

# MP-BGP EVPN コントロール プレーンの設定および確認 VXLAN。

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## 概要

この資料は MP-BGP EVPN コントロール・プレーンを使用して VXLAN 設定を説明したものです。それは確認およびよりよい知識のための関連した出力とのネットワーク例 シナリオおよび設定を示します。

## 前提条件

### 要件

次の項目に関する知識が推奨されます。

- MPLS レイヤ 3 VPN ( L3VPN )
- MP-BGP は確かに助けます。

## 使用するコンポーネント

このドキュメントは、特定のソフトウェアやハードウェアのバージョンに限定されるものではありません。

このドキュメントは、特定のソフトウェアやハードウェアのバージョンに限定されるものではありません。本書の情報は、特定のラボ環境にあるデバイスに基づいて作成されたものです。このドキュメントで使用するすべてのデバイスは、初期（デフォルト）設定の状態から起動しています。稼働中のネットワークで作業を行う場合、コマンドの影響について十分に理解したうえで作業してください。

## 背景説明

VXLAN はネットワーク 仮想化を提供するように設計されています。それは UDP カプセル化の MAC です。レイヤ2 インフラストラクチャはレイヤ3 下敷きネットワークに拡張データセンターでサーバの物理的および地理的上の位置に依存していない簡単サービスを提供するためにです。

この資料は MP-BGP EVPN コントロール プレーンの VXLAN を記述したものです。これは更新を送信し、受信するために BGP プロトコルがインフラストラクチャの上にあるのに使用されていることを意味します。

STP が、これ使用された従来の ネットワーク配備でいくつかのアップリンク閉鎖状態という結果に永久に終わりました。VXLAN 設計ですべてのアップリンクは正常に動作して、下敷きインフラストラクチャが IP ネットワークであるので ECMP は活用されます。

すべての詳細の説明はこの資料の範囲外にいくつかの重要な用語が下記に示されているどんなに、あります。

VXLAN -仮想 で拡張可能な LAN。

MP-BGP - Multiprotocol BGP。

EVPN - イーサネット VPN。

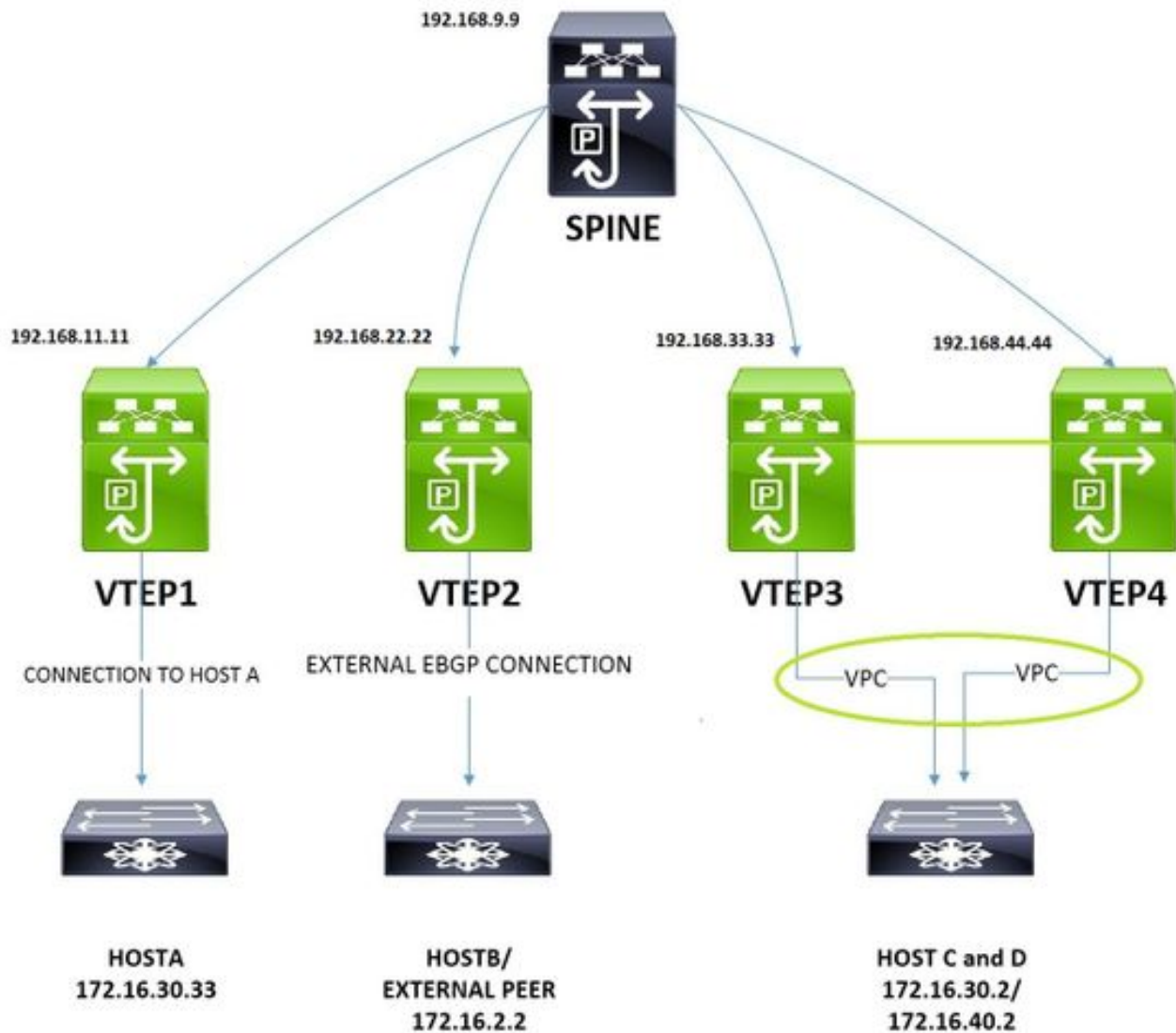
VTEP - 仮想 なトンネル エンドポイント。別名リーフ。これパケットがカプセル化され、カプセル化を解除されるインポート。

スパイン-これは MPLS L3VPN のルート リフレクタに非常に類似したです。このデバイスは 1 VTEP からの更新を奪取し、他の VTEP にそれを渡します。

VNI - VXLAN ネットワーク識別名。これが主にレイヤ2 境界に分離を提供するのに使用されています。このフィールドは 24 ビット長です従って従来の VLAN の範囲 制限を克服します。VTEP の VNI は従来の VLAN に「マッピング されます」。これは説明されていた以降です。

## 設定

### ネットワーク図



示されているイメージは設定および確認側面のために使用されます。これは VXLAN インフラストラクチャの観点から非vpc、vpc、内部vni の、相互vni および外部接続性の設定をカバーします。

## 設定

### 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

VTEP3 および VTEP1 のための構成はほとんど同一です。違いだけ VLAN 40 のための VPC および追加 layer2 VNI です。

```

!
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
```

## スパイン

```
!  
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
```

## ホストA

ホストA は 3750 スイッチによって模倣されます。

```
! 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
```

## ホスト B

ホスト B は外部ピアリング デバイス、N5K ここでは使用されません。

```
!
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
```

## ホスト C および D

ホスト C および D は個別の vrf で IP アドレスを保存する Nexus5k によって模倣されます。

```
!  
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>
```

## 確認

### ホスト A からの外部ホスト B への接続

```
!  
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>
```

## ホストAからのホストCへの接続 ( 内部VNI )

```
!  
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>
```

## ホストAからのホストDへの接続 ( 相互VNI )

```
!  
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>
```

## ホストB ( 外部ピア ) のルーティング テーブル

```

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,

```

それはホストルーティングがこの external BGP ピアに正常にアドバタイズされたこと観察することができます。

## コントロールの確認-平面。

- このコマンドは VNIDs の従来の VLAN の「マッピング」を示したものです。

```

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,

```

- 次は MAC が VTEP でローカルで学ばれることを確認することです。

```

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)

```

- 次のステップはルートが l2rib にインストールされていることを確認することです。

```

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.
```

- 次のステップは l2rib が l2vpn evpn にアップデートをエクスポートすることを確認することです。

```
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.
```

```
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
```

- 次のステップはルーティングがスパインにアドバタイズされることを確認することです。

```
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
```

```
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
```

- 次のステップはスパインから届くルーティングをチェックすることです。

```
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

```

- VTEP1 VNID だけ 10000030 で設定され、ホストA の MAC および IP がローカルで学ばれ、また evpn ルートとしてアドバタイズされることが確認されました。ホスト C からのアップデートがまた受信され、ここにインストールされていたことがまた観察されました。
- nve 同位はまたトラフィックが転送することができる前に稼働するはずです。

```

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

```

## トラブルシューティング

- nve インターフェイスがチェックされる場合、カプセル化のためのカウンターの増分し、非カプセル化は見るはずです。

```

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

```

- 透過ファイアウォールがフィルタリングのために使用される場合、確実にに関連するポートを割り当てられますさせて下さい。

```

VTEP1# show nve vxlan-params
VxLAN Dest. UDP Port: 4789

```

- 相互VNI ルーティングのために使用されるローカル VTEP MAC アドレスをチェックするため。セカンダリアドレスは VTEP が vpc ペアにあるとき見られます。

```

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)

```

- ピアリングのリモート VTEPS MAC アドレスおよび状態をチェックするため。

```

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
|=====|=====|=====|=====|=====|=====|
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

```

- ピアリングをチェックするために VTEP のための時間を計り、VNI

```

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
|=====|=====|=====|=====|=====|=====|
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

```

- BGP が EVI および内部 情報とどのように相互に作用しているかチェックすることは構築されます。VNI 10000030 にマッピングされる VLAN 30 の例はここに示されています。

```

VTEP1# sh bgp internal evi 10000030
*****

```

L2RIB bound / VNI Req to L2RIB : Yes / 1  
L2VNI Adds / Dels / ALD 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
```

- 正しい RT ( ルート ターゲット ) はおおよび受け取られていることを相互VNI か内部VNI アップデートであるその確かめなさいに関係なくアップデートが受信されるときアップデートを受信する VTEP に関連した構成があります。スパインによって来る VTEP3 からのアップデートは RT 一貫性のためにここに分析されます。VTEP1 のための RT および RD のローカルステートは出力の上で示されていました。

```
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
```