Configuración de EVPN de capa 3 sobre SR MPLS [eBGP] en Nexus 9300

Contenido

Introducción

Este documento describe cómo implementar L3 Ethernet VPN (EVPN) sobre Segment Routing (SR) Multiprotocol Label Switching en Nexus 9300 con BGP externo.

Prerequisites

Requirements

Cisco recomienda que tenga conocimiento sobre estos temas:

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

Componentes Utilizados

La información que contiene este documento se basa en las siguientes versiones de software y hardware.

- Hardware de columna - 9336C-FX que ejecuta la versión 10.2(2)
- LEAF Hardware - 93240YC-FX2 que ejecuta la versión 10.2(2)
- CLIENTE - 92160YC-X (Host-1), Catalyst-3850 (Host-2)

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. Si tiene una red en vivo, asegúrese de entender el posible impacto de cualquier comando.

Antecedentes

Resumen de MPLS L3VPN

Una VPN es:

- Red basada en IP que ofrece servicios de red privada en una infraestructura pública.
- Conjunto de sitios que pueden comunicarse entre sí de forma privada a través de Internet u otras redes públicas o privadas.

Las VPN convencionales se crean mediante la configuración de una malla completa de túneles o circuitos virtuales permanentes (PVC) para todos los sitios de una VPN. Este tipo de VPN no es fácil de mantener o ampliar, ya que la adición de un nuevo sitio requiere un cambio en cada dispositivo periférico de la VPN.

Las VPN basadas en MPLS se crean en la capa 3 y se basan en el modelo de peer. El modelo de peer permite al proveedor de servicios y al CE intercambiar información de routing de capa 3. El proveedor de servicios transmite los datos entre los sitios CE sin la intervención del CE.

Las VPN MPLS son más fáciles de gestionar y ampliar que las VPN convencionales. Cuando se agrega un nuevo sitio a una VPN MPLS, solo es necesario actualizar el router de extremo del proveedor de servicios que proporciona servicios al sitio del cliente.

Estos son los componentes de MPLS VPN:

- Router del proveedor (P): router en el núcleo de la red del proveedor. Los routers PE ejecutan switching MPLS y no adjuntan etiquetas VPN a los paquetes enrutados. Las etiquetas VPN se utilizan para dirigir paquetes de datos a la red privada o al router de borde CE correcto.

- Router de extremo del proveedor (PE): Router que conecta la etiqueta VPN a los paquetes entrantes en función de la interfaz o subinterfaz en la que se reciben y que también conecta las etiquetas de núcleo MPLS. Un router PE se conecta directamente a un router.

- Router del cliente (C): router del proveedor de servicios de Internet (ISP) o red de la empresa.

- Router de extremo del cliente (CE): router de extremo en la red del ISP que se conecta al router PE de la red. Un router CE debe interactuar con un router PE.

Descripción General de EVPN con L3VPN (MPLS SR)

Las implementaciones de Data Center (DC) han adoptado EVPN de LAN extensible virtual (VXLAN) o EVPN MPLS por sus ventajas, como el aprendizaje del plano de control de EVPN, la capacidad de varios arrendatarios, la movilidad sin problemas, la redundancia y las adiciones de POD más sencillas. De manera similar, CORE es una red MPLS L3VPN basada en el protocolo de distribución de etiquetas (LDP) o una transición de la tradicional capa subyacente basada en MPLS L3VPN LDP a una solución más sofisticada como SR.

SR se adopta por sus ventajas como:

- Planos de control de MPLS y protocolo de gateway interior unificado (IGP)
- Métodos de ingeniería de tráfico más sencillos
- Configuración más sencilla
- Adopción de redes definidas por software (SDN)

EVPN (RFC 7432) es una solución basada en MPLS BGP que se ha utilizado para los servicios Ethernet de última generación en una red de Data Center virtualizada. Utiliza varios bloques como Route.

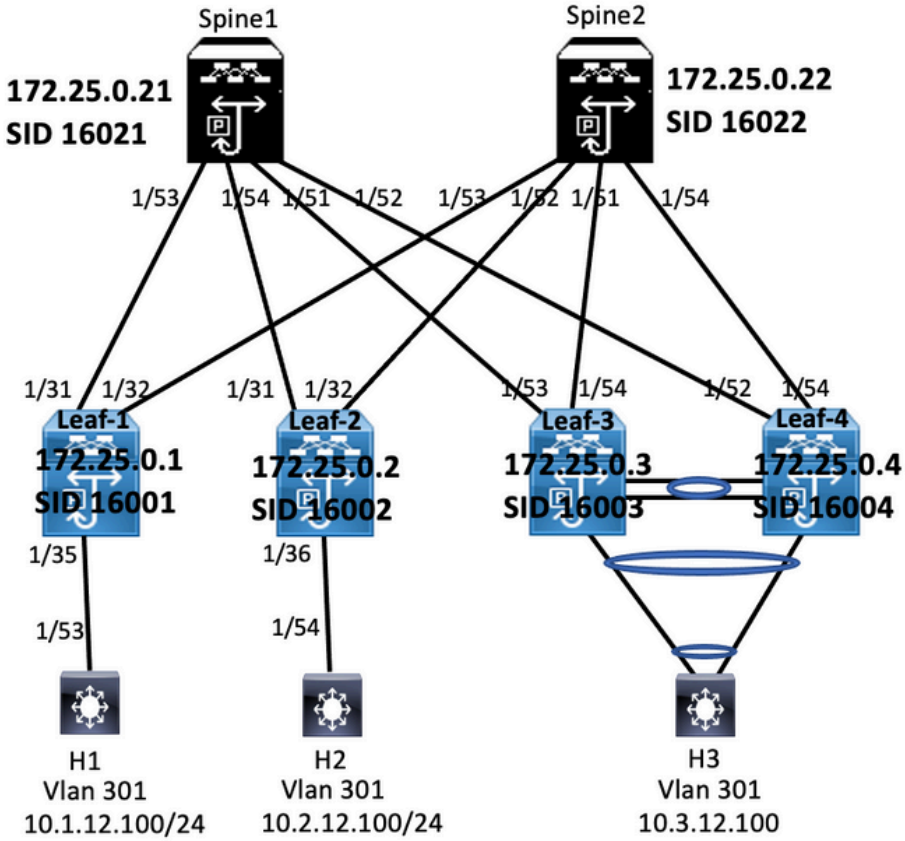
Distinguidor (RD), destino de ruta (RT) y routing y reenvío virtuales (VRF) de las tecnologías MPLS existentes.

La EVPN de nivel 3 sobre SR que se introdujo en la versión NXOS 7.0(3)I6(1) utiliza la ruta EVPN de tipo 5 con encapsulación MPLS. Ofrece varios arrendatarios, escalabilidad y alto rendimiento para servicios evolucionados de Data Center.

Nota: En DC, el plano de datos puede ser VXLAN o MPLS.

VPN L3 MPLS tradicional	MPLS L3 VPN sobre SR
Bloques de creación principales: RD, RT y VRF	Bloques de creación principales: RD, RT y VRF
Capa subyacente para transporte: IGP, LDP y RSVP-TE	Capa subyacente para transporte: IGP/BGP-LU
Capa superpuesta para servicio: VPNv4 y VPNv6	Capa superpuesta para servicio: EVPN

Diagrama de la red



Configuración de alto nivel

1. Instalar características
2. Configurar dirección IP - Subyacente
3. Configuración de IGP/MP - BGP
4. Configuración de VLAN y EVPN Overlay
5. Configurar e-BGP entre hosts y hojas

Leaf-1

Enabling Features

```
install feature-set mpls
feature-set mpls
feature bgp
feature mpls segment-routing
feature mpls evpn
feature interface-vlan
feature lacp
feature mpls oam
feature mpls segment-routing traffic-engineering
vlan 1,301-310
segment-routing
 mpls
  global-block 16000 24000
  connected-prefix-sid-map
   address-family ipv4
172.25.0.1/32 absolute 16001
ip prefix-list node-sid-loopback seq 10 permit 172.25.0.1/32
ip as-path access-list LOCALLY-ORIGINATE seq 1 permit "^65534"
ip as-path access-list LOCALLY-ORIGINATE seq 2 permit "^$"
route-map NODE-SID-MED permit 10
 match ip address prefix-list node-sid-loopback
 set metric 100
route-map NODE-SID-MED permit 20
route-map SET_NH permit 5
```

Interface Configuration

```
interface Vlan301
 ip access-group deny-to-core_ra in
 vrf member VPN-A
 no ip redirects
 ip address 10.1.12.1/24
 ip directed-broadcast ip-dir-bcast
 ip arp timeout 720

interface Vlan302
 ip access-group deny-to-core_ra in
 vrf member VPN-B
 no ip redirects
 ip address 10.1.13.1/24
 ip directed-broadcast ip-dir-bcast
 ip arp timeout 720

interface Ethernet1/31
 description connected to spine1 - 1/53 - 192.168.1.10
 mtu 9216
 logging event port link-status
 no ip redirects
 ip address 192.168.1.9/30
 ip arp timeout 14400
 mpls ip forwarding
```

BGP/EVPN Configuration

```
router bgp 65534
 router-id 172.25.0.1
 disable-policy-batching
 bestpath as-path multipath-relax
 bestpath med missing-as-worst
 log-neighbor-changes
 event-history detail size large
 nexthop suppress-default-resolution
 address-family ipv4 unicast
  network 172.25.0.1/32
  maximum-paths 4
  maximum-paths ibgp 4
  allocate-label route-map node-sid-label
 address-family ipv4 labeled-unicast
  prefix-priority high
 address-family l2vpn evpn
 template peer EBGP-SPINE
  remote-as 64087
  description EBGP-PEERING-to-AGG
  address-family ipv4 unicast
   allowas-in 1
   send-community
   send-community extended
   route-map NODE-SID-MED out
```

```
vrf VPN-A
 bestpath as-path multipath-relax
 allocate-index 2001
 address-family ipv4 unicast
  network 10.1.12.0/24
  advertise l2vpn evpn
  maximum-paths 4
vrf VPN-B
 bestpath as-path multipath-relax
 allocate-index 2002
 address-family ipv4 unicast
  network 10.1.13.0/24
  advertise l2vpn evpn
  maximum-paths 4
```

```
 match community MATCH-65534:65534.
set ip next-hop unchanged
route-map SET_NH permit 10
 match as-path LOCALLY-ORIGINATE
set ip next-hop 172.25.0.1

vrf context VPN-A
 rd auto
 address-family ipv4 unicast
  route-target import 301:301
  route-target import 301:301 evpn
  route-target export 301:301
  route-target export 301:301 evpn
vrf context VPN-B
 rd auto
 address-family ipv4 unicast
  route-target import 302:302
  route-target import 302:302 evpn
  route-target export 302:302
  route-target export 302:302 evpn
```

```
interface Ethernet1/32
 description connected to spine2 - 1/53 - 192.168.1.14
 mtu 9216
 logging event port link-status
 no ip redirects
 ip address 192.168.1.13/30
 ip arp timeout 14400
 mpls ip forwarding
 no shutdown

interface Ethernet1/35
 switchport
 switchport mode trunk
 switchport trunk allowed vlan 301-310
 no shutdown

interface loopback0
 ip address 172.25.0.1/32
no shut
```

```
no advertise local-labeled-route
   soft-reconfiguration inbound
  address-family ipv4 labeled-unicast
   allowas-in 1
   send-community
   send-community extended
   route-map NODE-SID-MED out
   soft-reconfiguration inbound always
  address-family l2vpn evpn
   allowas-in 1
   send-community
   send-community extended
   filter-list LOCALLY-ORIGINATE out
   route-map SET_NH out
   encapsulation mpls
 neighbor 192.168.1.10
  inherit peer EBGP-SPINE
 neighbor 192.168.1.14
  inherit peer EBGP-SPINE
```

Leaf-2

Enabling Features

```
install feature-set mpls
feature-set mpls
feature bgp
feature mpls segment-routing
feature mpls evpn
feature interface-vlan
feature lacp
feature mpls oam
feature mpls segment-routing traffic-engineering
vlan 1,301-310
segment-routing
 mpls
  global-block 16000 24000
  connected-prefix-sid-map
   address-family ipv4
    172.25.0.2/32 absolute 16002
ip prefix-list node-sid-loopback seq 10 permit 172.25.0.2/32
ip as-path access-list LOCALLY-ORIGINATE seq 1 permit "^65534"
ip as-path access-list LOCALLY-ORIGINATE seq 2 permit "^$"
route-map NODE-SID-MED permit 10
 match ip address prefix-list node-sid-loopback
 set metric 100
route-map NODE-SID-MED permit 20
route-map SET_NH permit 5
```

Interface Configuration

```
interface Vlan301
 no shutdown
 ip access-group deny-to-core_ra in
 vrf member VPN-A
 no ip redirects
 ip address 10.2.12.1/24
 ip directed-broadcast ip-dir-bcast
 ip arp timeout 720

interface Vlan302
 no shutdown
 ip access-group deny-to-core_ra in
 vrf member VPN-B
 no ip redirects
 ip address 10.2.13.1/24
 ip directed-broadcast ip-dir-bcast
 ip arp timeout 720

interface Ethernet1/3
 switchport
 switchport mode trunk
 switchport trunk allowed vlan 301-310
 no shutdown
```

BGP/EVPN Configuration

```
router bgp 65534
 router-id 172.25.0.2
 disable-policy-batching
 bestpath as-path multipath-relax
 bestpath med missing-as-worst
 log-neighbor-changes
 event-history detail size large
 nexthop suppress-default-resolution
 address-family ipv4 unicast
  network 172.25.0.2/32
  maximum-paths 4
  maximum-paths ibgp 4
  allocate-label route-map node-sid-label
 address-family ipv4 labeled-unicast
  prefix-priority high
 address-family l2vpn evpn
 template peer EBGP-SPINE
  remote-as 64087
  description EBGP-PEERING-to-AGG
  address-family ipv4 unicast
   allowas-in 1
   send-community
   send-community extended
   route-map NODE-SID-MED out
```

```
vrf VPN-A
  bestpath as-path multipath-relax
  allocate-index 2001
  address-family ipv4 unicast
   network 10.2.12.0/24
   advertise l2vpn evpn
   maximum-paths 4
 vrf VPN-B
  bestpath as-path multipath-relax
  allocate-index 2002
  address-family ipv4 unicast
   network 10.2.13.0/24
   advertise l2vpn evpn
   maximum-paths 4
```

```
match community MATCH-65534:65534
 set ip next-hop unchanged
route-map SET_NH permit 10
 match as-path LOCALLY-ORIGINATE
 set ip next-hop 172.25.0.2
vrf context VPN-A
 rd auto
 address-family ipv4 unicast
  route-target import 301:301
  route-target import 301:301 evpn
  route-target export 301:301
  route-target export 301:301 evpn
vrf context VPN-B
 rd auto
 address-family ipv4 unicast
  route-target import 302:302
  route-target import 302:302 evpn
  route-target export 302:302
  route-target export 302:302 evpn
```

```
interface Ethernet1/31
 description connected to spine1 - 1/54 - 192.168.2.10
 mtu 9216
 logging event port link-status
 no ip redirects
 ip address 192.168.2.9/30
 ip arp timeout 14400
 mpls ip forwarding
interface Ethernet1/32
 description connected to Spine2 - 1/52 - 192.168.2.14
 mtu 9216
 logging event port link-status
 no ip redirects
 ip address 192.168.2.13/30
 ip arp timeout 14400
 mpls ip forwarding
interface Ethernet1/36
  switchport mode trunk
 switchport trunk allowed vlan 301-310
interface loopback0
 ip address 172.25.0.2/32
```

```
no advertise local-labeled-route
   soft-reconfiguration inbound
  address-family ipv4 labeled-unicast
   allowas-in 1
   send-community
   send-community extended
   route-map NODE-SID-MED out
   soft-reconfiguration inbound always
  address-family l2vpn evpn
   allowas-in 1
   send-community
   send-community extended
   filter-list LOCALLY-ORIGINATE out
   route-map SET_NH out
   encapsulation mpls
 neighbor 192.168.2.10
  inherit peer EBGP-SPINE
 neighbor 192.168.2.14
  inherit peer EBGP-SPINE
```

Spine-1

Enabling Features

```
install feature-set mpls
feature-set mpls
feature bgp
feature mpls segment-routing
feature mpls evpn
feature interface-vlan
feature lacp
feature mpls oam
feature mpls segment-routing traffic-engineering
vlan 1
segment-routing
  mpls
    global-block 16000 24000
    connected-prefix-sid-map
      address-family ipv4
        172.25.0.21/32 absolute 16021
ip prefix-list NH-RESTRICT seq 5 permit 0.0.0.0/0
ip prefix-list node-sid-loopback seq 5 permit 172.25.0.21/32
route-map NH-RESTRICT deny 10
  match ip address prefix-list NH-RESTRICT
route-map NH-RESTRICT permit 20
route-map NH_UNCHG permit 10
  set ip next-hop unchanged
```

Interface Configuration

```
interface Ethernet1/53
  description connected to Leaf1 - 1/31 - 192.168.1.9
  mtu 9216
  logging event port link-status
  no ip redirects
  ip address 192.168.1.10/30
  ip arp timeout 14400
  mpls ip forwarding
  no shutdown

interface Ethernet1/54
  description connected to Leaf2- 1/31 - 192.168.2.9
  mtu 9216
  logging event port link-status
  no ip redirects
  ip address 192.168.2.10/30
  ip arp timeout 14400
  mpls ip forwarding
  no shutdown


interface loopback0
  ip address 172.25.0.21/32
no shutdown
```

BGP/EVPN Configuration

```
router bgp 64087
  router-id 172.25.0.21
  bestpath as-path multipath-relax
  bestpath med missing-as-worst
  log-neighbor-changes
  nexthop suppress-default-resolution
  address-family ipv4 unicast
    network 172.25.0.21/32
    maximum-paths 4
    nexthop route-map NH-RESTRICT
    allocate-label route-map node-sid-label
  address-family ipv4 labeled-unicast
    prefix-priority high
  address-family l2vpn evpn
    retain route-target all
  template peer EBGP-ACCESS
    remote-as 65534
    description EBGP-PEERING-to-ACCESS
    address-family ipv4 unicast
      disable-peer-as-check
      send-community
      send-community extended
      default-originate
      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

```
install feature-set mpls
feature-set mpls
feature bgp
feature mpls segment-routing
feature mpls evpn
feature interface-vlan
feature lacp
feature mpls oam
feature mpls segment-routing traffic-engineering
vlan 1
segment-routing
  mpls
    global-block 16000 24000
    connected-prefix-sid-map
      address-family ipv4
        172.25.0.22/32 absolute 16021
ip prefix-list NH-RESTRICT seq 5 permit 0.0.0.0/0
ip prefix-list node-sid-loopback seq 5 permit 172.25.0.22/32
route-map NH-RESTRICT deny 10
  match ip address prefix-list NH-RESTRICT
route-map NH-RESTRICT permit 20
route-map NH_UNCHG permit 10
  set ip next-hop unchanged
```

Interface Configuration

```
interface Ethernet1/52
  description connected to Leaf2 - 1/31 - 192.168.2.13
  mtu 9216
  logging event port link-status
  no ip redirects
  ip address 192.168.2.14/30
  ip arp timeout 14400
  mpls ip forwarding
  no shutdown

interface Ethernet1/53
  description connected to Leaf2- 1/32 - 192.168.1.13
  mtu 9216
  logging event port link-status
  no ip redirects
  ip address 192.168.1.14/30
  ip arp timeout 14400
  mpls ip forwarding
  no shutdown


interface loopback0
  ip address 172.25.0.22/32
no shut
```

BGP/EVPN Configuration

```
router bgp 64087
  router-id 172.25.0.22
  bestpath as-path multipath-relax
  bestpath med missing-as-worst
  log-neighbor-changes
  nexthop suppress-default-resolution
  address-family ipv4 unicast
    network 172.25.0.22/32
    maximum-paths 4
    nexthop route-map NH-RESTRICT
    allocate-label route-map node-sid-label
  address-family ipv4 labeled-unicast
    prefix-priority high
  address-family l2vpn evpn
    retain route-target all
  template peer EBGP-ACCESS
    remote-as 65534
    description EBGP-PEERING-to-ACCESS
    address-family ipv4 unicast
      disable-peer-as-check
      send-community
      send-community extended
      default-originate
      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
```

Host-1 Configuration

```
install feature-set mpls
feature mpls
interface Ethernet1/53
switchport
switchport mode trunk
switchport trunk allowed vlan 301-310
no shut

interface vlan 301
no shutdown
no ip redirects
ip address 10.1.12.100/24
ip directed-broadcast ip-dir-bcast
ip arp timeout 720
```

Host-2 Configuration

```
install feature-set mpls
feature mpls
interface Ethernet1/54
switchport
switchport mode trunk
switchport trunk allowed vlan 301-310
no shut

interface vlan 301
no shutdown
no ip redirects
ip address 10.2.12.100/24
ip directed-broadcast ip-dir-bcast
ip arp timeout 720
```

Verificación

Utilize esta sección para confirmar que su configuración funcione correctamente.

```
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
```

Troubleshoot

En esta sección encontrará información que puede utilizar para solucionar problemas de configuración.

```
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,
   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, l-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 bri

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, l-
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#
```

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