

# VXLAN de configuração e verificação com Plano de controle MP-BGP EVPN.

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## Introduction

Este documento descreve a configuração de VXLAN usando o plano de controle MP-BGP EVPN. Ele mostra um exemplo de cenário de rede e sua configuração com saídas relevantes para verificação e melhor entendimento.

## Prerequisites

## Requirements

A Cisco recomenda que você tenha conhecimento destes tópicos:

- VPNs MPLS de camada 3
- MP-BGP certamente ajudaria.

## 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. 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. If your network is live, make sure that you understand the potential impact of any command.

## Informações de Apoio

A VXLAN foi projetada para fornecer virtualização de rede. É MAC no encapsulamento UDP. A infraestrutura da camada 2 é estendida sobre a rede de base da camada 3 para fornecer um serviço simplificado que não depende da localização física e geográfica dos servidores nos data centers.

Este documento descreve VXLAN com Plano de Controle de MP-BGP EVPN. Isso significa que o protocolo BGP é usado na infraestrutura de sobreposição para enviar e receber atualizações.

Em implantações de rede tradicionais, o STP foi usado, o que resultou em alguns uplinks um estado de bloqueio permanente. No projeto de VXLAN, todos os uplinks estão operacionais e o ECMP é aproveitado como a infraestrutura subjacente é a rede IP.

A discussão de todos os detalhes está fora do escopo deste documento, no entanto algumas terminologias importantes são mostradas abaixo.

VXLAN - Virtual Extensible LAN.

MP-BGP - BGP multiprotocolo.

EVPN - Ethernet VPN.

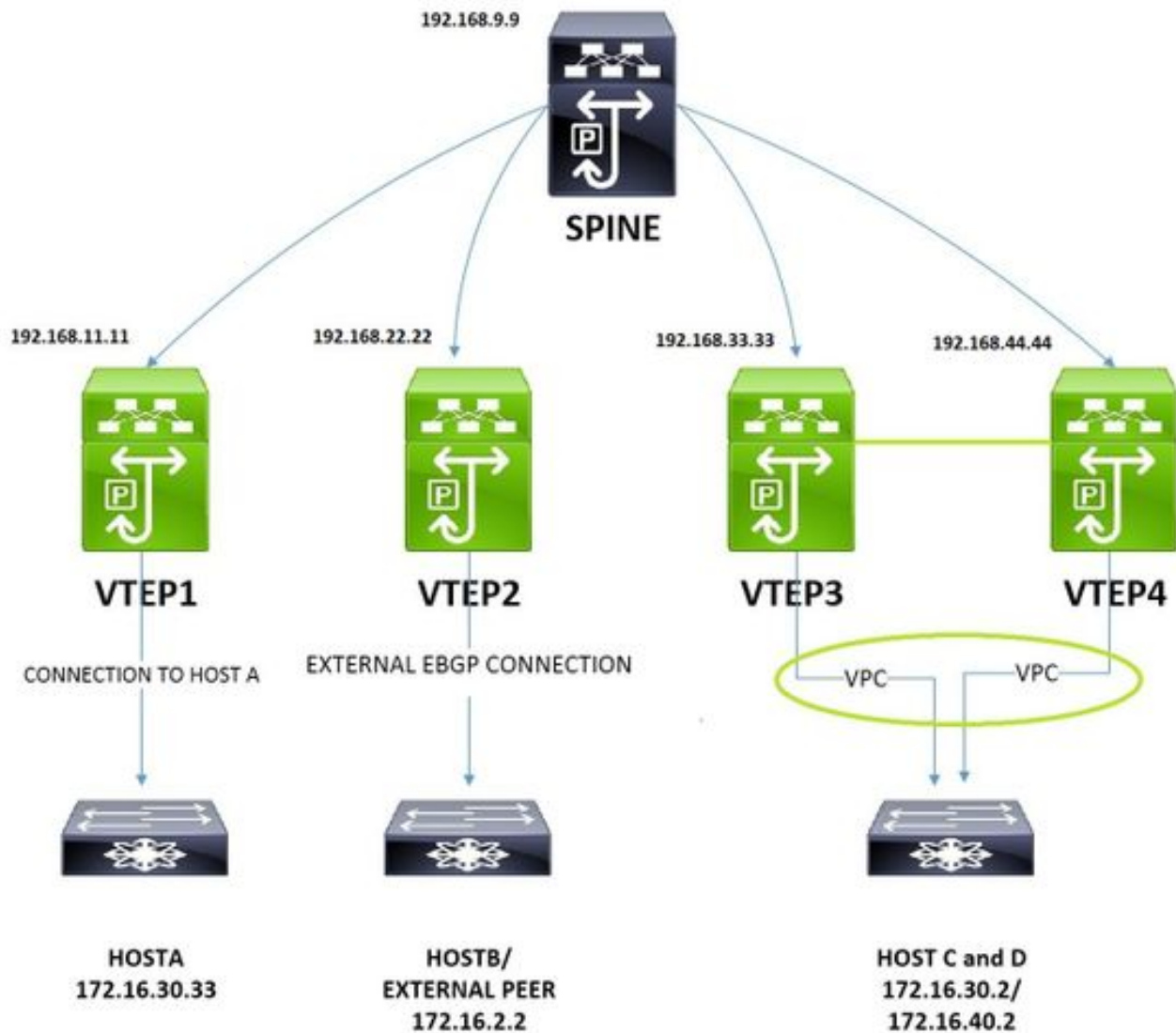
VTEP - Ponto Final do Túnel Virtual. Também conhecido como folha. Este é o local onde os pacotes são encapsulados e desencapsulados.

Spine - Isso é muito semelhante ao Route-Reflector em VPNs MPLS L3. Esse dispositivo pega as atualizações de um VTEP e as passa para outro VTEP.

VNI - Identificador de rede VXLAN. Isso é usado principalmente para fornecer isolamento para limites da camada 2. Esse campo tem 24 bits de comprimento, portanto, supera a limitação de intervalo das vlans tradicionais. Um VNI em um VTEP é 'mapeado' para uma vlan tradicional. Isso será discutido posteriormente.

## Configurar

### Diagrama de Rede



A imagem mostrada é usada para aspectos de configuração e verificação. Isso abrange configurações de conectividade não-vpc, vpc, intra-vni, inter-vni e externa da perspectiva da infraestrutura de 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 l2
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. A única diferença é o VPC e um VNI de camada 2 adicional para a vlan 40.

```

!
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

```

## SPINE

```

!
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

```

## HOST A

O host A é simulado por um switch 3750.

```

! 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 de peering 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

Os hosts C e D são simulados pelo Nexus5k , mantendo os endereços ip 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 (IntraVNI)

```
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 ao HOST 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 de host foram anunciadas com êxito para esse peer BGP externo.

## Verificação do plano de controle.

- Esse comando mostra o "mapeamento" de vlans tradicionais com VNIDs.

```

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

```

- A próxima é verificar se o mac é aprendido localmente no 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 verificar se a rota está instalada em l2rib.

```

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 verificar se a l2rib exporta a atualização para l2vpn evpn.

```
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 verificar se as rotas são anunciadas ao Spine.

```
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 do Spine.

```
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

```

- No VTEP1, apenas o VNID 10000030 está configurado e foi verificado que o mac e o ip do Host A são aprendidos localmente e também anunciados como rota de evpn. Também foi observado que a atualização do Host C também foi recebida e instalada aqui.
- Os nve peers também devem estar ativos antes que o tráfego possa ser encaminhado.

```

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

```





```

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 tempo de peering e as informações de VNI para Peers 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 as informações internas são criadas. Exemplo de vlan 30 mapeada para 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 (0x000006)  
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 de ser uma atualização Inter-VNI ou IntraVNI, certifique-se de que as RTs (Route Targets) corretas estão sendo recebidas e o VTEP que recebe a atualização tem configurações relevantes. Uma atualização do VTEP3 proveniente da SPINE será analisada aqui para verificar a consistência de RT. O estado local de RT e RD para VTEP1 foi mostrado nas saídas acima.

```
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
```