

Configuração e verificação VXLAN com plano do controle MP-BGP EVPN.

Índice

[Introdução](#)

[Pré-requisitos](#)

[Requisitos](#)

[Componentes Utilizados](#)

[Informações de Apoio](#)

[Configurar](#)

[Diagrama de Rede](#)

[Configuração](#)

[VTEP1](#)

[VTEP2](#)

[VTEP3](#)

[VTEP4](#)

[ESPINHA](#)

[HOSPEDE A](#)

[HOST B](#)

[HOST C e D](#)

[Verificar](#)

[Conectividade do host A ao Host B externo](#)

[Conectividade do host A ao HOST C \(intra-VNI\)](#)

[Conectividade do host A PARA HOSPEDAR D \(inter-VNI\)](#)

[Tabela de roteamento do Host B \(peer externo\)](#)

[Verificação do controle plano.](#)

[Troubleshooting](#)

Introdução

Este documento descreve a configuração VXLAN usando o controle plano MP-BGP EVPN. Mostra uma encenação do exemplo de rede e sua configuração com saídas relevantes para a verificação e a melhor compreensão.

Pré-requisitos

Requisitos

A Cisco recomenda que você tenha conhecimento destes tópicos:

- Camada 3 VPN MPLS
- O MP-BGP ajudaria certamente.

Componentes Utilizados

Este documento não se restringe a versões de software e hardware específicas.

Este documento não se restringe a versões de software e hardware específicas. As informações neste documento foram criadas a partir de dispositivos em um ambiente de laboratório específico. Todos os dispositivos utilizados neste documento foram iniciados com uma configuração (padrão) inicial. Se a sua rede estiver ativa, certifique-se de que entende o impacto potencial de qualquer comando.

Informações de Apoio

VXLAN é projetado fornecer a virtualização da rede. É MAC no encapsulamento UDP. A infraestrutura da camada 2 é prolongada sobre a rede do forro da camada 3 proporcionar um serviço simplificado que não seja dependente do exame e da localização geográfica dos server nos datacenters.

Este documento descreve VXLAN com plano do controle MP-BGP EVPN. Isto significa que o protocolo BGP está usado na infraestrutura da folha de prova para enviar e receber atualizações.

Em disposições que de rede tradicional o STP foi usado, isto conduziu ao estado de bloqueio de alguns uplinks permanentemente. No projeto VXLAN todos os uplinks são operacionais e o ECMP leveraged porque a infraestrutura do forro é rede IP.

O exame de todos os detalhes é fora do âmbito deste documento, porém algumas terminologias importantes são mostradas abaixo.

VXLAN - LAN elástico virtual.

MP-BGP - Multiprotocol BGP.

EVPN - Ethernet VPN.

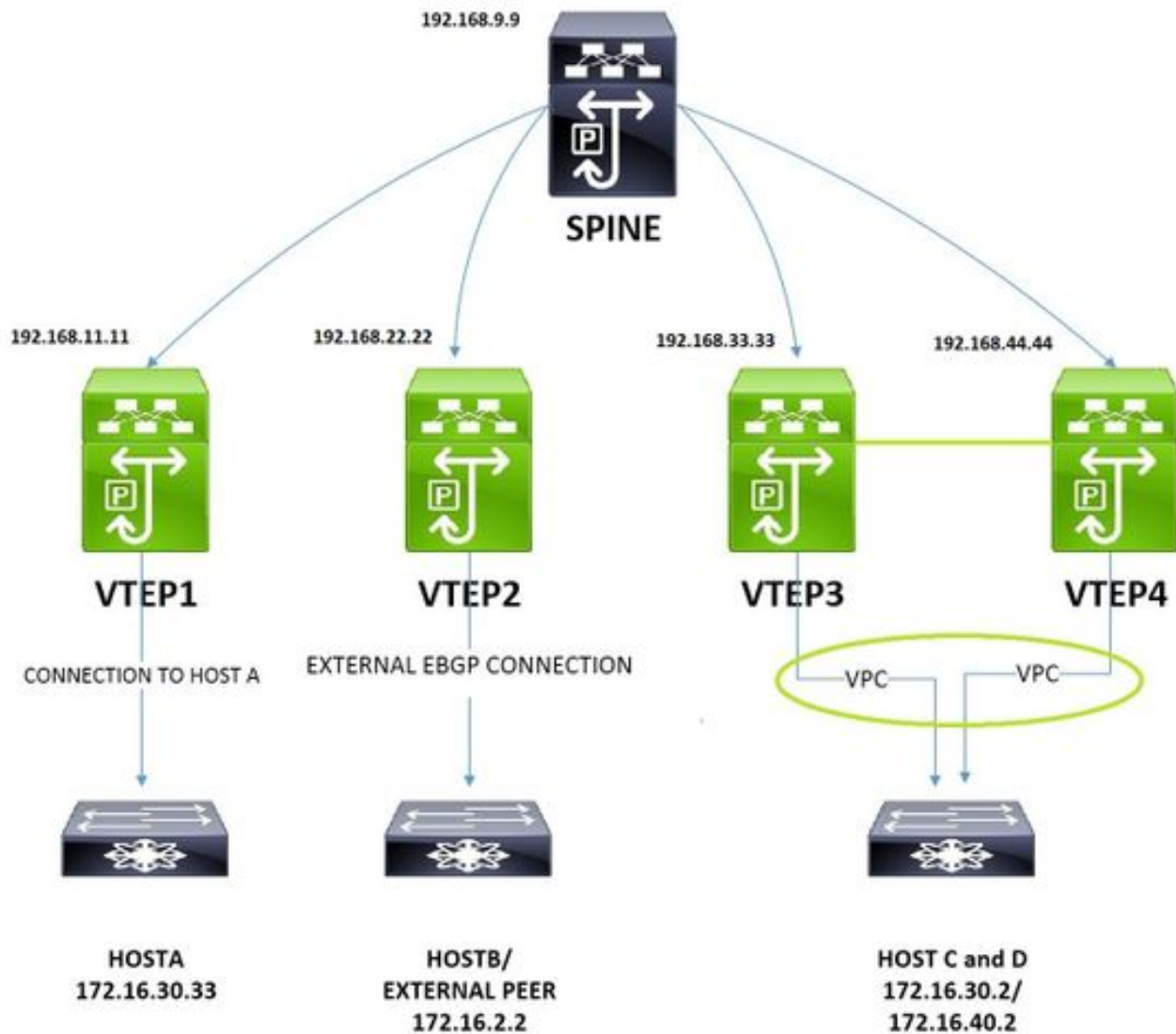
VTEP - Ponto final virtual do túnel. Igualmente sabido como a folha. Isto o lugar onde os pacotes são encapsulados e descapsulado.

Espinha - Isto é muito similar ao refletor de rota em MPLS L3 VPN. Este dispositivo toma as atualizações de um VTEP e passa-as sobre ao outro VTEP.

VNI - Identificador de rede VXLAN. Isto é usado principalmente para fornecer o isolamento para limites da camada 2. Este campo é 24 mordido de comprimento assim que supera a limitação da escala de vlans tradicionais. Um VNI em um VTEP "é traçado" a um vlan tradicional. Isto será discutido mais tarde.

Configurar

Diagrama de Rede



A imagem mostrada é usada para aspectos da configuração e da verificação. Isto cobre configurações NON-VPC, de vpc, intra-vni, inter-vni e de conectividade externa da perspectiva da infraestrutura VXLAN.

Configuração

VTEP1

! Enabling features

```

nv overlay evpn
feature ospf
feature bgp
feature pim
feature interface-vlan
feature vn-segment-vlan-based
feature lacp
feature vpc
feature nv overlay
!
fabric forwarding anycast-gateway-mac 0001.0001.0001 ! This is needed for seamless VM mobility
across VTEPS, this configuration is same on all VTEPS.
ip pim rp-address 192.168.9.9 group-list 224.0.0.0/4 ! SPINE is the RP.
!
ip pim ssm range 232.0.0.0/8

```

```

!
vlan 1,10,30,40,100,200
!
vlan 10 ! VLAN 10 is used as layer3 VNI to route Inter-VNI traffic.
name L3-VNI-VLAN-10
vn-segment 10000010
vlan 30 ! The Host A resides on Vlan 30, The below command 'maps' vlan 30 with VNID 10000030.
vn-segment 10000030
!
vrf context EVPN-L3-VNI-VLAN-10 ! Defining layer3 vrf for Inter-VNI traffic.
vni 10000010
rd auto
address-family ipv4 unicast
route-target both auto
route-target both auto evpn
!
interface Vlan10 ! Layer3 VNI associated interface vlan does not have an ip address.
no shutdown
vrf member EVPN-L3-VNI-VLAN-10
ip forward
!
interface Vlan30 ! Associating the Host A Vlan with layer3 vrf.
no shutdown
vrf member EVPN-L3-VNI-VLAN-10
ip address 172.16.30.1/24
fabric forwarding mode anycast-gateway ! This is needed for seamless VM mobility across VTEPS, same on all VTEPS.
!
interface nve1 ! Nve is logical interface where VXLAN packets are encapsulated and decapsulated.
no shutdown
source-interface loopback2
host-reachability protocol bgp ! This means BGP control plane is used to exchange updates.
member vni 10000010 associate-vrf ! associate-vrf is used for for layer3 vni.
member vni 10000030
suppress-arp
mcast-group 239.1.1.10 ! A vlan or set of vlans mapped to VNI can be given identical multicast address, this is used for controlled flooding of arp requests.
!
interface Ethernet1/2 ! Ospf with PIM is used as Underlay.
description "Going to Spine"
no switchport
ip address 192.168.19.1/24
ip router ospf UNDERLAY area 0.0.0.0
ip pim sparse-mode
no shutdown
!
interface Ethernet1/11 ! Port to Host A.
switchport mode trunk
!
interface loopback2 ! Loopback for BGP Peering.
description "Loopback for "BGP"
ip address 192.168.11.11/32
ip router ospf UNDERLAY area 0.0.0.0
ip pim sparse-mode
!
router ospf UNDERLAY
!
router bgp 65000
address-family ipv4 unicast
address-family l2vpn evpn
neighbor 192.168.9.9 ! Peering with SPINE.
remote-as 65000
update-source loopback2
address-family ipv4 unicast

```

```
address-family l2vpn evpn
send-community extended
vrf EVPN-L3-VNI-VLAN-10
address-family ipv4 unicast
advertise l2vpn evpn
!
evpn
vni 10000030 12
rd auto ! RD is default calculated as VNI:BGP Router ID
route-target import auto ! RT is default calculated as BGP AS:VNI
route-target export auto
```

VTEP2

```
!
nv overlay evpn
feature ospf
feature bgp
feature pim
feature interface-vlan
feature vn-segment-vlan-based
feature lacp
feature vpc
feature nv overlay
!
fabric forwarding anycast-gateway-mac 0001.0001.0001
!
ip pim rp-address 192.168.9.9 group-list 224.0.0.0/4
!
ip pim ssm range 232.0.0.0/8
vlan 1,10,30,40,100
!
vlan 10 ! This VTEP is dedicated for external connectivity, there is only layer3 VNI config.
name L3-VNI-VLAN-10
vn-segment 10000010
!
vrf context EVPN-L3-VNI-VLAN-10 ! Defining layer3 vrf for Inter-VNI traffic.
vni 10000010
rd auto
address-family ipv4 unicast
route-target both auto
route-target both auto evpn
!
interface Vlan10 ! Layer3 VNI associated interface vlan does not have an ip address.
no shutdown
vrf member EVPN-L3-VNI-VLAN-10
ip forward
!
interface Vlan100 ! This vlan is used to peer with external EBGp Peer.
no shutdown
vrf member EVPN-L3-VNI-VLAN-10
ip address 192.168.1.2/24
!
interface nve1
no shutdown
source-interface loopback2
host-reachability protocol bgp
member vni 10000010 associate-vrf
!
interface Ethernet1/2 ! Ospf and PIM are used in Underlay.
description "Going to Spine"
no switchport
ip address 192.168.29.2/24
```

```

ip router ospf UNDERLAY area 0.0.0.0
ip pim sparse-mode
no shutdown
!
interface Ethernet1/12 ! Port to External Peer.
switchport mode trunk
!
interface loopback2
ip address 192.168.22.22/32
ip router ospf UNDERLAY area 0.0.0.0
ip pim sparse-mode
!
router ospf UNDERLAY
!
router bgp 65000
address-family ipv4 unicast
address-family l2vpn evpn
neighbor 192.168.9.9 ! Peering with SPINE.
remote-as 65000
update-source loopback2
address-family ipv4 unicast
address-family l2vpn evpn
send-community extended
vrf EVPN-L3-VNI-VLAN-10
address-family ipv4 unicast
advertise l2vpn evpn
neighbor 192.168.1.1 ! Peering with External Peer, under vrf.
remote-as 65111
update-source Vlan100
address-family ipv4 unicast

```

VTEP3

As configurações para VTEP3 e VTEP1 são quase idênticas. Somente a diferença é VPC e um layer2 adicional VNI para 40 vlan.

```

!
nv overlay evpn
feature ospf
feature bgp
feature pim
feature interface-vlan
feature vn-segment-vlan-based
feature lacp
feature vpc
feature nv overlay
!
fabric forwarding anycast-gateway-mac 0001.0001.0001
!
ip pim rp-address 192.168.9.9 group-list 224.0.0.0/4
!
ip pim ssm range 232.0.0.0/8
!
vlan 1,10,20,30,40
!
vlan 10
name L3-VNI-VLAN-10
vn-segment 10000010
!
vlan 30
vn-segment 10000030
!
vlan 40 ! New host vlan 40.

```

```
vn-segment 10000040
!
vpc domain 2 ! Vpc Configs.
peer-keepalive destination 10.197.204.103 source 10.197.204.106
!
interface Vlan10
no shutdown
vrf member EVPN-L3-VNI-VLAN-10
ip forward
!
interface Vlan30
no shutdown
vrf member EVPN-L3-VNI-VLAN-10
ip address 172.16.30.1/24
!
fabric forwarding mode anycast-gateway
!
interface Vlan40
no shutdown
vrf member EVPN-L3-VNI-VLAN-10
ip address 172.16.40.1/24
!
fabric forwarding mode anycast-gateway
!
interface port-channel2
switchport mode trunk
vpc 2
!
interface port-channel34
switchport mode trunk
spanning-tree port type network
vpc peer-link
!
interface nve1
no shutdown
source-interface loopback2
host-reachability protocol bgp
member vni 10000010 associate-vrf
member vni 10000030
suppress-arp
mcast-group 239.1.1.10
member vni 10000040 !New layer2 VNI for Vlan 40.
suppress-arp
mcast-group 239.1.1.20
!
interface Ethernet1/1 ! Connected to VTEP4.
switchport mode trunk
channel-group 34 mode active
!
interface Ethernet1/2
description "going to Spine"
no switchport
ip address 192.168.39.3/24
ip router ospf UNDERLAY area 0.0.0.0
ip pim sparse-mode
no shutdown
!
interface Ethernet1/13 ! Connected to N5K, which simulates Host C and D.
switchport mode trunk
channel-group 2 mode active
!
interface loopback2
description "loopback for Bgp"
ip address 192.168.33.33/32
```

ip address 192.168.33.34/32 secondary! **For other VTEPs VTEP3 and VTEP4 will look as single entity.**

ip router ospf UNDERLAY area 0.0.0.0!**This secondary address is needed in Vpc designs.**

```
!  
router ospf UNDERLAY  
!  
router bgp 65000  
address-family ipv4 unicast  
address-family l2vpn evpn  
neighbor 192.168.9.9 remote-as 100  
remote-as 65000  
update-source loopback2  
address-family ipv4 unicast  
address-family l2vpn evpn  
send-community extended  
vrf EVPN-L3-VNI-VLAN-10  
address-family ipv4 unicast  
advertise l2vpn evpn  
!  
evpn  
vni 10000030 l2  
rd auto  
route-target import auto  
route-target export auto  
vni 10000040 l2  
rd auto  
route-target import auto  
route-target export auto
```

VTEP4

```
!  
nv overlay evpn  
feature ospf  
feature bgp  
feature pim  
feature interface-vlan  
feature vn-segment-vlan-based  
feature lacp  
feature vpc  
feature nv overlay  
!  
fabric forwarding anycast-gateway-mac 0001.0001.0001  
!  
ip pim rp-address 192.168.9.9 group-list 224.0.0.0/4  
!  
ip pim ssm range 232.0.0.0/8  
!  
vlan 1,10,20,30,40  
!  
vlan 10  
name L3-VNI-VLAN-10  
vn-segment 10000010  
!  
vlan 30  
vn-segment 10000030  
!  
vlan 40  
vn-segment 10000040  
!  
vrf context EVPN-L3-VNI-VLAN-10  
vni 10000010  
rd auto
```



```
address-family ipv4 unicast
route-target both auto
route-target both auto evpn
!
interface Vlan10
no shutdown
vrf member EVPN-L3-VNI-VLAN-10
ip forward
!
interface Vlan30
no shutdown
vrf member EVPN-L3-VNI-VLAN-10
ip address 172.16.30.1/24
!
fabric forwarding mode anycast-gateway
!
interface Vlan40
no shutdown
vrf member EVPN-L3-VNI-VLAN-10
ip address 172.16.40.1/24
!
fabric forwarding mode anycast-gateway
!
interface port-channel2
switchport mode trunk
vpc 2
!
interface port-channel34
switchport mode trunk
spanning-tree port type network
vpc peer-link
!
interface nve1
no shutdown
source-interface loopback2
host-reachability protocol bgp
member vni 10000010 associate-vrf
member vni 10000030
suppress-arp
mcast-group 239.1.1.10
member vni 10000040
suppress-arp
mcast-group 239.1.1.20
!
interface Ethernet1/1 ! Connected to VTEP3.
switchport mode trunk
channel-group 34 mode active
!
interface Ethernet1/2
description "going to spine"
no switchport
ip address 192.168.49.4/24
ip router ospf UNDERLAY area 0.0.0.0
ip pim sparse-mode
no shutdown
!
interface Ethernet1/13 ! Connected to N5K, which simulates Host C and D.
switchport mode trunk
channel-group 2 mode active
!
router ospf UNDERLAY
!
router bgp 65000
address-family ipv4 unicast
```

```
address-family l2vpn evpn
neighbor 192.168.9.9 remote-as 100
remote-as 65000
update-source loopback2
address-family ipv4 unicast
address-family l2vpn evpn
send-community extended
vrf EVPN-L3-VNI-VLAN-10
address-family ipv4 unicast
advertise l2vpn evpn
!
evpn
vni 10000030 l2
rd auto
route-target import auto
route-target export auto
vni 10000040 l2
rd auto
route-target import auto
route-target export auto
```

ESPINHA

```
!
nv overlay evpn
feature ospf
feature bgp
feature pim
feature interface-vlan
feature vn-segment-vlan-based
feature lacp
feature vpc
feature nv overlay
!
ip pim rp-address 192.168.9.9 group-list 224.0.0.0/4
!
ip pim ssm range 232.0.0.0/8
!
interface Ethernet1/1 ! To VTEP1.
ip address 192.168.19.9/24
ip router ospf UNDERLAY area 0.0.0.0
ip pim sparse-mode
no shutdown
!
interface Ethernet1/2 ! To VTEP2.
ip address 192.168.29.9/24
ip router ospf UNDERLAY area 0.0.0.0
ip pim sparse-mode
no shutdown
!
interface Ethernet1/3 ! To VTEP3.
ip address 192.168.39.9/24
ip router ospf UNDERLAY area 0.0.0.0
ip pim sparse-mode
no shutdown
!
interface Ethernet1/4 ! To VTEP4.
ip address 192.168.49.9/24
ip router ospf UNDERLAY area 0.0.0.0
ip pim sparse-mode
no shutdown
!
interface loopback1 ! SPINE is RP(Rendezvous Point).
```

```

ip address 192.168.9.9/32
ip router ospf UNDERLAY area 0.0.0.0
ip pim sparse-mode
!
router ospf UNDERLAY
!
router bgp 65000
log-neighbor-changes
address-family ipv4 unicast
address-family l2vpn evpn
retain route-target all
template peer VTEP-PEERS
remote-as 65000
update-source loopback1
address-family ipv4 unicast
send-community both
route-reflector-client ! Spine treats VTEPs as Route-Reflector Clients.
address-family l2vpn evpn
send-community both
route-reflector-client
neighbor 192.168.11.11 ! VTEP1.
inherit peer VTEP-PEERS
neighbor 192.168.22.22 ! VTEP2.
inherit peer VTEP-PEERS
neighbor 192.168.33.33 ! VTEP3.
inherit peer VTEP-PEERS
neighbor 192.168.44.44 ! VTEP4.
inherit peer VTEP-PEERS

```

HOSPEDE A

Hospede A é simulado por um 3750 Switch.

```

! This port is the uplink to VTEP1.
interface GigabitEthernet1/0/1
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface Vlan30
ip address 172.16.30.33 255.255.255.0
!
! Below the default route to VTEP1.
ip route 0.0.0.0 0.0.0.0 172.16.30.1

```

HOST B

O Host B é o dispositivo espreitando externo, N5K é usado aqui.

```

!
router bgp 65111
address-family ipv4 unicast
!
network 172.16.2.2/32 ! Advertsing the external subnet to VXLAN infrastructure.
neighbor 192.168.1.2 remote-as 65000 ! EBGP Peering with VTEP2.
address-family ipv4 unicast
!
interface loopback1
ip address 172.16.2.2/32
!
interface Ethernet1/19 ! Uplink port to VTEP2.
switchport mode trunk
!

```

```
interface Vlan100
no shutdown
ip address 192.168.1.1/24
```

HOST C e D

O host C e D são simulados por Nexus5k, mantendo os endereços IP de Um ou Mais Servidores Cisco ICM NT em vrfs distintos.

```
!
vrf context vni30 ! This vrf simulates the HOST C.
ip route 0.0.0.0/0 172.16.30.1
vrf context vni40 ! This vrf simulates the HOST D.
ip route 0.0.0.0/0 172.16.40.1
!
interface Vlan30 ! Addressing for HOST C.
no shutdown
vrf member vni30
ip address 172.16.30.2/24
!
interface Vlan40 ! Addressing for HOST D.
no shutdown
vrf member vni40
ip address 172.16.40.2/24
!
interface Ethernet1/20 ! Uplink port to VTEP3 in Port-Channel.
switchport mode trunk
channel-group 2 mode active
!
interface Ethernet1/21 ! Uplink port to VTEP4 in Port-Channel.
switchport mode trunk
channel-group 2 mode active< /pre>
```

Verificar

Conectividade do host A ao Host B externo

```
HOST_A#ping 172.16.2.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.2.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/4/9 ms
```

Conectividade do host A ao HOST C (intra-VNI)

```
HOST_A#ping 172.16.30.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.30.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/4/9 ms
```

Conectividade do host A PARA HOSPEDAR D (inter-VNI)

```
HOST_A#ping 172.16.40.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.40.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/9 ms
```

Tabela de roteamento do Host B (peer externo)

```

N5K-5672-1# show ip route bgp
IP Route Table for VRF "default"
'*' denotes best ucast next-hop
'***' denotes best mcast next-hop
'[x/y]' denotes [preference/metric]
'%<string>' in via output denotes VRF <string>
172.16.30.2/32, ubest/mbest: 1/0, pending ! Host route for Host C.
*via 192.168.1.2, [20/0], 00:00:22, bgp-65100, external, tag 65000,
172.16.30.33/32, ubest/mbest: 1/0, pending ! Host route for Host A.
*via 192.168.1.2, [20/0], 00:00:22, bgp-65100, external, tag 65000,
172.16.40.2/32, ubest/mbest: 1/0, pending ! Host route for Host D.
*via 192.168.1.2, [20/0], 00:00:22, bgp-65100, external, tag 65000,

```

Pode-se observar que as rotas do host estiveram anunciadas com sucesso a este par do BGP externo.

Verificação do controle plano.

- Este comando mostra o “mapeamento” de vlans tradicionais com VNIDs.

```

VTEP1# show vxlan
Vlan VN-Segment
==== =====
10 10000010
30 10000030
40 10000040

```

- O seguinte é certificar-se do Mac esteja aprendido localmente em VTEP.

```

VTEP1# show mac address-table vlan 30
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
VLAN MAC Address Type age Secure NTFY Ports
-----+-----+-----+-----+-----+-----
* 30 0006.f63f.e3c1 dynamic 0 F F Eth1/11 ! Mac of HOST A
* 30 8c60.4ff2.f541 dynamic 0 F F nve1(192.168.33.34)! Mac of HOST C installed into mac
address table, it was learned from BGP.
G 30 e00e.da2a.2393 static - F F sup-eth1(R)

```

- A próxima etapa é certificar-se da rota esteja instalada em I2rib.

```

VTEP1# show l2route evpn mac evi 30
Mac Address Prod Next Hop (s)
-----
0006.f63f.e3c1 Local Eth1/11 ! Mac of HOST A installed into l2rib.
8c60.4ff2.f541 BGP 192.168.33.34 ! Mac of HOST C installed into l2rib learnt via BGP. VTEP1#
show l2route evpn mac-ip evi 30
Mac Address Prod Host IP Next Hop (s)
-----
0006.f63f.e3c1 HMM 172.16.30.33 N/A
8c60.4ff2.f541 BGP 172.16.30.2 192.168.33.34 ! Mac+IP of Host C learnt across the Vxlan Fabric.
VTEP1# show l2route evpn mac-ip evi 40
Mac Address Prod Host IP Next Hop (s)
-----
8c60.4ff2.f541 BGP 172.16.40.2 192.168.33.34 ! Mac+IP of Host D learnt across the Vxlan Fabric.

```

- A próxima etapa é certificar-se de I2rib exporte a atualização para o evpn I2vpn.

```

VTEP1# show bgp l2vpn evpn vni-id 10000030
BGP routing table information for VRF default, address family L2VPN EVPN
BGP table version is 31, local router ID is 192.168.11.11
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 Network Next Hop Metric
LocPrf Weight Path
Route Distinguisher: 192.168.11.11:32797 (L2VNI 10000030)
*>l[2]:[0]:[0]:[48]:[0006.f63f.e3c1]:[0]:[0.0.0.0]/216 ! Mac of Host A in update.
192.168.11.11 100 32768 i
*>i[2]:[0]:[0]:[48]:[8c60.4ff2.f541]:[0]:[0.0.0.0]/216
192.168.33.34 100 0 i
* i 192.168.33.34 100 0 i
*>l[2]:[0]:[0]:[48]:[0006.f63f.e3c1]:[32]:[172.16.30.33]/272 ! Mac and IP of Host A in update.
192.168.11.11 100 32768 i
* i[2]:[0]:[0]:[48]:[8c60.4ff2.f541]:[32]:[172.16.30.2]/272 ! Mac and IP of Host C in update
from Spine.
192.168.33.34 100 0 i
*>i 192.168.33.34 100 0 i

```

- A próxima etapa é certificar-se das rotas estejam anunciadas à espinha.

```

VTEP1# show bgp l2vpn evpn nei 192.168.9.9 advertised-routes
Peer 192.168.9.9 routes for address family L2VPN EVPN:
BGP table version is 31, local router ID is 192.168.11.11
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 Network Next Hop
Metric LocPrf Weight Path
Route Distinguisher: 192.168.11.11:32797 (L2VNI 10000030)
*>l[2]:[0]:[0]:[48]:[0006.f63f.e3c1]:[0]:[0.0.0.0]/216
192.168.11.11 100 32768 i
*>l[2]:[0]:[0]:[48]:[0006.f63f.e3c1]:[32]:[172.16.30.33]/272 ! Mac and IP advertised to Spine.
192.168.11.11 100 32768 i

```

- A próxima etapa é verificar as rotas recebidas da espinha.

```

VTEP1# show bgp l2vpn evpn nei 192.168.9.9 routes
Peer 192.168.9.9 routes for address family L2VPN EVPN:
BGP table version is 31, local router ID is 192.168.11.11
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
Network Next Hop Metric LocPrf Weight Path
Route Distinguisher: 192.168.11.11:32797 (L2VNI 10000030)
*>i[2]:[0]:[0]:[48]:[8c60.4ff2.f541]:[0]:[0.0.0.0]/216
192.168.33.34 100 0 i
* i 192.168.33.34 100 0 i
* i[2]:[0]:[0]:[48]:[8c60.4ff2.f541]:[32]:[172.16.30.2]/272 ! This is update from Host C in same
VNID.
192.168.33.34 100 0 i
*>i 192.168.33.34 100 0 i
Route Distinguisher: 192.168.11.11:32807 (L2VNI 10000040)
*>i[2]:[0]:[0]:[48]:[8c60.4ff2.f541]:[0]:[0.0.0.0]/216
192.168.33.34 100 0 i
* i 192.168.33.34 100 0 i
* i[2]:[0]:[0]:[48]:[8c60.4ff2.f541]:[32]:[172.16.40.2]/272 ! This is update from Host D
in different VNID.
192.168.33.34 100 0 i
*>i 192.168.33.34 100 0 i
Route Distinguisher: 192.168.11.11:3 (L3VNI 10000010)
*>i[2]:[0]:[0]:[48]:[8c60.4ff2.f541]:[32]:[172.16.30.2]/272
192.168.33.34 100 0 i
* i 192.168.33.34 100 0 i
*>i[2]:[0]:[0]:[48]:[8c60.4ff2.f541]:[32]:[172.16.40.2]/272

```

```

192.168.33.34 100 0 i
* i 192.168.33.34 100 0 i
*>i[5]:[0]:[0]:[32]:[172.16.2.2]:[0.0.0.0]/224 ! ! This is update from External Host.
192.168.22.22 100 0 65100 i VTEP1# show ip bgp vrf EVPN-L3-VNI-VLAN-10
BGP routing table information for VRF EVPN-L3-VNI-VLAN-10, address family IPv4 Unicast
BGP table version is 5, local router ID is 192.168.1.254
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-injected
Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup
Network          Next Hop Metric LocPrf Weight Path
*>i172.16.2.2/32  192.168.22.22  100      0      65111 i
*>i172.16.30.2/32 192.168.33.34  100      0      i
* i              192.168.33.34  100      0      i
*>i172.16.40.2/32 192.168.33.34  100      0      i
* i              192.168.33.34  100      0      i

```

- Em VTEP1 somente VNID 10000030 é configurado e verificou-se que o Mac e o IP do host A estão aprendidos localmente e igualmente anunciados como a rota do evpn. Igualmente observou-se que a atualização do host C igualmente esteve recebida e instalada aqui.
- Os pares do nve devem igualmente estar acima antes que o tráfego possa ser enviado.

```

VTEP1# show nve peers
Interface Peer-IP State LearnType Uptime Router-Mac
-----
nve1 192.168.22.22 Up CP 01:39:15 0062.ecbf.5325 ! VTEP2
nve1 192.168.33.34 Up CP 01:40:09 f8c2.8823.275f ! VTEP3 and VTEP4 appear as single entity as both are in Vpc.

```

```

VTEP1# sh bgp internal nve-peer-vni
PeerAddress VNI VrfID GatewayMAC TunnelID Encap EgressVNI F
192.168.22.22 10000010 1 0062.ecbf.5325 0xc0a81616 1 0 0
192.168.33.34 10000010 1 0062.ecbf.4e4d 0xc0a82122 1 0 0
192.168.33.34 10000010 1 f8c2.8823.275f 0xc0a82122 1 0 0
192.168.33.34 10000030 1 0000.0000.0000 0x0 1 0 0
192.168.33.34 10000040 1 0000.0000.0000 0x0 1 0 0

```

Troubleshooting

- Se a relação do nve é verificada, a seguir incrementa dos contadores para o encapsulamento e o decapsulation deve ser considerado.

```

VTEP1# show interface nve 1
nve1 is up
admin state is up, Hardware: NVE
MTU 9216 bytes
Encapsulation VXLAN
Auto-mdix is turned off
RX
ucast: 133 pkts, 22344 bytes - mcast: 0 pkts, 0 bytes
TX
ucast: 134 pkts, 22512 bytes - mcast: 0 pkts, 0 bytes

```

- Se um Firewall transparente está sendo usado filtrando, faça ao certo a porta associada é reservado.

```
VTEP1# show nve vxlan-params
```

VxLAN Dest. UDP Port: 4789

- Para verificar o MAC address local VTEP que é usado para o roteamento inter-VNI. O endereço secundário será considerado quando o VTEP está em um par do vpc.

```
VTEP1# show nve interface
Interface: nve1, State: Up, encapsulation: VXLAN
VPC Capability: VPC-VIP-Only [not-notified]
Local Router MAC: e00e.da2a.2393
Host Learning Mode: Control-Plane
Source-Interface: loopback2 (primary: 192.168.11.11, secondary: 0.0.0.0)
```

- Para verificar os endereços do Mac VTEPS e o estado remotos de espereitar.

```
VTEP1# sh nve internal platform interface nve1 detail
Printing Interface ifindex 0x49000001 detail
|=====|=====|=====|=====|=====|=====|
|Intf |State |PriIP |SecIP |Vnis |Peers|
|=====|=====|=====|=====|=====|=====|
|nve1 |UP |192.168.11.11 |0.0.0.0 |3 |2 | ! Secondary Ip is 0.0.0.0 because this VTEP is not in vpc
vpc
|=====|=====|=====|=====|=====|=====|
SW_BD/VNIs of interface nve1:
=====
|=====|=====|=====|=====|=====|=====|=====|=====|
|Sw BD |Vni |State |Intf |Type|Vrf-ID|Notified
|=====|=====|=====|=====|=====|=====|=====|=====|
|10 |10000010|UP |nve1 |CP |3 |Yes
|30 |10000030|UP |nve1 |CP |0 |Yes
|40 |10000040|UP |nve1 |CP |0 |Yes
|=====|=====|=====|=====|=====|=====|=====|=====|
Peers of interface nve1:
=====
Peer_ip: 192.168.22.22
Peer-ID : 1
State : UP
Learning : Disabled
TunnelID : 0xc0a81616
MAC : 0062.ecbf.5325
Table-ID : 0x1
Encap : 0x1
Peer_ip: 192.168.33.34 ! For both VTEP3 and VTEP4
Peer-ID : 2
State : UP
Learning : Disabled
TunnelID : 0xc0a82122
MAC : 0062.ecbf.4e4d
Table-ID : 0x1
Encap : 0x1
```

- Para verificar o momento espereitando e a informação VNI para pares VTEP.

```
VTEP1# show nve peer detail
Details of nve Peers:
-----
Peer-IP: 192.168.22.22
NVE Interface : nve1
Peer State : Up
Peer Uptime : 00:22:17
Router-Mac : 0062.ecbf.5325
Peer First VNI : 10000010
Time since Create : 00:22:17
Configured VNIs : 10000010,10000030,10000040
Provision State : add-complete ! Hardware ready for forwarding.
```



```

Route-Update : Yes
Peer Flags : RmacL2Rib, TunnelPD, DisableLearn
Learnt CP VNIs : 10000010
Peer-ifindex-resp : Yes
-----
Peer-IP: 192.168.33.34
NVE Interface : nve1
Peer State : Up
Peer Uptime : 00:22:10
Router-Mac : 0062.ecbf.4e4d
Peer First VNI : 10000010
Time since Create : 00:22:10
Configured VNIs : 10000010,10000030,10000040
Provision State : add-complete ! Hardware ready for forwarding.
Route-Update : Yes
Peer Flags : RmacL2Rib, TunnelPD, DisableLearn
Learnt CP VNIs : 10000010,10000030,10000040
Peer-ifindex-resp : Yes
-----

```

- Para verificar como o BGP interage com o EVI e a informação interna é construída. O exemplo do VLAN 30 traçado a VNI 10000030 é mostrado aqui.

```

VTEP1# sh bgp internal evi 10000030
*****
L2RIB bound / VNI Req to L2RIB : Yes / 1
L2VNI Adds / Dels / ALL Dels from L2RIB : 4 / 3 / 1
First L2VNI Add/Del : Dec 17 19:07:41.680736 / Dec 17 19:10:48.455562
Last L2VNI Add/Del : Dec 17 19:11:13.916893 / Dec 17 19:10:48.455792
L3VNI Adds / Dels from L2RIB : 2 / 0 / 1
First L3VNI Add/Del : Dec 17 19:07:41.681313 / never
Last L3VNI Add/Del : Dec 17 19:11:11.838315 / never
First/Last All VNI Del : Dec 17 19:10:48.455542 / Dec 17 19:10:48.455543
ALL VNI Del from L2RIB state (cleanup status) : All VNI Not Start (0x0000006)
All VNI down loop count : 0
L2RIB is up/registered/local-req: 1/1
L2RIB down: in-prg/up-defer: 0/0
L2RIB register/failures: 1/0
L2RIB deregister/failures: 0/0
L2RIB flow control (#enabled/#disabled): Disabled (0/0)
*****
BGP L2VPN/EVPN RD Information for 192.168.11.11:32797
L2VNI ID : 10000030 (evi_10000030)
#Prefixes Local/BRIB : 2 / 4
#Paths L3VPN->EVPN/EVPN->L3VPN : 129 / 0
*****
=====
BGP Configured VNI Information:
evi_cfg : 0xd87786c8
VNI ID (Index) : 10000030 (1)
RD : 192.168.11.11:32797
Export RTs : 1
ExportRT cfg list:
65000:10000030 (auto)
Import RTs : 1
ImportRT cfg list:
65000:10000030 (auto)
Topo Id : 30
VTEP IP : 192.168.11.11
VTEP VPC IP : 0.0.0.0
Encap Type : 8
Refcount : #00000003
Enabled : Yes ! If this is no then check the NVE interface config for this VNID
Delete Pending : No

```

Creation Req : No
Future RD : NULL
evi_ctx : 0xd86e554c
RD/Import RT/Export RT : Yes(Auto)/Yes/Yes
MAC First Add/Del : Dec 17 19:11:12.45086 / never
MAC Last Add/Del : Dec 17 19:11:12.45086 / never
MAC IP First Add/Del : Dec 17 19:11:12.54976 / never
MAC IP Last Add/Del : Dec 17 19:11:12.54977 / never
IMET First Add/Del : never / never
IMET Last Add/Del : never / never

```
=====
+++++
BGP VNI Information for evi_10000030 (0xd86e554c)
L2VNI ID : 10000030 (evi_10000030)
RD (rdinfo) : 192.168.11.11:32797 (0xd8811eb0)
Prefixes (local/total) : 2/4
Created : Dec 17 19:11:12.37640
Last Oper Up/Down : Dec 17 19:11:12.37827 / never
Enabled : Yes
Delete pending : 0
Stale : No
Import pending : 0
Import in progress : 0
Encap : VxLAN
Topo Id : 30
VTEP IP : 192.168.11.11
VTEP VPC IP : 0.0.0.0
Router-MAC : 0000.0000.0000
Active Export RTs : 1
Active Export RT list : 65000:10000030
Config Export RTs : 1
ExportRT cfg list:
65000:10000030 (auto)
Export RT chg/chg-pending : 0/0
Active Import RTs : 1
Active Import RT list : 65000:10000030
Config Import RTs : 1
ImportRT cfg list:
65000:10000030 (auto)
Import RT chg/chg-pending : 0/0
IMET Reg/Unreg from L2RIB : 2/0
MAC Reg/Unreg from L2RIB : 2/0
MAC IP Reg/Unreg from L2RIB : 2/0
IMET Add/Del from L2RIB : 0/0
MAC Add/Del from L2RIB : 1/0
MAC IP Add/Del from L2RIB : 1/0
IMET Dnld/Wdraw to L2RIB : 0/0
MAC Dnld/Wdraw to L2RIB : 1/0
MAC IP Dnld/Wdraw to L2RIB : 1/0
```

- Quando uma atualização é recebida independentemente do fato dela que é uma atualização inter-VNI ou intra-VNI, certifique-se de que RT corretos (alvos da rota) estão sendo recebidos e VTEP que recebe a atualização tem configurações relevantes. Uma atualização de VTEP3 que vem através da ESPINHA será analisada aqui para a consistência RT. O estado local do RT e do RD para VTEP1 foi mostrado dentro acima das saídas. SPINE# show bgp l2vpn evpn

```
172.16.30.2 ! Update from Spine
BGP routing table information for VRF default, address family L2VPN EVPN
Route Distinguisher: 3.3.3.3:32797
BGP routing table entry for [2]:[0]:[0]:[48]:[8c60.4ff2.f541]:[32]:[172.16.30.2]
/272, version 25
Paths: (1 available, best #1)
Flags: (0x000202) on xmit-list, is not in l2rib/evpn, is not in HW,
Advertised path-id 1
```

Path type: internal, path is valid, is best path, remote nh not installed, no labeled nexthop

AS-Path: NONE, path sourced internal to AS

192.168.33.34 (metric 5) from 192.168.33.33 (3.3.3.3)

Origin IGP, MED not set, localpref 100, weight 0

Received label 10000030 1000001

Extcommunity: RT:65000:10000010 RT:65000:10000030 SOO:192.168.33.34:0 ENC

AP:8 Router MAC:0062.ecbf.4e4d

Path-id 1 advertised to peers:

192.168.11.11 192.168.22.22 192.168.44.44