Nexus 9300에서 SR MPLS[eBGP]를 통한 Layer3 EVPN 구성

목차

소개

이 문서에서는 외부 BGP를 사용하여 Nexus 9300에서 SR(Segment Routing) MPLS(Multiprotocol Label Switching)를 통해 L3 이더넷 VPN(EVPN)을 구축하는 방법에 대해 설명합니다.

사전 요구 사항

요구 사항

다음 주제에 대한 지식을 보유하고 있으면 유용합니다.

- BGP(Border Gateway Protocol)
- L3VPN
- EVPN
- SR

사용되는 구성 요소

이 문서의 정보는 다음 소프트웨어 및 하드웨어 버전을 기반으로 합니다.

- SPINE 하드웨어 - 릴리스 10.2(2)를 실행하는 9336C-FX
- LEAF 하드웨어 - 93240YC-FX2, 릴리스 10.2(2) 실행
- 클라이언트 - 92160YC-X(Host-1), Catalyst-3850(Host-2)

이 문서의 정보는 특정 랩 환경의 디바이스를 토대로 작성되었습니다. 이 문서에 사용된 모든 디바이스는 초기화된(기본) 컨피그레이션으로 시작되었습니다. 현재 네트워크가 작동 중인 경우 모든 명령의 잠재적인 영향을 미리 숙지하시기 바랍니다.

배경 정보

MPLS L3VPN 요약

VPN은 다음과 같습니다.

- 공용 인프라를 통해 사설 네트워크 서비스를 제공하는 IP 기반 네트워크.
- 인터넷이나 기타 공용 또는 사설 네트워크를 통해 서로 개인적으로 통신할 수 있는 사이트 집합입니다.

기존 VPN은 VPN의 모든 사이트에 대한 터널 또는 PVC(Permanent Virtual Circuit)의 풀 메시(full mesh) 컨피그레이션에 의해 생성됩니다. 새 사이트를 추가하려면 VPN의 각 에지 장치를 변경해야 하므로 이 유형의 VPN은 유지 관리하거나 확장하기가 쉽지 않습니다.

MPLS 기반 VPN은 레이어 3에서 생성되며 피어 모델을 기반으로 합니다. 피어 모델은 통신 사업자와 CE가 레이어 3 라우팅 정보를 교환할 수 있도록 합니다. 서비스 제공자는 CE 사이트 간에 CE 개입 없이 데이터를 릴레이합니다.

MPLS VPN은 기존 VPN보다 관리 및 확장이 용이합니다. MPLS VPN에 새 사이트를 추가하는 경우 고객 사이트에 서비스를 제공하는 서비스 공급자의 에지 라우터만 업데이트해야 합니다.

다음은 MPLS VPN의 구성 요소입니다.

- 공급자(P) 라우터 - 공급자 네트워크의 코어에 있는 라우터 PE 라우터는 MPLS 스위칭을 실행하며 라우팅된 패킷에 VPN 레이블을 연결하지 않습니다. VPN 레이블은 데이터 패킷을 올바른 사설 네트워크 또는 CE 에지 라우터로 보내는 데 사용됩니다.

- PE(Provider Edge) 라우터 - VPN 레이블을 수신한 인터페이스 또는 하위 인터페이스에 따라 들어오는 패킷에 연결하고 MPLS 코어 레이블도 연결하는 라우터입니다. PE 라우터는 라우터에 직접 연결됩니다.

- 고객(C) 라우터 - 인터넷 서비스 공급자(ISP) 또는 엔터프라이즈 네트워크의 라우터

- CE(Customer Edge) 라우터 - 네트워크의 PE 라우터에 연결하는 ISP 네트워크의 에지 라우터입니다. CE 라우터는 PE 라우터와 연동해야 합니다.

L3VPN을 사용하는 EVPN 개요(MPLS SR)

DC(Data Center) 구축에서는 EVPN 컨트롤 플레인 학습, 멀티테넌시, 원활한 모빌리티, 이중화, 용이한 POD 추가 등의 이점을 위해 VXLAN(Virtual Extensible LAN) EVPN 또는 MPLS EVPN을 채택했습니다. 마찬가지로, 코어는 LDP(Label Distribution Protocol) 기반 MPLS L3VPN 네트워크이거나 기존 MPLS L3VPN LDP 기반 언더레이에서 SR과 같은 더욱 정교한 솔루션으로 전환됩니다.

SR은 다음과 같은 이점을 위해 채택됩니다.

- IGP(Unified Interior Gateway Protocol) 및 MPLS 제어 평면
- 더 간단한 트래픽 엔지니어링 방법
- 손쉬운 구성
- SDN(Software-Defined Networking) 채택

EVPN(RFC 7432)은 가상화된 데이터 센터 네트워크의 차세대 이더넷 서비스에 사용된 BGP MPLS 기반 솔루션입니다. Route와 같은 여러 블록을 사용합니다.

존재하는 MPLS 기술과 RD(Distinguisher), RT(Route Target) 및 VRF(Virtual Routing and Forwarding).

NXOS 7.0(3)I6(1) 릴리스에 도입된 SR을 통한 L3 EVPN은 MPLS 캡슐화와 함께 EVPN Type-5 경로를 사용합니다. 멀티 테넌트, 확장성 및 고성능을 제공하여 진화된 데이터 센터 서비스를 지원합니다.

참고: DC에서 데이터 평면은 VXLAN 또는 MPLS일 수 있습니다.

기존 MPLS L3 VPN	SR을 통한 MPLS L3 VPN
기본 빌드 블록: RD, RT 및 VRF	기본 빌드 블록: RD, RT 및 VRF
전송을 위한 언더레이 레이어: IGP, LDP 및 RSVP-TE	전송을 위한 언더레이 레이어: IGP/BGP-LU 및 SR-T
서비스용 오버레이 계층: VPNv4 및 VPNv6	서비스용 오버레이 계층: EVPN

네트워크 다이어그램
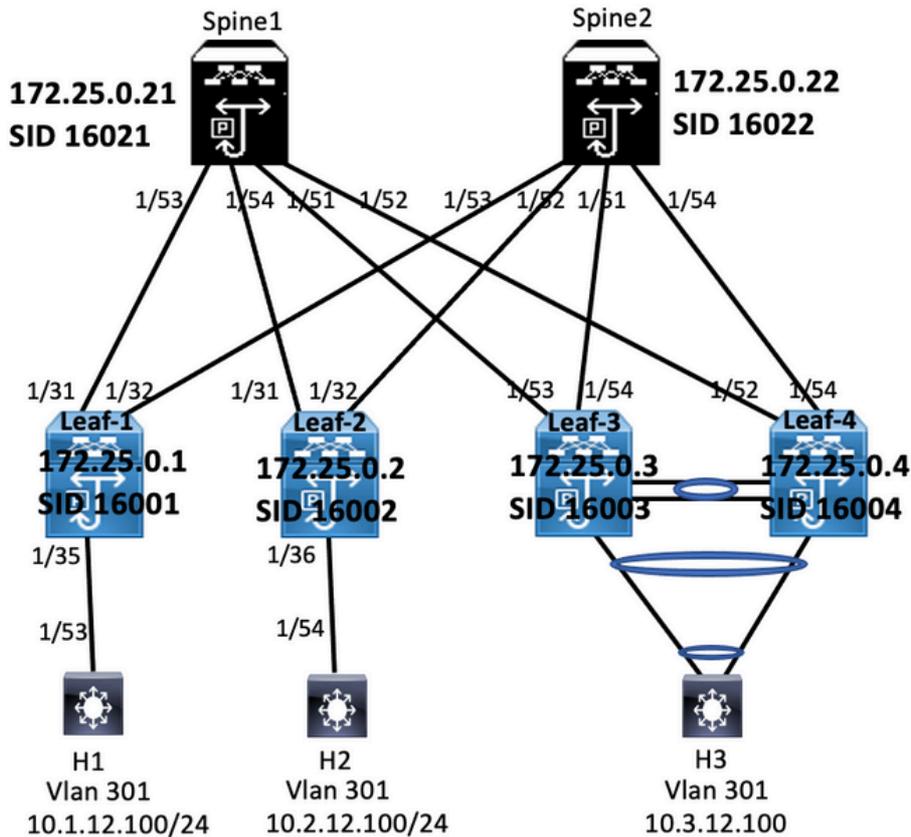
상위 레벨 컨피그레이션

1. 설치 기능
2. IP 주소 구성 - 언더레이
3. IGP/MP 구성 - BGP
4. VLAN 및 EVPN 오버레이 구성

5. 호스트와 LEAF 간의 e-BGP 구성

Leaf-1

Enabling Features	Interface Configuration	BGP/EVPN Configuration	
install feature-set mpls	interface Vlan301	router bgp 65534	
feature-set mpls	ip access-group deny-to-core_ra in	router-id 172.25.0.1	
feature bgp	vrf member VPN-A	disable-policy-batching	
feature mpls segment-routing	no ip redirects	bestpath as-path multipath-relax	
feature mpls evpn	ip address 10.1.12.1/24	bestpath med missing-as-worst	
feature interface-vlan	ip directed-broadcast ip-dir-bcast	log-neighbor-changes	
feature lacp	ip arp timeout 720	event-history detail size large	
feature mpls oam		nexthop suppress-default-resolution	
feature mpls segment-routing traffic-engineering	interface Vlan302	address-family ipv4 unicast	
vlan 1,301-310	ip access-group deny-to-core_ra in	network 172.25.0.1/32	
segment-routing	vrf member VPN-B	maximum-paths 4	
mpls	no ip redirects	maximum-paths ibgp 4	vrf VPN-A
global-block 16000 24000	ip address 10.1.13.1/24	allocate-label route-map node-sid-label	bestpath as-path multipath-relax
connected-prefix-sid-map	ip directed-broadcast ip-dir-bcast	address-family ipv4 labeled-unicast	allocate-index 2001
address-family ipv4	ip arp timeout 720	prefix-priority high	address-family ipv4 unicast
172.25.0.1/32 absolute 16001		address-family l2vpn evpn	network 10.1.12.0/24
ip prefix-list node-sid-loopback seq 10 permit 172.25.0.1/32	interface Ethernet1/31	template peer EBGP-SPINE	advertise l2vpn evpn
ip as-path access-list LOCALLY-ORIGINATE seq 1 permit "^65534"	description connected to spine1 - 1/53 - 192.168.1.10	remote-as 64087	maximum-paths 4
ip as-path access-list LOCALLY-ORIGINATE seq 2 permit "^$"	mtu 9216	description EBGP-PEERING-to-AGG	vrf VPN-B
route-map NODE-SID-MED permit 10	logging event port link-status	address-family ipv4 unicast	bestpath as-path multipath-relax
match ip address prefix-list node-sid-loopback	no ip redirects	allowas-in 1	allocate-index 2002
set metric 100	ip address 192.168.1.9/30	send-community	address-family ipv4 unicast
route-map NODE-SID-MED permit 20	ip arp timeout 14400	send-community extended	network 10.1.13.0/24
route-map SET_NH permit 5	mpls ip forwarding	route-map NODE-SID-MED out	advertise l2vpn evpn
			maximum-paths 4
match community MATCH-65534:65534.		no advertise local-labeled-route	
set ip next-hop unchanged		soft-reconfiguration inbound	
route-map SET_NH permit 10	interface Ethernet1/32	address-family ipv4 labeled-unicast	
match as-path LOCALLY-ORIGINATE	description connected to spine2 - 1/53 - 192.168.1.14	allowas-in 1	
set ip next-hop 172.25.0.1	mtu 9216	send-community	
	logging event port link-status	send-community extended	
vrf context VPN-A	no ip redirects	route-map NODE-SID-MED out	
rd auto	ip address 192.168.1.13/30	soft-reconfiguration inbound always	
address-family ipv4 unicast	ip arp timeout 14400	address-family l2vpn evpn	
route-target import 301:301	mpls ip forwarding	allowas-in 1	
route-target import 301:301 evpn	no shutdown	send-community	
route-target export 301:301		send-community extended	
route-target export 301:301 evpn	interface Ethernet1/35	filter-list LOCALLY-ORIGINATE out	
vrf context VPN-B	switchport	route-map SET_NH out	
rd auto	switchport mode trunk	encapsulation mpls	
address-family ipv4 unicast	switchport trunk allowed vlan 301-310	neighbor 192.168.1.10	
route-target import 302:302	no shutdown	inherit peer EBGP-SPINE	
route-target import 302:302 evpn		neighbor 192.168.1.14	
route-target export 302:302	interface loopback0	inherit peer EBGP-SPINE	
route-target export 302:302 evpn	ip address 172.25.0.1/32		
	no shut		

Leaf-2

Enabling Features	Interface Configuration	BGP/EVPN Configuration	
install feature-set mpls	interface Vlan301	router bgp 65534	
feature-set mpls	no shutdown	router-id 172.25.0.2	
feature bgp	ip access-group deny-to-core_ra in	disable-policy-batching	
feature mpls segment-routing	vrf member VPN-A	bestpath as-path multipath-relax	
feature mpls evpn	no ip redirects	bestpath med missing-as-worst	
feature interface-vlan	ip address 10.2.12.1/24	log-neighbor-changes	
feature lacp	ip directed-broadcast ip-dir-bcast	event-history detail size large	
feature mpls oam	ip arp timeout 720	nexthop suppress-default-resolution	
feature mpls segment-routing traffic-engineering		address-family ipv4 unicast	
vlan 1,301-310	interface Vlan302	network 172.25.0.2/32	
segment-routing	no shutdown	maximum-paths 4	vrf VPN-A
mpls	ip access-group deny-to-core_ra in	maximum-paths ibgp 4	bestpath as-path multipath-relax
global-block 16000 24000	vrf member VPN-B	allocate-label route-map node-sid-label	allocate-index 2001
connected-prefix-sid-map	no ip redirects	address-family ipv4 labeled-unicast	address-family ipv4 unicast
address-family ipv4	ip address 10.2.13.1/24	prefix-priority high	network 10.2.12.0/24
172.25.0.2/32 absolute 16002	ip directed-broadcast ip-dir-bcast	address-family l2vpn evpn	advertise l2vpn evpn
ip prefix-list node-sid-loopback seq 10 permit 172.25.0.2/32	ip arp timeout 720	template peer EBGP-SPINE	maximum-paths 4
ip as-path access-list LOCALLY-ORIGINATE seq 1 permit "^65534"		remote-as 64087	vrf VPN-B
ip as-path access-list LOCALLY-ORIGINATE seq 2 permit "^$"	interface Ethernet1/3	description EBGP-PEERING-to-AGG	bestpath as-path multipath-relax
route-map NODE-SID-MED permit 10	switchport	address-family ipv4 unicast	allocate-index 2002
match ip address prefix-list node-sid-loopback	switchport mode trunk	allowas-in 1	address-family ipv4 unicast
set metric 100	switchport trunk allowed vlan 301-310	send-community	network 10.2.13.0/24
route-map NODE-SID-MED permit 20	no shutdown	send-community extended	advertise l2vpn evpn
route-map SET_NH permit 5		route-map NODE-SID-MED out	maximum-paths 4
	interface Ethernet1/31		
	description connected to spine1 - 1/54 - 192.168.2.10		
match community MATCH-65534:65534	mtu 9216	no advertise local-labeled-route	
set ip next-hop unchanged	logging event port link-status	soft-reconfiguration inbound	
route-map SET_NH permit 10	no ip redirects	address-family ipv4 labeled-unicast	
match as-path LOCALLY-ORIGINATE	ip address 192.168.2.9/30	allowas-in 1	
set ip next-hop 172.25.0.2	ip arp timeout 14400	send-community	
vrf context VPN-A	mpls ip forwarding	send-community extended	
rd auto	interface Ethernet1/32	route-map NODE-SID-MED out	
address-family ipv4 unicast	description connected to Spine2 - 1/52 - 192.168.2.14	soft-reconfiguration inbound always	
route-target import 301:301	mtu 9216	address-family l2vpn evpn	
route-target import 301:301 evpn	logging event port link-status	allowas-in 1	
route-target export 301:301	no ip redirects	send-community	
route-target export 301:301 evpn	ip address 192.168.2.13/30	send-community extended	
vrf context VPN-B	ip arp timeout 14400	filter-list LOCALLY-ORIGINATE out	
rd auto	mpls ip forwarding	route-map SET_NH out	
address-family ipv4 unicast	interface Ethernet1/36	encapsulation mpls	
route-target import 302:302	switchport mode trunk	neighbor 192.168.2.10	
route-target import 302:302 evpn	switchport trunk allowed vlan 301-310	inherit peer EBGP-SPINE	
route-target export 302:302	interface loopback0	neighbor 192.168.2.14	
route-target export 302:302 evpn	ip address 172.25.0.2/32	inherit peer EBGP-SPINE	

Spine-1

Enabling Features	Interface Configuration	BGP/EVPN Configuration
install feature-set mpls	interface Ethernet1/53	router bgp 64087
feature-set mpls	description connected to Leaf1 - 1/31 - 192.168.1.9	router-id 172.25.0.21
feature bgp	mtu 9216	bestpath as-path multipath-relax
feature mpls segment-routing	logging event port link-status	bestpath med missing-as-worst
feature mpls evpn	no ip redirects	log-neighbor-changes
feature interface-vlan	ip address 192.168.1.10/30	nexthop suppress-default-resolution
feature lacp	ip arp timeout 14400	address-family ipv4 unicast
feature mpls oam	mpls ip forwarding	network 172.25.0.21/32
feature mpls segment-routing traffic-engineering	no shutdown	maximum-paths 4
vlan 1		nexthop route-map NH-RESTRICT
segment-routing	interface Ethernet1/54	allocate-label route-map node-sid-label
mpls	description connected to Leaf2- 1/31 - 192.168.2.9	address-family ipv4 labeled-unicast
global-block 16000 24000	mtu 9216	prefix-priority high
connected-prefix-sid-map	logging event port link-status	address-family l2vpn evpn
address-family ipv4	no ip redirects	retain route-target all
172.25.0.21/32 absolute 16021	ip address 192.168.2.10/30	template peer EBGP-ACCESS
ip prefix-list NH-RESTRICT seq 5 permit 0.0.0.0/0	ip arp timeout 14400	remote-as 65534
ip prefix-list node-sid-loopback seq 5 permit 172.25.0.21/32	mpls ip forwarding	description EBGP-PEERING-to-ACCESS
route-map NH-RESTRICT deny 10	no shutdown	address-family ipv4 unicast
match ip address prefix-list NH-RESTRICT		disable-peer-as-check
route-map NH-RESTRICT permit 20		send-community
route-map NH_UNCHG permit 10	interface loopback0	send-community extended
set ip next-hop unchanged	ip address 172.25.0.21/32	default-originate
	no shutdown	no advertise local-labeled-route
		soft-reconfiguration inbound
		address-family ipv4 labeled-unicast
		disable-peer-as-check
		send-community
		send-community extended
		soft-reconfiguration inbound
		address-family l2vpn evpn
		disable-peer-as-check
		send-community
		send-community extended
		route-map NH_UNCHG out
		encapsulation mpls
		neighbor 192.168.1.9
		inherit peer EBGP-ACCESS
		neighbor 192.168.2.9
		inherit peer EBGP-ACCESS

Spine-2

Enabling Feature	Interface Configuration	BGP/EVPN Configuration
	interface Ethernet1/52	router bgp 64087
install feature-set mpls	description connected to Leaf2 - 1/31 - 192.168.2.13	router-id 172.25.0.22
feature-set mpls	mtu 9216	bestpath as-path multipath-relax
feature bgp	logging event port link-status	bestpath med missing-as-worst
feature mpls segment-routing	no ip redirects	log-neighbor-changes
feature mpls evpn	ip address 192.168.2.14/30	nexthop suppress-default-resolution
feature interface-vlan	ip arp timeout 14400	address-family ipv4 unicast
feature lacp	mpls ip forwarding	network 172.25.0.22/32
feature mpls oam	no shutdown	maximum-paths 4
feature mpls segment-routing traffic-engineering		nexthop route-map NH-RESTRICT
vlan 1	interface Ethernet1/53	allocate-label route-map node-sid-label
segment-routing	description connected to Leaf2- 1/32 - 192.168.1.13	address-family ipv4 labeled-unicast
mpls	mtu 9216	prefix-priority high
global-block 16000 24000	logging event port link-status	address-family l2vpn evpn
connected-prefix-sid-map	no ip redirects	retain route-target all
address-family ipv4	ip address 192.168.1.14/30	template peer EBGP-ACCESS
172.25.0.22/32 absolute 16021	ip arp timeout 14400	remote-as 65534
ip prefix-list NH-RESTRICT seq 5 permit 0.0.0.0/0	mpls ip forwarding	description EBGP-PEERING-to-ACCESS
ip prefix-list node-sid-loopback seq 5 permit 172.25.0.22/32	no shutdown	address-family ipv4 unicast
route-map NH-RESTRICT deny 10		disable-peer-as-check
match ip address prefix-list NH-RESTRICT		send-community
route-map NH-RESTRICT permit 20	interface loopback0	send-community extended
route-map NH_UNCHG permit 10	ip address 172.25.0.22/32	default-originate
set ip next-hop unchanged	no shut	no advertise local-labeled-route
		soft-reconfiguration inbound
		address-family ipv4 labeled-unicast
		disable-peer-as-check
		send-community
		send-community extended
		soft-reconfiguration inbound
		address-family l2vpn evpn
		disable-peer-as-check
		send-community
		send-community extended
		route-map NH_UNCHG out
		encapsulation mpls
		neighbor 192.168.1.13
		inherit peer EBGP-ACCESS
		neighbor 192.168.2.13
		inherit peer EBGP-ACCESS

install feature-set mpls	install feature-set mpls
feature mpls	feature mpls
interface Ethernet1/53	interface Ethernet1/54
switchport	switchport
switchport mode trunk	switchport mode trunk
switchport trunk allowed vlan 301-310	switchport trunk allowed vlan 301-310
no shut	no shut
interface vlan 301	interface vlan 301
no shutdown	no shutdown
no ip redirects	no ip redirects
ip address 10.1.12.100/24	ip address 10.2.12.100/24
ip directed-broadcast ip-dir-bcast	ip directed-broadcast ip-dir-bcast
ip arp timeout 720	ip arp timeout 720

다음을 확인합니다.

구성이 올바르게 작동하는지 확인하려면 이 섹션을 활용하십시오.

```
H1(config)# show ip int brief

IP Interface Status for VRF "default"(1)
Interface      IP Address      Interface Status
Vlan301        10.1.12.100     protocol-up/link-up/admin-up

H1(config)# ping 10.2.12.100
PING 10.2.12.100 (10.2.12.100): 56 data bytes
64 bytes from 10.2.12.100: icmp_seq=0 ttl=251 time=0.994 ms
64 bytes from 10.2.12.100: icmp_seq=1 ttl=251 time=0.586 ms
64 bytes from 10.2.12.100: icmp_seq=2 ttl=251 time=0.677 ms
64 bytes from 10.2.12.100: icmp_seq=3 ttl=251 time=0.615 ms
64 bytes from 10.2.12.100: icmp_seq=4 ttl=251 time=0.597 ms

--- 10.2.12.100 ping statistics ---
5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 0.586/0.693/0.994 ms
```

```
H2(config)# show ip int brief

IP Interface Status for VRF "default"(1)
Interface      IP Address      Interface Status
Vlan301        10.2.12.100     protocol-up/link-up/admin-up

H2(config)# ping 10.1.12.100
PING 10.1.12.100 (10.1.12.100): 56 data bytes
64 bytes from 10.1.12.100: icmp_seq=0 ttl=251 time=1.043 ms
64 bytes from 10.1.12.100: icmp_seq=1 ttl=251 time=1.933 ms
64 bytes from 10.1.12.100: icmp_seq=2 ttl=251 time=0.865 ms
64 bytes from 10.1.12.100: icmp_seq=3 ttl=251 time=0.668 ms
64 bytes from 10.1.12.100: icmp_seq=4 ttl=251 time=0.713 ms

--- 10.1.12.100 ping statistics ---
5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 0.668/1.044/1.933 ms
```

문제 해결

이 섹션에서는 설정 문제 해결에 사용할 수 있는 정보를 제공합니다.

```
spine1(config-router-af)# show mpls switching

Legend:
(P)=Protected, (F)=FRR active, (*)=more labels in stack.

IPV4:
In-Label  Out-Label  FEC name       Out-Interface  Next-Hop
VRF default
16001     Pop Label  172.25.0.1/32  Eth1/53        10.1.1.9
16002     Pop Label  172.25.0.2/32  Eth1/54        10.2.1.9

In-Label  VRF
492287    default


Block   Label-Range
1       16000 - 24000
```

```
spine1(config-router-af)# show bgp l2vpn evpn
BGP routing table information for VRF default, address family L2VPN EVPN
BGP table version is 17, Local Router ID is 172.25.0.21

  Network       Next Hop       Metric    LocPrf   Weight Path
  Route Distinguisher: 172.25.0.1:3
*>e[5]:[0]:[0]:[24]:[12.1.12.0]/224
                172.25.0.1    4294967295          0 65534 i

  Route Distinguisher: 172.25.0.1:4
*>e[5]:[0]:[0]:[24]:[12.1.13.0]/224
                172.25.0.1    4294967295          0 65534 i

  Route Distinguisher: 172.25.0.2:3
*>e[5]:[0]:[0]:[24]:[10.2.12.0]/224
                172.25.0.2    4294967295          0 65534 i

  Route Distinguisher: 172.25.0.2:4
*>e[5]:[0]:[0]:[24]:[10.2.13.0]/224
                172.25.0.2    4294967295          0 65534 i
```

```
ping 10.1.12.200
PING 10.1.12.200 (10.1.12.200): 56 data bytes
64 bytes from 10.1.12.200: icmp_seq=0 ttl=254 time=1.14 ms
64 bytes from 10.1.12.200: icmp_seq=1 ttl=254 time=0.687 ms
64 bytes from 10.1.12.200: icmp_seq=2 ttl=254 time=0.658 ms
64 bytes from 10.1.12.200: icmp_seq=3 ttl=254 time=0.636 ms
64 bytes from 10.1.12.200: icmp_seq=4 ttl=254 time=0.699 ms
--- 10.1.12.200 ping statistics ---
5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 0.636/0.763/1.14 ms

H1# show ip int brie
IP Interface Status for VRF "default"(1)
Interface        IP Address    Interface Status
Vlan301          10.1.12.100   protocol-up/link-up/admin-up

H1# show mac address-table
Legend:
        * - primary entry, G - Gateway MAC, (R) - Routed MAC, O - Overlay MAC
        age - seconds since last seen,+ - primary entry using vPC Peer-Link,
        (T) - True, (F) - False, C - ControlPlane MAC, ~ - vsan
   VLAN   MAC Address    Type    age   Secure NTFY Ports
---------+-----------------+--------+---------+------+-----+------------------
*  301   0000.0000.1111  dynamic 0      F   F   Po30
*  301   00ea.bd27.86ef  dynamic 0      F   F   Po30
G  -     00ea.bd27.6285  static  -      F   F   sup-eth1(R)
G  301   00ea.bd27.6285  static  -      F   F   sup-eth1(R)
```

```
H2# show ip interface brief
Interface     IP Address    Interface Status
Vlan301       10.1.12.200   protocol-up/link-up/admin-up
H3# ping 10.1.12.100
PING 10.1.12.100 (10.1.12.100): 56 data bytes
64 bytes from 10.1.12.100: icmp_seq=0 ttl=254 time=1.211 ms
64 bytes from 10.1.12.100: icmp_seq=1 ttl=254 time=0.694 ms
64 bytes from 10.1.12.100: icmp_seq=2 ttl=254 time=0.68 ms
64 bytes from 10.1.12.100: icmp_seq=3 ttl=254 time=0.673 ms
64 bytes from 10.1.12.100: icmp_seq=4 ttl=254 time=0.624 ms
--- 10.1.12.100 ping statistics ---
5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 0.624/0.776/1.211 ms
H3# show int vlan 301
Vlan301 is up, line protocol is up, autostate enabled
   Hardware is EtherSVI, address is 00ea.bd27.86ef
H3# show mac address-table
Legend:
        * - primary entry, G - Gateway MAC, (R) - Routed MAC, O - Overlay MAC
        age - seconds since last seen,+ - primary entry using vPC Peer-Link,
        (T) - True, (F) - False, C - ControlPlane MAC, ~ - vsan
   VLAN   MAC Address    Type    age   Secure NTFY Ports
---------+-----------------+--------+---------+------+-----+------------------
*  301   0000.0000.1111  dynamic 0      F   F   Eth1/33
*  301   00ea.bd27.6285  dynamic 0      F   F   Eth1/33
G  -     00ea.bd27.86ef  static  -      F   F   sup-eth1(R)
G  301   00ea.bd27.86ef  static  -      F   F   sup-eth1(R)
```

```
spine-1# show bgp l2vpn evpn
BGP routing table information for VRF default, address family L2VPN EVPN
BGP table version is 188, Local Router ID is 172.25.0.21
Status: s-suppressed, x-deleted, S-stale, d-dampened, h-history, *-valid, >-best
Path type: i-internal, e-external, c-confed, l-local, a-aggregate, r-redist, I-i
njected
Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup, 2 - Network
  Next Hop      Metric   LocPrf   Weight Path
Route Distinguisher: 172.25.0.1:5
*>e[5]:[0]:[0]:[24]:[10.1.12.0]/224
             172.25.0.15    4294967295          0 65534 i
Route Distinguisher: 172.25.0.1:37164
*>e[2]:[0]:[0]:[48]:[00ea.bd27.6285]:[0]:[0.0.0.0]/216
             172.25.0.15    4294967295          0 65534 i
*>e[2]:[0]:[0]:[48]:[00ea.bd27.6285]:[32]:[10.1.12.100]/272
             172.25.0.15    4294967295          0 65534 i
*>e[3]:[0]:[32]:[172.25.0.15]/88
             172.25.0.15    4294967295          0 65534 i
Route Distinguisher: 172.25.0.2:37164
*>e[2]:[0]:[0]:[48]:[00ea.bd27.6285]:[0]:[0.0.0.0]/216
             172.25.0.15    4294967295          0 65534 i
*>e[2]:[0]:[0]:[48]:[00ea.bd27.6285]:[32]:[10.1.12.100]/272
             172.25.0.15    4294967295          0 65534 i
*>e[3]:[0]:[32]:[172.25.0.15]/88
             172.25.0.15    4294967295          0 65534 i

Route Distinguisher: 172.25.0.3:37164
*>e[2]:[0]:[0]:[48]:[00ea.bd27.86ef]:[0]:[0.0.0.0]/216
             172.25.0.3     4294967295          0 65534 i
*>e[2]:[0]:[0]:[48]:[00ea.bd27.86ef]:[32]:[10.1.12.200]/272
             172.25.0.3     4294967295          0 65534 i
*>e[3]:[0]:[32]:[172.25.0.3]/88
             172.25.0.3     4294967295          0 65534 i

spine-1# show ip int brie

IP Interface Status for VRF "default"(1)
Interface    IP Address     Interface Status
Lo0          172.25.0.21    protocol-up/link-up/admin-up
Eth1/45      192.168.1.10   protocol-up/link-up/admin-up
Eth1/46      192.168.2.10   protocol-up/link-up/admin-up
Eth1/52      192.168.3.10   protocol-up/link-up/admin-up
spine-1#
```

```
BGP routing table information for VRF default, address family L2VPN
EVPN
BGP table version is 188, Local Router ID is 172.25.0.22
Status: s-suppressed, x-deleted, S-stale, d-dampened, h-history, *-valid,
>-best
Path type: i-internal, e-external, c-confed, l-local, a-aggregate, r-redist, I-
i
njected
Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup, 2 -
b
  Network     Next Hop    Metric   LocPrf   Weight Path
Route Distinguisher: 172.25.0.1:5
*>e[5]:[0]:[0]:[24]:[12.1.12.0]/224
             172.25.0.15    4294967295          0 65534 i

Route Distinguisher: 172.25.0.1:37164
*>e[2]:[0]:[0]:[48]:[00ea.bd27.6285]:[0]:[0.0.0.0]/216
             172.25.0.15    4294967295          0 65534 i
*>e[2]:[0]:[0]:[48]:[00ea.bd27.6285]:[32]:[10.1.12.100]/272
             172.25.0.15    4294967295          0 65534 i
*>e[3]:[0]:[32]:[172.25.0.15]/88
             172.25.0.15    4294967295          0 65534 i

Route Distinguisher: 172.25.0.2:37164
*>e[2]:[0]:[0]:[48]:[00ea.bd27.6285]:[0]:[0.0.0.0]/216
             172.25.0.15    4294967295          0 65534 i
*>e[2]:[0]:[0]:[48]:[00ea.bd27.6285]:[32]:[10.1.12.100]/272

Route Distinguisher: 172.25.0.3:37164
*>e[2]:[0]:[0]:[48]:[00ea.bd27.86ef]:[0]:[0.0.0.0]/216
             172.25.0.3     4294967295          0 65534 i
*>e[2]:[0]:[0]:[48]:[00ea.bd27.86ef]:[32]:[10.1.12.200]/272
             172.25.0.3     4294967295          0 65534 i
*>e[3]:[0]:[32]:[172.25.0.3]/88
             172.25.0.3     4294967295          0 65534 i

spine2# show ip int brie

IP Interface Status for VRF "default"(1)
Interface    IP Address     Interface Status
Lo0          172.25.0.22    protocol-up/link-up/admin-up
Eth1/47      192.168.1.14   protocol-up/link-up/admin-up
Eth1/48      192.168.2.14   protocol-up/link-up/admin-up
Eth1/53      192.168.3.14   protocol-up/link-up/admin-up
spine2#
```