchport	interface TenGigabitEthernet1/0/5	switchport mode access
ip address 172.16.23.3 255.255.255.0	switchport trunk allowed vlan 2001	
in nim sparse-mode	switchport mode trunk	interface Vlan101
in ospf network point-to-point		urf forwarding green
in osnf 1 area 0	interface TenGigabitEthernet1/0/10	in address 10 1 101 1 255 255 255 0
	switchport access vlap 102	in nim sparse-mode
: interface GigabitEthernet1/0/10	switchport mode access	ipy6 address FC00.1.1011/64
switchport accoss wight 101		ipv6 address recourteror/04
switchport access vian ioi	interface Vlan101	ipvo enabre
switchpoit mode access	unf forwarding groop	interface Vien102
:	vii iorwarding green	
unf forwarding groap	ip pim approx-mode	in address 10 1 102 1 255 255 255 0
VII IOIWAIUING GIEEN	TP PIM Sparse-mode	1 p audress 10.1.102.1 200.200.200.0
address 10.1.101.1 255.255.255.0	Lipvo address FCUU:1:1U1::1/64	ip pim sparse-mode
ip pim sparse-mode	eraeue ovy	ipvo address FCUU:1:1U2::1/64
1pv6 address FCUU:1:1U1::1/64	! 	1pvo enable
ipvo enable		

VTEP 1	Border VTEP	VTEP 2
address-family ipv6 mvpn neighbor 172.16.255.1 activate neighbor 172.16.255.1 send-community	! address-family ipv4 exit-address-family	! address-family 12vpn 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 ovit-address-family	! address-family ipv4 mvpn 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 ouit-addross-family
extr-address-family ! address-family 12vpn evpn neighbor 172.16.255.1 activate neighbor 172.16.255.1 send-community	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
both neighbor 172.16.255.2 activate neighbor 172.16.255.2 send-community both	! address-family ipv6 mvpn neighbor 172.16.255.1 activate neighbor 172.16.255.1 send-community	redistribute static exit-address-family ! address-family ipv6 vrf green
exit-address-family ! address-family ipv4 vrf green advertise l2vpn evpn redistribute connected	neighbor 172.16.255.2 activate neighbor 172.16.255.2 send-community both exit-address-family	redistribute connected redistribute static advertise l2vpn evpn exit-address-family !
redistribute static exit-address-family ! address-family ipv6 vrf green	! address-family l2vpn evpn neighbor 172.16.255.1 activate neighbor 172.16.255.1 send-community	ip pim rp-address 172.16.255.255 ip pim ssm default ip pim vrf green rp-address 10.2.255.255
redistribute connected redistribute static advertise l2vpn evpn exit-address-family	both neighbor 172.16.255.2 activate neighbor 172.16.255.2 send-community both	! ipv6 pim vrf green rp-address FC00:2:255::255 ipv6 pim vrf green register-source
: ip pim rp-address 172.16.255.255 ip pim ssm default ip pim vrf green rp-address 10 2 255 255	exit-address-family ! address-family ipv4 vrf green advertise 12vpn evpn redistribute connected	Loopback901 ! end ! ! Leaf-02#
! ipv6 pim vrf green rp-address FC00:2:255::255 ipv6 pim vrf green register-source	redistribute connected redistribute static redistribute ospf 2 match internal external 1 external 2 exit-address-family	
Loopback901 ! end !	address-family ipv6 vrf green redistribute connected redistribute ospf 1 include-connected	
Leaf-01#	redistribute static advertise l2vpn evpn exit-address-family !	
	ip pim rp-address 172.16.255.255 ip pim ssm default ip pim vrf green rp-address 10.2.255.255	
	! ipv6 pim vrf green rp-address FC00:2:255::255 !	
	ena ! Border#	

Table 7: Configuring Spine Switch 1 and Spine Switch 2 to Configure TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Inside the BGP EVPN VXLAN Fabric

Spine Switch 1	Spine Switch 2
Spine-01# show running-config	Spine-02# show running-config
hostname Spine-01	hostname Spine-02
!	!
ip routing	ip routing
!	!
ip multicast-routing	ip multicast-routing
system mtu 9198	system mtu 9198
'	'
interface Loopback0	interface Loopback0
ip address 172.16.255.1 255.255.255.255	ip address 172.16.255.2 255.255.255.255
ip ospf 1 area 0	ip ospf 1 area 0
!	!
interface Loopback1	interface Loopback1
ip address 172.16.254.1 255.255.255.255	ip address 172.16.254.2 255.255.255.255
ip ospf 1 area 0	ip ospf 1 area 0
interface Loopback2	interface Loopback2
ip address 172.16.255.255 255.255.255.255	ip address 172.16.255.255 255.255.255.255
ip pim sparse-mode	ip pim sparse-mode
ip ospf 1 area 0	ip ospf 1 area 0
interface GigabitEthernet1/0/1	interface GigabitEthernet1/0/1
no switchport	no switchport
ip address 172.16.13.1 255.255.255.0	ip address 172.16.23.2 255.255.255.0
ip pim sparse-mode	ip pim sparse-mode
ip ospf network point-to-point	ip ospf network point-to-point
ip ospf 1 area 0	ip ospf 1 area 0
!	!
interface GigabitEthernet1/0/2	interface GigabitEthernet1/0/2
no switchport	no switchport
ip address 172.16.14.1 255.255.255.0	ip address 172.16.24.2 255.255.255.0
ip pim sparse-mode	ip pim sparse-mode
ip ospf network point-to-point	ip ospf network point-to-point
ip ospf 1 area 0	ip ospf 1 area 0
<pre>! interface GigabitEthernet1/0/4 no switchport ip address 172.16.16.1 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0</pre>	<pre>! interface GigabitEthernet1/0/4 no switchport ip address 172.16.26.2 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 </pre>
!	!
router ospf 1	router ospf 1
router-id 172.16.255.1	router-id 172.16.255.2
!	!
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 172.16.255.4 remote-as 65001 neighbor 172.16.255.4 update-source Loopback0 neighbor 172.16.255.6 remote-as 65001 neighbor 172.16.255.6 remote-as 65001 neighbor 172.16.255.6 update-source Loopback0	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 172.16.255.4 update-source Loopback0 neighbor 172.16.255.4 update-source Loopback0 neighbor 172.16.255.6 update-source Loopback0 neighbor 172.16.255.6 update-source Loopback0
neighbor 172.16.255.6 update-source Loopback0	neighbor 172.16.255.6 update-source Loopback0 !

Spine Switch 1	Spine Switch 2
address-family ipv4	address-family ipv4
exit-address-family	exit-address-family
:	:
address-family ipv4 mvpn	address-family ipv4 mvpn
neighbor 172.16.255.2 activate	neighbor 172.16.255.1 activate
neighbor 172.16.255.2 send-community both	neighbor 172.16.255.1 send-community both
neighbor 172.16.255.2 route-reflector-client	neighbor 172.16.255.1 route-reflector-client
neighbor 172.16.255.3 activate	neighbor 172.16.255.3 activate
neighbor 172.16.255.3 send-community both	neighbor 172.16.255.3 send-community both
neighbor 172 16.255.3 route-reflector-client	neighbor 172.16.255.3 route-reflector-client
neighbor 172.16.255.4 activate	neighbor 172.16.255.4 activate
neighbor 172.16.255.4 send-community both	neighbor 172.16.255.4 send-community both
neighbor 172.16.255.4 route-reflector-client	neighbor 172.16.255.4 route-reflector-client
neighbor 172.16.255.6 activate	neighbor 172.16.255.6 activate
neighbor 172.16.255.6 send-community both	neighbor 172.16.255.6 send-community both
neighbor 172.16.255.6 route-reflector-client	neighbor 172.16.255.6 route-reflector-client
exit-address-family	exit-address-family
!	!
address-family ipv6 mvpn	address-family ipv6 mvpn
neighbor 172.16.255.2 activate	neighbor 172.16.255.1 activate
neighbor 172 16.255.2 send-community both	neighbor 172 16 255 1 send-community both
neighbor 172.16.255.2 sond community both neighbor 172.16.255.3 activate neighbor 172.16.255.3 send-community both	neighbor 172.16.255.1 sond 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 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 172.16.255.6 activate	neighbor 172.16.255.6 activate
neighbor 172.16.255.6 send-community both	neighbor 172.16.255.6 send-community both
neighbor 172.16.255.6 route-reflector-client	neighbor 172.16.255.6 route-reflector-client
exit-address-family	exit-address-family
!	!
address-family 12vpn evpn	address-family 12vpn evpn
neighbor 172.16.255.2 activate	neighbor 172.16.255.1 activate
neighbor 172.16.255.2 send-community both	neighbor 172.16.255.1 send-community both
neighbor 172.16.255.2 route-reflector-client	neighbor 172.16.255.1 route-reflector-client
neighbor 172.16.255.3 activate	neighbor 172.16.255.3 activate
neighbor 172.16.255.3 send-community both neighbor 172.16.255.4 activate neighbor 172.16.255.4 send-community both neighbor 172.16.255.4 route-reflector-client	neighbor 172.16.255.3 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
<pre>neighbor 172.16.255.6 activate neighbor 172.16.255.6 send-community both neighbor 172.16.255.6 route-reflector-client exit-address-family</pre>	<pre>neighbor 172.16.255.6 activate neighbor 172.16.255.6 send-community both neighbor 172.16.255.6 route-reflector-client exit-address-family '</pre>
ip pim rp-address 172.16.255.255	<pre>ip pim rp-address 172.16.255.255</pre>
ip pim ssm default	ip pim ssm default
ip msdp peer 172.16.254.2 connect-source Loopback1	ip msdp peer 172.16.254.1 connect-source Loopback1
remote-as 65001	remote-as 65001
ip msdp cache-sa-state	ip msdp cache-sa-state
!	!
end	end
!	!
Spine-01#	Spine-02#

Table 8: Configuring Router 1, Router 2, and Router 3 to Configure TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric

Router 1	Router 2	Router 3
R1# show running-config hostname R1	R2# show running-config hostname R2	R3# show running-config hostname R3
: ip multicast-routing distributed !	: ip multicast-routing distributed !	: ip multicast-routing distributed !
<pre>ipv6 unicast-routing ipv6 multicast-routing ! interface Loopback0 ip address 10.2.255.1 255.255.255.255</pre>	<pre>ipv6 unicast-routing ipv6 multicast-routing ! interface Loopback0 ip address 10.2.255.2 255.255.255.255</pre>	<pre>ipv6 unicast-routing ipv6 multicast-routing ! interface Loopback0 ip address 10.2.255.3 255.255.255.255</pre>
<pre>ip pim sparse-mode ip ospf 1 area 0 ipv6 address FC00:2:255::1/128 ipv6 enable ospfv3 1 ipv6 area 0</pre>	<pre>ip pim sparse-mode ip igmp join-group 226.1.1.1 ip ospf 1 area 0 ipv6 address FC00:2:255::2/128 ipv6 enable ipv6 enable</pre>	<pre>ip pim sparse-mode ip ospf 1 area 0 ipv6 address FC00:2:255::3/128 ipv6 enable ospfv3 1 ipv6 area 0</pre>
<pre>! interface TenGigabitEthernet0/0/0 ip address 10.2.12.1 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 cdp enable ipv6 address FC00:2:12::1/64 ipv6 enable ospfv3 network point-to-point ospfv3 1 ipv6 area 0</pre>	<pre>ipv6 mid join-group FF06:1::1 ospfv3 1 ipv6 area 0 ! interface TenGigabitEthernet0/0/0 ip address 10.2.12.2 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 cdp enable ipv6 address FC00:2:12::2/64 ipv6 enable</pre>	<pre>! interface TenGigabitEthernet0/0/0 ip address 10.2.13.3 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 cdp enable ipv6 address FC00:2:13::3/64 ipv6 enable ospfv3 network point-to-point ospfv3 1 ipv6 area 0</pre>
<pre>! interface TenGigabitEthernet0/0/1 ip address 10.2.13.1 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 cdp enable ipv6 address FC00:2:13::1/64 ipv6 enable ospfv3 network point-to-point ospfv3 1 ipv6 area 0 !</pre>	<pre>ospfv3 network point-to-point ospfv3 1 ipv6 area 0 ! interface TenGigabitEthernet0/0/1 ip address 10.2.23.2 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 cdp enable ipv6 address FC00:2:23::2/64 ipv6 enable ospfv3 network point-to-point</pre>	<pre>! interface TenGigabitEthernet0/0/1 ip address 10.2.23.3 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 cdp enable ipv6 address FC00:2:23::3/64 ipv6 enable ospfv3 network point-to-point ospfv3 1 ipv6 area 0 !</pre>
<pre>interface GigabitEthernet0/0/1.2001 encapsulation dot1Q 2001 ip address 10.2.1.2 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 ipv6 address FC00:2:1::2/64 ipv6 enable ospfv3 network point-to-point ospfv3 1 ipv6 area 0 !</pre>	<pre>ospfv3 1 ipv6 area 0 ! router ospfv3 1 ! address-family ipv6 unicast exit-address-family ! router ospf 1 router-id 10.2.255.2 ! ip pim rp-address 10.2.255.255</pre>	<pre>router ospfv3 1 ! address-family ipv6 unicast exit-address-family ! router ospf 1 router-id 10.2.255.3 ! ip pim rp-address 10.2.255.255 !</pre>

Router 1	Router 2	Router 3
router ospfv3 1	!	ipv6 pim rp-address FC00:2:255::255
!	ipv6 pim rp-address FC00:2:255::255	!
address-family ipv6 unicast	!	end
exit-address-family	end	!
!	!	R3#
router ospf 1	R2#	
router-id 10.2.255.1		
!		
ip pim rp-address 10.2.255.255		
!		
ipv6 pim rp-address FC00:2:255::255		
!		
end		
!		
R1#		

Verifying TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Inside the BGP EVPN VXLAN Fabric

The following sections provide sample outputs for **show** commands to verify TRM with PIM-SM on the devices in the topology configured above:

- Outputs to Verify the Configuration on VTEP 1 (RP Inside the BGP EVPN VXLAN Fabric), on page 101
- Outputs to Verify the Configuration on VTEP 2, on page 109
- Outputs to Verify the Configuration on Border VTEP, on page 116
- Outputs to Verify the Configuration on Spine Switch 1, on page 124
- Outputs to Verify the Configuration on Spine Switch 2, on page 127

Outputs to Verify the Configuration on VTEP 1 (RP Inside the BGP EVPN VXLAN Fabric)

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

Leaf-01#	show nve	peers						
Interface	VNI	Туре	Peer-IP	RMAC/Num RTs	eVNI	state	flags	UP time
nvel	50901	L3CP	172.16.254.6	0c75.bd67.ef48	50901	UP	A/-/4	1d05h
nvel	50901	L3CP	172.16.254.4	7c21.0dbd.9548	50901	UP	A/-/4	1d05h
nvel	50901	L3CP	172.16.254.6	0c75.bd67.ef48	50901	UP	A/M/6	1d05h
nvel	50901	L3CP	172.16.254.4	7c21.0dbd.9548	50901	UP	A/M/6	1d05h
nve1	10102	L2CP	172.16.254.4	7	10102	UP	N/A	1d05h
nvel	10102	L2CP	172.16.254.6	5	10102	UP	N/A	1d05h
Leaf-01#								

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

Leaf-01# show 12vpn evpn peers vxlan								
Interface	VNI	Peer-IP	Num routes	eVNI	UP time			
nve1	10102	172.16.254.4	7	10102	1d05h			
nvel	10102	172.16.254.6	5	10102	1d05h			
Leaf-01#								

The following example shows the output for the **show bgp ipv6 mvpn all summary** command on VTEP 1:

Leaf-01# show bgp ipv6 mvpn all summary BGP router identifier 172.16.255.3, local AS number 65001 BGP table version is 60, main routing table version 60 5 network entries using 1960 bytes of memory 8 path entries using 1280 bytes of memory 4/4 BGP path/bestpath attribute entries using 1248 bytes of memory 4 BGP rrinfo entries using 160 bytes of memory 1 BGP community entries using 24 bytes of memory 18 BGP extended community entries using 2396 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 7068 total bytes of memory BGP activity 139/41 prefixes, 275/138 paths, scan interval 60 secs 5 networks peaked at 15:46:09 Aug 6 2020 UTC (1d02h ago)

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
172.16.255.1	4	65001	2135	2003	60	0	0	1d05h	3
172.16.255.2	4	65001	2131	2003	60	0	0	1d05h	3
Leaf-01#									

The following example shows the output for the **show ipv6 pim vrf** *vrf-name* **group-map** command on VTEP 1:

```
Leaf-01# show ipv6 pim vrf green group-map ff06:1::1
IP PIM Group Mapping Table
(* indicates group mappings being used)
FF00::/8*
   SM, RP: FC00:2:255::255
   RPF: Tu7,FC00:2:255::255 (us)
   Info source: Static
   Uptime: 1d02h, Groups: 1
Leaf-01#
```

The following example shows the output for the **show ipv6 routing vrf** command on VTEP 1:

```
Leaf-01# show ipv6 routing vrf green FC00:2:255::255
Routing entry for FC00:2:255::255/128
Known via "connected", distance 0, metric 0, type receive, connected
Redistributing via bgp 65001
Route count is 1/1, share count 0
Routing paths:
    receive via Loopback255
    Last updated 04:21:51 ago
Leaf-01#
```

The following example shows the output for the **show ipv6 mld vrf** *vrf-name* **groups** command on VTEP 1:

```
Leaf-01# show ipv6 mld vrf green groups

MLD Connected Group Membership

Group Address Interface

Uptime Expires

FF06:1::1 Vlan101

1d02h 00:02:28

Leaf-01#
```

The following example shows the output for the **show ipv6 mroute vrf** *vrf-name* command on VTEP 1:

```
Leaf-01# show ipv6 mroute vrf green
Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group,
       C - Connected, L - Local, I - Received Source Specific Host Report,
       P - Pruned, R - RP-bit set, F - Register flag, T - SPT-bit set,
       J - Join SPT, Y - Joined MDT-data group,
       y - Sending to MDT-data group
       g - BGP signal originated, G - BGP Signal received,
       N - BGP Shared-Tree Prune received, n - BGP C-Mroute suppressed,
       {\tt q} - BGP Src-Active originated, {\tt Q} - BGP Src-Active received
       E - Extranet
Timers: Uptime/Expires
Interface state: Interface, State
(*, FF06:1::1), 1d02h/00:03:13, RP FC00:2:255::255, flags: SCJG
  Incoming interface: Tunnel7
  RPF nbr: FC00:2:255::255
  Immediate Outgoing interface list:
    Vlan101, Forward, 1d02h/00:03:13
    Vlan901, Forward, 04:21:51/never
(FC00:1:102::12, FF06:1::1), 00:02:17/00:03:04, flags: SJTg
  Incoming interface: Vlan901
  RPF nbr: ::FFFF:172.16.254.4
  Immediate Outgoing interface list:
    Vlan101, Forward, 00:02:13/00:03:23
(FC00:2:255::1, FF06:1::1), 00:01:24/00:03:04, flags: SJTg
  Incoming interface: Vlan901
  RPF nbr: ::FFFF:172.16.254.6
  Immediate Outgoing interface list:
    Vlan101, Forward, 00:01:20/00:03:13
Leaf-01#
```

The following example shows the output for the **show ipv6 mfib vrf** *vrf-name* command on VTEP 1:

```
Leaf-01# show ipv6 mfib vrf green
Entry Flags:
               C - Directly Connected, S - Signal, IA - Inherit A flag,
                ET - Data Rate Exceeds Threshold, K - Keepalive
                DDE - Data Driven Event, HW - Hardware Installed
               ME - MOFRR ECMP entry, MNE - MOFRR Non-ECMP entry, MP - MFIB
               MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
                    - Encap helper tunnel flag.
                е
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
               NS - Negate Signalling, SP - Signal Present,
                A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
Other counts: Total/RPF failed/Other drops
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
VRF green
 (*,FF00::/8) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 412/412/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
   Tunnel7 Flags: NS
```

```
(*,FF00::/15) Flags: HW
 SW Forwarding: 0/0/0/0, Other: 0/0/0
 HW Forwarding: 0/0/0/0, Other: 0/0/0
(*,FF02::/16) Flags:
 SW Forwarding: 0/0/0/0, Other: 0/0/0
(*,FF06:1::1) Flags: C HW
 SW Forwarding: 2/0/100/0, Other: 0/0/0
 HW Forwarding: 4/0/126/0, Other: 0/0/0
 Tunnel7 Flags: A NS
 Vlan101 Flags: F NS
   Pkts: 0/0/2
                Rate: 0 pps
 Vlan901, VXLAN v4 Encap (50901, 239.1.1.1) Flags: F
   Pkts: 0/0/2 Rate: 0 pps
(FC00:1:102::12,FF06:1::1) Flags: HW
 SW Forwarding: 1/0/100/0, Other: 0/0/0
 HW Forwarding: 64/0/126/0, Other: 0/0/0
 Vlan901, VXLAN Decap Flags: A
 Vlan101 Flags: F NS
  Pkts: 0/0/1 Rate: 0 pps
(FC00:2:255::1,FF06:1::1) Flags: HW
 SW Forwarding: 2/0/100/0, Other: 0/0/0
 HW Forwarding: 38/0/126/0, Other: 0/0/0
 Vlan901, VXLAN Decap Flags: A
 Vlan101 Flags: F NS
   Pkts: 0/0/2 Rate: 0 pps
(*,FF10::/15) Flags: HW
 SW Forwarding: 0/0/0/0, Other: 0/0/0
 HW Forwarding: 0/0/0/0, Other: 0/0/0
(*,FF12::/16) Flags:
 SW Forwarding: 0/0/0/0, Other: 0/0/0
(*,FF20::/15) Flags: HW
 SW Forwarding: 0/0/0/0, Other: 0/0/0
 HW Forwarding: 0/0/0/0, Other: 0/0/0
(*,FF22::/16) Flags:
 SW Forwarding: 0/0/0/0, Other: 0/0/0
(*,FF30::/15) Flags: HW
 SW Forwarding: 0/0/0/0, Other: 0/0/0
 HW Forwarding: 0/0/0/0, Other: 0/0/0
(*,FF32::/16) Flags:
 SW Forwarding: 0/0/0/0, Other: 0/0/0
(*,FF33::/32) Flags: HW
 SW Forwarding: 0/0/0/0, Other: 0/0/0
 HW Forwarding: 0/0/0/0, Other: 0/0/0
(*,FF34::/32) Flags: HW
 SW Forwarding: 0/0/0/0, Other: 0/0/0
 HW Forwarding: 0/0/0/0, Other: 0/0/0
(*,FF35::/32) Flags: HW
 SW Forwarding: 0/0/0/0, Other: 0/0/0
 HW Forwarding: 0/0/0/0, Other: 0/0/0
(*,FF36::/32) Flags: HW
 SW Forwarding: 0/0/0/0, Other: 0/0/0
 HW Forwarding: 0/0/0/0, Other: 0/0/0
(*,FF37::/32) Flags: HW
 SW Forwarding: 0/0/0/0, Other: 0/0/0
 HW Forwarding: 0/0/0/0, Other: 0/0/0
(*,FF38::/32) Flags: HW
 SW Forwarding: 0/0/0/0, Other: 0/0/0
 HW Forwarding: 0/0/0/0, Other: 0/0/0
(*,FF39::/32) Flags: HW
 SW Forwarding: 0/0/0/0, Other: 0/0/0
 HW Forwarding: 0/0/0/0, Other: 0/0/0
(*,FF3A::/32) Flags: HW
 SW Forwarding: 0/0/0/0, Other: 0/0/0
 HW Forwarding: 0/0/0/0, Other: 0/0/0
```

(*,FF3B::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3C::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3D::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3E::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3F::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF40::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF42::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF50::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF52::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF60::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF62::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF70::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF72::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF80::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF82::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF90::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF92::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFA0::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFA2::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFB0::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFB2::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFC0::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFC2::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFD0::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFD2::/16) Flags:

```
SW Forwarding: 0/0/0/0, Other: 0/0/0
(*,FFE0::/15) Flags: HW
SW Forwarding: 0/0/0/0, Other: 0/0/0
HW Forwarding: 0/0/0/0, Other: 0/0/0
(*,FFE2::/16) Flags:
SW Forwarding: 0/0/0/0, Other: 0/0/0
(*,FFF0::/15) Flags: HW
SW Forwarding: 0/0/0/0, Other: 0/0/0
HW Forwarding: 0/0/0/0, Other: 0/0/0
(*,FFF2::/16) Flags:
SW Forwarding: 0/0/0/0, Other: 0/0/0
Leaf-01#
```

The following example shows the output for the **show bgp ipv6 mvpn all** command on VTEP 1:

```
Leaf-01# show bgp ipv6 mvpn all
BGP table version is 60, 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: 1:1 (default for vrf green)
* i [5][1:1][FC00:1:102::12][FF06:1::1]/42
                                                100
                                                         0 2
                    172.16.255.4
                                             0
 *>i
                      172.16.255.4
                                             0
                                                 100
                                                           0 ?
 * i [5][1:1][FC00:2:255::1][FF06:1::1]/42
                     172.16.255.6
                                             0
                                                  100
                                                          0 2
                      172.16.255.6
                                             0
 *>i
                                                  100
                                                           0 ?
 * i
     [6][1:1][65001][FC00:2:255::255][FF06:1::1]/46
                     172.16.255.4
                                            0 100
                                                         0 ?
 *>i
                     172.16.255.4
                                             0
                                                          0 ?
                                                   100
 *>
      [7][1:1][65001][FC00:2:255::1][FF06:1::1]/46
                                                       32768 2
                     ::
Route Distinguisher: 172.16.254.4:102
*> [7][172.16.254.4:102][65001][FC00:1:102::12][FF06:1::1]/46
                                                       32768 ?
                     ::
Leaf-01#
```

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

```
Leaf-01# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
      L - Local, P - Pruned, R - RP-bit set, F - Register flag,
       T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
       X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
      U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
      Y - Joined MDT-data group, y - Sending to MDT-data group,
      G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
       V - RD & Vector, v - Vector, p - PIM Joins on route,
       x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf,
       e - encap-helper tunnel flag
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
```

Interface state: Interface, Next-Hop or VCD, State/Mode (*, 239.1.1.1), 1d05h/stopped, RP 172.16.255.255, flags: SJCFx Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2 Outgoing interface list: Tunnel0, Forward/Sparse, 1d05h/00:01:34 (172.16.254.3, 239.1.1.1), 00:02:17/00:02:05, flags: FTx Incoming interface: Loopback1, RPF nbr 0.0.0.0, Registering Outgoing interface list: GigabitEthernet1/0/2, Forward/Sparse, 00:02:17/00:03:09, A (172.16.254.6, 239.1.1.1), 00:28:47/00:02:22, flags: JTx Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2 Outgoing interface list: Tunnel0, Forward/Sparse, 00:28:47/00:01:12 (172.16.254.4, 239.1.1.1), 04:45:08/00:01:03, flags: JTx Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2 Outgoing interface list: Tunnel0, Forward/Sparse, 04:45:08/00:02:51 (*, 224.0.1.40), 1d05h/00:02:38, RP 172.16.255.255, flags: SJCL Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2 Outgoing interface list: Loopback0, Forward/Sparse, 1d05h/00:02:38 (*, 225.0.0.102), 1d05h/stopped, RP 172.16.255.255, flags: SJCx Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2 Outgoing interface list: Tunnel0, Forward/Sparse, 1d05h/00:01:34 (172.16.254.4, 225.0.0.102), 1d05h/00:02:33, flags: JTx Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2 Outgoing interface list: Tunnel0, Forward/Sparse, 1d05h/00:00:56 (172.16.254.6, 225.0.0.102), 1d05h/00:01:12, flags: JTx Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2 Outgoing interface list: Tunnel0, Forward/Sparse, 1d05h/00:01:34 (*, 225.0.0.101), 1d05h/stopped, RP 172.16.255.255, flags: SJCFx Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2 Outgoing interface list: Tunnel0, Forward/Sparse, 1d05h/00:01:34 (172.16.254.3, 225.0.0.101), 1d05h/00:03:17, flags: FTx Incoming interface: Loopback1, RPF nbr 0.0.0.0 Outgoing interface list: GigabitEthernet1/0/2, Forward/Sparse, 1d05h/00:03:17 Leaf-01#

The following example shows the output for the show ip mfib command on VTEP 1:

Leaf-01# show ip mfib Entry Flags: C - Directly Connected, S - Signal, IA - Inherit A flag, ET - Data Rate Exceeds Threshold, K - Keepalive DDE - Data Driven Event, HW - Hardware Installed ME - MOFRR ECMP entry, MNE - MOFRR Non-ECMP entry, MP - MFIB MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary MS - MOFRR Entry in Sync, MC - MOFRR entry in MOFRR Client, e - Encap helper tunnel flag.

I/O Item Flags: IC - Internal Copy, NP - Not platform switched, NS - Negate Signalling, SP - Signal Present, A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward, MA - MFIB Accept, A2 - Accept backup, RA2 - MRIB Accept backup, MA2 - MFIB Accept backup Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second Other counts: Total/RPF failed/Other drops I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps Default (*,224.0.0.0/4) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,224.0.1.40) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A NS Loopback0 Flags: F IC NS Pkts: 0/0/0 Rate: 0 pps (*,225.0.0.101) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 1/0/114/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A NS TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.3,225.0.0.101) Flags: HW SW Forwarding: 13/0/127/0, Other: 2/2/0 HW Forwarding: 12686/0/165/0, Other: 0/0/0 NullO Flags: A GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/1 Rate: 0 pps (*,225.0.0.102) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 2/0/172/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A NS TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.4,225.0.0.102) Flags: HW SW Forwarding: 1/0/154/0, Other: 0/0/0 HW Forwarding: 9299/0/176/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A Tunnel0, VXLAN Decap Flags: F NS Pkts: 0/0/1 Rate: 0 pps (172.16.254.6,225.0.0.102) Flags: HW SW Forwarding: 1/0/154/0, Other: 0/0/0 HW Forwarding: 3817/0/163/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A Tunnel0, VXLAN Decap Flags: F NS Pkts: 0/0/1 Rate: 0 pps (*,232.0.0.0/8) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,239.1.1.1) Flags: C HW SW Forwarding: 0/0/0/0, Other: 4/4/0 HW Forwarding: 15/0/168/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A NS TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.3,239.1.1.1) Flags: HW SW Forwarding: 0/0/0/0, Other: 6/5/1 HW Forwarding: 0/0/0/0, Other: 0/0/0 NullO Flags: A NS GigabitEthernet1/0/2 Flags: F Pkts: 0/0/0 Rate: 0 pps
```
Tunnel4 Flags: F
    Pkts: 0/0/0
                 Rate: 0 pps
 (172.16.254.4,239.1.1.1) Flags: HW
  SW Forwarding: 1/0/150/0, Other: 0/0/0
  HW Forwarding: 8525/0/167/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A
  Tunnel0, VXLAN Decap Flags: F NS
    Pkts: 0/0/1 Rate: 0 pps
 (172.16.254.6,239.1.1.1) Flags: HW
  SW Forwarding: 2/0/150/0, Other: 0/0/0
  HW Forwarding: 1629/0/168/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/2 Rate: 0 pps
Leaf-01#
```

Return to Verifying TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Inside the BGP EVPN VXLAN Fabric, on page 101

Outputs to Verify the Configuration on VTEP 2

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

Leaf-02#	show nve	peers						
Interface	VNI	Туре	Peer-IP	RMAC/Num_RTs	eVNI	state	flags	UP time
nvel	50901	L3CP	172.16.254.6	0c75.bd67.ef48	50901	UP	A/-/4	1d05h
nvel	50901	L3CP	172.16.254.3	10b3.d56a.8fc8	50901	UP	A/-/4	1d05h
nvel	50901	L3CP	172.16.254.6	0c75.bd67.ef48	50901	UP	A/M/6	1d05h
nvel	50901	L3CP	172.16.254.3	10b3.d56a.8fc8	50901	UP	A/M/6	1d05h
nvel	10101	L2CP	172.16.254.3	6	10101	UP	N/A	1d05h
nvel	10102	L2CP	172.16.254.6	5	10102	UP	N/A	1d05h
Leaf-02#								

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

Leaf-02# show 12vpn evpn peers vxlan

Interface	VNI	Peer-IP	Num routes	eVNI	UP time
nvel	10101	172.16.254.3	6	10101	1d05h
nvel	10102	172.16.254.6	5	10102	1d05h
Leaf-02#					

The following example shows the output for the **show bgp ipv6 mvpn all summary** command on VTEP 2:

```
Leaf-02# show bgp ipv6 mvpn all summary
BGP router identifier 172.16.255.4, local AS number 65001
BGP table version is 85, main routing table version 85
6 network entries using 2352 bytes of memory
8 path entries using 1280 bytes of memory
5/5 BGP path/bestpath attribute entries using 1560 bytes of memory
4 BGP rrinfo entries using 160 bytes of memory
1 BGP community entries using 24 bytes of memory
18 BGP extended community entries using 2396 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 7772 total bytes of memory
```

BGP activity 145/47 prefixes, 249/117 paths, scan interval 60 secs 6 networks peaked at 15:50:41 Aug 6 2020 UTC (1d02h ago)

 Neighbor
 V
 AS MsgRcvd MsgSent
 TblVer
 InQ OutQ Up/Down
 State/PfxRcd

 172.16.255.1
 4
 65001
 2143
 2019
 85
 0
 0
 1d05h
 2

 172.16.255.2
 4
 65001
 2139
 2019
 85
 0
 0
 1d05h
 2

 Leaf-02#
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The following example shows the output for the **show ip pim vrf** *vrf-name* **group-map** command on VTEP 2:

```
Leaf-02# show ip pim vrf green group-map ff06:1::1
IP PIM Group Mapping Table
(* indicates group mappings being used)
FF00::/8*
    SM, RP: FC00:2:255::255
    RPF: V1901,::FFFF:172.16.254.3
    Info source: Static
    Uptime: 1d05h, Groups: 1
Leaf-02#
```

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

```
Leaf-02# show ip routing vrf green FC00:2:255::255
Routing entry for FC00:2:255::255/128
Known via "bgp 65001", distance 200, metric 0, type internal
Route count is 1/1, share count 0
Routing paths:
    172.16.254.3%default, Vlan901%default
    From AC10:FF01::
    opaque_ptr 0x7F65BA333EC0
    Last updated 04:26:58 ago
Leaf-02#
```

The following example shows the output for the **show ipv6 mld vrf** *vrf-name* **groups** command on VTEP 2:

```
Leaf-02# show ipv6 mld vrf green groups

MLD Connected Group Membership

Group Address Interface

Uptime Expires

FF06:1::1 Vlan102

1d05h 00:03:53

Leaf-02#
```

The following example shows the output for the **show ipv6 mroute vrf** *vrf*-*name* command on VTEP 2:

```
Leaf-02# show ipv6 mroute vrf green
Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group,
C - Connected, L - Local, I - Received Source Specific Host Report,
P - Pruned, R - RP-bit set, F - Register flag, T - SPT-bit set,
J - Join SPT, Y - Joined MDT-data group,
y - Sending to MDT-data group
g - BGP signal originated, G - BGP Signal received,
N - BGP Shared-Tree Prune received, n - BGP C-Mroute suppressed,
q - BGP Src-Active originated, Q - BGP Src-Active received
```

```
E - Extranet
Timers: Uptime/Expires
Interface state: Interface, State
(*, FF06:1::1), 1d05h/never, RP FC00:2:255::255, flags: SCJg
  Incoming interface: Vlan901
  RPF nbr: ::FFFF:172.16.254.3
  Immediate Outgoing interface list:
   Vlan102, Forward, 1d05h/never
(FC00:1:102::12, FF06:1::1), 00:07:24/00:03:28, flags: SFJTGq
  Incoming interface: Vlan102
  RPF nbr: FE80::46D3:CAFF:FE28:6CC5
  Immediate Outgoing interface list:
   Vlan901, Forward, 00:07:24/never
(FC00:2:255::1, FF06:1::1), 00:06:31/00:00:32, flags: SJTgQ
  Incoming interface: Vlan901
  RPF nbr: ::FFFF:172.16.254.6
  Inherited Outgoing interface list:
   Vlan102, Forward, 1d05h/never
Leaf-02#
```

The following example shows the output for the **show ipv6 mfib vrf** *vrf-name* command on VTEP 2:

```
Leaf-02# show ipv6 mfib vrf green
               C - Directly Connected, S - Signal, IA - Inherit A flag,
Entry Flags:
                ET - Data Rate Exceeds Threshold, K - Keepalive
                DDE - Data Driven Event, HW - Hardware Installed
               ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB
                MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
                   - Encap helper tunnel flag.
                е
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
               NS - Negate Signalling, SP - Signal Present,
                A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
Other counts: Total/RPF failed/Other drops
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
VRF green
 (*,FF00::/8) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF00::/15) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF02::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 10/10/0
 (*,FF06:1::1) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
   HW Forwarding: 3/0/126/0, Other: 0/0/0
   Vlan901, VXLAN Decap Flags: A NS
  Vlan102 Flags: F NS
     Pkts: 0/0/0
                 Rate: 0 pps
 (FC00:1:102::12,FF06:1::1) Flags: HW
   SW Forwarding: 2/0/100/0, Other: 0/0/0
   HW Forwarding: 217/0/118/0, Other: 0/0/0
  Vlan102 Flags: A F
    Pkts: 0/0/0
                  Rate: 0 pps
```

Vlan901, VXLAN v4 Encap (50901, 239.1.1.1) Flags: F Pkts: 0/0/1 Rate: 0 pps (FC00:2:255::1,FF06:1::1) Flags: HW SW Forwarding: 2/0/100/0, Other: 0/0/0 HW Forwarding: 191/0/126/0, Other: 0/0/0 Vlan901, VXLAN Decap Flags: A Vlan102 Flags: F NS Pkts: 0/0/2 Rate: 0 pps (*,FF10::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF12::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF20::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF22::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF30::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF32::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF33::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF34::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF35::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF36::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF37::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF38::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF39::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3A::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3B::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3C::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3D::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3E::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3F::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF40::/15) Flags: HW

```
SW Forwarding: 0/0/0/0, Other: 0/0/0
```

```
HW Forwarding:
                   0/0/0/0, Other: 0/0/0
 (*,FF42::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF50::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF52::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF60::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding:
                  0/0/0/0, Other: 0/0/0
 (*,FF62::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF70::/15) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF72::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF80::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF82::/16) Flags:
   SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF90::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF92::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFA0::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFA2::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFB0::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFB2::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFC0::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFC2::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFD0::/15) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding:
                  0/0/0/0, Other: 0/0/0
 (*,FFD2::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFE0::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding:
                   0/0/0/0, Other: 0/0/0
 (*,FFE2::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFF0::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding:
                   0/0/0/0, Other: 0/0/0
 (*,FFF2::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
Leaf-02#
```

The following example shows the output for the **show bgp ipv6 mvpn all** command on VTEP 2:

```
Leaf-02# show bgp ipv6 mvpn all
BGP table version is 85, 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
                    Next Hop
                                       Metric LocPrf Weight Path
    Network
Route Distinguisher: 1:1 (default for vrf green)
 *>
    [5] [1:1] [FC00:1:102::12] [FF06:1::1]/42
                                                      32768 ?
                     ::
 * i [5][1:1][FC00:2:255::1][FF06:1::1]/42
                    172.16.255.6
                                           0
                                               100
                                                        0 ?
 *>i
                     172.16.255.6
                                            0
                                                100
                                                         0 ?
 *>
     [6][1:1][65001][FC00:2:255::255][FF06:1::1]/46
                                                      32768 ?
                     ::
     [7][1:1][65001][FC00:1:102::12][FF06:1::1]/46
 *>i
                                                        0 ?
                    172.16.255.3
                                           0 100
 *>
      [7][1:1][65001][FC00:2:255::1][FF06:1::1]/46
                                                      32768 2
                    ::
Route Distinguisher: 172.16.254.4:102
 * i [7][172.16.254.4:102][65001][FC00:1:102::12][FF06:1::1]/46
                   172.16.255.3 0 100 0 ?
*>i
                    172.16.255.3
                                            0 100
                                                         0 ?
Leaf-02#
```

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

```
Leaf-02# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
       L - Local, P - Pruned, R - RP-bit set, F - Register flag,
       T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
      X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
       U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
      Y - Joined MDT-data group, y - Sending to MDT-data group,
       G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
      V - RD & Vector, v - Vector, p - PIM Joins on route,
      x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf,
       e - encap-helper tunnel flag
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
 Timers: Uptime/Expires
Interface state: Interface, Next-Hop or VCD, State/Mode
(*, 239.1.1.1), 1d05h/stopped, RP 172.16.255.255, flags: SJCFx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 1d05h/00:02:00
(172.16.254.6, 239.1.1.1), 00:33:54/00:01:36, flags: JTx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 00:33:54/00:02:05
(172.16.254.4, 239.1.1.1), 04:50:15/00:03:03, flags: FTx
  Incoming interface: Loopback1, RPF nbr 0.0.0.0
```

.

.

.

...

```
Outgoing interface list:
    GigabitEthernet1/0/2, Forward/Sparse, 04:50:15/00:03:29
(*, 224.0.1.40), 1d05h/00:02:01, RP 172.16.255.255, flags: SJCL
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
  Outgoing interface list:
    Loopback0, Forward/Sparse, 1d05h/00:02:01
(*, 225.0.0.102), 1d05h/stopped, RP 172.16.255.255, flags: SJCFx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 1d05h/00:02:00
(172.16.254.6, 225.0.0.102), 1d05h/00:02:05, flags: JTx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
  Outgoing interface list:
   Tunnel0, Forward/Sparse, 1d05h/00:02:00
(172.16.254.4, 225.0.0.102), 1d05h/00:02:29, flags: FTx
  Incoming interface: Loopback1, RPF nbr 0.0.0.0
  Outgoing interface list:
    GigabitEthernet1/0/2, Forward/Sparse, 1d05h/00:03:28
(*, 225.0.0.101), 1d05h/stopped, RP 172.16.255.255, flags: SJCx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
  Outgoing interface list:
   Tunnel0, Forward/Sparse, 1d05h/00:02:00
(172.16.254.3, 225.0.0.101), 1d05h/00:01:04, flags: JTx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 1d05h/00:02:00
Leaf-02#
```

The following example shows the output for the show ip mfib command on VTEP 2:

Lear-02# snow 1	p mild
Entry Flags:	C - Directly Connected, S - Signal, IA - Inherit A flag,
	ET - Data Rate Exceeds Threshold, K - Keepalive
	DDE - Data Driven Event, HW - Hardware Installed
	ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB
	MoFRR Primary, RP - MRIB MoFRR Primary, P - MoFRR Primary
	MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
	e – Encap helper tunnel flag.
I/O Item Flags:	IC - Internal Copy, NP - Not platform switched,
	NS - Negate Signalling, SP - Signal Present,
	A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
	MA - MFIB Accept, A2 - Accept backup,
	RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Count	-c. Det Count/Deta nor accord/Aug Det Size/White nor accord
Other counts:	Total/PDF failed/Other drops
T/O Item Counts.	• HW Det Count/FS Det Count/DS Det Count Farese Date in one
Default	. IN IKE COUNT/IS IKE COUNT/IS IKE COUNT EQUESS Nace IN pps
	WH D Page C HW
SW Forwarding	$x \cdot 0/0/0/0$ Other: 0/0/0
HW Forwarding	n = 0/0/0/0 Other: $0/0/0$
(* 224 0 1 40)	Flags: C HW
(,224.0.1.40) SW Forwarding	$r_1 ags. C m r_1 ags. C m r_2 ags. C m r_2$
HW Forwarding	0/0/0/0, Other: $0/0/0$
CicchitEthor	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
Joophack0 El	ICUL/U/2 FLAYS. A NO
LOOPDACKU FI8	AAS: L TO NO

Pkts: 0/0/0 Rate: 0 pps (*,225.0.0.101) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 2/0/170/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A NS Tunnel0, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.3,225.0.0.101) Flags: HW SW Forwarding: 1/0/150/0, Other: 0/0/0 HW Forwarding: 12630/0/177/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A Tunnel0, VXLAN Decap Flags: F NS Pkts: 0/0/1 Rate: 0 pps (*,225.0.0.102) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 1/0/224/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A NS TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.4,225.0.0.102) Flags: HW SW Forwarding: 2/0/163/0, Other: 3/1/2 HW Forwarding: 9373/0/164/0, Other: 0/0/0 NullO Flags: A GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/1 Rate: 0 pps (172.16.254.6,225.0.0.102) Flags: HW SW Forwarding: 1/0/206/0, Other: 0/0/0 HW Forwarding: 3825/0/163/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A Tunnel0, VXLAN Decap Flags: F NS Pkts: 0/0/1 Rate: 0 pps (*,232.0.0.0/8) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,239.1.1.1) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 9/0/168/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A NS TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.4,239.1.1.1) Flags: HW SW Forwarding: 1/0/150/0, Other: 24/20/4 HW Forwarding: 8667/0/156/0, Other: 0/0/0 NullO Flags: A GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/1 Rate: 0 pps (172.16.254.6,239.1.1.1) Flags: HW SW Forwarding: 2/0/150/0, Other: 0/0/0 HW Forwarding: 1781/0/168/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A Tunnel0, VXLAN Decap Flags: F NS Pkts: 0/0/2 Rate: 0 pps Leaf-02#

Return to Verifying TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Inside the BGP EVPN VXLAN Fabric, on page 101

Outputs to Verify the Configuration on Border VTEP

The following example shows the output for the **show nve peers** command on Border VTEP:

Border# sho	ow nve	peers						
Interface	VNI	Туре	Peer-IP	RMAC/Num_RTs	eVNI	state	flags	UP time
nvel	50901	L3CP	172.16.254.3	10b3.d56a.8fc8	50901	UP	A/-/4	1d06h
nvel	50901	L3CP	172.16.254.4	7c21.0dbd.9548	50901	UP	A/-/4	1d06h
nvel	50901	L3CP	172.16.254.3	10b3.d56a.8fc8	50901	UP	A/M/6	1d06h
nvel	50901	L3CP	172.16.254.4	7c21.0dbd.9548	50901	UP	A/M/6	1d06h
nvel	10101	L2CP	172.16.254.3	6	10101	UP	N/A	1d06h
nvel	10102	L2CP	172.16.254.4	7	10102	UP	N/A	1d05h
Border#								

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

The following example shows the output for the **show bgp ipv6 mvpn all summary** command on Border VTEP:

```
Border# show bgp ipv6 mvpn all summary
BGP router identifier 172.16.255.6, local AS number 65001
BGP table version is 85, main routing table version 85
5 network entries using 1960 bytes of memory
7 path entries using 1120 bytes of memory
5/5 BGP path/bestpath attribute entries using 1560 bytes of memory
4 BGP rrinfo entries using 160 bytes of memory
1 BGP community entries using 24 bytes of memory
20 BGP extended community entries using 2706 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
O BGP filter-list cache entries using O bytes of memory
BGP using 7530 total bytes of memory
BGP activity 137/41 prefixes, 272/148 paths, scan interval 60 secs
5 networks peaked at 15:42:39 Aug 6 2020 UTC (1d02h ago)

        Neighbor
        V
        AS MsgRcvd MsgSent
        TblVer
        InQ OutQ Up/Down
        State/Pfr

        172.16.255.1
        4
        65001
        2158
        2031
        85
        0
        0
        1d06h
        2

        172.16.255.2
        4
        65001
        2157
        2025
        85
        0
        0
        1d06h
        2

                                   AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd
Border#
```

The following example shows the output for the **show ip pim vrf** *vrf-name* **group-map** command on Border VTEP:

```
Border# show ip pim vrf green group-map ff06:1::1
IP PIM Group Mapping Table
(* indicates group mappings being used)
FF00::/8*
    SM, RP: FC00:2:255::255
    RPF: V1901,::FFFF:172.16.254.3
    Info source: Static
    Uptime: 1d06h, Groups: 1
Border#
```

The following example shows the output for the **show ip routing vrf** *vrf*-*name* command on Border VTEP:

```
Border# show ip routing vrf green FC00:2:255::255
Routing entry for FC00:2:255::255/128
Known via "bgp 65001", distance 200, metric 0, type internal
Redistributing via ospf 1
Route count is 1/1, share count 0
Routing paths:
172.16.254.3%default, Vlan901%default
From AC10:FF01::
opaque_ptr 0x7FEF699AEC28
Last updated 04:34:38 ago
Border#
```

The following example shows the output for the **show ipv6 mld vrf** *vrf-name* **groups** command on Border VTEP:

```
Border# show ipv6 mld vrf green groups

MLD Connected Group Membership

Group Address Interface

Uptime Expires

FF06:1::1 Vlan102

1d05h 00:02:29

Border#
```

The following example shows the output for the **show ipv6 mroute vrf** *vrf-name* command on Border VTEP:

```
Border# show ipv6 mroute vrf green
Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group,
       C - Connected, L - Local, I - Received Source Specific Host Report,
       P - Pruned, R - RP-bit set, F - Register flag, T - SPT-bit set,
      J - Join SPT, Y - Joined MDT-data group,
      y - Sending to MDT-data group
       g - BGP signal originated, G - BGP Signal received,
      N - BGP Shared-Tree Prune received, n - BGP C-Mroute suppressed,
       q - BGP Src-Active originated, Q - BGP Src-Active received
      E - Extranet
Timers: Uptime/Expires
Interface state: Interface, State
(*, FF06:1::1), 1d05h/00:02:52, RP FC00:2:255::255, flags: SCg
  Incoming interface: Vlan901
 RPF nbr: ::FFFF:172.16.254.3
  Immediate Outgoing interface list:
   Vlan102, Null, 1d05h/never
   Vlan2001, Forward, 04:34:39/00:02:52
(FC00:1:102::12, FF06:1::1), 00:15:05/00:02:32, flags: STqQ
  Incoming interface: Vlan901
  RPF nbr: ::FFFF:172.16.254.4
  Immediate Outgoing interface list:
   Vlan2001, Forward, 00:15:03/00:02:32
  Inherited Outgoing interface list:
   Vlan102, Null, 1d05h/never
(FC00:2:255::1, FF06:1::1), 00:14:13/00:02:52, RP FC00:2:255::255, flags: SPR
  Incoming interface: Vlan901
  RPF nbr: ::FFFF:172.16.254.3
  Immediate Outgoing interface list:
   Vlan2001, Null, 00:14:13/00:02:52
  Inherited Outgoing interface list:
   Vlan102, Null, 1d05h/never
```

```
(FC00:2:255::1, FF06:1::1), 00:14:12/never, flags: STGq
Incoming interface: Vlan2001
RPF nbr: FE80::A2B4:39FF:FE21:9183
Immediate Outgoing interface list:
    Vlan901, Forward, 00:14:12/never
Inherited Outgoing interface list:
    Vlan102, Null, 1d05h/never
Border#
```

The following example shows the output for the **show ipv6 mfib vrf***vrf-name* command on Border VTEP:

```
Border# show ipv6 mfib vrf green
Entry Flags:
               C - Directly Connected, S - Signal, IA - Inherit A flag,
                ET - Data Rate Exceeds Threshold, K - Keepalive
                DDE - Data Driven Event, HW - Hardware Installed
                ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB
               MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
                    - Encap helper tunnel flag.
                е
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
                NS - Negate Signalling, SP - Signal Present,
                A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
Other counts:
                  Total/RPF failed/Other drops
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
VRF green
 (*, FF00::/8) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF00::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF02::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 12/12/0
 (*,FF06:1::1) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 4/4/0
  HW Forwarding: 7/0/122/0, Other: 0/0/0
  Vlan901, VXLAN Decap Flags: A
  Vlan2001 Flags: F NS
     Pkts: 0/0/0
                  Rate: 0 pps
 (FC00:1:102::12,FF06:1::1) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 450/0/125/0, Other: 0/0/0
  Vlan901, VXLAN Decap Flags: A
  Vlan2001 Flags: F NS
     Pkts: 0/0/0
                   Rate: 0 pps
 (FC00:2:255::1,FF06:1::1) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 2/1/1
   HW Forwarding: 423/0/122/0, Other: 0/0/0
  Vlan2001 Flags: A
  Vlan901, VXLAN v4 Encap (50901, 239.1.1.1) Flags: F
     Pkts: 0/0/0
                 Rate: 0 pps
 (*,FF10::/15) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF12::/16) Flags:
   SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF20::/15) Flags: HW
```

SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF22::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF30::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF32::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF33::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF34::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF35::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF36::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF37::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF38::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF39::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3A::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3B::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3C::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3D::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3E::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3F::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF40::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF42::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF50::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF52::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF60::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF62::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0

^{(*,}FF70::/15) Flags: HW

```
SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF72::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF80::/15) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding:
                  0/0/0/0, Other: 0/0/0
 (*,FF82::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF90::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
                  0/0/0/0, Other: 0/0/0
  HW Forwarding:
 (*,FF92::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFA0::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFA2::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFB0::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding:
                  0/0/0/0, Other: 0/0/0
 (*,FFB2::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFC0::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFC2::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFD0::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFD2::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFE0::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFE2::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFF0::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFF2::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
Border#
```

The following example shows the output for the **show bgp ipv6 mvpn all** command on Border VTEP:

```
Border# show bgp ipv6 mvpn all
BGP table version is 85, local router ID is 172.16.255.6
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: 1:1 (default for vrf green)
 * i [5][1:1][FC00:1:102::12][FF06:1::1]/42
                                                           0 2
                      172.16.255.4
                                              0
                                                   100
```

```
*>i
                     172.16.255.4
                                             0 100 0 ?
 *>
     [5][1:1][FC00:2:255::1][FF06:1::1]/42
                                                      32768 ?
                    ::
 *>
      [6] [1:1] [65001] [FC00:2:255::255] [FF06:1::1]/46
                                                      32768 2
                    ::
 * i
     [7][1:1][65001][FC00:2:255::1][FF06:1::1]/46
                     172.16.255.3
                                        0
                                                 100
                                                          0 ?
 *>i
                                                100
                     172.16.255.3
                                            0
                                                          0 ?
Route Distinguisher: 172.16.254.4:102
 *> [7][172.16.254.4:102][65001][FC00:1:102::12][FF06:1::1]/46
                                                      32768 ?
                    ::
Border#
```

The following example shows the output for the **show ip mroute** command on Border VTEP:

```
Border# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
      L - Local, P - Pruned, R - RP-bit set, F - Register flag,
      T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
       X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
      U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
       Y - Joined MDT-data group, y - Sending to MDT-data group,
       G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
      V - RD & Vector, v - Vector, p - PIM Joins on route,
      x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf,
      e - encap-helper tunnel flag
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
Interface state: Interface, Next-Hop or VCD, State/Mode
(*, 239.1.1.1), 1d06h/stopped, RP 172.16.255.255, flags: SJCFx
  Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
  Outgoing interface list:
   Tunnel0, Forward/Sparse, 1d06h/00:00:08
(172.16.254.6, 239.1.1.1), 00:41:35/00:02:45, flags: FTx
  Incoming interface: Loopback1, RPF nbr 0.0.0.0
  Outgoing interface list:
    TenGigabitEthernet1/0/2, Forward/Sparse, 00:41:35/00:03:11
(172.16.254.4, 239.1.1.1), 04:57:56/00:02:37, flags: JTx
  Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 04:57:56/00:02:03
(*, 224.0.1.40), 1d06h/00:02:10, RP 172.16.255.255, flags: SJCL
  Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
  Outgoing interface list:
   Loopback0, Forward/Sparse, 1d06h/00:02:10
(*, 225.0.0.102), 1d06h/stopped, RP 172.16.255.255, flags: SJCFx
  Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
  Outgoing interface list:
   Tunnel0, Forward/Sparse, 1d06h/00:00:08
(172.16.254.4, 225.0.0.102), 1d06h/00:01:56, flags: JTx
  Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
  Outgoing interface list:
```

```
Tunnel0, Forward/Sparse, 1d06h/00:00:08
(172.16.254.6, 225.0.0.102), 1d06h/00:02:16, flags: FTx
Incoming interface: Loopback1, RPF nbr 0.0.0.0
Outgoing interface list:
TenGigabitEthernet1/0/2, Forward/Sparse, 1d06h/00:03:21, A
(*, 225.0.0.101), 1d06h/stopped, RP 172.16.255.255, flags: SJCx
Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
Outgoing interface list:
Tunnel0, Forward/Sparse, 1d06h/00:00:08
(172.16.254.3, 225.0.0.101), 1d06h/00:02:00, flags: JTx
Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
Outgoing interface: 1enGigabitEthernet1/0/2, RPF nbr 172.16.26.2
Outgoing interface: 1enGigabitEthernet1/0/2, RPF nbr 172.16.26.2
Outgoing interface list:
Tunnel0, Forward/Sparse, 1d06h/00:00:20
Border#
```

The following example shows the output for the **show ip mfib** command on Border VTEP:

```
Border# show ip mfib
               C - Directly Connected, S - Signal, IA - Inherit A flag,
Entry Flags:
                ET - Data Rate Exceeds Threshold, K - Keepalive
               DDE - Data Driven Event, HW - Hardware Installed
               ME - MOFRR ECMP entry, MNE - MOFRR Non-ECMP entry, MP - MFIB
               MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
                  - Encap helper tunnel flag.
               е
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
               NS - Negate Signalling, SP - Signal Present,
                A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
Other counts:
                  Total/RPF failed/Other drops
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count
                                                          Egress Rate in pps
Default
 (*,224.0.0.0/4) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  TenGigabitEthernet1/0/2 Flags: A NS
  Loopback0 Flags: F IC NS
    Pkts: 0/0/0 Rate: 0 pps
 (*,225.0.0.101) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 8/0/146/0, Other: 0/0/0
  TenGigabitEthernet1/0/2 Flags: A NS
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/0
                   Rate: 0 pps
 (172.16.254.3,225.0.0.101) Flags: HW
  SW Forwarding: 7/0/125/0, Other: 0/0/0
  HW Forwarding: 12768/0/177/0, Other: 0/0/0
  TenGigabitEthernet1/0/2 Flags: A
  Tunnel0, VXLAN Decap Flags: F NS
    Pkts: 0/0/7
                 Rate: 0 pps
 (*,225.0.0.102) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 1/0/172/0, Other: 0/0/0
```

TenGigabitEthernet1/0/2 Flags: A NS TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.4,225.0.0.102) Flags: HW SW Forwarding: 1/0/154/0, Other: 0/0/0 HW Forwarding: 9363/0/176/0, Other: 0/0/0 TenGigabitEthernet1/0/2 Flags: A TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/1 Rate: 0 pps (172.16.254.6,225.0.0.102) Flags: HW SW Forwarding: 17/0/174/0, Other: 10/9/1 HW Forwarding: 3858/0/151/0, Other: 0/0/0 NullO Flags: A TenGigabitEthernet1/0/2 Flags: F Pkts: 0/0/16 Rate: 0 pps (*,232.0.0.0/8) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,239.1.1.1) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 10/0/168/0, Other: 0/0/0 TenGigabitEthernet1/0/2 Flags: A NS TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.4,239.1.1.1) Flags: HW SW Forwarding: 1/0/150/0, Other: 0/0/0 HW Forwarding: 8909/0/167/0, Other: 0/0/0 TenGigabitEthernet1/0/2 Flags: A Tunnel0, VXLAN Decap Flags: F NS Pkts: 0/0/1 Rate: 0 pps (172.16.254.6,239.1.1.1) Flags: HW SW Forwarding: 2/0/150/0, Other: 2/2/0 HW Forwarding: 2018/0/156/0, Other: 0/0/0 NullO Flags: A TenGigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/0 Rate: 0 pps Border#

Return to Verifying TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Inside the BGP EVPN VXLAN Fabric, on page 101

Outputs to Verify the Configuration on Spine Switch 1

The following example shows the output for the **show bgp ipv6 mvpn all summary** command on Spine Switch 1:

Spine-01# show bgp ipv6 mvpn all summary
BGP router identifier 172.16.255.1, local AS number 65001
BGP table version is 78, main routing table version 78
5 network entries using 1960 bytes of memory
13 path entries using 2080 bytes of memory
4/4 BGP path/bestpath attribute entries using 1216 bytes of memory
3 BGP rrinfo entries using 120 bytes of memory
1 BGP community entries using 24 bytes of memory
17 BGP extended community entries using 2356 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
BGP using 7756 total bytes of memory
BGP activity 270/220 prefixes, 3041/2934 paths, scan interval 60 secs
5 networks peaked at 15:48:28 Aug 6 2020 UTC (1d02h ago)

Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd

172.16.255.2	4	65001	2540	2489	78	0	0 1d09h	5
172.16.255.3	4	65001	2020	2157	78	0	0 1d06h	2
172.16.255.4	4	65001	2030	2154	78	0	0 1d06h	3
172.16.255.6	4	65001	2033	2160	78	0	0 1d06h	3
Spine-01#								

The following example shows the output for the **show ip pim rp mapping** command on Spine Switch 1:

```
Spine-01# show ip pim rp mapping
PIM Group-to-RP Mappings
```

```
Group(s): 224.0.0.0/4, Static
    RP: 172.16.255.255 (?)
Spine-01#
```

The following example shows the output for the **show bgp ipv6 mvpn all** command on Spine Switch 1:

ľ	Jetwork	Next Hop		Metric	Loc	Prf	Weight	Path
Route	Distinguisher: 1	:1						
* i	[5][1:1][FC00:1:	102::12]	[FF06:1::1],	/42				
		172.16.25	55.4	C		100	0	?
*>i		172.16.2	255.4		0	100) ()?
* i	[5][1:1][FC00:2:	255::1][H	F06:1::1]/4	12				
		172.16.25	55.6	C		100	0	?
*>i		172.16.2	255.6		0	100) () ?
* i	[6][1:1][65001]	FC00:2:25	55 :: 255][FF(06:1::1]/46	5		
		172.16.25	55.6	C		100	0	?
* i		172.16.2	255.4		0	100) ()?
*>i		172.16.2	255.4		0	100) () ?
* i	[7][1:1][65001]	FC00:2:25	55::1][FF06:	:1::1]/	46			
		172.16.25	55.4	C		100	0	?
* i		172.16.2	255.3		0	100) ()?
*>i		172.16.2	255.3		0	100) ()?
Route	Distinguisher: 1	72.16.254	4.4:102					
* i	[7][172.16.254.4	1:102][650	001][FC00:1:	:102::1	2][I	F06:	:1::1]/4	16
		172.16.25	5.6	C		100	0	?
* i		172.16.2	255.3		0	100) () ?
*>i		172.16.2	255.3		0	100) ()?
Spine-	-01#							

The following example shows the output for the show ip mroute command on Spine Switch 1:

```
Spine-01# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
L - Local, P - Pruned, R - RP-bit set, F - Register flag,
T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
U - URD, I - Received Source Specific Host Report,
```

Z - Multicast Tunnel, z - MDT-data group sender, Y - Joined MDT-data group, y - Sending to MDT-data group, G - Received BGP C-Mroute, g - Sent BGP C-Mroute, N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed, Q - Received BGP S-A Route, q - Sent BGP S-A Route, V - RD & Vector, v - Vector, p - PIM Joins on route, x - VxLAN group, c - PFP-SA cache created entry, \star - determined by Assert, # - iif-starg configured on rpf intf Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join Timers: Uptime/Expires Interface state: Interface, Next-Hop or VCD, State/Mode (*, 239.1.1.1), 04:59:49/stopped, RP 172.16.255.255, flags: SP Incoming interface: Null, RPF nbr 0.0.0.0 Outgoing interface list: Null (172.16.254.6, 239.1.1.1), 00:43:26/00:02:24, flags: PA Incoming interface: GigabitEthernet1/0/4, RPF nbr 172.16.16.6 Outgoing interface list: Null (172.16.254.4, 239.1.1.1), 04:57:47/00:01:01, flags: PTA Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.14.4 Outgoing interface list: Null (*, 224.0.1.40), 1w0d/00:02:32, RP 172.16.255.255, flags: SJCL Incoming interface: Null, RPF nbr 0.0.0.0 Outgoing interface list: Loopback2, Forward/Sparse, 1w0d/00:02:32 (*, 225.0.0.102), 1w0d/stopped, RP 172.16.255.255, flags: SP Incoming interface: Null, RPF nbr 0.0.0.0 Outgoing interface list: Null (172.16.254.6, 225.0.0.102), 02:11:00/00:01:54, flags: PA Incoming interface: GigabitEthernet1/0/4, RPF nbr 172.16.16.6 Outgoing interface list: Null (172.16.254.4, 225.0.0.102), 1d06h/00:02:27, flags: PA Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.14.4 Outgoing interface list: Null Spine-01#

The following example shows the output for the **show ip mfib** command on Spine Switch 1:

```
Spine-01# show ip mfib
               C - Directly Connected, S - Signal, IA - Inherit A flag,
Entry Flags:
                ET - Data Rate Exceeds Threshold, K - Keepalive
                DDE - Data Driven Event, HW - Hardware Installed
                ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB
                MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
                MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
                NS - Negate Signalling, SP - Signal Present,
                A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
                MA - MFIB Accept, A2 - Accept backup,
                RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
                  Total/RPF failed/Other drops
Other counts:
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
Default
 (*,224.0.0.0/4) Flags: C HW
```

```
SW Forwarding: 0/0/0/0, Other: 83/83/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
  Loopback2 Flags: F IC NS
                 Rate: 0 pps
    Pkts: 0/0/0
 (*,225.0.0.102) Flags: C HW
  SW Forwarding: 1/0/206/0, Other: 282/0/282
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
 (172.16.254.4,225.0.0.102) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
  GigabitEthernet1/0/2 Flags: NS
 (172.16.254.6,225.0.0.102) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
                  0/0/0/0, Other: 0/0/0
  HW Forwarding:
  Tunnell Flags: A
  GigabitEthernet1/0/4 Flags: NS
 (*,232.0.0.0/8) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,239.1.1.1) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 6/5/1
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
 (172.16.254.4,239.1.1.1) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 8/0/157/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A NS
 (172.16.254.6,239.1.1.1) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
  GigabitEthernet1/0/4 Flags: NS
Spine-01#
```

Return to Verifying TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Inside the BGP EVPN VXLAN Fabric, on page 101

Outputs to Verify the Configuration on Spine Switch 2

The following example shows the output for the **show bgp ipv6 mvpn all summary** command on Spine Switch 2:

```
Spine-02# show bgp ipv6 mvpn all summary
BGP router identifier 172.16.255.2, local AS number 65001
BGP table version is 77, main routing table version 77
5 network entries using 1960 bytes of memory
13 path entries using 2080 bytes of memory
4/4 BGP path/bestpath attribute entries using 1216 bytes of memory
3 BGP rrinfo entries using 120 bytes of memory
1 BGP community entries using 24 bytes of memory
17 BGP extended community entries using 2356 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 7756 total bytes of memory
BGP activity 301/251 prefixes, 3143/3036 paths, scan interval 60 secs
5 networks peaked at 15:49:16 Aug 6 2020 UTC (1d02h ago)
```

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
172.16.255.1	4	65001	2491	2541	77	0	0	1d09h	5
172.16.255.3	4	65001	2021	2155	77	0	0	1d06h	2
172.16.255.4	4	65001	2031	2152	77	0	0	1d06h	3
172.16.255.6	4	65001	2029	2161	77	0	0	1d06h	3
Spine-02#									

The following example shows the output for the **show ip pim rp mapping** command on Spine Switch 2:

Spine-02# **show ip pim rp mapping** PIM Group-to-RP Mappings

```
Group(s): 224.0.0.0/4, Static
    RP: 172.16.255.255 (?)
Spine-02#
```

The following example shows the output for the **show bgp ipv6 mvpn all** command on Spine Switch 2:

```
Spine-02# show bgp ipv6 mvpn all
BGP table version is 77, 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: 1:1
 * i [5][1:1][FC00:1:102::12][FF06:1::1]/42
                                         0 100
                   172.16.255.4
                                                     0 ?
                                         0 100
 *>i
                    172.16.255.4
                                                      0 ?
 * i [5][1:1][FC00:2:255::1][FF06:1::1]/42
                  172.16.255.6
                                        0 100
                                                    0 ?
 *>i
                                         0
                                             100
                                                      0 ?
 * i [6][1:1][65001][FC00:2:255::255][FF06:1::1]/46
                                 0 100
                                                      0 2
                   172.16.255.6
* i
                                             100
                    172.16.255.4
                                         0
                                                      0 ?
                                        0 100
 *>i
                   172.16.255.4
                                                      0 ?
 * i [7][1:1][65001][FC00:2:255::1][FF06:1::1]/46
                   172.16.255.4 0
                                              100
                                                      0 2
                                                    0 ?
* i
                    172.16.255.3
                                          0
                                               100
                                                      0 ?
*>i
                    172.16.255.3
                                         0
                                               100
Route Distinguisher: 172.16.254.4:102
 * i [7][172.16.254.4:102][65001][FC00:1:102::12][FF06:1::1]/46
                  172.16.255.6 0 100 0 ?
* i
                    172.16.255.3
                                         0
                                              100
                                                      0 ?
 *>i
                    172.16.255.3
                                          0
                                               100
                                                      0 ?
```

Spine-02#

The following example shows the output for the **show ip mroute** command on Spine Switch 2:

```
Spine-02# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
L - Local, P - Pruned, R - RP-bit set, F - Register flag,
T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
```

X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement, U - URD, I - Received Source Specific Host Report, Z - Multicast Tunnel, z - MDT-data group sender, Y - Joined MDT-data group, y - Sending to MDT-data group, G - Received BGP C-Mroute, g - Sent BGP C-Mroute, N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed, Q - Received BGP S-A Route, q - Sent BGP S-A Route, V - RD & Vector, v - Vector, p - PIM Joins on route, x - VxLAN group, c - PFP-SA cache created entry, * - determined by Assert, # - iif-starg configured on rpf intf Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join Timers: Uptime/Expires Interface state: Interface, Next-Hop or VCD, State/Mode (*, 239.1.1.1), 3d13h/00:03:01, RP 172.16.255.255, flags: S Incoming interface: Null, RPF nbr 0.0.0.0 Outgoing interface list: GigabitEthernet1/0/2, Forward/Sparse, 1d06h/00:03:01 GigabitEthernet1/0/1, Forward/Sparse, 1d06h/00:02:41 GigabitEthernet1/0/4, Forward/Sparse, 1d06h/00:02:43 (172.16.254.6, 239.1.1.1), 00:44:52/00:02:29, flags: T Incoming interface: GigabitEthernet1/0/4, RPF nbr 172.16.26.6 Outgoing interface list: GigabitEthernet1/0/1, Forward/Sparse, 00:44:52/00:02:58 GigabitEthernet1/0/2, Forward/Sparse, 00:44:52/00:03:02 (172.16.254.4, 239.1.1.1), 05:01:13/00:02:28, flags: T Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.4 Outgoing interface list: GigabitEthernet1/0/4, Forward/Sparse, 05:01:13/00:03:22 GigabitEthernet1/0/1, Forward/Sparse, 05:01:13/00:02:56 (*, 224.0.1.40), 1w0d/00:03:12, RP 172.16.255.255, flags: SJCL Incoming interface: Null, RPF nbr 0.0.0.0 Outgoing interface list: GigabitEthernet1/0/2, Forward/Sparse, 1d06h/00:03:12 GigabitEthernet1/0/1, Forward/Sparse, 1d06h/00:02:54 GigabitEthernet1/0/4, Forward/Sparse, 1d06h/00:02:44 Loopback2, Forward/Sparse, 1w0d/00:02:32 (*, 225.0.0.102), 1w0d/00:03:26, RP 172.16.255.255, flags: S Incoming interface: Null, RPF nbr 0.0.0.0 Outgoing interface list: GigabitEthernet1/0/2, Forward/Sparse, 1d06h/00:03:21 GigabitEthernet1/0/1, Forward/Sparse, 1d06h/00:03:26 GigabitEthernet1/0/4, Forward/Sparse, 1d06h/00:02:56 (172.16.254.4, 225.0.0.102), 1d06h/00:02:18, flags: MT Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.4 Outgoing interface list: GigabitEthernet1/0/4, Forward/Sparse, 1d06h/00:03:15 GigabitEthernet1/0/1, Forward/Sparse, 1d06h/00:03:26 (172.16.254.6, 225.0.0.102), 1d06h/00:02:40, flags: MT Incoming interface: GigabitEthernet1/0/4, RPF nbr 172.16.26.6 Outgoing interface list: GigabitEthernet1/0/2, Forward/Sparse, 1d06h/00:03:28 GigabitEthernet1/0/1, Forward/Sparse, 1d06h/00:03:28 (*, 225.0.0.101), 3d13h/00:03:13, RP 172.16.255.255, flags: S Incoming interface: Null, RPF nbr 0.0.0.0 Outgoing interface list: GigabitEthernet1/0/2, Forward/Sparse, 1d06h/00:02:59

```
GigabitEthernet1/0/1, Forward/Sparse, 1d06h/00:02:53
GigabitEthernet1/0/4, Forward/Sparse, 1d06h/00:03:13
(172.16.254.3, 225.0.0.101), 1d06h/00:03:09, flags: TA
Incoming interface: GigabitEthernet1/0/1, RPF nbr 172.16.23.3
Outgoing interface list:
GigabitEthernet1/0/2, Forward/Sparse, 1d06h/00:03:27
GigabitEthernet1/0/4, Forward/Sparse, 1d06h/00:03:13
Spine-02#
```

```
The following example shows the output for the show ip mfib command on Spine Switch 2:
```

```
Spine-02# show ip mfib
               C - Directly Connected, S - Signal, IA - Inherit A flag,
Entry Flags:
               ET - Data Rate Exceeds Threshold, K - Keepalive
               DDE - Data Driven Event, HW - Hardware Installed
               ME - MOFRR ECMP entry, MNE - MOFRR Non-ECMP entry, MP - MFIB
               MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
               NS - Negate Signalling, SP - Signal Present,
               A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
Other counts: Total/RPF failed/Other drops
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Eqress Rate in pps
Default
 (*,224.0.0.0/4) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
   Tunnell Flags: A
  GigabitEthernet1/0/1 Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
   GigabitEthernet1/0/2 Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
   GigabitEthernet1/0/4 Flags: F NS
     Pkts: 0/0/0 Rate: 0 pps
   Loopback2 Flags: F IC NS
    Pkts: 0/0/0 Rate: 0 pps
 (*,225.0.0.101) Flags: C HW
   SW Forwarding: 9/0/112/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
   Tunnell Flags: A
  GigabitEthernet1/0/1 Flags: F NS
    Pkts: 0/0/2 Rate: 0 pps
   GigabitEthernet1/0/2 Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
   GigabitEthernet1/0/4 Flags: F NS
    Pkts: 0/0/2 Rate: 0 pps
 (172.16.254.3,225.0.0.101) Flags: HW
   SW Forwarding: 4/0/132/0, Other: 0/0/0
  HW Forwarding: 12790/0/177/0, Other: 0/0/0
   GigabitEthernet1/0/1 Flags: A
   GigabitEthernet1/0/2 Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
   GigabitEthernet1/0/4 Flags: F NS
    Pkts: 0/0/4 Rate: 0 pps
```

(*,225.0.0.102) Flags: C HW SW Forwarding: 27/0/101/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 Tunnell Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/4 Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.4,225.0.0.102) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 9381/0/176/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/4 Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.6,225.0.0.102) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 3853/0/163/0, Other: 0/0/0 GigabitEthernet1/0/4 Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/0 Rate: 0 pps (*,232.0.0.0/8) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,239.1.1.1) Flags: C HW SW Forwarding: 10/0/150/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 Tunnell Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/4 Rate: 0 pps GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/4 Rate: 0 pps GigabitEthernet1/0/4 Flags: F NS Pkts: 0/0/4 Rate: 0 pps (172.16.254.4,239.1.1.1) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 9007/0/167/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/4 Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.6,239.1.1.1) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 2111/0/168/0, Other: 0/0/0 GigabitEthernet1/0/4 Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/0 Rate: 0 pps Spine-02#

Return to Verifying TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Inside the BGP EVPN VXLAN Fabric, on page 101

Example: Configuring TRM with PIM-SM for IPv4 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric

This example shows how to configure and verify Layer 3 TRM with PIM-SM for IPv4 multicast traffic when the RP is outside the BGP EVPN VXLAN fabric. The example uses the following topology:

Figure 11: TRM with PIM-SM when the RP is Outside the BGP EVPN VXLAN Fabric



The topology shows an EVPN VXLAN network, with two spine switches and three VTEPs, connected to an external network with three routers. Router 3 in the external network acts as the RP in this topology and Border VTEP connects the fabric to the external network through Router 1. The IPv4 multicast group is 226.1.1.1 for this topology. The following tables provide sample configurations for the devices in this topology:

Table 9: Configuring VTEP 1, Border VTEP, and VTEP 2 to Configure TRM with PIM-SM for IPv4 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric

VTEP 1	Border VTEP	VTEP 2
Leaf-01# show running-config	Border# show running-config	Leaf-02# show running-config
hostname Leaf-01	hostname Border	hostname Leaf-02
vrf definition green	vrf definition green	rf definition green
rd 1:1	rd 1:1	rd 1:1
!	!	!
address-family ipv4	address-family ipv4	address-family ipv4
mdt auto-discovery vxlan	mdt auto-discovery vxlan	mdt auto-discovery vxlan
mdt default vxlan 239.1.1.1	mdt default vxlan 239.1.1.1	mdt default vxlan 239.1.1.1
mdt overlay use-bgp	mdt overlay use-bgp	mdt overlay use-bgp
route-target export 1:1	route-target export 1:1	route-target export 1:1
route-target import 1:1	route-target import 1:1	route-target import 1:1
route-target export 1:1 stitching	route-target export 1:1 stitching	route-target export 1:1 stitching
route-target import 1:1 stitching	route-target import 1:1 stitching	route-target import 1:1 stitching
exit-address-family	exit-address-family	exit-address-famil
ip routing !	ip routing !	: ip routing !
ip multicast-routing	ip multicast-routing	ip multicast-routing
ip multicast-routing vrf green	ip multicast-routing vrf green	ip multicast-routing vrf green
!	!	!
12vpn evpn	12vpn evpn	12vpn evpn
replication-type static	replication-type static	replication-type static
router-id Loopback1	router-id Loopback1	router-id Loopback1
default-gateway advertise	default-gateway advertise	default-gateway advertise
!	!	!
l2vpn evpn instance 101 vlan-based	l2vpn evpn instance 101 vlan-based	l2vpn evpn instance 101 vlan-based
encapsulation vxlan	encapsulation vxlan	encapsulation vxlan
!	!	!
12vpn evpn instance 102 vlan-based	12vpn evpn instance 102 vlan-based	12vpn evpn instance 102 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 10101	member evpn-instance 101 vni 10101	member evpn-instance 101 vni 10101
vlan configuration 102	vlan configuration 102	vlan configuration 102
member evpn-instance 102 vni 10102	member evpn-instance 102 vni 10102	member evpn-instance 102 vni 10102
vlan configuration 901	vlan configuration 901	vlan configuration 901
member vni 50901	member vni 50901	member vni 50901
!	!	!
interface Loopback0	vlan 2001	interface Loopback0
ip address 172.16.255.3	!	ip address 172.16.255.4
255 255 255 255	!	255.255.255.255
ip pim sparse-mode	ip address 172.16.255.6	ip pim sparse-mode
ip ospf 1 area 0	255.255.255.255	ip ospf 1 area 0
interface Loopback1 ip address 172.16.254.3 255.255.255.255	<pre>ip pin sparse mode ip ospf 1 area 0 ! interface Loopback1 ip address 172 16 254 6</pre>	interface Loopback1 ip address 172.16.254.4 255.255.255.255
ip ospf 1 area 0	255.255.255.255	ip ospf 1 area 0
!	ip pim sparse-mode	!
<pre>interface GigabitEthernet1/0/1 no switchport </pre>	ip ospf 1 area 0 !	interface GigabitEthernet1/0/1 no switchport
<pre>ip address 1/2.16.13.3 255.255.0 ip pim sparse-mode</pre>		<pre>ip address 1/2.16.14.4 255.255.255.0 ip pim sparse-mode</pre>
<pre>ip ospf network point-to-point ip ospf 1 area 0 !</pre>		ip ospi network point-to-point ip ospi 1 area 0 !

VTEP 1	Border VTEP	VTEP 2
<pre>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 GigabitEthernet1/0/10</pre>	<pre>interface TenGigabitEthernet1/0/1 no switchport ip address 172.16.16.6 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 ! interface TenGigabitEthernet1/0/2</pre>	<pre>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 GigabitEthernet1/0/10</pre>
<pre>switchport access vlan 101 switchport mode access ! interface Vlan101 vrf forwarding green ip address 10.1.101.1 255.255.255.0 ip pim sparse-mode !</pre>	no switchport ip address 172.16.26.6 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 ! interface TenGigabitEthernet1/0/5 switchport trunk allowed vlan 2001	<pre>switchport access vlan 102 switchport mode access ! interface Vlan101 vrf forwarding green ip address 10.1.101.1 255.255.255.0 ip pim sparse-mode !</pre>
<pre>interface Vlan102 vrf forwarding green ip address 10.1.102.1 255.255.255.0 ip pim sparse-mode ! interface Vlan901 vrf forwarding green ip unnumbered Loopback1 ip pim sparse-mode no autostate</pre>	<pre>switchport mode trunk ! interface Vlan101 vrf forwarding green ip address 10.1.101.1 255.255.255.0 ip pim sparse-mode ! interface Vlan102 vrf forwarding green ip address 10.1.102.1 255.255.255.0</pre>	<pre>interface Vlan102 vrf forwarding green ip address 10.1.102.1 255.255.255.0 ip pim sparse-mode ! interface Vlan901 vrf forwarding green ip unnumbered Loopback1 ip pim sparse-mode no autostate</pre>
<pre>interface nvel interface nvel no ip address source-interface Loopback1 host-reachability protocol bgp member vni 10101 mcast-group 225.0.0.101 member vni 50901 vrf green member vni 10102 mcast-group 225.0.0.102 ! router ospf 1 router ospf 1 router bgp 65001 bgp log-neighbor-changes no bgp default ipv4-unicast neighbor 172.16.255.1 update-source Loopback0 neighbor 172.16.255.2 remote-as 65001 neighbor 172.16.255.2 update-source Loopback0 !</pre>	<pre>ip pim sparse-mode i interface Vlan901 vrf forwarding green ip unnumbered Loopback1 ip pim sparse-mode no autostate ! interface Vlan2001 vrf forwarding green ip address 10.2.1.1 255.255.255.0 ip mtu 1500 ip pim sparse-mode ip ospf network point-to-point ip ospf 2 area 0 ! interface nve1 no ip address source-interface Loopback1 host-reachability protocol bgp member vni 10101 mcast-group 225.0.0.101 member vni 50901 vrf green member vni 10102 mcast-group</pre>	<pre>! interface nvel no ip address source-interface Loopback1 host-reachability protocol bgp member vni 10101 mcast-group 225.0.0.101 member vni 50901 vrf green member vni 10102 mcast-group 225.0.0.102 ! router ospf 1 router-id 172.16.255.4 ! router bgp 65001 bgp log-neighbor-changes no bgp default ipv4-unicast neighbor 172.16.255.1 remote-as 65001 neighbor 172.16.255.2 remote-as 65001 neighbor 172.16.255.2 update-source Loopback0 !</pre>
address-family ipv4 redistribute connected redistribute static exit-address-family !	225.0.0.102 ! router ospf 2 vrf green redistribute bgp 65001	address-family ipv4 redistribute connected redistribute static exit-address-family !

VTEP 1	Border VTEP	VTEP 2
address-family ipv4 mvpn	!	
<pre>neighbor 172.16.255.1 activate neighbor 172.16.255.1 send-community both</pre>	router ospf 1 router-id 172.16.255.6	address-family ipv4 mvpn neighbor 172.16.255.1 activate neighbor 172 16 255 1 send-community
neighbor 172.16.255.2 activate	router bgp 65001 bgp log-neighbor-changes	both neighbor 172 16 255 2 activate
both exit-address-family	no bgp default ipv4-unicast peighbor 172 16 255 1 remote-as 65001	neighbor 172.16.255.2 send-community
! address-family l2wpn evpn	neighbor 172.16.255.1 update-source	exit-address-family
neighbor 172.16.255.1 activate	neighbor 172.16.255.2 remote-as 65001	address-family 12vpn evpn
both	Loopback0	neighbor 172.16.255.1 activate neighbor 172.16.255.1 send-community
neighbor 1/2.16.255.2 activate neighbor 172.16.255.2 send-community	address-family ipv4	neighbor 172.16.255.2 activate
both exit-address-family	exit-address-family !	heighbor 1/2.16.255.2 send-community both
! address-family ipv4 vrf green	address-family ipv4 mvpn neighbor 172.16.255.1 activate	exit-address-family !
advertise 12vpn evpn redistribute connected	neighbor 172.16.255.1 send-community both	address-family ipv4 vrf green advertise 12vpn evpn
redistribute static exit-address-family	neighbor 172.16.255.2 activate neighbor 172.16.255.2 send-community	redistribute connected redistribute static
! ip pim rp-address 172.16.255.255	both exit-address-family	exit-address-family !
ip pim ssm default ip pim vrf green rp-address	! address-family l2vpn evpn	ip pim rp-address 172.16.255.255 ip pim ssm default
10.2.255.255	neighbor 172.16.255.1 activate neighbor 172.16.255.1 send-community	ip pim vrf green rp-address 10.2.255.255
end !	both neighbor 172.16.255.2 activate	! end
Leaf-01#	neighbor 172.16.255.2 send-community both	! Leaf-02#
	exit-address-family !	
	address-family ipv4 vrf green advertise l2vpn evpn	
	redistribute connected redistribute static	
	redistribute ospf 2 match internal external 1 external 2	
	exit-address-family !	
	ip pim rp-address 172.16.255.255 ip pim ssm default	
	10.2.255.255	
	end !	
	Border#	

Table 10: Configuring Spine Switch 1 and Spine Switch 2 to Configure TRM with PIM-SM for IPv4 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric

Spine Switch 1	Spine Switch 2
Spine-01# show running-config hostname Spine-01	Spine-02# show running-config hostname Spine-02
ip routing	: ip routing !
ip multicast-routing !	ip multicast-routing !
system mtu 9198 !	system mtu 9198 !
<pre>interface Loopback0 ip address 172.16.255.1 255.255.255.255 ip ospf 1 area 0 !</pre>	interface Loopback0 ip address 172.16.255.2 255.255.255.255 ip ospf 1 area 0 !
interface Loopback1 ip address 172.16.254.1 255.255.255.255 ip ospf 1 area 0 !	interface 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 Loopback2 ip address 172.16.255.255 255.255.255.255 ip pim sparse-mode ip ospf 1 area 0
<pre>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 !</pre>	: 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 !
<pre>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</pre>	<pre>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</pre>
<pre>interface GigabitEthernet1/0/4 no switchport ip address 172.16.16.1 255.255.255.0 ip pim sparse-mode ip ospf network point-to-point ip ospf 1 area 0 ! router ospf 1 router-id 172.16.255.1 </pre>	: interface GigabitEthernet1/0/4 no switchport ip address 172.16.26.2 255.255.255.0 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 172.16.255.1 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 172.16.255.4 remote-as 65001 neighbor 172.16.255.4 remote-as 65001 neighbor 172.16.255.6 remote-as 65001 neighbor 172.16.255.6 remote-as 65001 neighbor 172.16.255.6 update-source Loopback0 neighbor 172.16.255.6 update-source Loopback0	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 172.16.255.4 remote-as 65001 neighbor 172.16.255.4 update-source Loopback0 neighbor 172.16.255.6 remote-as 65001 neighbor 172.16.255.6 remote-as 65001 neighbor 172.16.255.6 update-source Loopback0

Spine Switch 1	Spine Switch 2
address-family ipv4 exit-address-family	address-family ipv4 exit-address-family
!	!
address-family ipv4 mvpn	address-family ipv4 mvpn
neighbor 172.16.255.2 activate	neighbor 172.16.255.1 activate
neighbor 172.16.255.2 send-community both	neighbor 172.16.255.1 send-community both
neighbor 172.16.255.2 route-reflector-client	neighbor 172.16.255.1 route-reflector-client
neighbor 172.16.255.3 activate	neighbor 172.16.255.3 activate
neighbor 172.16.255.3 send-community both	neighbor 172.16.255.3 send-community both
neighbor 172.16.255.3 route-reflector-client	neighbor 172.16.255.3 route-reflector-client
neighbor 172.16.255.4 activate	neighbor 172.16.255.4 activate
neighbor 172.16.255.4 send-community both	neighbor 172.16.255.4 send-community both
neighbor 172.16.255.4 route-reflector-client	neighbor 172.16.255.4 route-reflector-client
neighbor 172.16.255.6 activate	neighbor 172.16.255.6 activate
neighbor 172.16.255.6 send-community both	neighbor 172.16.255.6 send-community both
neighbor 172.16.255.6 route-reflector-client	neighbor 172.16.255.6 route-reflector-client
exit-address-family	exit-address-family
!	
address-family 12vpn evpn	!
neighbor 172.16.255.2 activate	address-family 12vpn evpn
neighbor 172.16.255.2 send-community both	neighbor 172.16.255.1 activate
neighbor 172.16.255.2 route-reflector-client	neighbor 172.16.255.1 send-community both
neighbor 172.16.255.3 activate	neighbor 172.16.255.1 route-reflector-client
neighbor 172.16.255.3 send-community both	neighbor 172.16.255.3 activate
neighbor 172.16.255.3 route-reflector-client	neighbor 172.16.255.3 send-community both
neighbor 172.16.255.4 activate	neighbor 172.16.255.3 route-reflector-client
neighbor 172.16.255.4 send-community both	neighbor 172.16.255.4 activate
neighbor 172.16.255.4 route-reflector-client	neighbor 172.16.255.4 send-community both
neighbor 172.16.255.6 activate	neighbor 172.16.255.4 route-reflector-client
neighbor 172.16.255.6 send-community both	neighbor 172.16.255.6 activate
neighbor 172.16.255.6 route-reflector-client	neighbor 172.16.255.6 send-community both
exit-address-family	neighbor 172.16.255.6 route-reflector-client
!	exit-address-family
ip pim rp-address 172.16.255.255	!
ip pim ssm default	ip pim rp-address 172.16.255.255
ip msdp peer 172.16.254.2 connect-source Loopback1	ip pim ssm default
remote-as 65001	ip msdp peer 172.16.254.1 connect-source Loopback1
ip msdp cache-sa-state	remote-as 65001
	ip msdp cache-sa-state
end	
!	end
Spine-01#	!
	Spine-02#

Router 1	Router 2	Router 3
R1# show running-config	R2# show running-config	R3# show running-config
hostname R1	hostname R2	hostname R3
!	!	!
ip multicast-routing distributed !	ip multicast-routing distributed !	ip multicast-routing distributed !
interface Loopback0	interface Loopback0	interface Loopback0
ip address 10.2.255.1 255.255.255.255	ip address 10.2.255.2 255.255.255.255	ip address 10.2.255.3 255.255.255.255
ip pim sparse-mode	ip pim sparse-mode	ip pim sparse-mode
ip ospf 1 area 0	ip igmp join-group 226.1.1.1	ip ospf 1 area 0
!	ip ospf 1 area 0	!
interface TenGigabitEthernet0/0/0	!	interface Loopback255
ip address 10.2.12.1 255.255.255.0	interface TenGigabitEthernet0/0/0	ip address 10.2.255.255
ip pim sparse-mode	ip address 10.2.12.2 255.255.255.0	255.255.255.255
ip ospf network point-to-point	ip pim sparse-mode	ip pim sparse-mode
ip ospf 1 area 0	ip ospf network point-to-point	ip ospf 1 area 0
!	ip ospf 1 area 0	!
interface TenGigabitEthernet0/0/1	!	interface TenGigabitEthernet0/0/0
ip address 10.2.13.1 255.255.255.0	interface TenGigabitEthernet0/0/1	ip address 10.2.13.3 255.255.255.0
ip pim sparse-mode	ip address 10.2.23.2 255.255.255.0	ip pim sparse-mode
ip ospf network point-to-point	ip pim sparse-mode	ip ospf network point-to-point
ip ospf 1 area 0	ip ospf network point-to-point	ip ospf 1 area 0
!	ip ospf 1 area 0	!
interface GigabitEthernet0/0/1.2001	!	interface TenGigabitEthernet0/0/1
encapsulation dot1Q 2001	router ospf 1	ip address 10.2.23.3 255.255.255.0
ip address 10.2.1.2 255.255.255.0	router-id 10.2.255.2	ip pim sparse-mode
ip pim sparse-mode	!	ip ospf network point-to-point
ip ospf network point-to-point	ip pim rp-address 10.2.255.255	ip ospf 1 area 0
ip ospf 1 area 0	!	!
router ospf 1	end	router ospf 1
router-id 10.2.255.1	!	router-id 10.2.255.3
!	R2#	!
ip pim rp-address 10.2.255.255		ip pim rp-address 10.2.255.255
!		!
end		end
!		!
R1#		R3#

Table 11: Configuring Router 1, Router 2, and Router 3 to Configure TRM with PIM-SM for IPv4 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric

Verifying TRM with PIM-SM for IPv4 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric

The following sections provide sample outputs for **show** commands to verify TRM with PIM-SM on the devices in the topology configured above:

- Outputs to Verify the Configuration on VTEP 1, on page 139
- Outputs to Verify the Configuration on VTEP 2, on page 144
- Outputs to Verify the Configuration on Border VTEP, on page 149
- Outputs to Verify the Configuration on Spine Switch 1, on page 155
- Outputs to Verify the Configuration on Spine Switch 2, on page 158
- Outputs to Verify the Configuration on Router 3 (RP Outside the BGP EVPN VXLAN Fabric), on page 162

Outputs to Verify the Configuration on VTEP 1

T = = £ 01# = h = = = = = = = = = = =

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

Lear-Or# SI	now nve pe	ers						
Interface	VNI	Туре	Peer-IP	RMAC/Num_RTs	eVNI	state	flags	UP time
nvel	50901	L3CP	172.16.254.6	0c75.bd67.ef48	50901	UP	A/-/4	16:44:02
nvel	50901	L3CP	172.16.254.4	7c21.0dbd.9548	50901	UP	A/-/4	16:41:00
nvel	50901	L3CP	172.16.254.6	0c75.bd67.ef48	50901	UP	A/M/6	16:44:02
nvel	50901	L3CP	172.16.254.4	7c21.0dbd.9548	50901	UP	A/M/6	16:41:00
nvel	10102	L2CP	172.16.254.4	7	10102	UP	N/A	16:23:05
nvel	10102	L2CP	172.16.254.6	5	10102	UP	N/A	16:44:02
Leaf-01#								

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

Leaf-01# s	show 12vpr	n evpn peers vxlan			
Interface	VNI	Peer-IP	Num routes	eVNI	UP time
nvel	10102	172.16.254.4	7	10102	16:23:06
nvel	10102	172.16.254.6	5	10102	16:44:02
Leaf-01#					

The following example shows the output for the **show bgp ipv4 mvpn all summary** command on VTEP 1:

```
Leaf-01# show bgp ipv4 mvpn all summary
BGP router identifier 172.16.255.3, local AS number 65001
BGP table version is 58, main routing table version 58
6 network entries using 1824 bytes of memory
8 path entries using 1088 bytes of memory
3/3 BGP path/bestpath attribute entries using 936 bytes of memory
4 BGP rrinfo entries using 160 bytes of memory
1 BGP community entries using 24 bytes of memory
17 BGP extended community entries using 2372 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
8 BGP filter-list cache entries using 0 bytes of memory
8 BGP using 6404 total bytes of memory
8 BGP activity 117/25 prefixes, 240/113 paths, scan interval 60 secs
6 networks peaked at 12:17:52 Aug 6 2020 UTC (16:27:28.286 ago)
```

 Neighbor
 V
 AS MsgRcvd MsgSent
 TblVer
 InQ OutQ Up/Down
 State/PfxRcd

 172.16.255.1
 4
 65001
 1217
 1126
 58
 0
 0
 16:44:58
 2

 172.16.255.2
 4
 65001
 1213
 1121
 58
 0
 0
 16:44:53
 2

 Leaf-01#
 58
 0
 0
 16:44:53
 2
 16

The following example shows the output for the **show ip pim vrf** *vrf*-*name* **rp mapping** command on VTEP 1:

```
Leaf-01# show ip pim vrf green rp mapping
PIM Group-to-RP Mappings
Group(s): 224.0.0.0/4, Static
    RP: 10.2.255.255 (?)
Leaf-01#
```

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

The following example shows the output for the **show ip igmp vrf** *vrf-name* **groups** command on VTEP 1:

```
Leaf-01# show ip igmp vrf green groups
IGMP Connected Group Membership
Group Address Interface Uptime Expires Last Reporter Group Accounted
226.1.1.1 Vlan101 13:03:08 00:02:13 10.1.101.11
224.0.1.40 Loopback901 16:45:17 00:02:50 10.1.255.1
Leaf-01#
```

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

```
Leaf-01# show ip mroute vrf green
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
       L - Local, P - Pruned, R - RP-bit set, F - Register flag,
      T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
      X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
      U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
       Y - Joined MDT-data group, y - Sending to MDT-data group,
       G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
      V - RD & Vector, v - Vector, p - PIM Joins on route,
      x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf,
       e - encap-helper tunnel flag
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
Interface state: Interface, Next-Hop or VCD, State/Mode
(*, 226.1.1.1), 13:03:08/stopped, RP 10.2.255.255, flags: SJCg
  Incoming interface: Vlan901, RPF nbr 172.16.254.6
  Outgoing interface list:
   Vlan101, Forward/Sparse, 13:03:08/00:02:13
(10.2.255.1, 226.1.1.1), 00:08:23/00:02:54, flags: TgQ
  Incoming interface: Vlan901, RPF nbr 172.16.254.6
  Outgoing interface list:
   Vlan101, Forward/Sparse, 00:08:23/00:02:13
(10.1.102.12, 226.1.1.1), 00:08:48/00:02:24, flags: TgQ
  Incoming interface: Vlan901, RPF nbr 172.16.254.4
  Outgoing interface list:
   Vlan101, Forward/Sparse, 00:08:48/00:02:13
(*, 224.0.1.40), 16:45:17/00:02:50, RP 10.2.255.255, flags: SJCLg
```

```
Incoming interface: Vlan901, RPF nbr 172.16.254.6
Leaf-01#
```

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

```
Leaf-01# show ip mfib vrf green
Entry Flags:
               C - Directly Connected, S - Signal, IA - Inherit A flag,
                ET - Data Rate Exceeds Threshold, K - Keepalive
                DDE - Data Driven Event, HW - Hardware Installed
                ME - MOFRR ECMP entry, MNE - MOFRR Non-ECMP entry, MP - MFIB
               MOFRR Primary, RP - MRIB MOFRR Primary, P - MoFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
                e - Encap helper tunnel flag.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
               NS - Negate Signalling, SP - Signal Present,
                A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
                  Total/RPF failed/Other drops
Other counts:
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
VRF green
 (*,224.0.0.0/4) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 2/2/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Vlan901, VXLAN Decap Flags: A NS
  Loopback901 Flags: F IC NS
     Pkts: 0/0/0 Rate: 0 pps
 (*,226.1.1.1) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
   HW Forwarding: 0/0/0/0, Other: 0/0/0
  Vlan901, VXLAN Decap Flags: A NS
  Vlan101 Flags: F NS
    Pkts: 0/0/0
                   Rate: 0 pps
 (10.1.102.12,226.1.1.1) Flags: HW
   SW Forwarding: 5/0/100/0, Other: 0/0/0
  HW Forwarding: 523/0/126/0, Other: 0/0/0
  Vlan901, VXLAN Decap Flags: A
Leaf-01#
```

The following example shows the output for the **show bgp ipv4 mvpn all** command on VTEP 1:

```
Leaf-01# show bgp ipv4 mvpn all
BGP table version is 60, local router ID is 172.16.255.6
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
                                        Metric LocPrf Weight Path
    Network
                     Next Hop
Route Distinguisher: 1:1 (default for vrf green)
 *>i [5][1:1][10.1.102.12][226.1.1.1]/18
                                                 100
                                                          0 ?
                     172.16.255.4
                                             0
 * i
                      172.16.255.4
                                             0 100
                                                           0 ?
 *> [5][1:1][10.2.255.1][226.1.1.1]/18
                                                        32768 ?
                     0.0.0.0
```

```
* i [6][1:1][65001][10.2.255.255/32][224.0.1.40/32]/22
                   172.16.255.3
                                         0 100
                                                       0 2
 *>i
                    172.16.255.3
                                          0 100
                                                       0 ?
 * i [6][1:1][65001][10.2.255.255/32][226.1.1.1/32]/22
                   172.16.255.3
                                  0 100
                                                       0 2
 *>i
                    172.16.255.3
                                           0
                                               100
                                                       0 ?
 *>i [7][1:1][65001][10.2.255.1/32][226.1.1.1/32]/22
                                                       0 ?
                   172.16.255.3 0 100
* i
                                             100
                    172.16.255.3
                                          0
                                                       0 ?
Route Distinguisher: 172.16.254.4:102
 *> [7] [172.16.254.4:102] [65001] [10.1.102.12/32] [226.1.1.1/32]/22
                    0.0.0.0
                                                    32768 ?
Leaf-01#
```

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

```
Leaf-01# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
       L - Local, P - Pruned, R - RP-bit set, F - Register flag,
       T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
      X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
      U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
      Y - Joined MDT-data group, y - Sending to MDT-data group,
      G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
       V - RD & Vector, v - Vector, p - PIM Joins on route,
       x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf,
       e - encap-helper tunnel flag
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
Interface state: Interface, Next-Hop or VCD, State/Mode
(*, 239.1.1.1), 16:45:08/stopped, RP 172.16.255.255, flags: SJCx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 16:45:08/00:00:45
(172.16.254.4, 239.1.1.1), 00:08:47/00:01:59, flags: JTx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 00:08:47/00:00:12
(172.16.254.6, 239.1.1.1), 00:08:49/00:02:00, flags: JTx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2
  Outgoing interface list:
   Tunnel0, Forward/Sparse, 00:08:49/00:00:10
(*, 224.0.1.40), 16:45:17/00:02:46, RP 172.16.255.255, flags: SJCL
 Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2
Leaf-01#
```

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

```
Leaf-Ol# show ip mfib
Entry Flags: C - Directly Connected, S - Signal, IA - Inherit A flag,
ET - Data Rate Exceeds Threshold, K - Keepalive
DDE - Data Driven Event, HW - Hardware Installed
```

```
ME - MOFRR ECMP entry, MNE - MOFRR Non-ECMP entry, MP - MFIB
               MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
                e - Encap helper tunnel flag.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
               NS - Negate Signalling, SP - Signal Present,
                A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
Other counts:
                  Total/RPF failed/Other drops
I/O Item Counts:
                HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
Default
 (*,224.0.0.0/4) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A NS
  Loopback0 Flags: F IC NS
    Pkts: 0/0/0
                   Rate: 0 pps
 (*,225.0.0.101) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 1/0/114/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A NS
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
 (172.16.254.3,225.0.0.101) Flags: HW
  SW Forwarding: 13/0/127/0, Other: 2/2/0
  HW Forwarding:
                  7870/0/164/0, Other: 0/0/0
  NullO Flags: A
  GigabitEthernet1/0/2 Flags: F NS
    Pkts: 0/0/1 Rate: 0 pps
 (*,225.0.0.102) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 2/0/172/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A NS
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
 (172.16.254.4,225.0.0.102) Flags: HW
  SW Forwarding: 1/0/154/0, Other: 0/0/0
  HW Forwarding: 5222/0/176/0, Other: 0/0/0
   GigabitEthernet1/0/2 Flags: A
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/1 Rate: 0 pps
 (172.16.254.6,225.0.0.102) Flags: HW
  SW Forwarding: 1/0/154/0, Other: 0/0/0
  HW Forwarding: 2137/0/163/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/1 Rate: 0 pps
 (*,232.0.0.0/8) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,239.1.1.1) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 11/0/168/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A NS
  Tunnel0, VXLAN Decap Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
 (172.16.254.4,239.1.1.1) Flags: HW
  SW Forwarding: 4/0/150/0, Other: 0/0/0
```

```
HW Forwarding: 518/0/168/1, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/4 Rate: 0 pps
 (172.16.254.6,239.1.1.1) Flags: HW
   SW Forwarding: 1/0/150/0, Other: 0/0/0
  HW Forwarding: 498/1/168/1, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A
  Tunnel0, VXLAN Decap Flags: F NS
    Pkts: 0/0/1 Rate: 0 pps
Leaf-01#
```

Return to Verifying TRM with PIM-SM for IPv4 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric, on page 138

Outputs to Verify the Configuration on VTEP 2

T = = £ 00# = b = = = = = = = = = = =

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

Leal-UZ# S.	now nve p	eers						
Interface	VNI	Туре	Peer-IP	RMAC/Num_RTs	eVNI	state	flags	UP time
nvel	50901	L3CP	172.16.254.6	0c75.bd67.ef48	50901	UP	A/-/4	16:56:53
nvel	50901	L3CP	172.16.254.3	10b3.d56a.8fc8	50901	UP	A/-/4	16:56:53
nvel	50901	L3CP	172.16.254.6	0c75.bd67.ef48	50901	UP	A/M/6	16:56:53
nvel	50901	L3CP	172.16.254.3	10b3.d56a.8fc8	50901	UP	A/M/6	16:56:53
nvel	10101	L2CP	172.16.254.3	6	10101	UP	N/A	16:56:53
nvel	10102	L2CP	172.16.254.6	5	10102	UP	N/A	16:56:53
Leaf-02#								

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

Leaf-02# show 12vpn evpn peers vxlan							
Interface	VNI	Peer-IP	Num routes	eVNI	UP time		
nvel	10101	172.16.254.3	6	10101	16:56:54		
nvel	10102	172.16.254.6	5	10102	16:56:54		
Leaf-02#							

The following example shows the output for the **show bgp ipv4 mvpn all summary** command on **VTEP 2**:

```
Leaf-02# show bgp ipv4 mvpn all summary
BGP router identifier 172.16.255.4, local AS number 65001
BGP table version is 62, main routing table version 62
7 network entries using 2128 bytes of memory
9 path entries using 1224 bytes of memory
4/4 BGP path/bestpath attribute entries using 1248 bytes of memory
4 BGP rrinfo entries using 160 bytes of memory
1 BGP community entries using 24 bytes of memory
17 BGP extended community entries using 2372 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 7156 total bytes of memory
BGP activity 121/28 prefixes, 202/77 paths, scan interval 60 secs
9 networks peaked at 12:22:24 Aug 6 2020 UTC (16:43:21.423 ago)
Neighbor
                          AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd
               V
```

62

0 0 16:57:50

2.

172.16.255.1 4 65001 1229 1151
172.16.255.2 4 65001 1227 1152 62 0 0 16:57:51 2 Leaf-02#

The following example shows the output for the **show ip pim vrf** *vrf-name* **rp mapping** command on VTEP 2:

```
Leaf-02# show ip pim vrf green rp mapping
PIM Group-to-RP Mappings
Group(s): 224.0.0.0/4, Static
    RP: 10.2.255.255 (?)
```

```
Leaf-02#
```

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

```
Leaf-02# show ip routing vrf green 10.2.255.255
Routing Table: green
Routing entry for 10.2.255.255/32
Known via "bgp 65001", distance 200, metric 3, type internal
Last update from 172.16.254.6 on Vlan901, 16:56:55 ago
Routing Descriptor Blocks:
 * 172.16.254.6 (default), from 172.16.255.1, 16:56:55 ago, via Vlan901
            opaque_ptr 0x7F65B8B9E4B0
            Route metric is 3, traffic share count is 1
            AS Hops 0
            MPLS label: none
Leaf-02#
```

The following example shows the output for the **show ip igmp vrf** *vrf-name* **groups** command on VTEP 2:

Leaf-02# show ip igmp vrf green groups IGMP Connected Group Membership Group Address Interface Uptime Expires Last Reporter Group Accounted 226.1.1.1 Vlan102 16:58:00 00:02:11 10.1.102.12 224.0.1.40 Vlan901 16:58:37 00:02:33 172.16.254.4 Leaf-02#

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

```
Leaf-02# show ip mroute vrf green
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
       L - Local, P - Pruned, R - RP-bit set, F - Register flag,
       T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
      X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
      U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
       Y - Joined MDT-data group, y - Sending to MDT-data group,
      G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
       V - RD & Vector, v - Vector, p - PIM Joins on route,
       x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf,
       e - encap-helper tunnel flag
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
```

Interface state: Interface, Next-Hop or VCD, State/Mode

```
(*, 226.1.1.1), 16:58:00/stopped, RP 10.2.255.255, flags: SJCFg
Incoming interface: Vlan901, RPF nbr 172.16.254.6
Outgoing interface list:
    Vlan102, Forward/Sparse, 16:58:00/00:02:11
```

```
(10.2.255.1, 226.1.1.1), 00:24:16/00:02:40, flags: JTgQ
Incoming interface: Vlan901, RPF nbr 172.16.254.6
Outgoing interface list:
Vlan102, Forward/Sparse, 00:24:16/00:02:11
```

```
(10.1.102.12, 226.1.1.1), 00:24:41/00:02:09, flags: FTGqx
Incoming interface: Vlan102, RPF nbr 0.0.0.0, Registering
Outgoing interface list:
Vlan901, Forward/Sparse, 00:24:41/stopped
```

```
(*, 224.0.1.40), 16:58:37/00:02:33, RP 10.2.255.255, flags: SJPCLgx
Incoming interface: Vlan901, RPF nbr 172.16.254.6
Outgoing interface list: Null
Leaf-02#
```

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

```
Leaf-02# show ip mfib vrf green
Entry Flags:
               C - Directly Connected, S - Signal, IA - Inherit A flag,
                ET - Data Rate Exceeds Threshold, K - Keepalive
               DDE - Data Driven Event, HW - Hardware Installed
               ME - MOFRR ECMP entry, MNE - MOFRR Non-ECMP entry, MP - MFIB
               MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
                е
                   - Encap helper tunnel flag.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
               NS - Negate Signalling, SP - Signal Present,
                A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
Other counts: Total/RPF failed/Other drops
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
VRF green
 (*,224.0.0.0/4) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Vlan901, VXLAN Decap Flags: A IC NS
 (*,226.1.1.1) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 3/0/126/0, Other: 0/0/0
  Vlan901, VXLAN Decap Flags: A NS
  Vlan102 Flags: F NS
    Pkts: 0/0/0
                 Rate: 0 pps
 (10.1.102.12,226.1.1.1) Flags: HW
   SW Forwarding: 739/0/100/0, Other: 2/2/0
  HW Forwarding: 736/0/118/0, Other: 0/0/0
   Vlan102 Flags: A
  Tunnel5 Flags: F
    Pkts: 0/0/739
                     Rate: 0 pps
   Vlan901, VXLAN v4 Encap (50901, 239.1.1.1) Flags: F
```

Pkts: 0/0/739 Rate: 0 pps Leaf-02#

The following example shows the output for the **show bgp ipv4 mvpn all** command on VTEP 2:

Leaf-02# show bgp ipv4 mvpn all BGP table version is 62, 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 Next Hop Metric LocPrf Weight Path Network Route Distinguisher: 1:1 (default for vrf green) *> [5][1:1][10.1.102.12][226.1.1.1]/18 0.0.0.0 32768 ? *>i [5][1:1][10.2.255.1][226.1.1.1]/18 100 100 172.16.255.6 0 0 ? * i 172.16.255.6 0 0 ? *> [6][1:1][65001][10.2.255.255/32][224.0.1.40/32]/22 0.0.0.0 32768 ? *> [6][1:1][65001][10.2.255.255/32][226.1.1.1/32]/22 0.0.0.0 32768 ? [7] [1:1] [65001] [10.1.102.12/32] [226.1.1.1/32]/22 *>i 172.16.255.3 0 100 0 ? [7][1:1][65001][10.2.255.1/32][226.1.1.1/32]/22 *> 0.0.0.0 32768 ? Route Distinguisher: 172.16.254.4:102 *>i [7][172.16.254.4:102][65001][10.1.102.12/32][226.1.1.1/32]/22 0 ? 172.16.255.3 0 100 100 * i 0 ? 172.16.255.3 0 Leaf-02#

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

Leaf-02# show ip mroute IP Multicast Routing Table Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected, L - Local, P - Pruned, R - RP-bit set, F - Register flag, T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet, X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement, U - URD, I - Received Source Specific Host Report, Z - Multicast Tunnel, z - MDT-data group sender, Y - Joined MDT-data group, y - Sending to MDT-data group, G - Received BGP C-Mroute, g - Sent BGP C-Mroute, N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed, Q - Received BGP S-A Route, q - Sent BGP S-A Route, V - RD & Vector, v - Vector, p - PIM Joins on route, x - VxLAN group, c - PFP-SA cache created entry, * - determined by Assert, # - iif-starg configured on rpf intf, e - encap-helper tunnel flag Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join Timers: Uptime/Expires Interface state: Interface, Next-Hop or VCD, State/Mode (*, 239.1.1.1), 16:58:28/stopped, RP 172.16.255.255, flags: SJCFx Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2 Outgoing interface list: Tunnel0, Forward/Sparse, 16:58:28/00:02:25

```
(172.16.254.6, 239.1.1.1), 00:24:42/00:00:58, flags: JTx
Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
Outgoing interface list:
Tunnel0, Forward/Sparse, 00:24:42/00:02:17
(172.16.254.4, 239.1.1.1), 00:24:42/00:03:28, flags: FTx
Incoming interface: Loopback1, RPF nbr 0.0.0.0
Outgoing interface list:
GigabitEthernet1/0/2, Forward/Sparse, 00:24:42/00:03:23, A
(*, 224.0.1.40), 16:58:37/00:02:26, RP 172.16.255.255, flags: SJCL
Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
Outgoing interface list:
Loopback0, Forward/Sparse, 16:58:36/00:02:26
Leaf-02#
```

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

```
Leaf-02# show ip mfib
Entry Flags:
               C - Directly Connected, S - Signal, IA - Inherit A flag,
               ET - Data Rate Exceeds Threshold, K - Keepalive
                DDE - Data Driven Event, HW - Hardware Installed
                ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB
               MOFRR Primary, RP - MRIB MOFRR Primary, P - MoFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
                   - Encap helper tunnel flag.
                е
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
               NS - Negate Signalling, SP - Signal Present,
                A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
Other counts: Total/RPF failed/Other drops
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
Default
 (*,224.0.0.0/4) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
   HW Forwarding: 0/0/0/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A NS
  Loopback0 Flags: F IC NS
    Pkts: 0/0/0 Rate: 0 pps
 (*,225.0.0.101) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
   HW Forwarding: 2/0/170/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A NS
  Tunnel0, VXLAN Decap Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
 (172.16.254.3,225.0.0.101) Flags: HW
   SW Forwarding: 1/0/150/0, Other: 0/0/0
  HW Forwarding: 7870/0/176/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A
  Tunnel0, VXLAN Decap Flags: F NS
    Pkts: 0/0/1 Rate: 0 pps
 (*,225.0.0.102) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 1/0/224/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A NS
   TunnelO, VXLAN Decap Flags: F NS
```

Pkts: 0/0/0 Rate: 0 pps (172.16.254.4,225.0.0.102) Flags: HW SW Forwarding: 2/0/163/0, Other: 3/1/2 HW Forwarding: 5353/0/164/0, Other: 0/0/0 Null0 Flags: A GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/1 Rate: 0 pps (172.16.254.6,225.0.0.102) Flags: HW SW Forwarding: 1/0/206/0, Other: 0/0/0 HW Forwarding: 2165/0/163/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A Tunnel0, VXLAN Decap Flags: F NS Pkts: 0/0/1 Rate: 0 pps (*,232.0.0.0/8) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,239.1.1.1) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 5/0/168/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A NS Tunnel0, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.4,239.1.1.1) Flags: HW SW Forwarding: 1/0/150/0, Other: 1495/1491/4 HW Forwarding: 742/0/156/0, Other: 0/0/0 NullO Flags: A NS GigabitEthernet1/0/2 Flags: F Pkts: 0/0/1 Rate: 0 pps (172.16.254.6,239.1.1.1) Flags: HW SW Forwarding: 1/0/150/0, Other: 0/0/0 HW Forwarding: 1460/1/168/1, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A NS TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/1 Rate: 0 pps Leaf-02#

Return to Verifying TRM with PIM-SM for IPv4 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric, on page 138

Outputs to Verify the Configuration on Border VTEP

The following example shows the output for the **show nve peers** command on Border VTEP:

Border# show nve peers							
Interface	VNI	Туре	Peer-IP	RMAC/Num_RTs e	eVNI sta	te flags	UP time
nvel	50901	L3CP	172.16.254.3	10b3.d56a.8fc8 5	50901 U	P A/-/4	17:09:20
nvel	50901	L3CP	172.16.254.4	7c21.0dbd.9548 5	50901 U	P A/-/4	17:06:19
nvel	50901	L3CP	172.16.254.3	10b3.d56a.8fc8 5	50901 U	P A/M/6	17:09:20
nvel	50901	L3CP	172.16.254.4	7c21.0dbd.9548 5	50901 U	P A/M/6	17:06:19
nvel	10101	L2CP	172.16.254.3	6 1	10101 U	P N/A	17:09:20
nvel	10102	L2CP	172.16.254.4	7 1	10102 U	P N/A	16:48:24
Border#							

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

Border VTEP

- -

Border# show 1	2vpn evpn peers vxlan		
Interface VNI	Peer-IP	Num routes eVNI U	JP time

The following example shows the output for the **show bgp ipv4 mvpn all summary** command on Border VTEP:

```
Border# show bgp ipv4 mvpn all summary

BGP router identifier 172.16.255.6, local AS number 65001

BGP table version is 60, main routing table version 60

6 network entries using 1824 bytes of memory

10 path entries using 1360 bytes of memory

4/4 BGP path/bestpath attribute entries using 1248 bytes of memory

4 BGP rrinfo entries using 160 bytes of memory

1 BGP community entries using 24 bytes of memory

19 BGP extended community entries using 2682 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 activity 116/24 prefixes, 232/112 paths, scan interval 60 secs

8 networks peaked at 12:14:22 Aug 6 2020 UTC (16:52:46.174 ago)

Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd

172.16.255.1 4 65001 1246 1165 60 0 017:13:17 4

172.16.255.2 4 65001 1247 1161 60 0 017:13:14 4
```

```
Border#
```

The following example shows the output for the **show ip pim vrf** *vrf-name* **rp mapping** command on Border VTEP:

```
Border# show ip pim vrf green rp mapping
PIM Group-to-RP Mappings
Group(s): 224.0.0.0/4, Static
    RP: 10.2.255.255 (?)
Border#
```

The following example shows the output for the **show ip routing vrf** *vrf-name* command on Border VTEP:

```
Border# show ip routing vrf green 10.2.255.255
Routing Table: green
Routing entry for 10.2.255.255/32
Known via "ospf 2", distance 110, metric 3, type intra area
Redistributing via bgp 65001
Advertised by bgp 65001 match internal external 1 & 2
Last update from 10.2.1.2 on Vlan2001, 17:12:42 ago
Routing Descriptor Blocks:
* 10.2.1.2, from 10.2.255.3, 17:12:42 ago, via Vlan2001
Route metric is 3, traffic share count is 1
Border#
```

The following example shows the output for the **show ip igmp vrf** *vrf-name* **groups** command on Border VTEP:

```
Border# show ip igmp vrf green groups
IGMP Connected Group Membership
Group Address Interface Uptime Expires Last Reporter Group Accounted
```

224.0.1.40 Vlan901 17:14:13 00:02:51 172.16.254.6 Border#

The following example shows the output for the **show ip mroute vrf** *vrf-name* command on Border VTEP:

Border# show ip mroute vrf green IP Multicast Routing Table Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected, L - Local, P - Pruned, R - RP-bit set, F - Register flag, T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet, X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement, U - URD, I - Received Source Specific Host Report, Z - Multicast Tunnel, z - MDT-data group sender, Y - Joined MDT-data group, y - Sending to MDT-data group, G - Received BGP C-Mroute, g - Sent BGP C-Mroute, N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed, Q - Received BGP S-A Route, q - Sent BGP S-A Route, V - RD & Vector, v - Vector, p - PIM Joins on route, x - VxLAN group, c - PFP-SA cache created entry, * - determined by Assert, # - iif-starg configured on rpf intf, e - encap-helper tunnel flag Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join Timers: Uptime/Expires Interface state: Interface, Next-Hop or VCD, State/Mode (*, 226.1.1.1), 17:06:19/stopped, RP 10.2.255.255, flags: SJGx Incoming interface: Vlan2001, RPF nbr 10.2.1.2 Outgoing interface list: Vlan901, Forward/Sparse, 17:06:19/stopped (10.2.255.1, 226.1.1.1), 00:33:41/00:01:22, flags: TGqx Incoming interface: Vlan2001, RPF nbr 10.2.1.2 Outgoing interface list: Vlan901, Forward/Sparse, 00:33:41/stopped (10.1.102.12, 226.1.1.1), 00:34:06/00:03:14, flags: Tgx Incoming interface: Vlan901, RPF nbr 172.16.254.4 Outgoing interface list: Vlan2001, Forward/Sparse, 00:34:06/00:02:52, A (*, 224.0.1.40), 17:14:13/00:02:51, RP 10.2.255.255, flags: SJCLGx Incoming interface: Vlan2001, RPF nbr 10.2.1.2 Outgoing interface list: Vlan901, Forward/Sparse, 17:14:12/00:02:51 Border#

The following example shows the output for the **show ip mfib vrf** *vrf-name* command on Border VTEP:

Border# show ip mfib vrf green Entry Flags: C - Directly Connected, S - Signal, IA - Inherit A flag, ET - Data Rate Exceeds Threshold, K - Keepalive DDE - Data Driven Event, HW - Hardware Installed ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB MoFRR Primary, RP - MRIB MoFRR Primary, P - MoFRR Primary MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client, e - Encap helper tunnel flag. I/O Item Flags: IC - Internal Copy, NP - Not platform switched, NS - Negate Signalling, SP - Signal Present, A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward, MA - MFIB Accept, A2 - Accept backup,

RA2 - MRIB Accept backup, MA2 - MFIB Accept backup Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second Other counts: Total/RPF failed/Other drops I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps VRF green (*,224.0.0.0/4) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,224.0.1.40) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 Vlan2001 Flags: A NS Vlan901, VXLAN Decap Flags: F IC NS Pkts: 0/0/0 Rate: 0 pps (*,226.1.1.1) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 6/0/122/0, Other: 0/0/0 Vlan2001 Flags: A NS Vlan901, VXLAN v4 Encap (50901, 239.1.1.1) Flags: F Pkts: 0/0/0 Rate: 0 pps (10.1.102.12,226.1.1.1) Flags: HW SW Forwarding: 4/0/100/0, Other: 1/1/0 HW Forwarding: 2096/1/126/0, Other: 0/0/0 Vlan901, VXLAN Decap Flags: A Vlan2001 Flags: F Pkts: 0/0/4 Rate: 0 pps (10.2.255.1,226.1.1.1) Flags: HW SW Forwarding: 1/0/100/0, Other: 0/0/0 HW Forwarding: 2072/1/122/0, Other: 0/0/0 Vlan2001 Flags: A Vlan901, VXLAN v4 Encap (50901, 239.1.1.1) Flags: F Pkts: 0/0/1 Rate: 0 pps Border#

The following example shows the output for the **show bgp ipv4 mvpn all** command on Border VTEP:

```
Border# show bgp ipv4 mvpn all
BGP table version is 60, local router ID is 172.16.255.6
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: 1:1 (default for vrf green)
 *>i [5][1:1][10.1.102.12][226.1.1.1]/18
                    172.16.255.4
                                               100
                                                        0 ?
                                            0
 * i
                     172.16.255.4
                                            0
                                                100
                                                          0 2
 *>
     [5][1:1][10.2.255.1][226.1.1.1]/18
                    0.0.0.0
                                                      32768 ?
 * i [6][1:1][65001][10.2.255.255/32][224.0.1.40/32]/22
                                            0 100
0 100
                     172.16.255.3
                                                          0 2
 *>i
                     172.16.255.3
                                                         0 2
 * i [6][1:1][65001][10.2.255.255/32][226.1.1.1/32]/22
                                                        0 ?
                    172.16.255.3
                                           0 100
                     172.16.255.3
                                            0
 *>i
                                                 100
                                                         0 ?
 *>i
     [7][1:1][65001][10.2.255.1/32][226.1.1.1/32]/22
                    172.16.255.3
                                           0 100
                                                          0 2
```

The following example shows the output for the **show ip mroute** command on Border VTEP:

```
Border# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
       L - Local, P - Pruned, R - RP-bit set, F - Register flag,
       T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
      X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
       U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
       Y - Joined MDT-data group, y - Sending to MDT-data group,
      G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
       V - RD & Vector, v - Vector, p - PIM Joins on route,
      x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf,
       e - encap-helper tunnel flag
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
 Interface state: Interface, Next-Hop or VCD, State/Mode
(*, 239.1.1.1), 17:14:04/stopped, RP 172.16.255.255, flags: SJCFx
  Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 17:14:04/00:01:48
(172.16.254.4, 239.1.1.1), 00:34:05/00:02:44, flags: JTx
  Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
  Outgoing interface list:
   Tunnel0, Forward/Sparse, 00:34:05/00:01:54
(172.16.254.6, 239.1.1.1), 00:34:07/00:03:12, flags: FTx
  Incoming interface: Loopback1, RPF nbr 0.0.0.0
  Outgoing interface list:
    TenGigabitEthernet1/0/2, Forward/Sparse, 00:34:07/00:02:52, A
(*, 224.0.1.40), 17:14:13/00:02:47, RP 172.16.255.255, flags: SJCL
  Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2
  Outgoing interface list:
   Loopback0, Forward/Sparse, 17:14:12/00:02:47
Border#
```

The following example shows the output for the **show ip mfib** command on Border VTEP:

. . .

....

.

Border# show 1p	MILD
Entry Flags:	C - Directly Connected, S - Signal, IA - Inherit A flag,
	ET - Data Rate Exceeds Threshold, K - Keepalive
	DDE - Data Driven Event, HW - Hardware Installed
	ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB
	MoFRR Primary, RP - MRIB MoFRR Primary, P - MoFRR Primary
	MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
	e – Encap helper tunnel flag.
I/O Item Flags:	IC - Internal Copy, NP - Not platform switched,
	NS - Negate Signalling, SP - Signal Present,

A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward, MA - MFIB Accept, A2 - Accept backup, RA2 - MRIB Accept backup, MA2 - MFIB Accept backup Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second Other counts: Total/RPF failed/Other drops HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps I/O Item Counts: Default (*,224.0.0.0/4) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,224.0.1.40) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 TenGigabitEthernet1/0/2 Flags: A NS Loopback0 Flags: F IC NS Pkts: 0/0/0 Rate: 0 pps (*,225.0.0.101) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 8/0/146/0, Other: 0/0/0 TenGigabitEthernet1/0/2 Flags: A NS TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.3,225.0.0.101) Flags: HW SW Forwarding: 7/0/125/0, Other: 0/0/0 HW Forwarding: 8010/0/176/0, Other: 0/0/0 TenGigabitEthernet1/0/2 Flags: A TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/7 Rate: 0 pps (*,225.0.0.102) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 1/0/172/0, Other: 0/0/0 TenGigabitEthernet1/0/2 Flags: A NS TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.4,225.0.0.102) Flags: HW SW Forwarding: 1/0/154/0, Other: 0/0/0 HW Forwarding: 5353/0/176/0, Other: 0/0/0 TenGigabitEthernet1/0/2 Flags: A TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/1 Rate: 0 pps (172.16.254.6,225.0.0.102) Flags: HW SW Forwarding: 11/0/167/0, Other: 7/6/1 2207/0/151/0, Other: 0/0/0 HW Forwarding: NullO Flags: A TenGigabitEthernet1/0/2 Flags: F Pkts: 0/0/10 Rate: 0 pps (*,232.0.0.0/8) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,239.1.1.1) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 8/0/168/0, Other: 0/0/0 TenGigabitEthernet1/0/2 Flags: A NS TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.4,239.1.1.1) Flags: HW SW Forwarding: 4/0/150/0, Other: 0/0/0 HW Forwarding: 2032/1/168/1, Other: 0/0/0 TenGigabitEthernet1/0/2 Flags: A Tunnel0, VXLAN Decap Flags: F NS Pkts: 0/0/4 Rate: 0 pps (172.16.254.6,239.1.1.1) Flags: HW SW Forwarding: 2/0/150/0, Other: 4/4/0

```
HW Forwarding: 2015/1/156/1, Other: 0/0/0
Null0 Flags: A
TenGigabitEthernet1/0/2 Flags: F
Pkts: 0/0/1 Rate: 0 pps
Border#
```

Return to Verifying TRM with PIM-SM for IPv4 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric, on page 138

Outputs to Verify the Configuration on Spine Switch 1

The following example shows the output for the **show bgp ipv4 mvpn all summary** command on Spine Switch 1:

```
Spine-01# show bgp ipv4 mvpn all summary
BGP router identifier 172.16.255.1, local AS number 65001
BGP table version is 169, main routing table version 169
6 network entries using 1824 bytes of memory
16 path entries using 2176 bytes of memory
3/3 BGP path/bestpath attribute entries using 912 bytes of memory
3 BGP rrinfo entries using 120 bytes of memory
1 BGP community entries using 24 bytes of memory
16 BGP extended community entries using 2332 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
O BGP filter-list cache entries using O bytes of memory
BGP using 7388 total bytes of memory
BGP activity 250/203 prefixes, 2984/2883 paths, scan interval 60 secs
8 networks peaked at 12:20:11 Aug 6 2020 UTC (16:59:40.011 ago)
Neighbor
               57
                            AS Measured Measant Thiller Ind Outo Un/Down State/PfyPeo
```

Nerginot	V	AS	MSGROVA	Msgsent	IDIVEL	τng	outy	0p/Down	State/PIXRCu
172.16.255.2	4	65001	1632	1581	169	0	0	20:28:37	6
172.16.255.3	4	65001	1161	1252	169	0	0	17:17:09	4
172.16.255.4	4	65001	1169	1247	169	0	0	17:14:09	4
172.16.255.6	4	65001	1172	1253	169	0	0	17:20:10	2
Spine-01#									

The following example shows the output for the **show ip pim rp mapping** command on Spine Switch 1:

```
Spine-01# show ip pim rp mapping
PIM Group-to-RP Mappings
```

```
Group(s): 224.0.0.0/4, Static
    RP: 172.16.255.255 (?)
Spine-01#
```

The following example shows the output for the **show bgp ipv4 mvpn all** command on Spine Switch 1:

Network Next Hop Metric LocPrf Weight Path

Route	Distinguisher: 1:1			
* i	[5][1:1][10.1.102.12][226.1.1.1]/18			
	172.16.255.4	0	100	0 ?
*>i	172.16.255.4	0	100	0 ?
* i	[5][1:1][10.2.255.1][226.1.1.1]/18			
	172.16.255.6	0	100	0 ?
*>i	172.16.255.6	0	100	0 ?
* i	[6][1:1][65001][10.2.255.255/32][224.0	.1.40/3	32]/22	
	172.16.255.4	0	100	0 ?
*>i	172.16.255.3	0	100	0 ?
* i	172.16.255.3	0	100	0 ?
*>i	[6][1:1][65001][10.2.255.255/32][226.1	.1.1/32	2]/22	
	172.16.255.3	0	100	0 ?
* i	172.16.255.3	0	100	0 ?
* i	172.16.255.4	0	100	0 ?
*>i	[7][1:1][65001][10.2.255.1/32][226.1.1	.1/32]/	/22	
	172.16.255.3	0	100	0 ?
* i	172.16.255.3	0	100	0 ?
* i	172.16.255.4	0	100	0 ?
Route	Distinguisher: 172.16.254.4:102			
*>i	[7] [172.16.254.4:102] [65001] [10.1.102.2	12/32]	[226.1.1	.1/32]/22
	172.16.255.3	0	100	0 ?
* i	172.16.255.3	0	100	0 ?
* i	172.16.255.6	0	100	0 ?
Spine-	-01#			

The following example shows the output for the **show ip mroute** command on Spine Switch 1:

```
Spine-01# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
       L - Local, P - Pruned, R - RP-bit set, F - Register flag,
      T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
      X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
      U - URD, I - Received Source Specific Host Report,
      Z - Multicast Tunnel, z - MDT-data group sender,
      Y - Joined MDT-data group, y - Sending to MDT-data group,
       G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
      Q - Received BGP S-A Route, q - Sent BGP S-A Route,
      V - RD & Vector, v - Vector, p - PIM Joins on route,
      x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
Interface state: Interface, Next-Hop or VCD, State/Mode
(*, 239.1.1.1), 00:42:45/stopped, RP 172.16.255.255, flags: SP
  Incoming interface: Null, RPF nbr 0.0.0.0
  Outgoing interface list: Null
(172.16.254.6, 239.1.1.1), 00:42:22/00:02:37, flags: PTA
  Incoming interface: GigabitEthernet1/0/4, RPF nbr 172.16.16.6
  Outgoing interface list: Null
(172.16.254.4, 239.1.1.1), 00:42:45/00:02:28, flags: PTA
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.14.4
  Outgoing interface list: Null
(*, 224.0.1.40), 1w0d/00:02:18, RP 172.16.255.255, flags: SJCL
  Incoming interface: Null, RPF nbr 0.0.0.0
  Outgoing interface list:
   Loopback2, Forward/Sparse, 1w0d/00:02:18
```

```
(*, 225.0.0.102), 6d19h/stopped, RP 172.16.255.255, flags: SP
Incoming interface: Null, RPF nbr 0.0.0.0
Outgoing interface list: Null
(172.16.254.6, 225.0.0.102), 05:29:52/00:02:22, flags: PA
Incoming interface: GigabitEthernet1/0/4, RPF nbr 172.16.16.6
Outgoing interface list: Null
(172.16.254.4, 225.0.0.102), 17:12:35/00:02:03, flags: PA
Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.14.4
Outgoing interface list: Null
Spine-01#
```

The following example shows the output for the **show ip mfib** command on Spine Switch 1:

```
Spine-01# show ip mfib
Entry Flags:
               C - Directly Connected, S - Signal, IA - Inherit A flag,
               ET - Data Rate Exceeds Threshold, K - Keepalive
                DDE - Data Driven Event, HW - Hardware Installed
               ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB
               MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
               NS - Negate Signalling, SP - Signal Present,
               A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
                  Total/RPF failed/Other drops
Other counts:
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
Default
 (*,224.0.0.0/4) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 82/82/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
  Loopback2 Flags: F IC NS
     Pkts: 0/0/0
                 Rate: 0 pps
 (*,225.0.0.102) Flags: C HW
  SW Forwarding: 1/0/206/0, Other: 279/0/279
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
 (172.16.254.4,225.0.0.102) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
  GigabitEthernet1/0/2 Flags: NS
 (172.16.254.6,225.0.0.102) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
  GigabitEthernet1/0/4 Flags: NS
 (*,232.0.0.0/8) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,239.1.1.1) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 1/0/1
  HW Forwarding: 0/0/0/0, Other: 0/0/0
```

```
Tunnel1 Flags: A
(172.16.254.4,239.1.1.1) Flags: HW
SW Forwarding: 0/0/0/0, Other: 0/0/0
HW Forwarding: 1224/0/168/0, Other: 0/0/0
GigabitEthernet1/0/2 Flags: A
(172.16.254.6,239.1.1.1) Flags: HW
SW Forwarding: 0/0/0/0, Other: 0/0/0
HW Forwarding: 0/0/0/0, Other: 0/0/0
GigabitEthernet1/0/4 Flags: A NS
Spine-01#
```

Return to Verifying TRM with PIM-SM for IPv4 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric, on page 138

Outputs to Verify the Configuration on Spine Switch 2

The following example shows the output for the **show bgp ipv4 mvpn all summary** command on Spine Switch 2:

Spine-02# show bgp ipv4 mvpn all summary BGP router identifier 172.16.255.2, local AS number 65001 BGP table version is 131, main routing table version 131 6 network entries using 1824 bytes of memory 16 path entries using 2176 bytes of memory 3/3 BGP path/bestpath attribute entries using 912 bytes of memory 3 BGP rrinfo entries using 120 bytes of memory 1 BGP community entries using 24 bytes of memory 16 BGP extended community entries using 2332 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 7388 total bytes of memory BGP activity 283/236 prefixes, 3089/2988 paths, scan interval 60 secs 8 networks peaked at 12:20:59 Aug 6 2020 UTC (17:02:43.558 ago) Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd

 172.16.255.1
 4

 172.16.255.3
 4

 172.16.255.4
 4

 172.16.255.6
 4

 65001
 1584
 1635
 131
 0
 0
 20:31:41
 6

 65001
 1160
 1252
 131
 0
 0
 17:20:09
 4

 65001
 1173
 1249
 131
 0
 0
 17:17:14
 4

 65001
 1172
 1258
 131
 0
 0
 17:23:12
 2

 172.16.255.6 4 0 17:23:12 Spine-02#

The following example shows the output for the **show ip pim rp mapping** command on Spine Switch 2:

```
Spine-02# show ip pim rp mapping
PIM Group-to-RP Mappings
```

Group(s): 224.0.0.0/4, Static
 RP: 172.16.255.255 (?)
Spine-02#

The following example shows the output for the **show bgp ipv4 mvpn all** command on Spine Switch 2:

Origin RPKI N	t secondary path, L long-li n codes: i - IGP, e - EGP, ? - incom validation codes: V valid, I invalid	ved-stale, plete , N Not fo	ound	
1	Jetwork Next Hop	Metric Lo	ocPrf We	ight Path
Route	Distinguisher: 1:1			
* i	[5][1:1][10.1.102.12][226.1.1.1]/18			
	172.16.255.4	0	100	0 ?
*>i	172.16.255.4	0	100	0 ?
* i	[5][1:1][10.2.255.1][226.1.1.1]/18			
	172.16.255.6	0	100	0 ?
*>i	172.16.255.6	0	100	0 ?
* i	[6][1:1][65001][10.2.255.255/32][22	4.0.1.40/3	321/22	
	172.16.255.4	0	100	0 ?
*>i	172.16.255.3	0	100	0 ?
* i	172.16.255.3	0	100	0 ?
*>i	[6][1:1][65001][10.2.255.255/32][22	6.1.1.1/32	21/22	
	172.16.255.3	0	100	0 ?
* i	172.16.255.3	0	100	0 ?
* i	172.16.255.4	0	100	0 ?
*>i	[7][1:1][65001][10.2.255.1/32][226.	1.1.1/321/	2.2	
	172.16.255.3	0	100	0 ?
* i	172.16.255.3	0	100	0 ?
* i	172.16.255.4	0	100	0 ?
Route	Distinguisher: 172.16.254.4:102	-		
*>i	[7][172.16.254.4:102][65001][10.1.1	02.12/321	226.1.1	.1/321/22
	172.16.255.3	0	100	0 ?
* i	172.16.255.3	0	100	0 ?
* i	172.16.255.6	0	100	0 ?
Snine-	-02#	0	± • •	•••

```
Spine-02#
```

The following example shows the output for the **show ip mroute** command on Spine Switch 2:

```
Spine-02# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
       L - Local, P - Pruned, R - RP-bit set, F - Register flag,
       T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
      X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
      U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
      Y - Joined MDT-data group, y - Sending to MDT-data group,
       G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
       V - RD & Vector, v - Vector, p - PIM Joins on route,
      x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
 Interface state: Interface, Next-Hop or VCD, State/Mode
(*, 239.1.1.1), 3d00h/00:03:23, RP 172.16.255.255, flags: S
  Incoming interface: Null, RPF nbr 0.0.0.0
  Outgoing interface list:
    GigabitEthernet1/0/2, Forward/Sparse, 17:17:14/00:03:23
    GigabitEthernet1/0/1, Forward/Sparse, 17:20:16/00:03:17
   GigabitEthernet1/0/4, Forward/Sparse, 17:23:12/00:02:52
(172.16.254.4, 239.1.1.1), 00:44:04/00:01:34, flags: T
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.4
  Outgoing interface list:
    GigabitEthernet1/0/4, Forward/Sparse, 00:44:04/00:02:52
```

GigabitEthernet1/0/1, Forward/Sparse, 00:44:04/00:03:17 (172.16.254.6, 239.1.1.1), 00:44:04/00:01:32, flags: T Incoming interface: GigabitEthernet1/0/4, RPF nbr 172.16.26.6 Outgoing interface list: GigabitEthernet1/0/1, Forward/Sparse, 00:44:04/00:03:17 GigabitEthernet1/0/2, Forward/Sparse, 00:44:04/00:03:23 (*, 224.0.1.40), 1w0d/00:03:22, RP 172.16.255.255, flags: SJCL Incoming interface: Null, RPF nbr 0.0.0.0 Outgoing interface list: GigabitEthernet1/0/2, Forward/Sparse, 17:17:14/00:02:46 GigabitEthernet1/0/1, Forward/Sparse, 17:20:16/00:03:22 GigabitEthernet1/0/4, Forward/Sparse, 17:23:12/00:03:13 Loopback2, Forward/Sparse, 1w0d/00:02:33 (*, 225.0.0.102), 1w0d/00:03:29, RP 172.16.255.255, flags: S Incoming interface: Null, RPF nbr 0.0.0.0 Outgoing interface list: GigabitEthernet1/0/2, Forward/Sparse, 17:17:14/00:03:04 GigabitEthernet1/0/1, Forward/Sparse, 17:20:16/00:03:29 GigabitEthernet1/0/4, Forward/Sparse, 17:23:12/00:02:36 (172.16.254.4, 225.0.0.102), 17:17:08/00:02:44, flags: MT Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.4 Outgoing interface list: GigabitEthernet1/0/4, Forward/Sparse, 17:17:08/00:02:37 GigabitEthernet1/0/1, Forward/Sparse, 17:17:08/00:03:29 (172.16.254.6, 225.0.0.102), 17:23:14/00:03:21, flags: MT Incoming interface: GigabitEthernet1/0/4, RPF nbr 172.16.26.6 Outgoing interface list: GigabitEthernet1/0/2, Forward/Sparse, 17:17:14/00:03:04 GigabitEthernet1/0/1, Forward/Sparse, 17:20:16/00:03:29 (*, 225.0.0.101), 3d00h/00:03:10, RP 172.16.255.255, flags: S Incoming interface: Null, RPF nbr 0.0.0.0 Outgoing interface list: GigabitEthernet1/0/2, Forward/Sparse, 17:17:14/00:03:01 GigabitEthernet1/0/1, Forward/Sparse, 17:20:16/00:03:10 GigabitEthernet1/0/4, Forward/Sparse, 17:23:12/00:02:40 (172.16.254.3, 225.0.0.101), 17:19:56/00:02:53, flags: TA Incoming interface: GigabitEthernet1/0/1, RPF nbr 172.16.23.3 Outgoing interface list: GigabitEthernet1/0/2, Forward/Sparse, 17:17:14/00:03:01 GigabitEthernet1/0/4, Forward/Sparse, 17:19:56/00:03:02 Spine-02#

The following example shows the output for the **show ip mfib** command on Spine Switch 2:

```
Spine-02# show ip mfib
Entry Flags: C - Directly Connected, S - Signal, IA - Inherit A flag,
ET - Data Rate Exceeds Threshold, K - Keepalive
DDE - Data Driven Event, HW - Hardware Installed
ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB
MoFRR Primary, RP - MRIB MOFRR Primary, P - MoFRR Primary
MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
NS - Negate Signalling, SP - Signal Present,
A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
MA - MFIB Accept, A2 - Accept backup,
```

RA2 - MRIB Accept backup, MA2 - MFIB Accept backup Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second Other counts: Total/RPF failed/Other drops I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps Default (*,224.0.0.0/4) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,224.0.1.40) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 Tunnell Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/4 Flags: F NS Pkts: 0/0/0 Rate: 0 pps Loopback2 Flags: F IC NS Pkts: 0/0/0 Rate: 0 pps (*,225.0.0.101) Flags: C HW SW Forwarding: 9/0/112/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 Tunnell Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/2 Rate: 0 pps GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/4 Flags: F NS Pkts: 0/0/2 Rate: 0 pps (172.16.254.3,225.0.0.101) Flags: HW SW Forwarding: 4/0/132/0, Other: 0/0/0 8067/0/176/0, Other: 0/0/0 HW Forwarding: GigabitEthernet1/0/1 Flags: A GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/4 Flags: F NS Pkts: 0/0/4 Rate: 0 pps (*,225.0.0.102) Flags: C HW SW Forwarding: 27/0/101/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 Tunnell Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/2 Flags: F NS Rate: 0 pps Pkts: 0/0/0 GigabitEthernet1/0/4 Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.4,225.0.0.102) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 5404/0/176/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A GigabitEthernet1/0/1 Flags: F NS Rate: 0 pps Pkts: 0/0/0 GigabitEthernet1/0/4 Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.6,225.0.0.102) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 2214/0/163/0, Other: 0/0/0 GigabitEthernet1/0/4 Flags: A NS GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/2 Flags: F NS

Pkts: 0/0/0 Rate: 0 pps (*,232.0.0.0/8) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,239.1.1.1) Flags: C HW SW Forwarding: 9/0/150/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 Tunnell Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/3 Rate: 0 pps GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/3 Rate: 0 pps GigabitEthernet1/0/4 Flags: F NS Pkts: 0/0/3 Rate: 0 pps (172.16.254.4,239.1.1.1) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0HW Forwarding: 2629/1/168/1, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/4 Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.6,239.1.1.1) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 2607/1/168/1, Other: 0/0/0 GigabitEthernet1/0/4 Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/0 Rate: 0 pps Spine-02#

Return to Verifying TRM with PIM-SM for IPv4 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric, on page 138

Outputs to Verify the Configuration on Router 3 (RP Outside the BGP EVPN VXLAN Fabric)

The following example shows the output for the **show ip pim rp mapping** command on Router 3:

```
R3# show ip pim rp mapping
PIM Group-to-RP Mappings
Group(s): 224.0.0.0/4, Static
    RP: 10.2.255.255 (?)
R3#
```

The following example shows the output for the **show ip mroute** command on Router 3:

```
R3# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
L - Local, P - Pruned, R - RP-bit set, F - Register flag,
T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
U - URD, I - Received Source Specific Host Report,
Z - Multicast Tunnel, z - MDT-data group sender,
Y - Joined MDT-data group, y - Sending to MDT-data group,
G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
Q - Received BGP S-A Route, q - Sent BGP S-A Route,
V - RD & Vector, v - Vector, p - PIM Joins on route,
```

```
x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
 Timers: Uptime/Expires
 Interface state: Interface, Next-Hop or VCD, State/Mode
(*, 226.1.1.1), 2d19h/00:03:17, RP 10.2.255.255, flags: S
  Incoming interface: Null, RPF nbr 0.0.0.0
  Outgoing interface list:
    TenGigabitEthernet0/0/0, Forward/Sparse, 17:10:20/00:03:17
   TenGigabitEthernet0/0/1, Forward/Sparse, 2d16h/00:03:11
(10.2.255.1, 226.1.1.1), 00:37:40/00:02:14, flags: PJT
  Incoming interface: TenGigabitEthernet0/0/0, RPF nbr 10.2.13.1
  Outgoing interface list: Null
(10.1.102.12, 226.1.1.1), 00:38:05/00:02:58, flags: P
  Incoming interface: TenGigabitEthernet0/0/0, RPF nbr 10.2.13.1
  Outgoing interface list: Null
(*, 224.0.1.40), 2d23h/00:03:27, RP 10.2.255.255, flags: SJCL
  Incoming interface: Null, RPF nbr 0.0.0.0
  Outgoing interface list:
    Loopback0, Forward/Sparse, 2d23h/00:02:11
   TenGigabitEthernet0/0/1, Forward/Sparse, 2d19h/00:03:26
    TenGigabitEthernet0/0/0, Forward/Sparse, 2d19h/00:03:27
R3#
```

Return to Verifying TRM with PIM-SM for IPv4 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric, on page 138

Example: Configuring TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric

This example shows how to configure and verify Layer 3 TRM with PIM-SM for IPv4 and IPv6 multicast traffic when the RP is outside the BGP EVPN VXLAN fabric. The example uses the topology in the Figure 11: TRM with PIM-SM when the RP is Outside the BGP EVPN VXLAN Fabric, on page 132 figure.

The topology shows an EVPN VXLAN network, with two spine switches and three VTEPs, connected to an external network with three routers. Router 3 in the external network acts as the RP in this topology and Border VTEP connects the fabric to the external network through Router 1. The IPv4 multicast group is 226.1.1.1 and the IPv6 multicast group is FF06:1::1 in this topology. The following tables provide sample configurations for the devices in this topology:

Table 12: Configuring VTEP 1, Border VTEP, and VTEP 2 to Configure TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric

VTEP 1	Border VTEP	VTEP 2
Leaf-01# show running-config hostname Leaf-01 ! vrf definition green rd 1:1	Border # show running-config hostname Border ! vrf definition green rd 1:1	Leaf-02 # show running-config hostname Leaf-02 ! vrf definition green rd 1:1
<pre>! address-family ipv4 mdt auto-discovery vxlan mdt default vxlan 239.1.1.1 mdt overlay use-bgp route-target export 1:1 route-target import 1:1 stitching route-target import 1:1 stitching exit-address-family ! address-family ipv6 mdt auto-discovery vxlan mdt default vxlan 239.1.1.1 mdt overlay use-bgp route-target export 1:1 route-target import 1:1 route-target import 1:1 stitching route-target import 1:1 route-target import 1:1</pre>	<pre>! address-family ipv4 mdt auto-discovery vxlan mdt default vxlan 239.1.1.1 mdt overlay use-bgp route-target export 1:1 route-target import 1:1 stitching route-target import 1:1 stitching exit-address-family ! address-family ipv6 mdt auto-discovery vxlan mdt default vxlan 239.1.1.1 mdt overlay use-bgp route-target export 1:1 route-target import 1:1 route-target import 1:1 stitching route-target import 1:1 route-target import 1:1</pre>	<pre>! address-family ipv4 mdt auto-discovery vxlan mdt default vxlan 239.1.1.1 mdt overlay use-bgp route-target export 1:1 route-target export 1:1 stitching route-target import 1:1 stitching exit-address-family ! address-family ipv6 mdt auto-discovery vxlan mdt default vxlan 239.1.1.1 mdt overlay use-bgp route-target export 1:1 route-target import 1:1 route-targe</pre>
<pre>exit-address-family ! ip routing ! </pre>	<pre>exit-address-family ! ip routing ! </pre>	<pre>exit-address-family ! ip routing ! </pre>
<pre>ip multicast fouring vrf green ! ipv6 unicast-routing ipv6 multicast-routing vrf green !</pre>	<pre>ip multicast routing vrf green ! ipv6 unicast-routing ipv6 multicast-routing vrf green !</pre>	<pre>ip multicast fouring vrf green ! ipv6 unicast-routing ipv6 multicast-routing vrf green !</pre>
12vpn evpn replication-type static router-id Loopback1 default-gateway advertise !	12vpn evpn replication-type static router-id Loopback1 default-gateway advertise !	12vpn evpn replication-type static router-id Loopback1 default-gateway advertise !
<pre>l2vpn evpn instance 101 vlan-based encapsulation vxlan ! l2vpn evpn instance 102 vlan-based encapsulation vxlan</pre>	12vpn evpn instance 101 vlan-based encapsulation vxlan ! 12vpn evpn instance 102 vlan-based encapsulation vxlan	<pre>l2vpn evpn instance 101 vlan-based encapsulation vxlan ! l2vpn evpn instance 102 vlan-based encapsulation vxlan</pre>
: system mtu 9198 ! vlan configuration 101 member evpn-instance 101 vni 10101 vlan configuration 102 member evpn-instance 102 vni 10102 vlan configuration 901 member vni 50901	: system mtu 9198 ! vlan configuration 101 member evpn-instance 101 vni 10101 vlan configuration 102 member evpn-instance 102 vni 10102 vlan configuration 901 member vni 50901 !	: system mtu 9198 ! vlan configuration 101 member evpn-instance 101 vni 10101 vlan configuration 102 member evpn-instance 102 vni 10102 vlan configuration 901 member vni 50901 !

VTEP 1	Border VTEP	VTEP 2
! interface Loopback0	vlan 2001	interface Loophack0
in address 172 16 255 3	: interface Iconhack0	in address 172 16 255 4
255 255 255 255	in address 172 16 255 6	1p address 1/2.10.200.4
in nim sparse-mode	255 255 255 255	in nim sparse-mode
ip ospf 1 area 0	ip pim sparse-mode	ip ospf 1 area 0
i	ip ospf 1 area 0	
interface Loopback1	1	interface Loopback1
ip address 172.16.254.3	interface Loopback1	ip address 172.16.254.4
255.255.255.255	ip address 172.16.254.6	255.255.255.255
ip pim sparse-mode	255.255.255.255	ip pim sparse-mode
ip ospf 1 area 0	ip pim sparse-mode	ip ospf 1 area 0
!	ip ospf 1 area 0	!
interface Loopback901	!	interface Loopback901
vrf forwarding green	interface Loopback901	vrf forwarding green
ip address 10.1.255.1 255.255.255.255	vrf forwarding green	ip address 10.1.255.2 255.255.255.255
ip pim sparse-mode	ip address 10.1.255.4 255.255.255.255	ip pim sparse-mode
ipv6 address FC00:1:255::1/128	ip pim sparse-mode	ipv6 address FC00:1:255::2/128
ipv6 enable	ipv6 address FC00:1:255::4/128	ipv6 enable
!	ipv6 enable	!
interface GigabitEthernet1/0/1	!	interface GigabitEthernet1/0/1
no switchport	interface TenGigabitEthernet1/0/1	no switchport
ip address 172.16.13.3 255.255.255.0	no switchport	ip address 172.16.14.4 255.255.255.0
ip pim sparse-mode	ip address 172.16.16.6 255.255.255.0	ip pim sparse-mode
ip ospi network point-to-point	ip pim sparse-mode	ip ospi network point-to-point
ip ospi 1 area 0	ip ospi network point-to-point	ip ospi 1 area 0
	ip ospi 1 area U	!
interface GigabitEthernet1/0/2	!	interface GigabitEthernet1/0/2
in address 172 16 23 3 255 255 255 0	no switchport	no Switchport
ip pim sparse-mode	in address 172 16 26 6 255 255 255 0	ip nim sparse_mode
ip ospf network point-to-point	ip pim sparse-mode	ip ospf network point-to-point
in ospf 1 area 0	ip ospf network point-to-point	ip ospf 1 area 0
	ip ospf 1 area 0	
interface GigabitEthernet1/0/10	i ib oobi i aica o	interface GigabitEthernet1/0/10
switchport access vlan 101	interface TenGigabitEthernet1/0/5	switchport access vlan 101
switchport mode access	switchport trunk allowed vlan 2001	switchport mode access
!	switchport mode trunk	!
interface Vlan101	!	interface Vlan101
vrf forwarding green	interface TenGigabitEthernet1/0/10	vrf forwarding green
ip address 10.1.101.1 255.255.255.0	switchport access vlan 102	ip address 10.1.101.1 255.255.255.0
ip pim sparse-mode	switchport mode access	ip pim sparse-mode
ipv6 address FC00:1:101::1/64	!	ipv6 address FC00:1:101::1/64
ipv6 enable	interface Vlan101	ipv6 enable
!	vrf forwarding green	!
interface Vlan102	ip address 10.1.101.1 255.255.255.0	interface Vlan102
vrf forwarding green	ip pim sparse-mode	vrf forwarding green
ip address 10.1.102.1 255.255.255.0	ipv6 address FC00:1:101::1/64	ip address 10.1.102.1 255.255.255.0
ip pim sparse-mode	ipv6 enable	ip pim sparse-mode
ipv6 address FC00:1:102::1/64	!	ipv6 address FC00:1:102::1/64
ipv6 enable	interface Vlan102	ipv6 enable
	vri forwarding green	
interface Vian901	1p address 10.1.102.1 255.255.255.0	interface Vlan901
vri forwarding green	ip pim sparse-mode	vri forwarding green
ip unnumbered Loopbackl	ipvo address FCUU:1:1U2::1/64	ip unnumbered Loopbackl
⊥p pim sparse-mode	ipvo enabie	ip pim sparse-mode
The shreet ste	•	The antostate
		Ino autostate
•		·

VTEP 1	Border VTEP	VTEP 2
interface nvel	interface Vlan901	interface nvel
no ip address	vrf forwarding green	no ip address
source-interface Loopback1	ip unnumbered Loopback1	source-interface Loopback1
host-reachability protocol bgp	ip pim sparse-mode	host-reachability protocol bgp
member vni 10101 mcast-group	ipv6 enable	member vni 10101 mcast-group
225.0.0.101	no autostate	225.0.0.101
member vii 50901 vii green	: interface Mlan2001	member vni 50901 vii green
225 0 0 102	urf forwarding green	225 0 0 102
1	in address 10 2 1 1 255 255 255 0	1
router ospf 1	ip mtu 1500	router ospf 1
router-id 172.16.255.3	ip pim sparse-mode	router-id 172.16.255.4
!	ip ospf network point-to-point	!
router bgp 65001	ip ospf 2 area 0	router bgp 65001
bgp log-neighbor-changes	ipv6 address FC00:2:1::1/64	bgp log-neighbor-changes
no bgp default ipv4-unicast	ipv6 enable	no bgp default ipv4-unicast
neighbor 172.16.255.1 remote-as 65001	ipv6 mtu 1500	neighbor 172.16.255.1 remote-as 65001
neighbor 172.16.255.1 update-source	ospfv3 network point-to-point	neighbor 172.16.255.1 update-source
Loopback0	ospfv3 1 ipv6 area 0	Loopback0
neighbor 172.16.255.2 remote-as 65001	!	neighbor 172.16.255.2 remote-as 65001
neighbor 172.16.255.2 update-source	interface nvel	neighbor 172.16.255.2 update-source
Loopback0	no ip address	Loopback0
!	source-interface Loopback1	!
address-family ipv4	host-reachability protocol bgp	address-family ipv4
redistribute connected	member vni 10101 mcast-group	redistribute connected
redistribute static	225.U.U.IUI	redistribute static
exit-address-ramity	member vni 50901 vii green	exit-address-ramity
: address_family inv/ myon	225 0 0 102	: address=family inv/ mynn
neighbor 172.16.255.1 activate	1	neighbor 172.16.255.1 activate
neighbor 172.16.255.1 send-community	router ospfv3 1	neighbor 172.16.255.1 send-community
both	!	both
neighbor 172.16.255.2 activate	address-family ipv6 unicast vrf green	neighbor 172.16.255.2 activate
neighbor 172.16.255.2 send-community	redistribute bgp 65001	neighbor 172.16.255.2 send-community
both	exit-address-family	both
exit-address-family	!	exit-address-family
!	router ospf 2 vrf green	!
address-family ipv6 mvpn	redistribute bgp 65001	address-family ipv6 mvpn
neighbor 172.16.255.1 activate	!	neighbor 172.16.255.1 activate
neighbor 172.16.255.1 send-community	router ospf 1	neighbor 172.16.255.1 send-community
both	router-id 172.16.255.6	both
neighbor 172.16.255.2 activate	!	neighbor 172.16.255.2 activate
heighbor 1/2.16.255.2 send-community	router bgp 65001	heighbor 1/2.16.255.2 send-community
Doun ovit-addross-family	bgp log-neighbor-changes	DOUN owit-addross-family
	no byp default ipv4-dificast	
address-family 12vpn evpn	neighbor 172 16 255 1 undate-source	address-family 12vpn evpn
neighbor 172.16.255.1 activate	Loopback()	neighbor 172.16.255.1 activate
neighbor 172.16.255.1 send-community	neighbor 172.16.255.2 remote-as 65001	neighbor 172.16.255.1 send-community
both	neighbor 172.16.255.2 update-source	both
neighbor 172.16.255.2 activate	Loopback0	neighbor 172.16.255.2 activate
neighbor 172.16.255.2 send-community		neighbor 172.16.255.2 send-community
both		both
exit-address-family		exit-address-family
!		!

Table 13: Configuring Spine Switch 1 and Spine Switch 2 to Configure TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric

Spine Switch 1	Spine Switch 2

Spine Switch 1	Spine Switch 2
Spine-01# show running-config	Spine-02# show running-config
hostname Spine-01	hostname Spine-02
!	!
ip routing	ip routing
!	!
ip multicast-routing	ip multicast-routing
!	!
system mtu 9198	system mtu 9198
interface Loopback0	interface Loopback0
ip address 172.16.255.1 255.255.255.255	ip address 172.16.255.2 255.255.255.255
ip ospf 1 area 0	ip ospf 1 area 0
interiace Loopbacki	Interiace Loopbacki
1p address 1/2.16.254.1 255.255.255.255	1p address 1/2.16.254.2 255.255.255.255
ip ospi i area U	ip ospi i area U
interiace Loopback2	Interiace Loopback2
1p address 172.10.255.255 255.255.255.255	ip address 172.16.255.255 255.255.255.255
ip pim sparse-mode	ip pin sparse-mode
ip ospi i area U	ip ospi i area U
: :=================================	isterfere CischitEthernet1/0/1
Interiace GigabitEthernet1/0/1	Interiace GigabitEtherneti/0/1
no switchport	no switchport
1p address 1/2.10.13.1 255.255.255.0	ip address 172.16.23.2 255.255.255.0
ip pim sparse-mode	ip pim sparse-mode
ip ospi network point-to-point	ip ospi network point-to-point
ip ospi i area u	
: interface CigabitEthernet1/0/2	: interface GigabitEthernet1/0/2
no switchport	no switchport
in address 172 16 14 1 255 255 255 0	in address 172 16 24 2 255 255 255 0
ip nim sparse-mode	in nim sparse-mode
ip ospf network point-to-point	in ospf network point-to-point
ip ospi necesi poine co poine	in osnf 1 area 0
interface GigabitEthernet1/0/4	interface GigabitEthernet1/0/4
no switchport	no switchport
ip address 172.16.16.1 255.255.255.0	ip address 172.16.26.2 255.255.255.0
ip pim sparse-mode	ip pim sparse-mode
ip ospf network point-to-point	ip ospf network point-to-point
ip ospf 1 area 0	ip ospf 1 area 0
!	!
router ospf 1	router ospf 1
router-id 172.16.255.1	router-id 172.16.255.2
!	!
router bgp 65001	router bgp 65001
bgp router-id 172.16.255.1	bgp router-id 172.16.255.2
bgp log-neighbor-changes	bgp log-neighbor-changes
no bgp default ipv4-unicast	no bgp default ipv4-unicast
neighbor 172.16.255.2 remote-as 65001	neighbor 172.16.255.1 remote-as 65001
neighbor 172.16.255.2 update-source Loopback0	neighbor 172.16.255.1 update-source Loopback0
neighbor 172.16.255.3 remote-as 65001	neighbor 172.16.255.3 remote-as 65001
neighbor 172.16.255.3 update-source Loopback0	neighbor 172.16.255.3 update-source Loopback0
neighbor 172.16.255.4 remote-as 65001	neighbor 172.16.255.4 remote-as 65001
neighbor 172.16.255.4 update-source Loopback0	neighbor 172.16.255.4 update-source Loopback0
neighbor 172.16.255.6 remote-as 65001	neighbor 172.16.255.6 remote-as 65001
neighbor 172.16.255.6 update-source Loopback0	neighbor 172.16.255.6 update-source Loopback0
!	!
address-family ipv4	address-family ipv4
exit-address-family	exit-address-family
!	!

Spine Switch 1	Spine Switch 2
address-family ipv4 mvpn	address-family ipv4 mvpn
neighbor 172.16.255.2 activate	neighbor 172.16.255.1 activate
neighbor 172.16.255.2 send-community both	neighbor 172.16.255.1 send-community both
neighbor 172.16.255.2 route-reflector-client	neighbor 172.16.255.1 route-reflector-client
neighbor 172.16.255.3 activate	neighbor 172.16.255.3 activate
neighbor 172.16.255.3 send-community both	neighbor 172.16.255.3 send-community both
neighbor 172.16.255.3 route-reflector-client	neighbor 172.16.255.3 route-reflector-client
neighbor 172.16.255.4 activate	neighbor 172.16.255.4 activate
neighbor 172.16.255.4 send-community both	neighbor 172.16.255.4 send-community both
neighbor 172.16.255.4 route-reflector-client	neighbor 172.16.255.4 route-reflector-client
neighbor 172.16.255.6 activate	neighbor 172.16.255.6 activate
neighbor 172.16.255.6 send-community both	neighbor 172.16.255.6 send-community both
neighbor 172.16.255.6 route-reflector-client	neighbor 172.16.255.6 route-reflector-client
exit-address-family !	exit-address-family !
address-family ipv6 mvpn	address-family ipv6 mvpn
neighbor 172.16.255.2 activate	neighbor 172.16.255.1 activate
neighbor 172.16.255.2 send-community both	neighbor 172.16.255.1 send-community both
neighbor 172.16.255.2 route-reflector-client	neighbor 172.16.255.1 route-reflector-client
neighbor 172.16.255.3 activate	neighbor 172.16.255.3 activate
neighbor 172.16.255.3 send-community both	neighbor 172.16.255.3 send-community both
neighbor 172.16.255.3 route-reflector-client	neighbor 172.16.255.3 route-reflector-client
neighbor 172.16.255.4 activate	neighbor 172.16.255.4 activate
neighbor 172.16.255.4 send-community both	neighbor 172.16.255.4 send-community both
neighbor 172.16.255.4 route-reflector-client	neighbor 172.16.255.4 route-reflector-client
neighbor 172.16.255.6 activate	neighbor 172.16.255.6 activate
neighbor 172.16.255.6 send-community both	neighbor 172.16.255.6 send-community both
neighbor 172.16.255.6 route-reflector-client	neighbor 172.16.255.6 route-reflector-client
exit-address-family !	exit-address-family !
address-family 12vpn evpn	address-family 12vpn evpn
neighbor 172.16.255.2 activate	neighbor 172.16.255.1 activate
neighbor 172.16.255.2 send-community both	neighbor 172.16.255.1 send-community both
neighbor 172.16.255.2 route-reflector-client	neighbor 172.16.255.1 route-reflector-client
neighbor 172.16.255.3 activate	neighbor 172.16.255.3 activate
neighbor 172.16.255.3 send-community both	neighbor 172.16.255.3 send-community both
neighbor 172.16.255.3 route-reflector-client	neighbor 172.16.255.3 route-reflector-client
neighbor 172.16.255.4 activate	neighbor 172.16.255.4 activate
neighbor 172.16.255.4 send-community both	neighbor 172.16.255.4 send-community both
neighbor 172.16.255.4 route-reflector-client	neighbor 172.16.255.4 route-reflector-client
neighbor 172.16.255.6 activate	neighbor 172.16.255.6 activate
neighbor 172.16.255.6 send-community both	neighbor 172.16.255.6 send-community both
neighbor 172.16.255.6 route-reflector-client	neighbor 172.16.255.6 route-reflector-client
exit-address-family !	exit-address-family !
ip pim rp-address 172.16.255.255	ip pim rp-address 172.16.255.255
ip pim ssm default	ip pim ssm default
ip msdp peer 172.16.254.2 connect-source Loopback1	ip msdp peer 172.16.254.1 connect-source Loopback1
remote-as 65001	remote-as 65001
ip msdp cache-sa-state	ip msdp cache-sa-state
!	!
end	end
!	1
Spine-01#	Spine-02#

Table 14: Configuring Router 1, Router 2, and Router 3 to Configure TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric

Router 1	Router 2	Router 3
R1# show running-config hostname R1	R2# show running-config hostname R2	R3# show running-config hostname R3
! ip multicast-routing distributed !	: ip multicast-routing distributed !	: ip multicast-routing distributed !
ipv6 unicast-routing	ipv6 unicast-routing	ipv6 unicast-routing
ipv6 multicast-routing !	ipv6 multicast-routing !	ipv6 multicast-routing !
interface Loopback0 ip address 10.2.255.1 255.255.255.255	interface Loopback0 ip address 10.2.255.2 255.255.255.255	interface Loopback0 ip address 10.2.255.3 255.255.255.255
ip pim sparse-mode ip ospf 1 area 0	ip pim sparse-mode ip igmp join-group 226.1.1.1	ip pim sparse-mode ip ospf 1 area 0
ipv6 address FC00:2:255::1/128 ipv6 enable	ip ospf 1 area 0 ipv6 address FC00:2:255::2/128	ipv6 address FC00:2:255::3/128
ospfv3 1 ipv6 area 0	ipv6 enable	ospfv3 1 ipv6 area 0
interface TenGigabitEthernet0/0/0 in address 10 2 12 1 255 255 0	ospfv3 1 ipv6 area 0	interface Loopback255
ip pim sparse-mode	interface TenGigabitEthernet0/0/0	255.255.255.255
ip ospf network point-to-point	ip address 10.2.12.2 255.255.255.0	ip pim sparse-mode
cdp enable	ip pim sparse-mode ip ospf network point-to-point	ipv6 address FC00:2:255::255/128
ipv6 address FC00:2:12::1/64	ip ospf 1 area 0	ipv6 enable
ipv6 enable	cdp enable	ospfv3 1 ipv6 area 0
ospfv3 network point-to-point	ipv6 address FC00:2:12::2/64	!
ospfv3 1 ipv6 area 0 !	ipv6 enable ospfv3 network point-to-point	interface TenGigabitEthernet0/0/0 ip address 10.2.13.3 255.255.255.0
interface TenGigabitEthernet0/0/1	ospfv3 1 ipv6 area 0	ip pim sparse-mode
ip address 10.2.13.1 255.255.255.0	!	ip ospf network point-to-point
ip pim sparse-mode	interface TenGigabitEthernet0/0/1	ip ospf 1 area 0
ip ospf network point-to-point	ip address 10.2.23.2 255.255.255.0	cdp enable
ip ospf 1 area 0	ip pim sparse-mode	ipv6 address FC00:2:13::3/64
cdp enable	ip ospi network point-to-point	ipv6 enable
ipv6 address FCUU:2:13::1/64	ip ospi i area U	ospiv3 network point-to-point
ipvo enable	cup enable	USPIVS I IPVO area U
ospfv3 1 ipv6 area 0	ipv6 enable	: interface TenGigabitEthernet0/0/1
	ospfy3 network point-to-point	in address 10 2 23 3 255 255 255 0
interface GigabitEthernet0/0/1.2001	ospfv3 1 ipv6 area 0	ip pim sparse-mode
encapsulation dot10 2001	!	ip ospf network point-to-point
ip address 10.2.1.2 255.255.255.0	router ospfv3 1	ip ospf 1 area 0
ip pim sparse-mode	!	cdp enable
ip ospf network point-to-point	address-family ipv6 unicast	ipv6 address FC00:2:23::3/64
ip ospf 1 area 0	exit-address-family	ipv6 enable
ipv6 address FC00:2:1::2/64	!	ospfv3 network point-to-point
ipv6 enable	router ospf 1	ospfv3 1 ipv6 area 0
ospfv3 network point-to-point	router-id 10.2.255.2	!
ospiv3 1 ipv6 area 0		router ospfv3 1
		!

Router 1	Router 2	Router 3
<pre>! router ospfv3 1 ! address-family ipv6 unicast exit-address-family ! router ospf 1 router-id 10.2.255.1 ! ip pim rp-address 10.2.255.255 ! ipv6 pim rp-address FC00:2:255::255 ! end ! R1#</pre>	! ip pim rp-address 10.2.255.255 ! ipv6 pim rp-address FC00:2:255::255 ! end ! R2#	<pre>address-family ipv6 unicast exit-address-family ! router ospf 1 router-id 10.2.255.3 ! ip pim rp-address 10.2.255.255 ! ipv6 pim rp-address FC00:2:255::255 ! end ! R3#</pre>

Verifying TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric

The following sections provide sample outputs for **show** commands to verify TRM with PIM-SM on the devices in the topology configured above:

- Outputs to Verify the Configuration on VTEP 1, on page 172
- Outputs to Verify the Configuration on VTEP 2, on page 180
- Outputs to Verify the Configuration on Border VTEP, on page 187
- Outputs to Verify the Configuration on Spine Switch 1, on page 195
- Outputs to Verify the Configuration on Spine Switch 2, on page 198
- Outputs to Verify the Configuration on Router 3 (RP Outside the BGP EVPN VXLAN Fabric), on page 202

Outputs to Verify the Configuration on VTEP 1

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

Leaf-01# s	show nve	peers						
Interface	VNI	Type	Peer-IP	RMAC/Num RTs	eVNI	state	flags	UP time
nve1	50901	L3CP	172.16.254.6	0c75.bd67.ef48	50901	UP	A/-/4	1d01h
nve1	50901	L3CP	172.16.254.4	7c21.0dbd.9548	50901	UP	A/-/4	1d01h
nve1	50901	L3CP	172.16.254.6	0c75.bd67.ef48	50901	UP	A/M/6	1d01h
nve1	50901	L3CP	172.16.254.4	7c21.0dbd.9548	50901	UP	A/M/6	1d01h
nve1	10102	L2CP	172.16.254.4	7	10102	UP	N/A	1d00h
nvel	10102	L2CP	172.16.254.6	5	10102	UP	N/A	1d01h
Leaf-01#								

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

```
Leaf-01# show 12vpn evpn peers vxlan
Interface VNI Peer-IP Num
```

 nvel
 10102
 172.16.254.4
 7
 10102
 1d00h

 nvel
 10102
 172.16.254.6
 5
 10102
 1d01h

 Leaf-01#
 Leaf-01#
 1000
 1000
 1000
 1000
 1000

The following example shows the output for the **show bgp ipv6 mvpn all summary** command on VTEP 1:

```
Leaf-01# show bgp ipv6 mvpn all summary
BGP router identifier 172.16.255.3, local AS number 65001
BGP table version is 43, main routing table version 43
5 network entries using 1960 bytes of memory
7 path entries using 1120 bytes of memory
3/3 BGP path/bestpath attribute entries using 936 bytes of memory
4 BGP rrinfo entries using 160 bytes of memory
1 BGP community entries using 24 bytes of memory
17 BGP extended community entries using 2372 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 6572 total bytes of memory
BGP activity 124/30 prefixes, 253/123 paths, scan interval 60 secs
5 networks peaked at 15:46:09 Aug 6 2020 UTC (21:27:07.275 ago)
Noighbor
               57
                           As MacRoud MacSont Thillor In Outo Un Down State /DfyPac
```

Nerginoor	V	AS	MSGREVa	Msgsenic	IDIVEL	τng	Outy	0p/Down	State/PIXRCu
172.16.255.1	4	65001	1796	1688	43	0	0	1d01h	2
172.16.255.2	4	65001	1795	1685	43	0	0	1d01h	2
Leaf-01#									

The following example shows the output for the **show ipv6 pim vrf** *vrf-name* **group-map** command on VTEP 1:

```
Leaf-01# show ip pim vrf green group-map ff06:1::1
IP PIM Group Mapping Table
(* indicates group mappings being used)
FF00::/8*
   SM, RP: FC00:2:255::255
   RPF: V1901,::FFFF:172.16.254.6
   Info source: Static
   Uptime: 21:43:02, Groups: 1
Leaf-01#
```

The following example shows the output for the **show ipv6 routing vrf** command on VTEP 1:

```
Leaf-01# show ipv6 routing vrf green FC00:2:255::255
Routing entry for FC00:2:255::255/128
Known via "bgp 65001", distance 200, metric 2, type internal
Route count is 1/1, share count 0
Routing paths:
    172.16.254.6%default, Vlan901%default
    From AC10:FF01::
    opaque_ptr 0x7FBB863DE268
    Last updated 1d00h ago
Leaf-01#
```

The following example shows the output for the **show ipv6 mld vrf** *vrf-name* **groups** command on VTEP 1:

```
Leaf-01# show ipv6 mld vrf green groups

MLD Connected Group Membership

Group Address Interface

Uptime Expires

FF06:1::1 Vlan101

21:30:55 00:03:57

Leaf-01#
```

The following example shows the output for the **show ipv6 mroute vrf** *vrf-name* command on VTEP 1:

```
Leaf-01# show ipv6 mroute vrf green
Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group,
      C - Connected, L - Local, I - Received Source Specific Host Report,
       P - Pruned, R - RP-bit set, F - Register flag, T - SPT-bit set,
       J - Join SPT, Y - Joined MDT-data group,
       y - Sending to MDT-data group
       g - BGP signal originated, G - BGP Signal received,
      N - BGP Shared-Tree Prune received, n - BGP C-Mroute suppressed,
      q - BGP Src-Active originated, Q - BGP Src-Active received
      E - Extranet
Timers: Uptime/Expires
Interface state: Interface, State
(*, FF06:1::1), 21:30:55/00:03:08, RP FC00:2:255::255, flags: SCJg
  Incoming interface: Vlan901
  RPF nbr: ::FFFF:172.16.254.6
  Immediate Outgoing interface list:
   Vlan101, Forward, 21:30:55/00:03:08
(FC00:1:102::12, FF06:1::1), 00:01:55/00:01:34, flags: SJTgQ
  Incoming interface: Vlan901
  RPF nbr: ::FFFF:172.16.254.4
  Immediate Outgoing interface list:
   Vlan101, Forward, 00:01:55/00:02:38
(FC00:2:255::1, FF06:1::1), 00:01:14/00:02:15, flags: SJTgQ
  Incoming interface: Vlan901
  RPF nbr: ::FFFF:172.16.254.6
  Immediate Outgoing interface list:
   Vlan101, Forward, 00:01:14/00:03:18
Leaf-01#
```

The following example shows the output for the **show ipv6 mfib vrf** *vrf-name* command on VTEP 1:

```
Leaf-01# show ipv6 mfib vrf green
Entry Flags:
              C - Directly Connected, S - Signal, IA - Inherit A flag,
               ET - Data Rate Exceeds Threshold, K - Keepalive
                DDE - Data Driven Event, HW - Hardware Installed
                ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB
               MoFRR Primary, RP - MRIB MoFRR Primary, P - MoFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
                е
                  - Encap helper tunnel flag.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
                NS - Negate Signalling, SP - Signal Present,
                A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
```

```
Total/RPF failed/Other drops
Other counts:
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count
                                                          Egress Rate in pps
VRF green
 (*, FF00::/8) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 412/412/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF00::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF02::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*, FF06:1::1) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 4/0/126/0, Other: 0/0/0
  Vlan901, VXLAN Decap Flags: A NS
  Vlan101 Flags: F NS
    Pkts: 0/0/0
                  Rate: 0 pps
 (FC00:1:102::12,FF06:1::1) Flags: HW
  SW Forwarding: 3/0/100/0, Other: 0/0/0
  HW Forwarding: 58/0/125/0, Other: 0/0/0
  Vlan901, VXLAN Decap Flags: A
  Vlan101 Flags: F NS
     Pkts: 0/0/3
                   Rate: 0 pps
 (FC00:2:255::1,FF06:1::1) Flags: HW
  SW Forwarding: 1/0/100/0, Other: 0/0/0
  HW Forwarding: 36/0/126/0, Other: 0/0/0
  Vlan901, VXLAN Decap Flags: A
  Vlan101 Flags: F NS
    Pkts: 0/0/1 Rate: 0 pps
 (*,FF10::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF12::/16) Flags:
   SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF20::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
                  0/0/0/0, Other: 0/0/0
  HW Forwarding:
 (*,FF22::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF30::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF32::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF33::/32) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF34::/32) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF35::/32) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF36::/32) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF37::/32) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF38::/32) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF39::/32) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
```

0/0/0/0, Other: 0/0/0 HW Forwarding: (*,FF3A::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3B::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3C::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3D::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3E::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3F::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF40::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF42::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF50::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF52::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF60::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF62::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF70::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF72::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF80::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF82::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF90::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF92::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFA0::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFA2::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFB0::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFB2::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*, FFC0::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFC2::/16) Flags:

```
SW Forwarding: 0/0/0/0, Other: 0/0/0
```

```
(*,FFD0::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFD2::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFE0::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFE2::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFF0::/15) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFF2::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
Leaf-01#
```

The following example shows the output for the **show bgp ipv6 mvpn all** command on VTEP 1:

```
Leaf-01# show bgp ipv6 mvpn all
BGP table version is 43, 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: 1:1 (default for vrf green)
 *>i [5][1:1][FC00:1:102::12][FF06:1::1]/42
                                               0
                                                    100
                                                             0 ?
                      172.16.255.4
 * i
                      172.16.255.4
                                               0
                                                   100
                                                             0 2
 *>i [5][1:1][FC00:2:255::1][FF06:1::1]/42
                     172.16.255.6
                                               0
                                                  100
                                                             0 ?
 * i
                      172.16.255.6
                                               0
                                                    100
                                                             0 2
 *>
      [6] [1:1] [65001] [FC00:2:255::255] [FF06:1::1] /46
                                                         32768 ?
                      ::
 *>
      [7][1:1][65001][FC00:2:255::1][FF06:1::1]/46
                                                         32768 ?
                     ::
Route Distinguisher: 172.16.254.4:102
 *> [7][172.16.254.4:102][65001][FC00:1:102::12][FF06:1::1]/46
                                                         32768 ?
                      ::
Leaf-01#
```

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

```
Leaf-01# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
L - Local, P - Pruned, R - RP-bit set, F - Register flag,
T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
U - URD, I - Received Source Specific Host Report,
Z - Multicast Tunnel, z - MDT-data group sender,
Y - Joined MDT-data group, y - Sending to MDT-data group,
G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
Q - Received BGP S-A Route, q - Sent BGP S-A Route,
V - RD & Vector, v - Vector, p - PIM Joins on route,
x - VxLAN group, c - PFP-SA cache created entry,
* - determined by Assert, # - iif-starg configured on rpf intf,
```

e - encap-helper tunnel flag Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join Timers: Uptime/Expires Interface state: Interface, Next-Hop or VCD, State/Mode (*, 239.1.1.1), 1d01h/stopped, RP 172.16.255.255, flags: SJCx Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2 Outgoing interface list: Tunnel0, Forward/Sparse, 1d01h/00:02:49 (172.16.254.4, 239.1.1.1), 00:01:54/00:01:05, flags: JTx Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2 Outgoing interface list: Tunnel0, Forward/Sparse, 00:01:54/00:01:05 (172.16.254.6, 239.1.1.1), 00:01:56/00:01:03, flags: JTx Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2 Outgoing interface list: Tunnel0, Forward/Sparse, 00:01:56/00:01:03 (*, 224.0.1.40), 1d01h/00:02:53, RP 172.16.255.255, flags: SJCL Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2 Outgoing interface list: Loopback0, Forward/Sparse, 1d01h/00:02:53 (*, 225.0.0.102), 1d01h/stopped, RP 172.16.255.255, flags: SJCx Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2 Outgoing interface list: Tunnel0, Forward/Sparse, 1d01h/00:02:49 (172.16.254.4, 225.0.0.102), 1d01h/00:02:01, flags: JTx Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2 Outgoing interface list: Tunnel0, Forward/Sparse, 1d01h/00:02:10 (172.16.254.6, 225.0.0.102), 1d01h/00:02:20, flags: JTx Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2 Outgoing interface list: Tunnel0, Forward/Sparse, 1d01h/00:02:49 (*, 225.0.0.101), 1d01h/stopped, RP 172.16.255.255, flags: SJCFx Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.23.2 Outgoing interface list: Tunnel0, Forward/Sparse, 1d01h/00:02:49 (172.16.254.3, 225.0.0.101), 1d01h/00:01:58, flags: FTx Incoming interface: Loopback1, RPF nbr 0.0.0.0 Outgoing interface list: GigabitEthernet1/0/2, Forward/Sparse, 1d01h/00:03:08 Leaf-01#

The following example shows the output for the show ip mfib command on VTEP 1:

Leaf-01# show i	p mfib
Entry Flags:	C - Directly Connected, S - Signal, IA - Inherit A flag,
	ET - Data Rate Exceeds Threshold, K - Keepalive
	DDE - Data Driven Event, HW - Hardware Installed
	ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB
	MoFRR Primary, RP - MRIB MoFRR Primary, P - MoFRR Primary
	MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
	e – Encap helper tunnel flag.
I/O Item Flags:	IC - Internal Copy, NP - Not platform switched,
	NS - Negate Signalling, SP - Signal Present,

A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward, MA - MFIB Accept, A2 - Accept backup, RA2 - MRIB Accept backup, MA2 - MFIB Accept backup Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second Other counts: Total/RPF failed/Other drops I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps Default (*,224.0.0.0/4) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,224.0.1.40) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A NS Loopback0 Flags: F IC NS Pkts: 0/0/0 Rate: 0 pps (*,225.0.0.101) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 1/0/114/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A NS Tunnel0, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.3,225.0.0.101) Flags: HW SW Forwarding: 13/0/127/0, Other: 2/2/0 7870/0/164/0, Other: 0/0/0 HW Forwarding: NullO Flags: A GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/1 Rate: 0 pps (*,225.0.0.102) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 2/0/172/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A NS TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.4,225.0.0.102) Flags: HW SW Forwarding: 1/0/154/0, Other: 0/0/0 HW Forwarding: 5222/0/176/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/1 Rate: 0 pps (172.16.254.6,225.0.0.102) Flags: HW SW Forwarding: 1/0/154/0, Other: 0/0/0 HW Forwarding: 2137/0/163/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/1 Rate: 0 pps (*,232.0.0.0/8) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,239.1.1.1) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 11/0/168/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A NS TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.4,239.1.1.1) Flags: HW SW Forwarding: 4/0/150/0, Other: 0/0/0 HW Forwarding: 518/0/168/1, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A Tunnel0, VXLAN Decap Flags: F NS Pkts: 0/0/4 Rate: 0 pps (172.16.254.6,239.1.1.1) Flags: HW SW Forwarding: 1/0/150/0, Other: 0/0/0

```
HW Forwarding: 498/1/168/1, Other: 0/0/0
GigabitEthernet1/0/2 Flags: A
Tunnel0, VXLAN Decap Flags: F NS
Pkts: 0/0/1 Rate: 0 pps
Leaf-01#
```

Return to Verifying TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric, on page 172

Outputs to Verify the Configuration on VTEP 2

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

Leaf-02# show nve peers

	=							
Interface	VNI	Туре	Peer-IP	RMAC/Num RTs	eVNI	state	flags	UP time
nvel	50901	L3CP	172.16.254.6	0c75.bd67.ef48	50901	UP	A/-/4	1d01h
nvel	50901	L3CP	172.16.254.3	10b3.d56a.8fc8	50901	UP	A/-/4	1d01h
nvel	50901	L3CP	172.16.254.6	0c75.bd67.ef48	50901	UP	A/M/6	1d01h
nvel	50901	L3CP	172.16.254.3	10b3.d56a.8fc8	50901	UP	A/M/6	1d01h
nvel	10101	L2CP	172.16.254.3	6	10101	UP	N/A	1d01h
nvel	10102	L2CP	172.16.254.6	5	10102	UP	N/A	1d01h
Leaf-02#								

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

```
      Leaf-02# show 12vpn evpn peers vxlan

      Interface VNI
      Peer-IP

      nve1
      10101

      172.16.254.3
      6

      10102
      172.16.254.6

      5
      10102

      1d01h

      Leaf-02#
```

The following example shows the output for the **show bgp ipv6 mvpn all summary** command on VTEP 2:

```
Leaf-02# show bgp ipv6 mvpn all summary
BGP router identifier 172.16.255.4, local AS number 65001
BGP table version is 63, main routing table version 63
6 network entries using 2352 bytes of memory
8 path entries using 1280 bytes of memory
4/4 BGP path/bestpath attribute entries using 1248 bytes of memory
4 BGP rrinfo entries using 160 bytes of memory
1 BGP community entries using 24 bytes of memory
17 BGP extended community entries using 2372 bytes of memory
O BGP route-map cache entries using O bytes of memory
0 BGP filter-list cache entries using 0 bytes of memory
BGP using 7436 total bytes of memory
BGP activity 128/33 prefixes, 221/93 paths, scan interval 60 secs
6 networks peaked at 15:50:41 Aug 6 2020 UTC (21:30:56.871 ago)
Neighbor

        Neighbor
        V
        AS MsgRcvd MsgSent
        TblVer
        InQ OutQ Up/Down
        State/PfxRcd

        172.16.255.1
        4
        65001
        1797
        1698
        63
        0
        0
        1d01h
        2

        172.16.255.2
        4
        65001
        1792
        1701
        63
        0
        0
        1d01h
        2

Leaf-02#
```

The following example shows the output for the **show ip pim vrf** *vrf-name* **group-map** command on VTEP 2:
```
Leaf-02# show ip pim vrf green group-map ff06:1::1
IP PIM Group Mapping Table
(* indicates group mappings being used)
FF00::/8*
   SM, RP: FC00:2:255::255
   RPF: V1901,::FFFF:172.16.254.6
   Info source: Static
   Uptime: 1d01h, Groups: 1
Leaf-02#
```

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

```
Leaf-02# show ip routing vrf green FC00:2:255::255
Routing entry for FC00:2:255::255/128
Known via "bgp 65001", distance 200, metric 2, type internal
Route count is 1/1, share count 0
Routing paths:
    172.16.254.6%default, Vlan901%default
    From AC10:FF01::
    opaque_ptr 0x7F65BA333AD0
    Last updated 1d01h ago
Leaf-02#
```

The following example shows the output for the **show ipv6 mld vrf** *vrf-name* **groups** command on VTEP 2:

```
Leaf-02# show ipv6 mld vrf green groups

MLD Connected Group Membership

Group Address Interface

Uptime Expires

FF06:1::1 Vlan102

1d00h 00:02:25

Leaf-02#
```

The following example shows the output for the **show ipv6 mroute vrf** *vrf-name* command on VTEP 2:

```
Leaf-02# show ipv6 mroute vrf green
Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group,
       C - Connected, L - Local, I - Received Source Specific Host Report,
       P - Pruned, R - RP-bit set, F - Register flag, T - SPT-bit set,
       J - Join SPT, Y - Joined MDT-data group,
       y - Sending to MDT-data group
       q - BGP signal originated, G - BGP Signal received,
      N - BGP Shared-Tree Prune received, n - BGP C-Mroute suppressed,
       q - BGP Src-Active originated, Q - BGP Src-Active received
       E - Extranet
Timers: Uptime/Expires
Interface state: Interface, State
(*, FF06:1::1), 1d00h/never, RP FC00:2:255::255, flags: SCJg
  Incoming interface: Vlan901
  RPF nbr: ::FFFF:172.16.254.6
  Immediate Outgoing interface list:
   Vlan102, Forward, 1d00h/never
(FC00:1:102::12, FF06:1::1), 00:05:45/00:01:27, flags: SFJTGq
  Incoming interface: Vlan102
  RPF nbr: FE80::46D3:CAFF:FE28:6CC5
```

```
Immediate Outgoing interface list:
    Vlan901, Forward, 00:05:45/never
(FC00:2:255::1, FF06:1::1), 00:05:04/00:02:07, flags: SJTgQ
    Incoming interface: Vlan901
    RPF nbr: ::FFFF:172.16.254.6
    Inherited Outgoing interface list:
    Vlan102, Forward, 1d00h/never
Leaf-02#
```

The following example shows the output for the **show ipv6 mfib vrf** *vrf-name* command on VTEP 2:

```
Leaf-02# show ipv6 mfib vrf green
Entry Flags:
               C - Directly Connected, S - Signal, IA - Inherit A flag,
               ET - Data Rate Exceeds Threshold, K - Keepalive
                DDE - Data Driven Event, HW - Hardware Installed
                ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB
               MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
                e - Encap helper tunnel flag.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
               NS - Negate Signalling, SP - Signal Present,
                A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
Other counts:
                  Total/RPF failed/Other drops
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
VRF green
 (*,FF00::/8) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF00::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF02::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 9/9/0
 (*,FF06:1::1) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 3/0/126/0, Other: 0/0/0
  Vlan901, VXLAN Decap Flags: A NS
  Vlan102 Flags: F NS
    Pkts: 0/0/0
                  Rate: 0 pps
 (FC00:1:102::12,FF06:1::1) Flags: HW
  SW Forwarding: 3/0/100/0, Other: 2/2/0
  HW Forwarding: 168/0/118/0, Other: 0/0/0
  Vlan102 Flags: A F
    Pkts: 0/0/0 Rate: 0 pps
   Vlan901, VXLAN v4 Encap (50901, 239.1.1.1) Flags: F
    Pkts: 0/0/2 Rate: 0 pps
 (FC00:2:255::1,FF06:1::1) Flags: HW
   SW Forwarding: 1/0/100/0, Other: 0/0/0
  HW Forwarding: 148/0/126/0, Other: 0/0/0
   Vlan901, VXLAN Decap Flags: A
  Vlan102 Flags: F NS
    Pkts: 0/0/1 Rate: 0 pps
 (*,FF10::/15) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FF12::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
```

(*,FF20::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF22::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF30::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF32::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF33::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF34::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF35::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF36::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF37::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF38::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF39::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3A::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 0/0/0/0, Other: 0/0/0 HW Forwarding: (*,FF3B::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3C::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3D::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3E::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3F::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF40::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF42::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF50::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF52::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF60::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF62::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0

(*,FF70::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF72::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF80::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF82::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF90::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF92::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFA0::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFA2::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFB0::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFB2::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFC0::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFC2::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFD0::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFD2::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFE0::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFE2::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFF0::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFF2::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 Leaf-02#

The following example shows the output for the **show bgp ipv6 mvpn all** command on VTEP 2:

```
Leaf-02# show bgp ipv6 mvpn all
BGP table version is 63, 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: 1:1 (default for vrf green)
 *> [5][1:1][FC00:1:102::12][FF06:1::1]/42
                                                         32768 ?
                      ::
 * i [5][1:1][FC00:2:255::1][FF06:1::1]/42
```

```
172.16.255.6
                                           0
                                              100
                                                        0 ?
                                          0 100
 *>i
                    172.16.255.6
                                                        0 ?
 *>
     [6][1:1][65001][FC00:2:255::255][FF06:1::1]/46
                    ::
                                                    32768 ?
     [7][1:1][65001][FC00:1:102::12][FF06:1::1]/46
 *>i
                    172.16.255.3 0
                                               100
                                                        0 ?
 *>
     [7][1:1][65001][FC00:2:255::1][FF06:1::1]/46
                                                    32768 ?
                    ::
Route Distinguisher: 172.16.254.4:102
* i [7][172.16.254.4:102][65001][FC00:1:102::12][FF06:1::1]/46
                                                      0 ?
                   172.16.255.3
                                    0 100
*>i
                                           0
                                                100
                     172.16.255.3
                                                        0 ?
Leaf-02#
```

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

```
Leaf-02# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
       L - Local, P - Pruned, R - RP-bit set, F - Register flag,
       T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
      X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
      U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
       Y - Joined MDT-data group, y - Sending to MDT-data group,
       G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
       N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
       V - RD & Vector, v - Vector, p - PIM Joins on route,
       x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf,
       e - encap-helper tunnel flag
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
 Interface state: Interface, Next-Hop or VCD, State/Mode
(*, 239.1.1.1), 1d01h/stopped, RP 172.16.255.255, flags: SJCFx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 1d01h/00:01:32
(172.16.254.4, 239.1.1.1), 00:05:43/00:01:46, flags: FTx
  Incoming interface: Loopback1, RPF nbr 0.0.0.0
  Outgoing interface list:
    GigabitEthernet1/0/2, Forward/Sparse, 00:05:43/00:02:43
(172.16.254.6, 239.1.1.1), 00:05:45/00:01:06, flags: JTx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
  Outgoing interface list:
   Tunnel0, Forward/Sparse, 00:05:45/00:00:14
(*, 224.0.1.40), 1d01h/00:02:31, RP 172.16.255.255, flags: SJCL
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
  Outgoing interface list:
   Loopback0, Forward/Sparse, 1d01h/00:02:31
(*, 225.0.0.102), 1d01h/stopped, RP 172.16.255.255, flags: SJCFx
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
  Outgoing interface list:
    Tunnel0, Forward/Sparse, 1d01h/00:01:32
(172.16.254.6, 225.0.0.102), 1d01h/00:00:55, flags: JTx
```

Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2

```
Outgoing interface list:
   Tunnel0, Forward/Sparse, 1d01h/00:01:32
(172.16.254.4, 225.0.0.102), 1d01h/00:01:49, flags: FTx
   Incoming interface: Loopback1, RPF nbr 0.0.0.0
   Outgoing interface list:
      GigabitEthernet1/0/2, Forward/Sparse, 1d01h/00:03:26
(*, 225.0.0.101), 1d01h/stopped, RP 172.16.255.255, flags: SJCx
   Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
   Outgoing interface list:
      Tunnel0, Forward/Sparse, 1d01h/00:01:32
(172.16.254.3, 225.0.0.101), 1d01h/00:01:46, flags: JTx
   Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.2
   Outgoing interface list:
      Tunnel0, Forward/Sparse, 1d01h/00:01:32
Leaf-02#
```

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

```
Leaf-02# show ip mfib
               C - Directly Connected, S - Signal, IA - Inherit A flag,
Entry Flags:
                ET - Data Rate Exceeds Threshold, K - Keepalive
                DDE - Data Driven Event, HW - Hardware Installed
                ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB
               MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
                e - Encap helper tunnel flag.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
                NS - Negate Signalling, SP - Signal Present,
                A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
Other counts:
                  Total/RPF failed/Other drops
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps
Default
 (*,224.0.0.0/4) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
   HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A NS
  Loopback0 Flags: F IC NS
    Pkts: 0/0/0 Rate: 0 pps
 (*,225.0.0.101) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 2/0/170/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A NS
   Tunnel0, VXLAN Decap Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
 (172.16.254.3,225.0.0.101) Flags: HW
   SW Forwarding: 1/0/150/0, Other: 0/0/0
  HW Forwarding: 7870/0/176/0, Other: 0/0/0
   GigabitEthernet1/0/2 Flags: A
  TunnelO, VXLAN Decap Flags: F NS
    Pkts: 0/0/1 Rate: 0 pps
 (*,225.0.0.102) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
```

HW Forwarding: 1/0/224/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A NS Tunnel0, VXLAN Decap Flags: F NS Rate: 0 pps Pkts: 0/0/0 (172.16.254.4,225.0.0.102) Flags: HW SW Forwarding: 2/0/163/0, Other: 3/1/2 HW Forwarding: 5353/0/164/0, Other: 0/0/0 NullO Flags: A GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/1 Rate: 0 pps (172.16.254.6,225.0.0.102) Flags: HW SW Forwarding: 1/0/206/0, Other: 0/0/0 HW Forwarding: 2165/0/163/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/1 Rate: 0 pps (*,232.0.0.0/8) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,239.1.1.1) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 5/0/168/0, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A NS TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.4,239.1.1.1) Flags: HW SW Forwarding: 1/0/150/0, Other: 1495/1491/4 HW Forwarding: 742/0/156/0, Other: 0/0/0 NullO Flags: A NS GigabitEthernet1/0/2 Flags: F Pkts: 0/0/1 Rate: 0 pps (172.16.254.6,239.1.1.1) Flags: HW SW Forwarding: 1/0/150/0, Other: 0/0/0 HW Forwarding: 1460/1/168/1, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A NS Tunnel0, VXLAN Decap Flags: F NS Pkts: 0/0/1 Rate: 0 pps Leaf-02#

Return to Verifying TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric, on page 172

Outputs to Verify the Configuration on Border VTEP

The following example shows the output for the **show nve peers** command on Border VTEP:

Border# show nve peers								
Interface	VNI	Туре	Peer-IP	RMAC/Num RTs	eVNI	state	flags	UP time
nvel	50901	L3CP	172.16.254.3	10b3.d56a.8fc8	50901	UP	A/-/4	1d01h
nvel	50901	L3CP	172.16.254.4	7c21.0dbd.9548	50901	UP	A/-/4	1d01h
nvel	50901	L3CP	172.16.254.3	10b3.d56a.8fc8	50901	UP	A/M/6	1d01h
nvel	50901	L3CP	172.16.254.4	7c21.0dbd.9548	50901	UP	A/M/6	1d01h
nvel	10101	L2CP	172.16.254.3	6	10101	UP	N/A	1d01h
nvel	10102	L2CP	172.16.254.4	7	10102	UP	N/A	1d00h
Border#								

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

Border# show 12vpn	evpn peers vxlan				
Interface VNI	Peer-IP	Num routes	eVNI	UP	time

The following example shows the output for the **show bgp ipv6 mvpn all summary** command on Border VTEP:

```
Border# show bgp ipv6 mvpn all summary

BGP router identifier 172.16.255.6, local AS number 65001

BGP table version is 62, main routing table version 62

5 network entries using 1960 bytes of memory

8 path entries using 1280 bytes of memory

4/4 BGP path/bestpath attribute entries using 1248 bytes of memory

4 BGP rrinfo entries using 160 bytes of memory

1 BGP community entries using 24 bytes of memory

19 BGP extended community entries using 2682 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 activity 122/28 prefixes, 244/122 paths, scan interval 60 secs

5 networks peaked at 15:42:39 Aug 6 2020 UTC (21:35:36.535 ago)

Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd

172.16.255.1 4 65001 1810 1710 62 0 0 1d01h 3

172.16.255.2 4 65001 1810 1704 62 0 0 1d01h 3
```

```
Border#
```

The following example shows the output for the **show ip pim vrf** *vrf-name* **group-map** command on Border VTEP:

```
Border# show ip pim vrf green group-map ff06:1::1
IP PIM Group Mapping Table
(* indicates group mappings being used)
FF00::/8*
    SM, RP: FC00:2:255::255
    RPF: Vl2001,FE80::A2B4:39FF:FE21:9183
    Info source: Static
    Uptime: 1d01h, Groups: 1
Border#
```

The following example shows the output for the **show ip routing vrf** *vrf-name* command on Border VTEP:

```
Border# show ip routing vrf green FC00:2:255::255
Routing entry for FC00:2:255::255/128
Known via "ospf 1", distance 110, metric 2, type intra area
Redistributing via bgp 65001
Route count is 1/1, share count 0
Routing paths:
    FE80::A2B4:39FF:FE21:9183, Vlan2001
    From FE80::A2B4:39FF:FE21:9183
    Last updated 1d01h ago
Border#
```

The following example shows the output for the **show ipv6 mld vrf** *vrf-name* **groups** command on Border VTEP:

```
Border# show ipv6 mld vrf green groups

MLD Connected Group Membership

Group Address Interface

Uptime Expires

FF06:1::1 Vlan102

1d00h 00:04:02

Border#
```

The following example shows the output for the **show ipv6 mroute vrf** *vrf-name* command on Border VTEP:

```
Border# show ipv6 mroute vrf green
Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group,
       C - Connected, L - Local, I - Received Source Specific Host Report,
       P - Pruned, R - RP-bit set, F - Register flag, T - SPT-bit set,
       J - Join SPT, Y - Joined MDT-data group,
       y - Sending to MDT-data group
       g - BGP signal originated, G - BGP Signal received,
      N - BGP Shared-Tree Prune received, n - BGP C-Mroute suppressed,
       q - BGP Src-Active originated, Q - BGP Src-Active received
      E - Extranet
Timers: Uptime/Expires
Interface state: Interface, State
(*, FF06:1::1), 1d00h/never, RP FC00:2:255::255, flags: SCG
  Incoming interface: Vlan2001
  RPF nbr: FE80::A2B4:39FF:FE21:9183
  Immediate Outgoing interface list:
   Vlan102, Null, 1d00h/never
   Vlan901, Forward, 1d00h/never
(FC00:1:102::12, FF06:1::1), 00:10:24/now, flags: STg
  Incoming interface: Vlan901
  RPF nbr: ::FFFF:172.16.254.4
  Immediate Outgoing interface list:
   Vlan2001, Forward, 00:10:24/00:03:05
  Inherited Outgoing interface list:
   Vlan102, Null, 1d00h/never
(FC00:2:255::1, FF06:1::1), 00:09:43/never, flags: STGq
  Incoming interface: Vlan2001
  RPF nbr: FE80::A2B4:39FF:FE21:9183
  Immediate Outgoing interface list:
    Vlan901, Forward, 00:09:43/never
  Inherited Outgoing interface list:
   Vlan102, Null, 1d00h/never
Border#
```

The following example shows the output for the **show ipv6 mfib vrf** *vrf-name* command on Border VTEP:

```
Border# show ipv6 mfib vrf green
Entry Flags: C - Directly Connected, S - Signal, IA - Inherit A flag,
ET - Data Rate Exceeds Threshold, K - Keepalive
DDE - Data Driven Event, HW - Hardware Installed
ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB
MoFRR Primary, RP - MRIB MoFRR Primary, P - MoFRR Primary
MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client,
e - Encap helper tunnel flag.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
NS - Negate Signalling, SP - Signal Present,
```

A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward, MA - MFIB Accept, A2 - Accept backup, RA2 - MRIB Accept backup, MA2 - MFIB Accept backup Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second Other counts: Total/RPF failed/Other drops I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Egress Rate in pps VRF green (*,FF00::/8) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF00::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF02::/16) Flags: SW Forwarding: 0/0/0/0, Other: 9/9/0 (*,FF06:1::1) Flags: C HW SW Forwarding: 0/0/0/0, Other: 3/3/0 HW Forwarding: 7/0/122/0, Other: 0/0/0 Vlan2001 Flags: A Vlan901, VXLAN v4 Encap (50901, 239.1.1.1) Flags: F Pkts: 0/0/0 Rate: 0 pps (FC00:1:102::12,FF06:1::1) Flags: HW SW Forwarding: 2/0/100/0, Other: 1/0/1 HW Forwarding: 311/0/125/0, Other: 0/0/0 Vlan901, VXLAN Decap Flags: A Vlan2001 Flags: F NS Pkts: 0/0/2 Rate: 0 pps (FC00:2:255::1,FF06:1::1) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 291/0/122/0, Other: 0/0/0 Vlan2001 Flags: A Vlan901, VXLAN v4 Encap (50901, 239.1.1.1) Flags: F Pkts: 0/0/0 Rate: 0 pps (*,FF10::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF12::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF20::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF22::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF30::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF32::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF33::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF34::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF35::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF36::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF37::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0

(*,FF38::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF39::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3A::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3B::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3C::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3D::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3E::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF3F::/32) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF40::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF42::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF50::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF52::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF60::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 0/0/0/0, Other: 0/0/0 HW Forwarding: (*,FF62::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF70::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF72::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF80::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF82::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF90::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FF92::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*, FFA0::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFA2::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFB0::/15) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,FFB2::/16) Flags: SW Forwarding: 0/0/0/0, Other: 0/0/0

```
(*,FFC0::/15) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFC2::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFD0::/15) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFD2::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFE0::/15) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFE2::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFF0::/15) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,FFF2::/16) Flags:
  SW Forwarding: 0/0/0/0, Other: 0/0/0
Border#
```

The following example shows the output for the **show bgp ipv6 mvpn all** command on Border VTEP:

```
Border# show bgp ipv4 mvpn all
BGP table version is 62, local router ID is 172.16.255.6
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
                    Next Hop
                                      Metric LocPrf Weight Path
    Network
Route Distinguisher: 1:1 (default for vrf green)
 *>i [5][1:1][FC00:1:102::12][FF06:1::1]/42
                                               100
                   172.16.255.4
                                                       0 ?
                                            0
                                           0
                                                100
 * i
                     172.16.255.4
                                                        0 2
 *>
     [5][1:1][FC00:2:255::1][FF06:1::1]/42
                                                     32768 ?
 * i [6][1:1][65001][FC00:2:255::255][FF06:1::1]/46
                   172.16.255.3 0 100
                                                        0 2
                     172.16.255.3
                                           0
                                                100
 *>i
                                                        0 ?
 * i [7][1:1][65001][FC00:2:255::1][FF06:1::1]/46
                    172.16.255.3 0
                                                100
                                                         0 ?
                                                100
 *>i
                     172.16.255.3
                                            0
                                                         0 ?
Route Distinguisher: 172.16.254.4:102
 *> [7][172.16.254.4:102][65001][FC00:1:102::12][FF06:1::1]/46
                                                     32768 ?
                    ::
Border#
```

The following example shows the output for the **show ip mroute** command on Border VTEP:

```
Border# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
L - Local, P - Pruned, R - RP-bit set, F - Register flag,
T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
U - URD, I - Received Source Specific Host Report,
Z - Multicast Tunnel, z - MDT-data group sender,
```

Y - Joined MDT-data group, y - Sending to MDT-data group, G - Received BGP C-Mroute, g - Sent BGP C-Mroute, N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed, Q - Received BGP S-A Route, q - Sent BGP S-A Route, V - RD & Vector, v - Vector, p - PIM Joins on route, x - VxLAN group, c - PFP-SA cache created entry, * - determined by Assert, # - iif-starg configured on rpf intf, e - encap-helper tunnel flag Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join Timers: Uptime/Expires Interface state: Interface, Next-Hop or VCD, State/Mode (*, 239.1.1.1), 1d01h/stopped, RP 172.16.255.255, flags: SJCFx Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2 Outgoing interface list: Tunnel0, Forward/Sparse, 1d01h/00:02:41 (172.16.254.4, 239.1.1.1), 00:10:23/00:02:45, flags: JTx Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2 Outgoing interface list: Tunnel0, Forward/Sparse, 00:10:23/00:01:36 (172.16.254.6, 239.1.1.1), 00:10:25/00:03:25, flags: FTx Incoming interface: Loopback1, RPF nbr 0.0.0.0 Outgoing interface list: TenGigabitEthernet1/0/2, Forward/Sparse, 00:10:25/00:02:56 (*, 224.0.1.40), 1d01h/00:02:45, RP 172.16.255.255, flags: SJCL Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2 Outgoing interface list: Loopback0, Forward/Sparse, 1d01h/00:02:45 (*, 225.0.0.102), 1d01h/stopped, RP 172.16.255.255, flags: SJCFx Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2 Outgoing interface list: Tunnel0, Forward/Sparse, 1d01h/00:02:41 (172.16.254.4, 225.0.0.102), 1d01h/00:02:35, flags: JTx Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2 Outgoing interface list: Tunnel0, Forward/Sparse, 1d01h/00:02:41 (172.16.254.6, 225.0.0.102), 1d01h/00:03:27, flags: FTx Incoming interface: Loopback1, RPF nbr 0.0.0.0 Outgoing interface list: TenGigabitEthernet1/0/2, Forward/Sparse, 1d01h/00:02:49, A (*, 225.0.0.101), 1d01h/stopped, RP 172.16.255.255, flags: SJCx Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2 Outgoing interface list: Tunnel0, Forward/Sparse, 1d01h/00:02:41 (172.16.254.3, 225.0.0.101), 1d01h/00:01:12, flags: JTx Incoming interface: TenGigabitEthernet1/0/2, RPF nbr 172.16.26.2 Outgoing interface list: Tunnel0, Forward/Sparse, 1d01h/00:02:53 Border#

The following example shows the output for the **show ip mfib** command on Border VTEP:

Border# show ip mfib Entry Flags: C - Directly Connected, S - Signal, IA - Inherit A flag, ET - Data Rate Exceeds Threshold, K - Keepalive

DDE - Data Driven Event, HW - Hardware Installed ME - MoFRR ECMP entry, MNE - MoFRR Non-ECMP entry, MP - MFIB MoFRR Primary, RP - MRIB MoFRR Primary, P - MoFRR Primary MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client, e - Encap helper tunnel flag. I/O Item Flags: IC - Internal Copy, NP - Not platform switched, NS - Negate Signalling, SP - Signal Present, A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward, MA - MFIB Accept, A2 - Accept backup, RA2 - MRIB Accept backup, MA2 - MFIB Accept backup Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second Other counts: Total/RPF failed/Other drops I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count Eqress Rate in pps Default (*,224.0.0.0/4) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,224.0.1.40) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 TenGigabitEthernet1/0/2 Flags: A NS Loopback0 Flags: F IC NS Pkts: 0/0/0 Rate: 0 pps (*,225.0.0.101) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 8/0/146/0, Other: 0/0/0 TenGigabitEthernet1/0/2 Flags: A NS Tunnel0, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.3,225.0.0.101) Flags: HW SW Forwarding: 7/0/125/0, Other: 0/0/0 HW Forwarding: 8010/0/176/0, Other: 0/0/0 TenGigabitEthernet1/0/2 Flags: A Tunnel0, VXLAN Decap Flags: F NS Pkts: 0/0/7 Rate: 0 pps (*,225.0.0.102) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 1/0/172/0, Other: 0/0/0 TenGigabitEthernet1/0/2 Flags: A NS TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.4,225.0.0.102) Flags: HW SW Forwarding: 1/0/154/0, Other: 0/0/0 HW Forwarding: 5353/0/176/0, Other: 0/0/0 TenGigabitEthernet1/0/2 Flags: A TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/1 Rate: 0 pps (172.16.254.6,225.0.0.102) Flags: HW SW Forwarding: 11/0/167/0, Other: 7/6/1 HW Forwarding: 2207/0/151/0, Other: 0/0/0 NullO Flags: A TenGigabitEthernet1/0/2 Flags: F Pkts: 0/0/10 Rate: 0 pps (*,232.0.0.0/8) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,239.1.1.1) Flags: C HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 8/0/168/0, Other: 0/0/0 TenGigabitEthernet1/0/2 Flags: A NS TunnelO, VXLAN Decap Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.4,239.1.1.1) Flags: HW

```
SW Forwarding: 4/0/150/0, Other: 0/0/0
HW Forwarding: 2032/1/168/1, Other: 0/0/0
TenGigabitEthernet1/0/2 Flags: A
Tunnel0, VXLAN Decap Flags: F NS
Pkts: 0/0/4 Rate: 0 pps
(172.16.254.6,239.1.1.1) Flags: HW
SW Forwarding: 2/0/150/0, Other: 4/4/0
HW Forwarding: 2015/1/156/1, Other: 0/0/0
Null0 Flags: A
TenGigabitEthernet1/0/2 Flags: F
Pkts: 0/0/1 Rate: 0 pps
Border#
```

Return to Verifying TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric, on page 172

Outputs to Verify the Configuration on Spine Switch 1

172.16.255.6 4

Spine-01#

The following example shows the output for the **show bgp ipv6 mvpn all summary** command on Spine Switch 1:

```
Spine-01# show bgp ipv6 mvpn all summary
BGP router identifier 172.16.255.1, local AS number 65001
BGP table version is 61, main routing table version 61
5 network entries using 1960 bytes of memory
13 path entries using 2080 bytes of memory
3/3 BGP path/bestpath attribute entries using 912 bytes of memory
3 BGP rrinfo entries using 120 bytes of memory
1 BGP community entries using 24 bytes of memory
16 BGP extended community entries using 2332 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
O BGP filter-list cache entries using O bytes of memory
BGP using 7428 total bytes of memory
BGP activity 257/209 prefixes, 3003/2900 paths, scan interval 60 secs
5 networks peaked at 15:48:28 Aug 6 2020 UTC (21:38:24.468 ago)
Neighbor
                         AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd
               V
                                                      0 0 1d04h
172.16.255.2
172.16.255.2 4
172.16.255.3 4
                      65001 2190 2137
                                             61
                                                                              5
                       65001
                                1700
                                        1808
                                                  61
                                                       0
                                                            0 1d01h
                                                                              3
                      65001 1706 1805 61 0 0 1d01h
172.16.255.4 4
                                                                             3
```

The following example shows the output for the **show bgp ipv6 mvpn all** command on Spine Switch 1:

65001 1713 1813

```
Spine-01# show bgp ipv6 mvpn all
BGP table version is 61, 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
                                       Metric LocPrf Weight Path
                    Next Hop
Route Distinguisher: 1:1
* i [5][1:1][FC00:1:102::12][FF06:1::1]/42
                                                 100 0?
                                   0
                   172.16.255.4
 *>i
                      172.16.255.4
                                             0
                                                          0 2
```

61 0 0 1d01h

2

```
* i [5][1:1][FC00:2:255::1][FF06:1::1]/42
                                          100
                                                  0 2
                  172.16.255.6
                                       0
 *>i
                                       0
                  172.16.255.6
                                           100
                                                   0 ?
 *>i
    [6][1:1][65001][FC00:2:255::255][FF06:1::1]/46
                  172.16.255.3 0 100
                                                   0 2
 * i
                   172.16.255.3
                                       0
                                            100
                                                    0 ?
 * i
                   172.16.255.4
                                        0
                                            100
                                                    0 ?
 * i [7][1:1][65001][FC00:2:255::1][FF06:1::1]/46
                                           100
                                                   0 ?
                 172.16.255.4 0
* i
                                       0
                                           100
                                                  0 ?
                   172.16.255.3
*>i
                   172.16.255.3
                                       0
                                           100
                                                   0 ?
Route Distinguisher: 172.16.254.4:102
 *>i [7][172.16.254.4:102][65001][FC00:1:102::12][FF06:1::1]/46
                 172.16.255.3 0 100 0 ?
* i
                  172.16.255.3
                                       0 100
                                                  0 ?
* i
                                       0 100
                  172.16.255.6
                                                   0 ?
Spine-01#
```

The following example shows the output for the **show ip pim rp mapping** command on Spine Switch 1:

```
Spine-01# show ip pim rp mapping
PIM Group-to-RP Mappings
Group(s): 224.0.0.0/4, Static
    RP: 172.16.255.255 (?)
Spine-01#
```

The following example shows the output for the **show ip mroute** command on Spine Switch 1:

```
Spine-01# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
      L - Local, P - Pruned, R - RP-bit set, F - Register flag,
      T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
      X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
      U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
      Y - Joined MDT-data group, y - Sending to MDT-data group,
      G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
      V - RD & Vector, v - Vector, p - PIM Joins on route,
      x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
Interface state: Interface, Next-Hop or VCD, State/Mode
(*, 239.1.1.1), 00:13:12/stopped, RP 172.16.255.255, flags: SP
 Incoming interface: Null, RPF nbr 0.0.0.0
  Outgoing interface list: Null
(172.16.254.4, 239.1.1.1), 00:11:10/00:01:49, flags: PA
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.14.4
 Outgoing interface list: Null
(172.16.254.6, 239.1.1.1), 00:13:12/00:02:08, flags: PA
  Incoming interface: GigabitEthernet1/0/4, RPF nbr 172.16.16.6
  Outgoing interface list: Null
(*, 224.0.1.40), 1w0d/00:02:04, RP 172.16.255.255, flags: SJCL
```

```
Incoming interface: Null, RPF nbr 0.0.0.0
Outgoing interface list:
Loopback2, Forward/Sparse, 1w0d/00:02:04
(*, 225.0.0.102), 1w0d/stopped, RP 172.16.255.255, flags: SP
Incoming interface: Null, RPF nbr 0.0.0.0
Outgoing interface list: Null
(172.16.254.6, 225.0.0.102), 00:19:31/00:02:22, flags: PA
Incoming interface: GigabitEthernet1/0/4, RPF nbr 172.16.16.6
Outgoing interface list: Null
(172.16.254.4, 225.0.0.102), 1d01h/00:01:52, flags: PA
Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.14.4
Outgoing interface list: Null
Spine-01#
```

The following example shows the output for the **show ip mfib** command on Spine Switch 1:

```
Spine-01# show ip mfib
               C - Directly Connected, S - Signal, IA - Inherit A flag,
Entry Flags:
                ET - Data Rate Exceeds Threshold, K - Keepalive
                DDE - Data Driven Event, HW - Hardware Installed
               ME - MOFRR ECMP entry, MNE - MOFRR Non-ECMP entry, MP - MFIB
               MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
               MS - MoFRR Entry in Sync, MC - MoFRR entry in MoFRR Client.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
               NS - Negate Signalling, SP - Signal Present,
                A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
                 Total/RPF failed/Other drops
Other counts:
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count
                                                          Egress Rate in pps
Default
 (*,224.0.0.0/4) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 82/82/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
   HW Forwarding:
                  0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
  Loopback2 Flags: F IC NS
     Pkts: 0/0/0 Rate: 0 pps
 (*,225.0.0.102) Flags: C HW
   SW Forwarding: 1/0/206/0, Other: 279/0/279
   HW Forwarding:
                  0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
 (172.16.254.4,225.0.0.102) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
   HW Forwarding: 0/0/0/0, Other: 0/0/0
   Tunnell Flags: A
   GigabitEthernet1/0/2 Flags: NS
 (172.16.254.6,225.0.0.102) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
   Tunnell Flags: A
   GigabitEthernet1/0/4 Flags: NS
 (*,232.0.0.0/8) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
   HW Forwarding: 0/0/0/0, Other: 0/0/0
```

```
(*,239.1.1.1) Flags: C HW
SW Forwarding: 0/0/0/0, Other: 1/0/1
HW Forwarding: 0/0/0/0, Other: 0/0/0
Tunnell Flags: A
(172.16.254.4,239.1.1.1) Flags: HW
SW Forwarding: 0/0/0/0, Other: 0/0/0
HW Forwarding: 1224/0/168/0, Other: 0/0/0
GigabitEthernet1/0/2 Flags: A
(172.16.254.6,239.1.1.1) Flags: HW
SW Forwarding: 0/0/0/0, Other: 0/0/0
HW Forwarding: 0/0/0/0, Other: 0/0/0
GigabitEthernet1/0/4 Flags: A NS
Spine-01#
```

```
Return to Verifying TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric, on page 172
```

Outputs to Verify the Configuration on Spine Switch 2

The following example shows the output for the **show bgp ipv6 mvpn all summary** command on Spine Switch 2:

```
Spine-02# show bgp ipv6 mvpn all summary
BGP router identifier 172.16.255.2, local AS number 65001
BGP table version is 61, main routing table version 61
5 network entries using 1960 bytes of memory
13 path entries using 2080 bytes of memory
3/3 BGP path/bestpath attribute entries using 912 bytes of memory
3 BGP rrinfo entries using 120 bytes of memory
1 BGP community entries using 24 bytes of memory
16 BGP extended community entries using 2332 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 7428 total bytes of memory
BGP activity 288/240 prefixes, 3108/3005 paths, scan interval 60 secs
5 networks peaked at 15:49:16 Aug 6 2020 UTC (21:40:40.843 ago)

        Neighbor
        V
        AS MsgRcva MsgSent
        TDivel
        Ing outg op, Dom.
        Outer

        172.16.255.1
        4
        65001
        2139
        2193
        61
        0
        1d04h

        172.16.255.3
        4
        65001
        1700
        1810
        61
        0
        1d01h

        172.16.255.4
        4
        65001
        1711
        1803
        61
        0
        0
        1d01h

        172.16.255.5
        4
        65001
        0
        0
        1
        0
        08:41:01
        Idle

        172.16.255.6
        4
        65001
        1710
        1815
        61
        0
        1d01h

        172.16.255.7
        4
        65001
        0
        0
        1
        0
        08:41:01
        Idle

        172.16.255.7
        4
        65001
        0
        0
        1
        0
        08:40:29
        Idle

Neighbor
                              V
                                                     AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd
                                                                                                                                                 .5
                                                                                                                                                              3
                                                                                                                                                              3
                                                                                                    1 0 0 08:41:01 Idle
                                                                                                                                                              2
Spine-02#
```

The following example shows the output for the **show bgp ipv6 mvpn all** command on Spine Switch 2:

* i	[5][1:1][FC00:1:102::12][FF06:1::1]/42					
	172.16.255.4	0	100	0 ?		
*>i	172.16.255.4	0	100	0 ?		
* i	[5][1:1][FC00:2:255::1][FF06:1::1]/42					
	172.16.255.6	0	100	0 ?		
*>i	172.16.255.6	0	100	0 ?		
*>i	[6][1:1][65001][FC00:2:255::255][FF06:1::1]/46					
	172.16.255.3	0	100	0 ?		
* i	172.16.255.3	0	100	0 ?		
* i	172.16.255.4	0	100	0 ?		
* i	[7][1:1][65001][FC00:2:255::1][FF06:1::1]/46					
	172.16.255.4	0	100	0 ?		
* i	172.16.255.3	0	100	0 ?		
*>i	172.16.255.3	0	100	0 ?		
Route	Distinguisher: 172.16.254.4:102					
*>i	[7][172.16.254.4:102][65001][FC00:1:102	::12]	[FF06:1:	:1]/46		
	172.16.255.3	0	100	0 ?		
* i	172.16.255.3	0	100	0 ?		
* i	172.16.255.6	0	100	0 ?		
Spine	-02#					

The following example shows the output for the **show ip pim rp mapping** command on Spine Switch 2:

Spine-02#

The following example shows the output for the **show ip mroute** command on Spine Switch 2:

```
Spine-02# show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
       L - Local, P - Pruned, R - RP-bit set, F - Register flag,
       T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
      X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
       U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
       Y - Joined MDT-data group, y - Sending to MDT-data group,
       G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
      N - Received BGP Shared-Tree Prune, n - BGP C-Mroute suppressed,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
       V - RD & Vector, v - Vector, p - PIM Joins on route,
       x - VxLAN group, c - PFP-SA cache created entry,
       * - determined by Assert, # - iif-starg configured on rpf intf
Outgoing interface flags: H - Hardware switched, A - Assert winner, p - PIM Join
Timers: Uptime/Expires
 Interface state: Interface, Next-Hop or VCD, State/Mode
(*, 239.1.1.1), 3d08h/00:03:24, RP 172.16.255.255, flags: S
  Incoming interface: Null, RPF nbr 0.0.0.0
  Outgoing interface list:
    GigabitEthernet1/0/2, Forward/Sparse, 1d01h/00:03:24
    GigabitEthernet1/0/1, Forward/Sparse, 1d01h/00:03:06
    GigabitEthernet1/0/4, Forward/Sparse, 1d01h/00:03:02
(172.16.254.4, 239.1.1.1), 00:15:27/00:02:45, flags: T
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.4
```

```
Outgoing interface list:
    GigabitEthernet1/0/4, Forward/Sparse, 00:15:27/00:03:02
    GigabitEthernet1/0/1, Forward/Sparse, 00:15:27/00:03:06
(172.16.254.6, 239.1.1.1), 00:15:29/00:02:38, flags: MT
  Incoming interface: GigabitEthernet1/0/4, RPF nbr 172.16.26.6
  Outgoing interface list:
    GigabitEthernet1/0/1, Forward/Sparse, 00:15:29/00:03:06
    GigabitEthernet1/0/2, Forward/Sparse, 00:15:29/00:03:24
(*, 224.0.1.40), 1w0d/00:03:27, RP 172.16.255.255, flags: SJCL
  Incoming interface: Null, RPF nbr 0.0.0.0
  Outgoing interface list:
    GigabitEthernet1/0/2, Forward/Sparse, 1d01h/00:02:31
    GigabitEthernet1/0/1, Forward/Sparse, 1d01h/00:03:27
    GigabitEthernet1/0/4, Forward/Sparse, 1d01h/00:03:08
   Loopback2, Forward/Sparse, 1w0d/00:02:17
(*, 225.0.0.102), 1w0d/00:03:21, RP 172.16.255.255, flags: S
  Incoming interface: Null, RPF nbr 0.0.0.0
  Outgoing interface list:
    GigabitEthernet1/0/2, Forward/Sparse, 1d01h/00:03:02
    GigabitEthernet1/0/1, Forward/Sparse, 1d01h/00:02:50
   GigabitEthernet1/0/4, Forward/Sparse, 1d01h/00:03:21
(172.16.254.4, 225.0.0.102), 1d01h/00:01:55, flags: MT
  Incoming interface: GigabitEthernet1/0/2, RPF nbr 172.16.24.4
  Outgoing interface list:
    GigabitEthernet1/0/4, Forward/Sparse, 1d01h/00:03:21
    GigabitEthernet1/0/1, Forward/Sparse, 1d01h/00:03:02
(172.16.254.6, 225.0.0.102), 1d01h/00:02:03, flags: MT
  Incoming interface: GigabitEthernet1/0/4, RPF nbr 172.16.26.6
  Outgoing interface list:
    GigabitEthernet1/0/2, Forward/Sparse, 1d01h/00:03:02
   GigabitEthernet1/0/1, Forward/Sparse, 1d01h/00:03:13
(*, 225.0.0.101), 3d08h/00:03:29, RP 172.16.255.255, flags: S
  Incoming interface: Null, RPF nbr 0.0.0.0
  Outgoing interface list:
    GigabitEthernet1/0/2, Forward/Sparse, 1d01h/00:03:05
    GigabitEthernet1/0/1, Forward/Sparse, 1d01h/00:03:07
    GigabitEthernet1/0/4, Forward/Sparse, 1d01h/00:03:29
(172.16.254.3, 225.0.0.101), 1d01h/00:02:39, flags: TA
  Incoming interface: GigabitEthernet1/0/1, RPF nbr 172.16.23.3
  Outgoing interface list:
    GigabitEthernet1/0/2, Forward/Sparse, 1d01h/00:03:05
    GigabitEthernet1/0/4, Forward/Sparse, 1d01h/00:03:29
Spine-02#
```

The following example shows the output for the **show ip mfib** command on Spine Switch 2:

```
Spine-02# show ip mfib
Entry Flags: C - Directly Connected, S - Signal, IA - Inherit A flag,
ET - Data Rate Exceeds Threshold, K - Keepalive
DDE - Data Driven Event, HW - Hardware Installed
ME - MOFRR ECMP entry, MNE - MOFRR Non-ECMP entry, MP - MFIB
MOFRR Primary, RP - MRIB MOFRR Primary, P - MOFRR Primary
MS - MOFRR Entry in Sync, MC - MOFRR entry in MOFRR Client.
I/O Item Flags: IC - Internal Copy, NP - Not platform switched,
NS - Negate Signalling, SP - Signal Present,
```

```
A - Accept, F - Forward, RA - MRIB Accept, RF - MRIB Forward,
               MA - MFIB Accept, A2 - Accept backup,
               RA2 - MRIB Accept backup, MA2 - MFIB Accept backup
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kbits per second
Other counts:
                  Total/RPF failed/Other drops
I/O Item Counts: HW Pkt Count/FS Pkt Count/PS Pkt Count
                                                         Egress Rate in pps
Default.
 (*,224.0.0.0/4) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
 (*,224.0.1.40) Flags: C HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
  GigabitEthernet1/0/1 Flags: F NS
    Pkts: 0/0/0
                 Rate: 0 pps
  GigabitEthernet1/0/2 Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
  GigabitEthernet1/0/4 Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
  Loopback2 Flags: F IC NS
    Pkts: 0/0/0
                  Rate: 0 pps
 (*,225.0.0.101) Flags: C HW
  SW Forwarding: 9/0/112/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
  GigabitEthernet1/0/1 Flags: F NS
                 Rate: 0 pps
    Pkts: 0/0/2
  GigabitEthernet1/0/2 Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
  GigabitEthernet1/0/4 Flags: F NS
    Pkts: 0/0/2 Rate: 0 pps
 (172.16.254.3,225.0.0.101) Flags: HW
  SW Forwarding: 4/0/132/0, Other: 0/0/0
  HW Forwarding: 8067/0/176/0, Other: 0/0/0
  GigabitEthernet1/0/1 Flags: A
  GigabitEthernet1/0/2 Flags: F NS
    Pkts: 0/0/0
                 Rate: 0 pps
  GigabitEthernet1/0/4 Flags: F NS
    Pkts: 0/0/4 Rate: 0 pps
 (*,225.0.0.102) Flags: C HW
  SW Forwarding: 27/0/101/0, Other: 0/0/0
  HW Forwarding: 0/0/0/0, Other: 0/0/0
  Tunnell Flags: A
  GigabitEthernet1/0/1 Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
  GigabitEthernet1/0/2 Flags: F NS
    Pkts: 0/0/0
                 Rate: 0 pps
  GigabitEthernet1/0/4 Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
 (172.16.254.4,225.0.0.102) Flags: HW
  SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 5404/0/176/0, Other: 0/0/0
  GigabitEthernet1/0/2 Flags: A
  GigabitEthernet1/0/1 Flags: F NS
    Pkts: 0/0/0 Rate: 0 pps
  GigabitEthernet1/0/4 Flags: F NS
                 Rate: 0 pps
    Pkts: 0/0/0
 (172.16.254.6,225.0.0.102) Flags: HW
   SW Forwarding: 0/0/0/0, Other: 0/0/0
  HW Forwarding: 2214/0/163/0, Other: 0/0/0
  GigabitEthernet1/0/4 Flags: A NS
  GigabitEthernet1/0/1 Flags: F NS
```

Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/0 Rate: 0 pps (*,232.0.0.0/8) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 (*,239.1.1.1) Flags: C HW SW Forwarding: 9/0/150/0, Other: 0/0/0 HW Forwarding: 0/0/0/0, Other: 0/0/0 Tunnell Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/3 Rate: 0 pps GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/3 Rate: 0 pps GigabitEthernet1/0/4 Flags: F NS Pkts: 0/0/3 Rate: 0 pps (172.16.254.4,239.1.1.1) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 2629/1/168/1, Other: 0/0/0 GigabitEthernet1/0/2 Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/4 Flags: F NS Pkts: 0/0/0 Rate: 0 pps (172.16.254.6,239.1.1.1) Flags: HW SW Forwarding: 0/0/0/0, Other: 0/0/0 HW Forwarding: 2607/1/168/1, Other: 0/0/0 GigabitEthernet1/0/4 Flags: A GigabitEthernet1/0/1 Flags: F NS Pkts: 0/0/0 Rate: 0 pps GigabitEthernet1/0/2 Flags: F NS Pkts: 0/0/0 Rate: 0 pps Spine-02#

Return to Verifying TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric, on page 172

Outputs to Verify the Configuration on Router 3 (RP Outside the BGP EVPN VXLAN Fabric)

The following example shows the output for the **show ip pim group-map** command on Router 3:

```
R3# show ipv6 pim group-map ff06:1::1
IP PIM Group Mapping Table
(* indicates group mappings being used)
FF00::/8*
    SM, RP: FC00:2:255::255
    RPF: Tu4,FC00:2:255::255 (us)
    Info source: Static
    Uptime: 1d04h, Groups: 1
R3#
```

The following example shows the output for the **show ipv6 mroute** command on Router 3:

```
R3# show ipv6 mroute
Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group,
        C - Connected, L - Local, I - Received Source Specific Host Report,
        P - Pruned, R - RP-bit set, F - Register flag, T - SPT-bit set,
        J - Join SPT, Y - Joined MDT-data group,
        y - Sending to MDT-data group
```

```
g - BGP signal originated, G - BGP Signal received,
       N - BGP Shared-Tree Prune received, n - BGP C-Mroute suppressed,
       q - BGP Src-Active originated, Q - BGP Src-Active received
       E - Extranet
Timers: Uptime/Expires
Interface state: Interface, State
(*, FF06:1::1), 1d04h/00:03:12, RP FC00:2:255::255, flags: S
  Incoming interface: Tunnel4
  RPF nbr: FC00:2:255::255
  Immediate Outgoing interface list:
    TenGigabitEthernet0/0/1, Forward, 1d04h/00:03:12
    TenGigabitEthernet0/0/0, Forward, 1d01h/00:02:45
(FC00:1:102::12, FF06:1::1), 00:18:43/00:03:12, RP FC00:2:255::255, flags: SPR
  Incoming interface: Tunnel4
  RPF nbr: FC00:2:255::255
  Immediate Outgoing interface list:
   TenGigabitEthernet0/0/0, Null, 00:18:43/00:02:45
    TenGigabitEthernet0/0/1, Null, 00:18:43/00:03:12
(FC00:1:102::12, FF06:1::1), 00:18:45/00:03:12, flags: S
  Incoming interface: TenGigabitEthernet0/0/0
  RPF nbr: FE80::A2B4:39FF:FE21:9181
  Inherited Outgoing interface list:
    TenGigabitEthernet0/0/1, Forward, 1d04h/00:03:12
(FC00:2:255::1, FF06:1::1), 00:18:08/00:02:55, RP FC00:2:255::255, flags: SPR
  Incoming interface: Tunnel4
  RPF nbr: FC00:2:255::255
  Immediate Outgoing interface list:
    TenGigabitEthernet0/0/0, Null, 00:18:08/00:02:45
   TenGigabitEthernet0/0/1, Null, 00:18:04/00:03:12
(FC00:2:255::1, FF06:1::1), 00:18:06/00:02:55, flags: S
  Incoming interface: TenGigabitEthernet0/0/0
  RPF nbr: FE80::A2B4:39FF:FE21:9181
  Inherited Outgoing interface list:
    TenGigabitEthernet0/0/1, Forward, 1d04h/00:03:12
R3#
```

Return to Verifying TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric, on page 172

Example: Configuring TRM with PIM-SM for IPv4 and IPv6 Multicast Traffic when the RP is Outside the BGP EVPN VXLAN Fabric