マルチサイト環境でのEVPN/VxLANの設定と確認

内容

はじめに

このドキュメントでは、Cisco Nexus 9000シリーズスイッチを使用してイーサネットVPN/仮想拡張LAN(VXLAN)マルチサイト環境を設定および確認する方法について説明します。

前提条件

要件

次の項目に関する知識があることが推奨されます。

- マルチプロトコルラベルスイッチング(MPLS)レイヤ3 VPN
- マルチプロトコルボーダーゲートウェイプロトコル(MP-BGP)
- イーサネットVPN(EVPN)

使用するコンポーネント

このドキュメントの情報は、次のソフトウェアとハードウェアのバージョンに基づいています。

リーフ1#	N5K-C5672UP-16G-SUP	システム：バージョン7.3(0)N1(1)
リーフ2#	N9K-C92160YC-X	NXOS：バージョン9.2(3)
スパイン1#	N9K-C9396PX	NXOS：バージョン9.2(3)

スパイン2#	N9K-C9396PX	NXOS：バージョン9.2(3)
MultisiteBG1#	N9K-C93108TC-EX	NXOS：バージョン9.2(3)
MultisiteBG2#	N9K-C93108TC-FX	NXOS：バージョン9.3(1)
multisitespine2#	N9K-C9372TX-E	NXOS：バージョン9.2(3)
Multisesine1#	N9K-C92160YC-X	NXOS：バージョン9.2(3)
MultisteLeaf1#	N9K-C93108TC-EX	NXOS：バージョン7.0(3)I7(5)

このドキュメントの情報は、特定のラボ環境にあるデバイスに基づいて作成されました。このドキュメントで使用するすべてのデバイスは、クリアな（デフォルト）設定で作業を開始しています。本稼働中のネットワークでは、各コマンドによって起こる可能性がある影響を十分確認してください。

関連製品

ソフトウェアおよびハードウェアの最小要件：EVPN Multi-Site Border Gateway

項目	Requirement
Cisco Nexusハードウェア	• Cisco Nexus 9300 EXプラットフォーム
	• Cisco Nexus 9300 FXプラットフォーム
	• Cisco Nexus 9332Cプラットフォーム
	• Cisco Nexus 9364Cプラットフォーム
	• X9700-EXラインカード搭載Cisco Nexus 9500プラットフォーム
	• X9700-FXラインカード搭載Cisco Nexus 9500プラットフォーム
Cisco NX-OS ソフトウェア	Cisco NX-OSソフトウェアリリース7.0(3)I7(1)以降

Virtual Extensible LAN(VXLAN)BGP EVPNサイトのサイト内部ノードのハードウェアおよびソフトウェア要件は、EVPN Multi-Site BGWがない場合と同じです

背景説明

データセンターは、コンピューティング能力、ストレージ、およびビジネス環境をサポートするために必要なアプリケーションを含むリソースプールです。データセンターインフラストラクチャ設計を適切に計画することが不可欠です。ここで、重要な要件とその克服について説明します。現代のITインフラストラクチャおよびデータセンターの導入には、HA、より高速な拡張、高いパフォーマンス、および常にオンである機能が必要です。

DC設計/アーキテクチャの分野で不可欠な要件を検討した回答者は次のとおりです。

- ポート密度はFEXによって向上します。
- コンピューティング能力は、ハードウェア仮想化(UCS)によって向上します。

- アクセスレイヤのアップリンク帯域幅は、FI、ポートチャネルによって向上します。
- シャーシレベルの冗長性は、vPCによって向上します。
- SDNファブリックはACIによって改善され、ファブリック内のアンダーレイとオーバーレイを自動化します。
- DCNMにより、迅速な導入と新しいサービスのサポートが向上します。
- 長距離アプリケーションの帯域幅要件は、ダークファイバまたは波長サービスによって改善されます。
- データセンター環境を徹底的に縮小/縮小するための重要な特性は、地理的な冗長性とスケーリングのすべてにおいて、マルチサイトVxLAN/EVPNがより優れたDCIソリューションを提供するのに役立ちます。

マルチサイトの利点

外部接続には、データセンターからネットワークの他の部分（インターネット、WAN、またはキャンパス）への接続が含まれます。外部接続用に提供されるオプションはすべてマルチテナント対応で、外部ネットワークドメインへのレイヤ3転送に重点を置いています。

- EVPNは次世代のオールインワンVPNソリューションです。
- これは、他の多くのVPNテクノロジーの役割を果たすだけでなく、より優れた機能でもあります。
- レガシーネットワークとの統合
- 選択的なアドバタイズメント/拡張：
  - タイプ2ルートを使用して拡張できる唯一のL2 – 特定のVLAN/サブネットを拡張します。
  - 唯一のL3を拡張する：特定のL3ドメインは、タイプ5ルートを使用して拡張できます。
- タイプ4ルートを使用した冗長グループの自動検出。
- エイリアシング、アドレスの一括撤回、タイプ1ルートを使用したSH/AA MH表示。
- タイプ3ルートを使用したマルチキャストトンネルエンドポイントおよびMCASTトンネルタイプの自動検出。

その他の利点

・データセンターおよびクラウド間でのワークロードバランシング

・障害へのプロアクティブな対応：災害、ハリケーン、洪水などの接近リスクを軽減します。

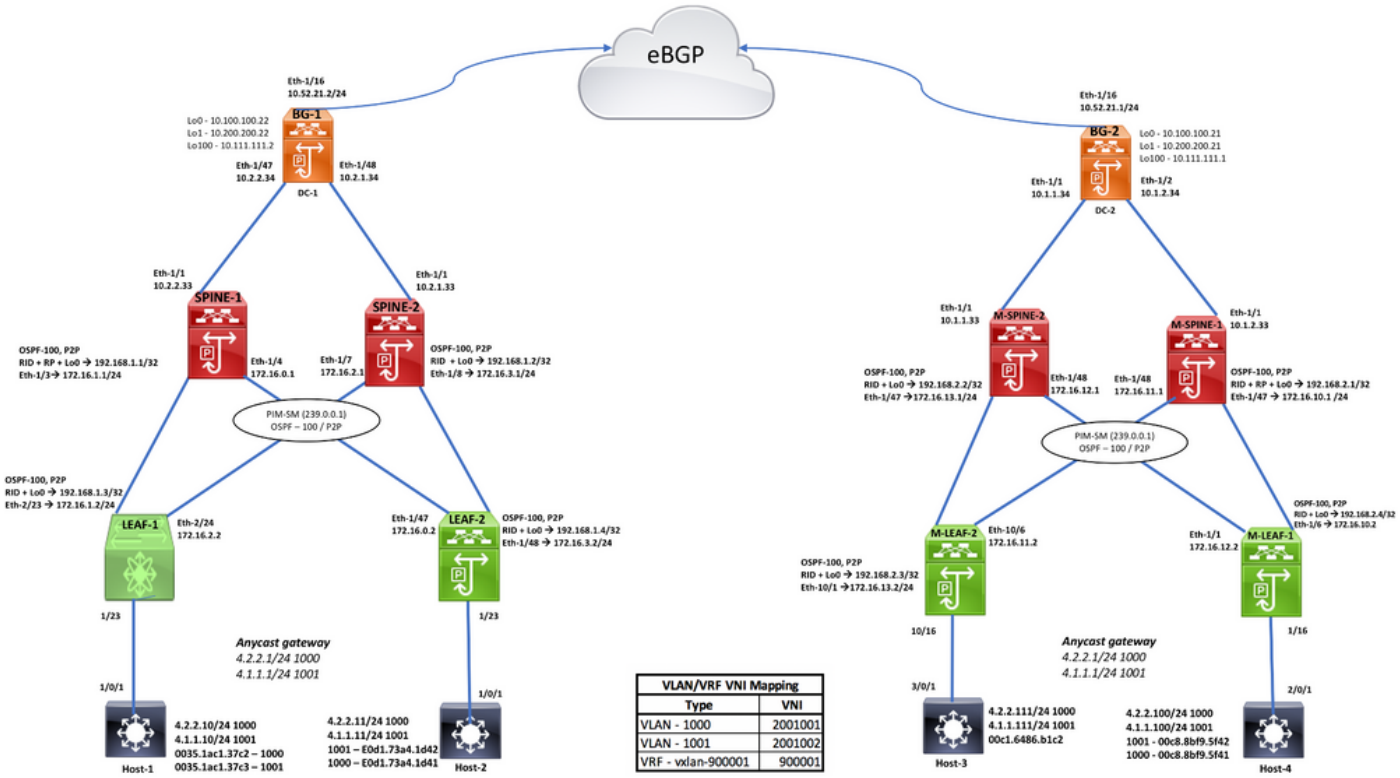
・データ・センターのメンテナンスと移行：一定期間にわたってスケジュールされた計画的なイベント、レガシー・ネットワークとの統合

・バックアップとディザスタリカバリaaS

サポートされるトポロジ

- BGW-to-Cloudモデル
- スパインモデルとスーパースパインモデル間のBGW
- スパインモデルのBGW
- BGWバックツーバックモデル

トポロジ



VLAN/VRF VNI Mapping	
Type	VNI
VLAN - 1000	2001001
VLAN - 1001	2001002
VRF - vxlan-900001	900001

設定

DC-1, LEAF-1 CONFIGURATION

Enable Features

```
install feature-set fabric
feature-set fabric
hostname leaf1
feature fabric forwarding
nv overlay evpn
feature ospf
feature bgp
feature pim
feature interface-vlan
feature fabric access
feature nv overlay
feature vn-segment-vlan-based
```

Enabling Store-and-Forward Switching

```
switching-mode store-forward
```

Interface towards HOST

```
interface Ethernet1/23
  switchport mode trunk
  switchport trunk allowed vlan 1000-1001
  speed 1000
```

VLAN-VNI Mapping

```
vlan 1
vlan 101
  vn-segment 900001
vlan 1000
  vn-segment 2001002
vlan 1001
  vn-segment 2001001
```

VLAN Config

```
interface Vlan101
  no shutdown
  vrf member vxlan-900001
  ip forward

interface Vlan1000
  no shutdown
  mtu 9216
  vrf member vxlan-900001
  ip address 4.2.2.1/24
  ipv6 address 4:2:0:1::1/64
  fabric forwarding mode anycast-gateway

interface Vlan1001
  no shutdown
  mtu 9216
  vrf member vxlan-900001
  ip address 4.1.1.1/24
  ipv6 address 4:1:0:1::1/64
  fabric forwarding mode anycast-gateway
```

Anycast GW mapping

```
fabric forwarding anycast-gateway-mac 0000.2222.3333
```

Static RP Config

```
ip pim rp-address 192.168.1.1 group-list 224.0.0.0/4
ip pim rp-address 192.168.1.2 group-list 224.0.0.0/4
ip pim ssm range 232.0.0.0/8
ip multicast multipath none
```

VTEP Config

```
interface nve1
  no shutdown
  source-interface loopback0
  host-reachability protocol bgp
  member vni 900001 associate-vrf
  member vni 2001001
    suppress-arp
    mcast-group 239.0.0.1
  member vni 2001002
    suppress-arp
    mcast-group 239.0.0.1
```

LEAF to SPINE interfaces/OSPF Config

```
interface Ethernet2/23
  no switchport
  ip address 172.16.1.2/24
  ip ospf network point-to-point
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode

interface Ethernet2/24
  no switchport
  ip address 172.16.2.2/24
  ip ospf network point-to-point
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode

interface loopback0
  ip address 192.168.1.3/24
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode

router ospf 100
  router-id 192.168.1.3
```

BGP Config

```
router bgp 200
  router-id 192.168.1.3
  address-family ipv4 unicast
  address-family l2vpn evpn
  neighbor 192.168.1.1
    remote-as 200
    update-source loopback0
    address-family ipv4 unicast
    address-family l2vpn evpn
      send-community extended
  neighbor 192.168.1.2
    remote-as 200
    update-source loopback0
    address-family ipv4 unicast
    address-family l2vpn evpn
      send-community extended

evpn
  vni 2001001 l2          <<<<<<< L2VNI Config
    rd auto
    route-target import auto
    route-target export auto
  vni 2001002 l2
    rd auto
    route-target import auto
    route-target export auto

vrf context vxlan-900001
  vni 900001              <<<<<<< L3VNI Config
  rd auto
  address-family ipv4 unicast
    route-target both auto
    route-target both auto evpn
  address-family ipv6 unicast
    route-target both auto
    route-target both auto evpn
```

DC-1 SPINE -1 Configuration

Enabling Features, RP Config

```
hostname spine1
boot nxos bootflash:/nxos.9.2.3.bin

nv overlay evpn
feature ospf
feature bgp
feature pim
feature interface-vlan
feature vn-segment-vlan-based
feature nv overlay

ip pim rp-address 192.168.1.1 group-list 224.0.0.0/4
```

OSPF Configuration

```
interface Ethernet1/1
  no switchport
  ip address 10.2.2.33/30
  ip ospf network point-to-point
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode
  no shutdown

interface Ethernet1/3
  no switchport
  ip address 172.16.1.1/24
  ip ospf network point-to-point
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode
  no shutdown

interface Ethernet1/4
  no switchport
  ip address 172.16.0.1/24
  ip ospf network point-to-point
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode
  no shutdown

interface loopback0
  ip address 192.168.1.1/32
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode

router ospf 100
  router-id 192.168.1.1
```

BGP/EVPN Configuration

```
router bgp 200
  router-id 192.168.1.1
  address-family ipv4 unicast
  address-family l2vpn evpn
  neighbor 10.100.100.22
    remote-as 200
    update-source loopback0
    address-family ipv4 unicast
    address-family l2vpn evpn
      send-community
      send-community extended
      route-reflector-client
  neighbor 192.168.1.3
    remote-as 200
    update-source loopback0
    address-family ipv4 unicast
      send-community extended
      route-reflector-client
    address-family l2vpn evpn
      send-community extended
      route-reflector-client
  neighbor 192.168.1.4
    remote-as 200
    update-source loopback0
    address-family ipv4 unicast
      send-community extended
      route-reflector-client
    address-family l2vpn evpn
      send-community extended
      route-reflector-client
```

DC-1 Border Gateway-1 Configuration

Enabling Features, RouteMap, B-G Config

```
hostname MultisiteBG1
boot nxos bootflash:/nxos.9.2.3.bin
nv overlay evpn
feature ospf
feature bgp
feature pim
feature fabric forwarding
feature interface-vlan
feature vn-segment-vlan-based
feature lldp
feature nv overlay

evpn multisite border-gateway 200
  delay-restore time 300

route-map RMAP-REDIST-DIRECT permit 10
  match tag 54321
```

VLAN,VNI,VTEP Config

```
VLAN-VNI Mapping
vlan 101
  vn-segment 900001
vlan 1000
  vn-segment 2001002
vlan 1001
  vn-segment 2001001

interface Vlan101
  no shutdown
  mtu 9192
  vrf member vxlan-900001
  ip forward

VTEP Config
interface nve1
  no shutdown
  host-reachability protocol bgp
  source-interface loopback1
  multisite border-gateway interface loopback100
  member vni 900001 associate-vrf
  member vni 2001001
    multisite ingress-replication
    ingress-replication protocol bgp
  member vni 2001002
    multisite ingress-replication
    ingress-replication protocol bgp

Core-Facing Interface Config
interface Ethernet1/16
  mtu 9216
  ip address 10.52.21.2/30 tag 54321
  evpn multisite dci-tracking
  no shutdown
```

OSPF Configuration

```
interface Ethernet1/47
  ip address 10.2.2.34/30
  ip ospf network point-to-point
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode
  evpn multisite fabric-tracking
  no shutdown

interface Ethernet1/48
  ip address 10.2.1.34/30
  ip ospf network point-to-point
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode
  evpn multisite fabric-tracking
  no shutdown

interface loopback0
  ip address 10.100.100.22/32 tag 54321
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode

interface loopback1
  ip address 10.200.200.22/32 tag 54321
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode

interface loopback100
  ip address 10.111.111.2/32 tag 54321
  ip router ospf 100 area 0.0.0.0

router ospf 100
  router-id 10.100.100.22
```

BGP/EVPN Configuration

```
router bgp 200
  router-id 10.100.100.22
  address-family ipv4 unicast
    redistribute direct route-map RMAP-REDIST-DIRECT
  neighbor 10.52.21.1
    remote-as 100
    update-source Ethernet1/16
    address-family ipv4 unicast
  neighbor 10.100.100.21
    remote-as 100
    update-source loopback0
    ebgp-multihop 5
    peer-type fabric-external
    address-family l2vpn evpn
      send-community
      send-community extended
      rewrite-evpn-rt-asn
  neighbor 192.168.1.1
    remote-as 200
    update-source loopback0
    address-family l2vpn evpn
      send-community
      send-community extended
  neighbor 192.168.1.2
    remote-as 200
    update-source loopback0
    address-family l2vpn evpn
      send-community
      send-community extended
  evpn                                  <==L2VNI Config
    vni 2001001 l2
      rd auto
      route-target import auto
      route-target export auto
    vni 2001002 l2
      rd auto
      route-target import auto
      route-target export auto
  vrf context vxlan-900001              <==L3VNI Config
    rd auto
    address-family ipv4 unicast
      route-target both auto
      route-target both auto evpn
    address-family ipv6 unicast
      route-target both auto
      route-target both auto evpn
```

DC-2 Border Gateway-2 Configuration

Enabling Features, RouteMap, B-G Config

```
boot nxos bootflash:/nxos.9.3.0.221.bin
hostname MultisiteBG2
nv overlay evpn
feature ospf
feature bgp
feature pim
feature fabric forwarding
feature interface-vlan
feature vn-segment-vlan-based
feature lldp
feature nv overlay

evpn multisite border-gateway 100
  delay-restore time 300

vlan 1,101,1000-1001
vlan 101
  vn-segment 900001
vlan 1000
  vn-segment 2001002
vlan 1001
  vn-segment 2001001

route-map RMAP-REDIST-DIRECT permit 10
  match tag 54321

interface Ethernet1/16
  mtu 9216
  ip address 10.52.21.1/30 tag 54321
  evpn multisite dci-tracking
  no shutdown
```

VLAN,VNI,VTEP Config

```
interface Vlan101
  no shutdown
  vrf member vxlan-900001
  ip forward

interface nve1
  no shutdown
  host-reachability protocol bgp
  source-interface loopback1
  multisite border-gateway interface loopback100
  member vni 900001 associate-vrf
  member vni 2001001
    multisite ingress-replication
    ingress-replication protocol bgp
  member vni 2001002
    multisite ingress-replication
    ingress-replication protocol bgp

vrf context vxlan-900001
  vni 900001
  rd auto
  address-family ipv4 unicast
    route-target both auto
    route-target both auto evpn
  address-family ipv6 unicast
    route-target both auto
    route-target both auto evpn
```

OSPF Configuration

```
interface Ethernet1/1
  description SITE-INTERNAL INTERFACE
  mtu 9216
  medium p2p
  ip address 10.1.1.34/30
  ip ospf network point-to-point
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode
  evpn multisite fabric-tracking
  no shutdown

interface Ethernet1/2
  description SITE-INTERNAL INTERFACE
  mtu 9216
  medium p2p
  ip address 10.1.2.34/30
  ip ospf network point-to-point
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode
  evpn multisite fabric-tracking
  no shutdown

interface loopback0
  description RID AND BGP PEERING
  ip address 10.100.100.21/32 tag 54321
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode

interface loopback1
  description NVE INTERFACE (PIP VTEP)
  ip address 10.200.200.21/32 tag 54321
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode

interface loopback100
  description MULTI-SITE INTERFACE (VIP VTEP)
  ip address 10.111.111.1/32 tag 54321
  ip router ospf 100 area 0.0.0.0

router ospf 100
  router-id 10.100.100.21
```

BGP/EVPN Configuration

```
router bgp 100
  router-id 10.100.100.21
  address-family ipv4 unicast
    redistribute direct route-map RMAP-REDIST-DIRECT
    maximum-paths 4
  neighbor 10.52.21.2
    remote-as 200
    update-source Ethernet1/16
    address-family ipv4 unicast
  neighbor 10.100.100.22
    remote-as 200
    update-source loopback0
    ebgp-multihop 5
    peer-type fabric-external
    address-family l2vpn evpn
      send-community
      send-community extended
      rewrite-evpn-rt-asn
  neighbor 192.168.2.1
    remote-as 100
    update-source loopback0
    address-family l2vpn evpn
      send-community
      send-community extended
  neighbor 192.168.2.2
    remote-as 100
    update-source loopback0
    address-family l2vpn evpn
      send-community
      send-community extended
  evpn
    vni 2001001 l2
      rd auto
      route-target import auto
      route-target export auto
    vni 2001002 l2
      rd auto
      route-target import auto
      route-target export auto
```

DC-2 SPINE -1 Configuration

Enabling Features, RP Config

```
boot nxos bootflash:/nxos.9.2.3.bin
hostname Multistespine1
nv overlay evpn
feature ospf
feature bgp
feature pim
feature interface-vlan
feature vn-segment-vlan-based
feature nv overlay


ip pim rp-address 192.168.2.1 group-list 224.0.0.0/4
```

OSPF Configuration

```
interface Ethernet1/1
  mtu 9216
  ip address 10.1.2.33/30
  ip ospf network point-to-point
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode
  no shutdown

interface Ethernet1/47
  ip address 172.16.10.1/24
  ip ospf network point-to-point
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode
  no shutdown

interface Ethernet1/48
  ip address 172.16.11.1/24
  ip ospf network point-to-point
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode
  no shutdown


interface loopback0
  ip address 192.168.2.1/32
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode

router ospf 100
  router-id 192.168.2.1
```

BGP/EVPN Configuration

```
router bgp 100
  router-id 192.168.2.1
  address-family ipv4 unicast
  address-family l2vpn evpn
  neighbor 10.100.100.21
    remote-as 100
    update-source loopback0
    address-family l2vpn evpn
      send-community
      send-community extended
      route-reflector-client
  neighbor 192.168.2.3
    remote-as 100
    update-source loopback0
    address-family ipv4 unicast
      send-community extended
      route-reflector-client
    address-family l2vpn evpn
      send-community extended
      route-reflector-client
  neighbor 192.168.2.4
    remote-as 100
    update-source loopback0
    address-family ipv4 unicast
      send-community extended
      route-reflector-client
    address-family l2vpn evpn
      send-community extended
      route-reflector-client
```

DC-2, LEAF -1 Configuration

Enabling Features, RP, VTEP Config

```
boot nxos bootflash:/nxos.7.0.3.I7.5.bin
hostname MultisteLeaf1
nv overlay evpn
feature ospf
feature bgp
feature pim
feature fabric forwarding
feature interface-vlan
feature vn-segment-vlan-based
feature lldp
feature nv overlay


fabric forwarding anycast-gateway-mac 0000.2222.3333
ip pim rp-address 192.168.2.1 group-list 224.0.0.0/4


interface nve1
  no shutdown
  host-reachability protocol bgp
  source-interface loopback0
  member vni 900001 associate-vrf
  member vni 2001001
    suppress-arp
    mcast-group 239.0.0.1
  member vni 2001002
    suppress-arp
    mcast-group 239.0.0.1
```

VLAN,VNI Configuration

```
vlan 101
  vn-segment 900001
vlan 1000
  vn-segment 2001002
vlan 1001
  vn-segment 2001001

interface Vlan101
  no shutdown
  vrf member vxlan-900001
  ip forward

interface Vlan1000
  no shutdown
  vrf member vxlan-900001
  ip address 4.2.2.1/24
  ipv6 address 4:2:0:1::1/64
  fabric forwarding mode anycast-gateway

interface Vlan1001
  no shutdown
  vrf member vxlan-900001
  ip address 4.1.1.1/24
  ipv6 address 4:1:0:1::1/64
  fabric forwarding mode anycast-gateway


vrf context vxlan-900001
  vni 900001
  rd auto
  address-family ipv4 unicast
    route-target both auto
    route-target both auto evpn
  address-family ipv6 unicast
    route-target both auto
    route-target both auto evpn
```

OSPF Configuration

```
interface Ethernet1/1
  ip address 172.16.12.2/24
  ip ospf network point-to-point
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode
  no shutdown

interface Ethernet1/6
  ip address 172.16.10.2/24
  ip ospf network point-to-point
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode
  no shutdown

interface Ethernet1/16
  switchport
  switchport mode trunk
  no shutdown

interface loopback0
  ip address 192.168.2.4/32
  ip router ospf 100 area 0.0.0.0
  ip pim sparse-mode


router ospf 100
  router-id 192.168.2.4
```

BGP/EVPN Configuration

```
router bgp 100
  router-id 192.168.2.4
  address-family ipv4 unicast
  address-family l2vpn evpn
  neighbor 192.168.2.1
    remote-as 100
    update-source loopback0
    address-family ipv4 unicast
    address-family l2vpn evpn
      send-community extended
  neighbor 192.168.2.2
    remote-as 100
    update-source loopback0
    address-family ipv4 unicast
    address-family l2vpn evpn
      send-community extended
evpn
  vni 2001001 l2
    rd auto
    route-target import auto
    route-target export auto
  vni 2001002 l2
    rd auto
    route-target import auto
    route-target export auto
```

確認

LEAF-1 VERIFICATION

```
leaf1# show cdp neighbors
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-
                  S - Switch, H - Host, I - IGMP, r - Repeater,
                  V - VoIP-Phone, D - Remotely-Managed-Device,
                  s - Supports-STP-Dispute


Device-ID             Local Intrfce Hldtme Capability  Platform
MX066-N-01-SW.cisco.com
                      mgmt0         142    S I         WS-C2960X-48T
ToLeaf1               Eth1/23       163    S I         WS-C3750X-24S
spine1(SAL1948U4Y1)
                      Eth2/23       156    R S s       N9K-C9396PX
spine2(SAL1949UELD)
                      Eth2/24       152    R S s       N9K-C9396PX

leaf1#


leaf1# sh ip int brief | exclude down
IP Interface Status for VRF "default"(1)
Interface            IP Address      Interface Status
Lo0                  192.168.1.3     protocol-up/link-up/admin-up
Eth2/23              172.16.1.2      protocol-up/link-up/admin-up
Eth2/24              172.16.2.2      protocol-up/link-up/admin-up
leaf1#

leaf1# sh nve vrf
VRF-Name      VNI         Interface Gateway-MAC
------------ ---------- --------- -----------------
vxlan-900001 900001      nve1      00de.fb01.9fc1

leaf1# sh nve vxlan-params
VxLAN Dest. UDP Port: 4789
```

```
leaf1# show ip pim rp
PIM RP Status Information for VRF "default"
BSR disabled
Auto-RP disabled
BSR RP Candidate policy: None
BSR RP policy: None
Auto-RP Announce policy: None
Auto-RP Discovery policy: None
RP: 192.168.1.1, (0),
 uptime: 3w1d   priority: 0,
 RP-source: (local),
 group ranges:
 224.0.0.0/4
RP: 192.168.1.2, (0),
 uptime: 3w1d   priority: 0,
 RP-source: (local),
 group ranges:
 224.0.0.0/4
leaf1#


leaf1# sh nve interface
Interface: nve1, State: Up, encapsulation: VXLAN
 VPC Capability: VPC-VIP-Only [not-notified]
 Local Router MAC: 00de.fb01.9fc1
 Host Learning Mode: Control-Plane
 Source-Interface: loopback0 (primary: 192.168.1.3, secondary: 0.

leaf1#
```

```
leaf1# sh nve peers
Interface Peer-IP          State LearnType Uptime   Router-Mac
--------- ---------------  ----- --------- -------- -----------------
nve1      10.111.111.2     Up    CP        3w1d     0200.0a6f.6f02
nve1      10.200.200.22    Up    CP        3w1d     n/a
nve1      192.168.1.4      Up    CP        3w1d     7079.b33e.8123

leaf1#

leaf1# show nve vni
Codes: CP - Control Plane        DP - Data Plane
       UC - Unconfigured         SA - Suppress ARP
       SU - Suppress Unknown Unicast

Interface VNI      Multicast-group   State Mode Type [BD/VRF]      Flags
--------- -------- ----------------- ----- ---- ------------------ -----
nve1      900001   n/a               Up    CP   L3 [vxlan-900001]
nve1      2001001  239.0.0.1         Up    CP   L2 [1001]          SA
nve1      2001002  239.0.0.1         Up    CP   L2 [1000]          SA

leaf1#


leaf1# sh vrf vxlan-900001 DETail
VRF-Name: vxlan-900001, VRF-ID: 3, State: Up
    VPNID: unknown
    RD: 192.168.1.3:3
    VNI: 900001, State: Up
    Max Routes: 0  Mid-Threshold: 0
    Table-ID: 0x80000003, AF: IPv6, Fwd-ID: 0x80000003, State: Up
    Table-ID: 0x00000003, AF: IPv4, Fwd-ID: 0x00000003, State: Up
```

CONTROL PLANE LEARNING: Destination Prefix is 4.2.2.100 <===> 00c8.8bf9.5f41 <===> Vlan1000 <===> VNI2001002

Destination Prefix is learnt on host-connected LEAF 192.168.2.4

```
MultisteLeaf1# sh ip route 4.2.2.100 vrf vxlan-900001
IP Route Table for VRF "vxlan-900001"
'*' denotes best ucast next-hop
'**' denotes best mcast next-hop
'[x/y]' denotes [preference/metric]
'%<string>' in via output denotes VRF <string>

4.2.2.100/32, ubest/mbest: 1/0, attached
    *via 4.2.2.100, Vlan1000, [190/0], 4w2d, hmm
MultisteLeaf1#
MultisteLeaf1# sh bgp l2vpn evpn summary
BGP summary information for VRF default, address family L2VPN EVPN
BGP router identifier 192.168.2.4, local AS number 100
BGP table version is 56, L2VPN EVPN config peers 2, capable peers 2
36 network entries and 50 paths using 7968 bytes of memory
BGP attribute entries [26/4160], BGP AS path entries [1/6]
BGP community entries [0/0], BGP clusterlist entries [2/8]

Neighbor        V    AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
192.168.2.1     4   100   44038   44029       56    0    0     4w2d 14
192.168.2.2     4   100   44037   44030       56    0    0     4w2d 14
MultisteLeaf1#
MultisteLeaf1# sh nve peers
Interface Peer-IP          State LearnType Uptime   Router-Mac
--------- ---------------  ----- --------- -------- -----------------
nve1      10.111.111.1     Up    CP        4w2d     0200.0a6f.6f01
nve1      10.200.200.21    Up    CP        4w2d     n/a

MultisteLeaf1# show nve vni
Codes: CP - Control Plane        DP - Data Plane
       UC - Unconfigured         SA - Suppress ARP
       SU - Suppress Unknown Unicast
       Xconn - Crossconnect
       MS-IR - Multisite Ingress Replication

Interface VNI      Multicast-group   State Mode Type [BD/VRF]      Flags
--------- -------- ----------------- ----- ---- ------------------ -----
nve1      900001   n/a               Up    CP   L3 [vxlan-900001]
nve1      2001001  239.0.0.1         Up    CP   L2 [1001]          SA
nve1      2001002  239.0.0.1         Up    CP   L2 [1000]          SA
MultisteLeaf1#
```

Host-Connected Leaf is advertising this prefix to its SPINE (192.168.2.1)

```
MultisteLeaf1# sh bgp l2vpn evpn neighbors 192.168.2.1 advertised-routes

Peer 192.168.2.1 routes for address family L2VPN EVPN:
BGP table version is 56, Local Router ID is 192.168.2.4
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: 10.100.100.21:33767

Route Distinguisher: 10.100.100.21:33768

Route Distinguisher: 10.100.100.22:33767

Route Distinguisher: 10.100.100.22:33768

Route Distinguisher: 192.168.1.3:33767

Route Distinguisher: 192.168.1.3:33768

Route Distinguisher: 192.168.1.4:33767

Route Distinguisher: 192.168.1.4:33768

Route Distinguisher: 192.168.2.4:33767    (L2VNI 2001002)
*>i[2]:[0]:[0]:[48]:[00c8.8bf9.5f41]:[0]:[0.0.0.0]/216
                    192.168.2.4                    100      32768 i
*>i[2]:[0]:[0]:[48]:[00c8.8bf9.5f41]:[32]:[4.2.2.100]/272
                    192.168.2.4                    100      32768 i

Route Distinguisher: 192.168.2.4:33768    (L2VNI 2001001)
*>i[2]:[0]:[0]:[48]:[00c8.8bf9.5f42]:[0]:[0.0.0.0]/216
                    192.168.2.4                    100      32768 i
*>i[2]:[0]:[0]:[48]:[00c8.8bf9.5f42]:[32]:[4.1.1.100]/272
                    192.168.2.4                    100      32768 i

Route Distinguisher: 192.168.2.4:3    (L3VNI 900001)

MultisteLeaf1#
```

SPINE is advertising the same prefix to Border Gateway (BG-2 === 10.100.100.21)

```
Multistespine1# sh bgp l2vpn evpn neighbors 10.100.100.21 advertised-routes

Peer 10.100.100.21 routes for address family L2VPN EVPN:
BGP table version is 26, Local Router ID is 192.168.2.1
Status: s-suppressed, x-deleted, S-stale, d-dampened, h-history, *-valid, >-best
Path type: i-internal, e-external, c-confed, l-local, a-aggregate, r-redist, I-i
njected
Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup, 2 - b
est2

   Network            Next Hop            Metric     LocPrf     Weight Path
Route Distinguisher: 10.100.100.21:27001

Route Distinguisher: 10.100.100.21:33767

Route Distinguisher: 10.100.100.21:33768

Route Distinguisher: 10.100.100.22:33767

Route Distinguisher: 10.100.100.22:33768

Route Distinguisher: 192.168.1.3:33767

Route Distinguisher: 192.168.1.3:33768

Route Distinguisher: 192.168.1.4:33767

Route Distinguisher: 192.168.1.4:33768

Route Distinguisher: 192.168.2.4:33767
*>i[2]:[0]:[0]:[48]:[00c8.8bf9.5f41]:[0]:[0.0.0.0]/216
                    192.168.2.4                    100          0 i
*>i[2]:[0]:[0]:[48]:[00c8.8bf9.5f41]:[32]:[4.2.2.100]/272
                    192.168.2.4                    100          0 i

Route Distinguisher: 192.168.2.4:33768
*>i[2]:[0]:[0]:[48]:[00c8.8bf9.5f42]:[0]:[0.0.0.0]/216
                    192.168.2.4                    100          0 i
*>i[2]:[0]:[0]:[48]:[00c8.8bf9.5f42]:[32]:[4.1.1.100]/272
                    192.168.2.4                    100          0 i
Multistespine1#
```

eBGP Neighborship between Border Gateways

```
MultisiteBG2# sh bgp l2vpn evpn summary
BGP summary information for VRF default, address family L2VPN EVPN
BGP router identifier 10.100.100.21, local AS number 100
BGP table version is 60, L2VPN EVPN config peers 3, capable peers 3
43 network entries and 47 paths using 8160 bytes of memory
BGP attribute entries [37/6068], BGP AS path entries [1/6]
BGP community entries [0/0], BGP clusterlist entries [2/8]

Neighbor        V    AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
10.100.100.22   4   200   44066   44039       60    0    0     4w2d 12
192.168.2.1     4   100   44050   44037       60    0    0     4w2d 4
192.168.2.2     4   100   44048   44037       60    0    0     4w2d 4

Neighbor        T     AS PfxRcd     Type-2     Type-3     Type-4     Type-5
10.100.100.22   E    200 12          10         2          0          0
192.168.2.1     I    100 4           4          0          0          0
192.168.2.2     I    100 4           4          0          0          0
MultisiteBG2#

MultisiteBG2# sh bgp ipv4 unicast summary
BGP summary information for VRF default, address family IPv4 Unicast
BGP router identifier 10.100.100.21, local AS number 100
BGP table version is 11, IPv4 Unicast config peers 1, capable peers 1
7 network entries and 8 paths using 1800 bytes of memory
BGP attribute entries [2/328], BGP AS path entries [1/6]
BGP community entries [0/0], BGP clusterlist entries [2/8]

Neighbor        V    AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
10.52.21.2      4   200   44043   44041       11    0    0     4w2d 4
MultisiteBG2#

MultisiteBG2# sh bgp ipv4 unicast neighbors 10.52.21.2 advertised-routes
Peer 10.52.21.2 routes for address family IPv4 Unicast:
BGP table version is 11, Local Router ID is 10.100.100.21
Status: s-suppressed, x-deleted, S-stale, d-dampened, h-history, *-valid, >-best
Path type: i-internal, e-external, c-confed, l-local, a-aggregate, r-redist, I-i
njected
Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup, 2 - b
est2

   Network          Next Hop            Metric     LocPrf     Weight Path
*>r10.52.21.0/30    0.0.0.0                  0        100      32768 ?
*>r10.100.100.21/32 0.0.0.0                  0        100      32768 ?
*>r10.111.111.1/32  0.0.0.0                  0        100      32768 ?
*>r10.200.200.21/32 0.0.0.0                  0        100      32768 ?
MultisiteBG2#
```

```
MultisiteBG1# sh bgp l2vpn evpn summary
BGP summary information for VRF default, address family L2VPN EVPN
BGP router identifier 10.100.100.22, local AS number 200
BGP table version is 82, L2VPN EVPN config peers 3, capable peers 3
37 network entries and 45 paths using 7296 bytes of memory
BGP attribute entries [37/6068], BGP AS path entries [1/6]
BGP community entries [0/0], BGP clusterlist entries [4/16]

Neighbor        V    AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
10.100.100.21   4   100   44126   44106       82    0    0     4w2d 8
192.168.1.1     4   200   44122   44104       82    0    0     4w2d 8
192.168.1.2     4   200   44121   44104       82    0    0     4w2d 8

Neighbor        T     AS PfxRcd     Type-2     Type-3     Type-4     Type-5
10.100.100.21   E    100 8           6          2          0          0
192.168.1.1     I    200 8           8          0          0          0
192.168.1.2     I    200 8           8          0          0          0
MultisiteBG1#

MultisiteBG1# sh bgp ipv4 unicast summary
BGP summary information for VRF default, address family IPv4 Unicast
BGP router identifier 10.100.100.22, local AS number 200
BGP table version is 11, IPv4 Unicast config peers 1, capable peers 1
7 network entries and 8 paths using 1692 bytes of memory
BGP attribute entries [2/328], BGP AS path entries [1/6]
BGP community entries [0/0], BGP clusterlist entries [4/16]

Neighbor        V    AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
10.52.21.1      4   100   44106   44105       11    0    0     4w2d 4
MultisiteBG1#

MultisiteBG1# show bgp ipv4 unicast neighbors 10.52.21.1 advertised-routes
Peer 10.52.21.1 routes for address family IPv4 Unicast:
BGP table version is 11, Local Router ID is 10.100.100.22
Status: s-suppressed, x-deleted, S-stale, d-dampened, h-history, *-valid, >-best
Path type: i-internal, e-external, c-confed, l-local, a-aggregate, r-redist, I-injected
Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup, 2 - best2

   Network          Next Hop            Metric     LocPrf     Weight Path
*>r10.52.21.0/30    0.0.0.0                  0        100      32768 ?
*>r10.100.100.22/32 0.0.0.0                  0        100      32768 ?
*>r10.111.111.2/32  0.0.0.0                  0        100      32768 ?
*>r10.200.200.22/32 0.0.0.0                  0        100      32768 ?
MultisiteBG1#
```

Route exchange between Border Gateways (B.G-2 ===> B.G-1)

```
MultisiteBG2# sh bgp l2vpn evpn neighbors 10.100.100.22 advertised-routes
Peer 10.100.100.22 routes for address family L2VPN EVPN:
BGP table version is 60, Local Router ID is 10.100.100.21
Status: s-suppressed, x-deleted, S-stale, d-dampened, h-history, *-valid, >-best
Path type: i-internal, e-external, c-confed, l-local, a-aggregate, r-redist, I-i
njected
Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup, 2 - b
est2

   Network            Next Hop            Metric     LocPrf     Weight Path
Route Distinguisher: 10.100.100.21:27001    (ES [0300.0000.0000.6400.0309 0])
*>l[4]:[0300.0000.0000.6400.0309]:[32]:[10.200.200.21]/136
                      10.200.200.21                          100      32768 i

Route Distinguisher: 10.100.100.21:33767    (L2VNI 2001002)
*>l[2]:[0]:[0]:[48]:[005d.738e.a337]:[0]:[0.0.0.0]/216
                      10.200.200.21                          100      32768 i
*>l[3]:[0]:[32]:[10.200.200.21]/88
                      10.200.200.21                          100      32768 i

Route Distinguisher: 10.100.100.21:33768    (L2VNI 2001001)
*>l[2]:[0]:[0]:[48]:[005d.738e.a337]:[0]:[0.0.0.0]/216
                      10.200.200.21                          100      32768 i
*>l[3]:[0]:[32]:[10.200.200.21]/88
                      10.200.200.21                          100      32768 i
Route Distinguisher: 10.100.100.22:33767
Route Distinguisher: 10.100.100.22:33768
Route Distinguisher: 192.168.1.3:33767
Route Distinguisher: 192.168.1.3:33768
Route Distinguisher: 192.168.1.4:33767
Route Distinguisher: 192.168.1.4:33768
Route Distinguisher: 192.168.2.4:33767
*>i[2]:[0]:[0]:[48]:[00c8.8bf9.5f41]:[0]:[0.0.0.0]/216
                      192.168.2.4                            100          0 i
*>i[2]:[0]:[0]:[48]:[00c8.8bf9.5f41]:[32]:[4.2.2.100]/272
                      192.168.2.4                            100          0 i
Route Distinguisher: 192.168.2.4:33768
*>i[2]:[0]:[0]:[48]:[00c8.8bf9.5f42]:[0]:[0.0.0.0]/216
                      192.168.2.4                            100          0 i
*>i[2]:[0]:[0]:[48]:[00c8.8bf9.5f42]:[32]:[4.1.1.100]/272
                      192.168.2.4                            100          0 i

Route Distinguisher: 10.100.100.21:3    (L3VNI 900001)
MultisiteBG2#
```

In DC-1, Route advertisement from BG-1 to SPINE-1

```
MultisiteBG1# sh bgp l2vpn evpn neighbors 192.168.1.1 advertised-routes
Peer 192.168.1.1 routes for address family L2VPN EVPN:
BGP table version is 82, Local Router ID is 10.100.100.22
Status: s-suppressed, x-deleted, S-stale, d-dampened, h-history, *-valid, >-best
Path type: i-internal, e-external, c-confed, l-local, a-aggregate, r-redist, I-injected
Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup, 2 - best2

   Network            Next Hop            Metric     LocPrf     Weight Path
Route Distinguisher: 10.100.100.21:33767
*>e[2]:[0]:[0]:[48]:[005d.738e.a337]:[0]:[0.0.0.0]/216
                      10.200.200.21                                     0 100 i

Route Distinguisher: 10.100.100.21:33768
*>e[2]:[0]:[0]:[48]:[005d.738e.a337]:[0]:[0.0.0.0]/216
                      10.200.200.21                                     0 100 i

Route Distinguisher: 10.100.100.22:27001    (ES [0300.0000.0000.c800.0309 0])
*>l[4]:[0300.0000.0000.c800.0309]:[32]:[10.200.200.22]/136
                      10.200.200.22                          100      32768 i

Route Distinguisher: 10.100.100.22:33767    (L2VNI 2001002)
*>l[2]:[0]:[0]:[48]:[6cb2.ae91.38bf]:[0]:[0.0.0.0]/216
                      10.200.200.22                          100      32768 i
*>l[3]:[0]:[32]:[10.200.200.22]/88
                      10.200.200.22                          100      32768 i

Route Distinguisher: 10.100.100.22:33768    (L2VNI 2001001)
*>l[2]:[0]:[0]:[48]:[6cb2.ae91.38bf]:[0]:[0.0.0.0]/216
                      10.200.200.22                          100      32768 i
*>l[3]:[0]:[32]:[10.200.200.22]/88
                      10.200.200.22                          100      32768 i
Route Distinguisher: 192.168.1.3:33767
Route Distinguisher: 192.168.1.3:33768
Route Distinguisher: 192.168.1.4:33767
Route Distinguisher: 192.168.1.4:33768
Route Distinguisher: 192.168.2.4:33767
*>e[2]:[0]:[0]:[48]:[00c8.8bf9.5f41]:[0]:[0.0.0.0]/216
                      10.111.111.1           2000                     0 100 i
*>e[2]:[0]:[0]:[48]:[00c8.8bf9.5f41]:[32]:[4.2.2.100]/272
                      10.111.111.1           2000                     0 100 i
Route Distinguisher: 192.168.2.4:33768
*>e[2]:[0]:[0]:[48]:[00c8.8bf9.5f42]:[0]:[0.0.0.0]/216
                      10.111.111.1           2000                     0 100 i
*>e[2]:[0]:[0]:[48]:[00c8.8bf9.5f42]:[32]:[4.1.1.100]/272
                      10.111.111.1           2000                     0 100 i
MultisiteBG1#
```

CONTROL PLANE VERIFICATIION AT DC-1 (Spine-1, Leaf-1): Destination Prefix is 4.2.2.100 <===> 00c8.8bf9.5f41 <===> Vlan1000 <===> VNI2001002

spine1# sh bgp ipv4 unicast summary

```
BGP summary information for VRF default, address family IPv4 Unicast
BGP router identifier 192.168.1.1, local AS number 200
BGP table version is 3, IPv4 Unicast config peers 3, capable peers 2
0 network entries and 0 paths using 0 bytes of memory
BGP attribute entries [0/0], BGP AS path entries [0/0]
BGP community entries [0/0], BGP clusterlist entries [0/0]

Neighbor        V    AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
10.100.100.22   4   200   43997   43988        0    0    0     4w2d 0 (No Cap)
192.168.1.3     4   200   43986   43984        3    0    0     4w2d 0
192.168.1.4     4   200   43990   43987        3    0    0     4w2d 0
spine1#
```

spine1# sh ip route 10.100.100.22

```
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>

10.100.100.22/32, ubest/mbest: 1/0
    *via 10.2.2.34, Eth1/1, [110/41], 4w2d, ospf-100, intra
spine1#
```

spine1# sh bgp l2vpn evpn summary

```
BGP summary information for VRF default, address family L2VPN EVPN
BGP router identifier 192.168.1.1, local AS number 200
BGP table version is 31, L2VPN EVPN config peers 3, capable peers 3
19 network entries and 19 paths using 4256 bytes of memory
BGP attribute entries [17/2788], BGP AS path entries [1/6]
BGP community entries [0/0], BGP clusterlist entries [0/0]

Neighbor        V    AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
10.100.100.22   4   200   44002   43993       31    0    0     4w2d 11
192.168.1.3     4   200   43991   43989       31    0    0     4w2d 4
192.168.1.4     4   200   43996   43992       31    0    0     4w2d 4
spine1#
```

spine1# sh bgp l2vpn evpn 00c8.8bf9.5f41

```
BGP routing table information for VRF default, address family L2VPN EVPN
Route Distinguisher: 192.168.2.4:33767
BGP routing table entry for [2]:[0]:[0]:[48]:[00c8.8bf9.5f41]:[0]:[0.0.0.0]/216,
 version 27
Paths: (1 available, best #1)
Flags: (0x000202) (high32 00000000) on xmit-list, is not in l2rib/evpn, is not i
n HW
Multipath: iBGP

  Advertised path-id 1
  Path type: internal, path is valid, is best path, no labeled nexthop
  AS-Path: 100 , path sourced external to AS
    10.111.111.2 (metric 41) from 10.100.100.22 (10.100.100.22)
      Origin IGP, MED 2000, localpref 100, weight 0
      Received label 2001002
      Extcommunity: RT:200:2001002 ENCAP:8

  Path-id 1 advertised to peers:
    192.168.1.3        192.168.1.4
BGP routing table entry for [2]:[0]:[0]:[48]:[00c8.8bf9.5f41]:[32]:[4.2.2.100]/2
72, version 29
Paths: (1 available, best #1)
Flags: (0x000202) (high32 00000000) on xmit-list, is not in l2rib/evpn, is not i
n HW
Multipath: iBGP

  Advertised path-id 1
  Path type: internal, path is valid, is best path, no labeled nexthop
  AS-Path: 100 , path sourced external to AS
    10.111.111.2 (metric 41) from 10.100.100.22 (10.100.100.22)
      Origin IGP, MED 2000, localpref 100, weight 0
      Received label 2001002 900001
      Extcommunity: RT:200:900001 RT:200:2001002 ENCAP:8 Router MAC:0200.0a6f.6f
       2

  Path-id 1 advertised to peers:
    192.168.1.3        192.168.1.4
spine1#
```

leaf1# sh bgp l2vpn evpn summary

```
BGP summary information for VRF default, address family L2VPN EVPN
BGP router identifier 192.168.1.3, local AS number 200
BGP table version is 52, L2VPN EVPN config peers 2, capable peers 2
36 network entries and 50 paths using 4864 bytes of memory
BGP attribute entries [32/4608], BGP AS path entries [1/6]
BGP community entries [0/0], BGP clusterlist entries [4/16]

Neighbor        V    AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
192.168.1.1     4   200   42565   42552       52    0    0     4w1d 14
192.168.1.2     4   200   42565   42552       52    0    0     4w1d 14
leaf1#
```

leaf1# show bgp ip unicast 4.2.2.100 vrf vxlan-900001

```
BGP routing table information for VRF vxlan-900001, address family IPv4 Unicast
BGP routing table entry for 4.2.2.100/32, version 7
Paths: (1 available, best #1)
Flags: (0x08041a) on xmit-list, is in urib, is best urib route, is in HW,
  vpn: version 7, (0x100002) on xmit-list

  Advertised path-id 1, VPN AF advertised path-id 1
  Path type: internal, path is valid, is best path
             Imported from 192.168.2.4:33767:[2]:[0]:[0]:[48]:[00c8.8bf9.5f41]:[
32]:[4.2.2.100]/272
  AS-Path: 100 , path sourced external to AS
    10.111.111.2 (metric 45) from 192.168.1.1 (192.168.1.1)
      Origin IGP, MED 2000, localpref 100, weight 0
      Received label 2001002 900001
      Extcommunity:
          RT:200:900001
          RT:200:2001002
          ENCAP:8
          Router MAC:0200.0a6f.6f02
    Originator: 10.100.100.22 Cluster list: 192.168.1.1

  VRF advertise information:
  Path-id 1 not advertised to any peer

  VPN AF advertise information:
  Path-id 1 not advertised to any peer
leaf1#
```

Host Reachability Verification from DC-1 to DC-2

ToLeaf1#show ip int br | e down

```
Interface              IP-Address      OK? Method Status     Protocol
Vlan1000               4.2.2.10        YES NVRAM  up         up
Vlan1001               4.1.1.10        YES NVRAM  up         up
GigabitEthernet1/0/1   unassigned      YES unset  up         up
ToLeaf1#
```

ToLeaf1#ping 4.2.2.100

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 4.2.2.100, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/4/9 ms
ToLeaf1#
```

ToLeaf1#show ip arp 4.2.2.100

```
Protocol  Address          Age (min)  Hardware Addr   Type   Interface
Internet  4.2.2.100              54   00c8.8bf9.5f41  ARPA   Vlan1000
ToLeaf1#
```

toMultisiteLeaf1#sh ip interf bri | ex down

```
Interface              IP-Address      OK? Method Status     Protocol
Vlan1000               4.2.2.100       YES NVRAM  up         up
Vlan1001               4.1.1.100       YES NVRAM  up         up
GigabitEthernet2/0/1   unassigned      YES unset  up         up
```

toMultisiteLeaf1#sh ip arp 4.2.2.100

```
Protocol  Address          Age (min)  Hardware Addr   Type   Interface
Internet  4.2.2.100              -   00c8.8bf9.5f41  ARPA   Vlan1000
toMultisiteLeaf1#
```

Reachability Verification from DC-1 Leaf-1

leaf1# show mac address-table | i 00c8.8bf9.5f41|"+"|Type

```
   VLAN     MAC Address      Type      age       Secure NTFY   Ports/SWID.SSID.LID
* 1000     00c8.8bf9.5f41   dynamic   0           F     F  nve1/10.111.111.2
leaf1#
```

leaf1# show ip interface bri vrf all

```
IP Interface Status for VRF "default"(1)
Interface            IP Address      Interface Status
Lo0                  192.168.1.3     protocol-up/link-up/admin-up
Eth1/18              1.1.1.1         protocol-down/link-down/admin-dc
Eth2/23              172.16.1.2      protocol-up/link-up/admin-up
Eth2/24              172.16.2.2      protocol-up/link-up/admin-up

IP Interface Status for VRF "management"(2)
Interface            IP Address      Interface Status
mgmt0                10.31.121.19    protocol-up/link-up/admin-up

IP Interface Status for VRF "vxlan-900001"(3)
Interface            IP Address      Interface Status
Vlan101              forward-enabled protocol-up/link-up/admin-up
Vlan1000             4.2.2.1         protocol-up/link-up/admin-up
Vlan1001             4.1.1.1         protocol-up/link-up/admin-up

leaf1#
```

leaf1# show ip arp vrf vxlan-900001

```
Flags: * - Adjacencies learnt on non-active FHRP router
       + - Adjacencies synced via CFSoE
       # - Adjacencies Throttled for Glean
       D - Static Adjacencies attached to down interface

IP ARP Table for context vxlan-900001
Total number of entries: 2
Address         Age       MAC Address     Interface
4.1.1.10        00:03:56  0035.1ac1.37c3  Vlan1001
4.2.2.10        00:13:10  0035.1ac1.37c2  Vlan1000
leaf1#
```

leaf1# show ip route vrf vxlan-900001 4.2.2.100

```
IP Route Table for VRF "vxlan-900001"
'*' denotes best ucast next-hop
'**' denotes best mcast next-hop
'[x/y]' denotes [preference/metric]
'%<string>' in via output denotes VRF <string>

4.2.2.100/32, ubest/mbest: 1/0
    *via 10.111.111.2%default, [200/2000], 4w2d, bgp-200, internal, tag 100,  (m
pls-vpn)segid 900001 tunnel: 175075074 encap: 1

leaf1#
```

leaf1# traceroute 10.111.111.2

```
traceroute to 10.111.111.2 (10.111.111.2), 30 hops max, 40 byte packets
 1  172.16.1.1 (172.16.1.1)  1.066 ms  0.816 ms  0.664 ms
 2  10.111.111.2 (10.111.111.2)  1 ms  0.74 ms  0.693 ms
leaf1#
```

leaf1# show l2route evpn mac-ip evi 1000

```
Mac Address    Prod Host IP                                 Next Hop (s)
-------------- ---- --------------------------------------- --------------
0035.1ac1.37c2 HMM  4.2.2.10                                N/A
00c8.8bf9.5f41 BGP  4.2.2.100                               10.111.111.2
e0d1.73a4.1d41 BGP  4.2.2.11                                192.168.1.4
leaf1#
```

leaf1# show nve internal bgp rnh database | i Encap|10.111.111.2

```
VNI     Peer-IP          Peer-MAC         Tunnel-ID  Encap     (A/S)  Flags
900001 10.111.111.2      0200.0a6f.6f02   0xa6f6f02  vxlan     (1/0)    0
200100110.111.111.2      0000.0000.0000   0x0        vxlan     (1/0)    0
200100210.111.111.2      0000.0000.0000   0x0        vxlan     (1/0)    0
leaf1#
```

Leaf-1 MAC Address Verification

```
leaf1# sh mac address-table vlan 1000
Legend:
        * - primary entry, G - Gateway MAC, (R) - Routed MAC, O - Overlay MAC
        age - seconds since last seen,+ - primary entry using vPC Peer-Link
   VLAN     MAC Address      Type      age     Secure NTFY   Ports/SWID.SSID.LID
---------+-----------------+--------+---------+------+----+------------------
* 1000     0000.2222.3333   static    0          F    F  sup-eth2
* 1000     0035.1ac1.37c2   dynamic   730        F    F  Eth1/23
* 1000     005d.738e.a337   static    0          F    F  nve1/10.111.111.2
* 1000     00c8.8bf9.5f41   dynamic   0          F    F  nve1/10.111.111.2
* 1000     6cb2.ae91.38bf   static    0          F    F  nve1/10.200.200.22
* 1000     e0d1.73a4.1d41   dynamic   0          F    F  nve1/192.168.1.4
leaf1#

leaf1# show mac address-table vlan 1001
Legend:
        * - primary entry, G - Gateway MAC, (R) - Routed MAC, O - Overlay MAC
        age - seconds since last seen,+ - primary entry using vPC Peer-Link
   VLAN     MAC Address      Type      age     Secure NTFY   Ports/SWID.SSID.LID
---------+-----------------+--------+---------+------+----+------------------
* 1001     0000.2222.3333   static    0          F    F  sup-eth2
* 1001     0035.1ac1.37c3   dynamic   630        F    F  Eth1/23
* 1001     005d.738e.a337   static    0          F    F  nve1/10.111.111.2
* 1001     00c8.8bf9.5f42   dynamic   0          F    F  nve1/10.111.111.2
* 1001     6cb2.ae91.38bf   static    0          F    F  nve1/10.200.200.22
* 1001     e0d1.73a4.1d42   dynamic   0          F    F  nve1/192.168.1.4
leaf1#

leaf1# sh system internal l2rib event-history mac | i 0035.1ac1.37c2
[04/24/20 13:10:09.721 UTC 3 4173] Received MAC ROUTE msg: addr: (1000-0035.1ac1.37c2) vni: 0 admin_dist: 0 seq_num: 0 rt_flags: L soo: 0 dg_count: 0 res: 0 esi: (F) nh_count: 1
[04/24/20 13:10:09.721 UTC 6 4173] (1000,0035.1ac1.37c2,3):MAC route created with seq num:0, flags:L (), soo:0, peerid:0
[04/24/20 13:10:09.732 UTC c 4173] (1000,0035.1ac1.37c2,3):Encoding MAC best route (ADD, client id 4)
[04/24/20 13:10:09.871 UTC e 4173] (1000,0035.1ac1.37c2):Bound MAC-IP(4.2.2.10) to MAC, Total MAC-IP linked: 1

leaf1# show system internal l2rib event-history mac | i 0035.1ac1.37c3
[04/24/20 13:10:09.721 UTC 8 4173] Received MAC ROUTE msg: addr: (1001-0035.1ac1.37c3) vni: 0 admin_dist: 0 seq_num: 0 rt_flags: L soo: 0 dg_count: 0 res: 0 esi: (F) nh_count: 1
[04/24/20 13:10:09.721 UTC b 4173] (1001,0035.1ac1.37c3,3):MAC route created with seq num:0, flags:L (), soo:0, peerid:0
[04/24/20 13:10:09.732 UTC d 4173] (1001,0035.1ac1.37c3,3):Encoding MAC best route (ADD, client id 4)
[04/24/20 13:10:09.871 UTC f 4173] (1001,0035.1ac1.37c3):Bound MAC-IP(4.1.1.10) to MAC, Total MAC-IP linked: 1


leaf1# sh system internal l2rib event-history mac-ip | i 0035.1ac1.37c2
[04/24/20 13:10:09.871 UTC 2 4173] Received MAC-IP ROUTE msg: addr: (1000-0035.1ac1.37c2) host ip: 4.2.2.10 vni: 0 L3 info: 900001 rt_flags: 0 admin_dist: 7 seq_num: 0 soo: 0 nh_count: 0
[04/24/20 13:10:09.871 UTC 3 4173] (1000,0035.1ac1.37c2,4.2.2.10):MAC-IP entry created
[04/24/20 13:10:09.871 UTC 4 4173] (1000,0035.1ac1.37c2,4.2.2.10,12):MAC-IP route created with flags 0, L3 vrf 900001, seq 0, admin dist 7, soo 0
[04/24/20 13:10:09.882 UTC 9 4173] (1000,0035.1ac1.37c2,4.2.2.10,12):Encoding MAC-IP best route (ADD, client id 4)
leaf1#

leaf1# show system internal l2rib event-history mac-ip | i 0035.1ac1.37c3
[04/24/20 13:10:09.871 UTC 6 4173] Received MAC-IP ROUTE msg: addr: (1001-0035.1ac1.37c3) host ip: 4.1.1.10 vni: 0 L3 info: 900001 rt_flags: 0 admin_dist: 7 seq_num: 0 soo: 0 nh_count: 0
[04/24/20 13:10:09.871 UTC 7 4173] (1001,0035.1ac1.37c3,4.1.1.10):MAC-IP entry created
[04/24/20 13:10:09.871 UTC 8 4173] (1001,0035.1ac1.37c3,4.1.1.10,12):MAC-IP route created with flags 0, L3 vrf 900001, seq 0, admin dist 7, soo 0
[04/24/20 13:10:09.882 UTC a 4173] (1001,0035.1ac1.37c3,4.1.1.10,12):Encoding MAC-IP best route (ADD, client id 4)
leaf1#
```

トラブルシュート

トラブルシューティングについては、「マルチサイト環境でのEVPN/VxLANのトラブルシューティング」を参照してください。

関連情報

- VXLAN EVPNマルチサイト設計および導入ホワイトペーパー
- VXLAN EVPNマルチサイトの設定

翻訳について
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