

マルチサイト環境でのEVPN/VxLANのトラブルシューティング

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概要

このドキュメントでは、マルチサイト環境でイーサネットVPN/仮想拡張LAN(EVPN/VxLAN)をトラブルシューティング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
- Multiprotocol-Border Gateway Protocol(MP-BGP)
- EVPN

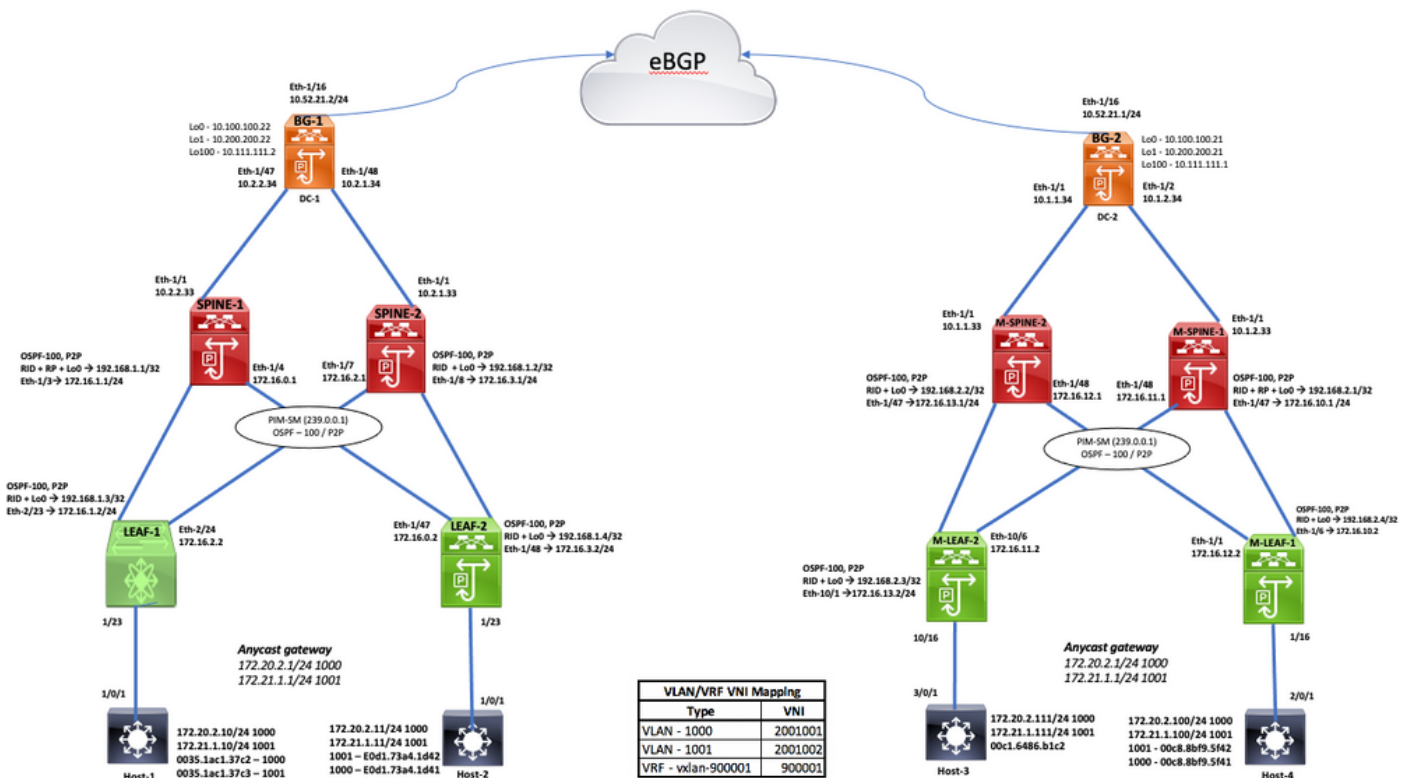
使用するコンポーネント

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。

leaf1#	N5K-C5672UP-16G-SUP	システム : バージョン7.3(0)N1(1)
leaf2#	N9K-C92160YC-X	NXOS : バージョン9.2(3)
spine1#	N9K-C9396PX	NXOS : バージョン9.2(3)
spine2#	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)
Multistesine1#	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、初期（デフォルト）設定の状態から起動しています。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。

トポロジ



このドキュメントでは、トラフィックの発信元(DC-1、Host1/2 - 172.20.2.10/11)を示し、パケットを使用して宛先DC-2、Host4(172.20.2.100)まで移動します。

コントロールプレーンの検証

トラフィック フロー



:
ノードで正しいIP、VLANを確認します。

ステップ 1 : 送信元

```
ToLeaf1#show ip interface brief | exclude down
```

Interface	IP-Address	OK?	Method	Status	Protocol
Vlan1000	172.20.2.10	YES	NVRAM	up	up
Vlan1001	172.21.1.10	YES	NVRAM	up	up
GigabitEthernet1/0/1	unassigned	YES	unset	up	up

```
ToLeaf1#
```

これで、送信元ノードからVlan-1000のSVI-GWへの到達可能性が確保されました。

```
ToLeaf1#ping 172.20.2.1
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 172.20.2.1, timeout is 2 seconds:
```

```
!!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/205/1006 ms
```

```
ToLeaf1#
```

ステップ 2 : 最初のホップであるleaf1に移動し、レイヤ2およびレイヤ3レベルで状況を確認します。

次に、leaf1がmacを学習するか、arpを送信元ノードから学習するかを確認します。

はい。送信元ノードのMACアドレス(0035.1ac1.37c2)、IP 172.20.2.10は、Vlan1000を介してeth1/23で学習されます。

```
leaf1#show mac address-table
```

```
Legend:
```

```
* - primary entry, G - Gateway MAC, (R) - Routed MAC, O - Overlay MAC
```

```
age - seconds since last seen,+ - primary entry using vPC Peer-Link
```

VLAN	MAC Address	Type	age	Secure	NTFY	Ports/SWID.SSID.LID
* 1001	0000.2222.3333	static	0	F	F	sup-eth2

```

* 1001      0035.1ac1.37c3      dynamic      500          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
* 1000      0000.2222.3333      static        0             F      F      sup-eth2
* 1000      0035.1ac1.37c2      dynamic       70           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#

```

ソースリーフのARPテーブルの確認

```
leaf1#show ip arp vrf all
```

```

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 all contexts
```

```
Total number of entries: 5
```

Address	Age	MAC Address	Interface
172.21.1.10	00:08:14	0035.1ac1.37c3	Vlan1001
172.20.2.10	00:00:58	0035.1ac1.37c2	Vlan1000
10.31.121.1	00:08:14	2c31.24b0.bf46	mgmt0
172.16.1.1	00:07:51	0081.c41c.f007	Ethernet2/23
172.16.2.1	00:08:14	cc46.d68f.d74b	Ethernet2/24

```
leaf1#
```

これは、leaf1が送信元ノードのIP/macエントリを作成するためのメッセージを取得する方法を示しています。

```

leaf1#show system internal l2rib event-history mac | i 0035.1ac1.37c2 | be create

[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(172.20.2.10) to MAC, Total
MAC-IP linked: 1

[04/24/20 13:10:42.651 UTC 1a 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 13:10:42.651 UTC 1c 4173] (1000,0035.1ac1.37c2):Mobility check for new rte from prod:
3

[04/24/20 13:10:42.651 UTC 1d 4173] (1000,0035.1ac1.37c2):Current non-del-pending route
local:yes, remote:no, linked mac-ip count:1

[04/24/20 13:10:42.651 UTC 1e 4173] (1000,0035.1ac1.37c2):Mobility type: local-to-local; New
route SOO: 0, Seq num: 0; Existing route SOO: 0, Seq num: 0

[04/24/20 13:10:42.651 UTC 1f 4173] (1000,0035.1ac1.37c2):Local Update, Add to DB

[04/24/20 13:10:42.651 UTC 20 4173] (1000,0035.1ac1.37c2,3):Using seq number from Recv-based
route

<.....snipped for brevity.....>

```

```
leaf1#
```

leaf1でのmac/IPエントリの作成方法を確認すると、これはmac/mac-ip情報がBGPと関連付けられ、l2vpn/evpnルートとしてアドバタイズされる重要な観察ポイントの1つになります。

```
leaf1#show bgp l2vpn evpn 0035.1ac1.37c2
```

```
Route Distinguisher: 192.168.1.3:33767 (L2VNI 2001002)
```

```
BGP routing table entry for [2]:[0]:[0]:[48]:[0035.1ac1.37c2]:[0]:[0.0.0.0]/216, version 99
```

```
Paths: (1 available, best #1)
```

```
Flags: (0x00010a) on xmit-list, is not in l2rib/evpn
```

```
Advertised path-id 1
```

```
Path type: local, path is valid, is best path
```

```
AS-Path: NONE, path locally originated
```

```
192.168.1.3 (metric 0) from 0.0.0.0 (192.168.1.3)
```

```
Origin IGP, MED not set, localpref 100, weight 32768
```

```
Received label 2001002
```

```
Extcommunity:
```

```
RT:200:2001002
```


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 (L2VNI 2001002)

*>1[2]:[0]:[0]:[48]:[0035.1ac1.37c2]:[0]:[0.0.0.0]/216

192.168.1.3	100	32768	i
-------------	-----	-------	---

*>1[2]:[0]:[0]:[48]:[0035.1ac1.37c2]:[32]:[172.20.2.10]/272

192.168.1.3	100	32768	i
-------------	-----	-------	---

Route Distinguisher: 192.168.1.3:33768 (L2VNI 2001001)

*>1[2]:[0]:[0]:[48]:[0035.1ac1.37c3]:[0]:[0.0.0.0]/216

192.168.1.3	100	32768	i
-------------	-----	-------	---

*>1[2]:[0]:[0]:[48]:[0035.1ac1.37c3]:[32]:[172.21.1.10]/272

192.168.1.3	100	32768	i
-------------	-----	-------	---

Route Distinguisher: 192.168.1.4:33767

Route Distinguisher: 192.168.1.4:33768

Route Distinguisher: 192.168.2.4:33767

Route Distinguisher: 192.168.2.4:33768

Route Distinguisher: 192.168.1.3:3 (L3VNI 900001)

leaf1#

DC-1 Leaf1からSpine2へのルートの確認

leaf1#show bgp l2vpn evpn neighbors 192.168.1.2 advertised-routes

Peer 192.168.1.2 routes for address family L2VPN EVPN:

BGP table version is 191, local router ID is 192.168.1.3

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
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 (L2VNI 2001002)					
*>1[2]:[0]:[0]:[48]:[0035.1ac1.37c2]:[0]:[0.0.0.0]/216					
	192.168.1.3		100	32768	i
*>1[2]:[0]:[0]:[48]:[0035.1ac1.37c2]:[32]:[172.20.2.10]/272					
	192.168.1.3		100	32768	i
Route Distinguisher: 192.168.1.3:33768 (L2VNI 2001001)					
*>1[2]:[0]:[0]:[48]:[0035.1ac1.37c3]:[0]:[0.0.0.0]/216					
	192.168.1.3		100	32768	i
*>1[2]:[0]:[0]:[48]:[0035.1ac1.37c3]:[32]:[172.21.1.10]/272					

192.168.1.3

100

32768 i

Route Distinguisher: 192.168.1.4:33767

Route Distinguisher: 192.168.1.4:33768

Route Distinguisher: 192.168.2.4:33767

Route Distinguisher: 192.168.2.4:33768

Route Distinguisher: 192.168.1.3:3 (L3VNI 900001)

leaf1#

複数のスパインが存在するため、異なるスパインで異なるコマンドをチェックして確認します
(ルートアップデートは変更されません)。

DC-1では、SPINE-1とSPINE-2はLeaf1、Leaf2、およびBGW-1とEVPNネイバーシップを確立し
ます

spine1#show 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#

```
spine2#show bgp l2vpn evpn summary
```

```
BGP summary information for VRF default, address family L2VPN EVPN
```

```
BGP router identifier 192.168.1.2, local AS number 200
```

```
BGP table version is 65, 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	47140	47115	65	0	0	4w4d 11	
192.168.1.3	4	200	47115	47112	65	0	0	4w4d 4	
192.168.1.4	4	200	47121	47116	65	0	0	4w4d 4	

```
spine2#
```

ここまでで、スパインレイヤに到達しました。今度は、これがボーダーゲートウェイ(DC-1、BGW-1)に渡されているかどうかを確認します。

```
spine2#show 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 65, Local Router ID is 192.168.1.2
```

```
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-redirect, 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
```

```
Route Distinguisher: 10.100.100.21:33768
```

```
Route Distinguisher: 10.100.100.22:27001
```

Route Distinguisher: 10.100.100.22:33767

Route Distinguisher: 10.100.100.22:33768

Route Distinguisher: 192.168.1.3:33767

*>i[2]:[0]:[0]:[48]:[0035.1ac1.37c2]:[0]:[0.0.0.0]/216

192.168.1.3 100 0 i

*>i[2]:[0]:[0]:[48]:[0035.1ac1.37c2]:[32]:[172.20.2.10]/272

192.168.1.3 100 0 i

Route Distinguisher: 192.168.1.3:33768

*>i[2]:[0]:[0]:[48]:[0035.1ac1.37c3]:[0]:[0.0.0.0]/216

192.168.1.3 100 0 i

*>i[2]:[0]:[0]:[48]:[0035.1ac1.37c3]:[32]:[172.21.1.10]/272

192.168.1.3 100 0 i

Route Distinguisher: 192.168.1.4:33767

*>i[2]:[0]:[0]:[48]:[e0d1.73a4.1d41]:[0]:[0.0.0.0]/216

192.168.1.4 100 0 i

*>i[2]:[0]:[0]:[48]:[e0d1.73a4.1d41]:[32]:[172.20.2.11]/272

192.168.1.4 100 0 i

Route Distinguisher: 192.168.1.4:33768

*>i[2]:[0]:[0]:[48]:[e0d1.73a4.1d42]:[0]:[0.0.0.0]/216

192.168.1.4 100 0 i

*>i[2]:[0]:[0]:[48]:[e0d1.73a4.1d42]:[32]:[172.21.1.11]/272

192.168.1.4 100 0 i

Route Distinguisher: 192.168.2.4:33767

Route Distinguisher: 192.168.2.4:33768

spine2#

<<<<<<<<<

```
spine2#show bgp l2vpn evpn neighbors 10.100.100.22 advertised-routes | i 0035.1ac1.37c2  
p 1 n 1
```

Route Distinguisher: 192.168.1.3:33767

*>i[2]:[0]:[0]:[48]:[0035.1ac1.37c2]:[0]:[0.0.0.0]/216

192.168.1.3	100	0	i
-------------	-----	---	---

*>i[2]:[0]:[0]:[48]:[0035.1ac1.37c2]:[32]:[172.20.2.10]/272

192.168.1.3	100	0	i
-------------	-----	---	---

spine2#

ルートが別のサイトに伝播されるDC-1のBORDERレイヤで確認します。

その後、BGW-1で交換されるルートのタイプと数を誰と確認できます

DC-1 BGW-1

```
MultisiteBG1#show 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 233, 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	47145	47121	233	0	0	4w4d	8
192.168.1.1	4	200	47153	47125	233	0	0	18:52:35	8
192.168.1.2	4	200	47139	47119	233	0	0	4w4d	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#**show 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 233, 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					

Route Distinguisher: 10.100.100.21:33768

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

*>i[2]:[0]:[0]:[48]:[0035.1ac1.37c2]:[0]:[0.0.0.0]/216

192.168.1.3 100 0 i

*>i[2]:[0]:[0]:[48]:[0035.1ac1.37c2]:[32]:[172.20.2.10]/272

192.168.1.3 100 0 i

Route Distinguisher: 192.168.1.3:33768

*>i[2]:[0]:[0]:[48]:[0035.1ac1.37c3]:[0]:[0.0.0.0]/216

192.168.1.3 100 0 i

*>i[2]:[0]:[0]:[48]:[0035.1ac1.37c3]:[32]:[172.21.1.10]/272

192.168.1.3 100 0 i

Route Distinguisher: 192.168.1.4:33767

*>i[2]:[0]:[0]:[48]:[e0d1.73a4.1d41]:[0]:[0.0.0.0]/216

192.168.1.4 100 0 i

*>i[2]:[0]:[0]:[48]:[e0d1.73a4.1d41]:[32]:[172.20.2.11]/272

192.168.1.4 100 0 i

Route Distinguisher: 192.168.1.4:33768

*>i[2]:[0]:[0]:[48]:[e0d1.73a4.1d42]:[0]:[0.0.0.0]/216

192.168.1.4 100 0 i

*>i[2]:[0]:[0]:[48]:[e0d1.73a4.1d42]:[32]:[172.21.1.11]/272

192.168.1.4 100 0 i

Route Distinguisher: 192.168.2.4:33767

Route Distinguisher: 192.168.2.4:33768

MultisiteBG1#

MultisiteBG1#show bgp l2vpn evpn neighbors 10.100.100.21 advertised-routes | i 0035.1ac1.37c2

Route Distinguisher: 192.168.1.3:33767

*>i[2]:[0]:[0]:[48]:[0035.1ac1.37c2]:[0]:[0.0.0.0]/216

192.168.1.3 100 0 i

*>i[2]:[0]:[0]:[48]:[0035.1ac1.37c2]:[32]:[172.20.2.10]/272

192.168.1.3 100 0 i

MultisiteBG1#

ルートがDC-2/BGW-2で受信されると、接続されているSPINE-1(192.168.2.1)へのルートアドバタイズメントが表示されます

DC-2 BGW-2

MultisiteBG2#show 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 142, L2VPN EVPN config peers 3, capable peers 2

43 network entries and 43 paths using 7680 bytes of memory

BGP attribute entries [33/5412], BGP AS path entries [1/6]

BGP community entries [0/0], BGP clusterlist entries [1/4]

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
10.100.100.22	4	200	47169	47124	142	0	0	4w4d	12
192.168.2.1	4	100	47136	47124	142	0	0	4w4d	4
192.168.2.2	4	100	45969	45963	0	0	0	19:21:40	Idle

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	Idle	0	0	0	0

MultisiteBG2#

n 1

Route Distinguisher: 192.168.1.3:33767

*>e[2]:[0]:[0]:[48]:[0035.1ac1.37c2]:[0]:[0.0.0.0]/216

10.111.111.2 2000 0 200 i

*>e[2]:[0]:[0]:[48]:[0035.1ac1.37c2]:[32]:[172.20.2.10]/272

10.111.111.2 2000 0 200 i

MultisiteBG2#

ルートは、宛先が接続されているDC-2、Leaf-1にさらにアドバタイズされます。

DC-2スパインからリーフルートアドバタイズメント

Multistespinel#show bgp l2vpn evpn summary

BGP summary information for VRF default, address family L2VPN EVPN

BGP router identifier 192.168.2.1, local AS number 100

BGP table version is 50, L2VPN EVPN config peers 3, capable peers 2

19 network entries and 19 paths using 4256 bytes of memory

BGP attribute entries [15/2460], 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
10.100.100.21	4	100	47152	47131	50	0	0	4w4d	15
192.168.2.3	4	100	0	0	0	0	0	4w4d	Idle
192.168.2.4	4	100	47135	47131	50	0	0	4w4d	4

Multistespinel#

Multistespinel#show bgp l2vpn evpn neighbors 192.168.2.4 advertised-routes | i 0035.1ac1.37c2 p
1 n 1

Route Distinguisher: 192.168.1.3:33767

*>i[2]:[0]:[0]:[48]:[0035.1ac1.37c2]:[0]:[0.0.0.0]/216

10.111.111.1 2000 100 0 200 i

*>i[2]:[0]:[0]:[48]:[0035.1ac1.37c2]:[32]:[172.20.2.10]/272

10.111.111.1 2000 100 0 200 i


```
C 1001    e0d1.73a4.1d42    dynamic  0          F      F      nve1(10.111.111.1)
G   -    0000.2222.3333    static   -          F      F      sup-eth1(R)
G   -    00be.75f4.544d    static   -          F      F      sup-eth1(R)
G  101    00be.75f4.544d    static   -          F      F      sup-eth1(R)
G 1000    00be.75f4.544d    static   -          F      F      sup-eth1(R)
G 1001    00be.75f4.544d    static   -          F      F      sup-eth1(R)
```

MultisteLeaf1#

DC-2、Leaf-1はVlan1000を介してホスト4 Macを学習しました。

MultisteLeaf1#**show ip arp vrf vxlan-900001**

```
Flags: * - Adjacencies learnt on non-active FHRP router
+ - Adjacencies synced via CFSOE
# - Adjacencies Throttled for Glean
CP - Added via L2RIB, Control plane Adjacencies
PS - Added via L2RIB, Peer Sync
RO - Re-Originated Peer Sync Entry
D - Static Adjacencies attached to down interface
```

IP ARP Table for context vxlan-900001

Total number of entries: 2

Address	Age	MAC Address	Interface	Flags
172.21.1.100	00:04:09	00c8.8bf9.5f42	Vlan1001	
172.20.2.100	00:04:09	00c8.8bf9.5f41	Vlan1000	

MultisteLeaf1#

データプレーンのトラブルシューティング

データプレーンの検証は、さまざまなパケットキャプチャ方式とバリエーションを理解するために、複数のデバイスでテストされます。



o

Host-4から開始して、Host-2に対して簡単なpingを実行できます。LEAFスイッチのトランジットトラフィックですが、これらのパケットを適切に処理できるかどうかを確認してください。DC-1/Leaf-2で確認します。

確認するには、インターフェイスeth-1/23を監視し、これらのパケットをCPUにパントし、それに対してethalyzer/dmirrorを実行します。

モニタセッションの設定

```

leaf2#configure terminal
leaf2(config)#monitor session 1
leaf2(config-monitor)#source interface ethernet 1/23
leaf2(config-monitor)#destination interface sup-eth 0
leaf2(config-monitor)#no shut
leaf2(config-monitor)#exit

```

```

toMultisiteLeaf1#ping 172.20.2.11 repeat 2
Type escape sequence to abort.
Sending 2, 100-byte ICMP Echos to 172.20.2.11, timeout is 2 seconds:
!!
Success rate is 100 percent (2/2), round-trip min/avg/max = 1/1/1 ms
toMultisiteLeaf1#

```

```

leaf2#ethalyzer local interface inband mirror

```

```

Capturing on inband
2020-05-27 12:20:57.081654 172.20.2.100 -> 172.20.2.11 ICMP Echo (ping) request
2020-05-27 12:20:57.082193 172.20.2.11 -> 172.20.2.100 ICMP Echo (ping) reply
2020-05-27 12:20:57.084902 172.20.2.100 -> 172.20.2.11 ICMP Echo (ping) request
2020-05-27 12:20:57.087406 172.20.2.11 -> 172.20.2.100 ICMP Echo (ping) reply

4 packets captured
leaf2#

```

```

leaf2#ethalyzer local interface inband display-filter "ip.addr==172.20.2.100 &&
ip.addr==172.20.2.11 && icmp" limit-captured-frames 0

```

```

Capturing on inband
2020-05-27 12:20:57.081654 172.20.2.100 -> 172.20.2.11 ICMP Echo (ping) request
2020-05-27 12:20:57.082193 172.20.2.11 -> 172.20.2.100 ICMP Echo (ping) reply
2020-05-27 12:20:57.084902 172.20.2.100 -> 172.20.2.11 ICMP Echo (ping) request
2020-05-27 12:20:57.087406 172.20.2.11 -> 172.20.2.100 ICMP Echo (ping) reply

4 packets captured
leaf2#

```

送信元からデータを送信し、宛先リーフでキャプチャする場合は、次の手順を実行します。

1. Host-4からHost-2にpingを実行します。
2. 送信元 : 172.20.2.100 //送信元MACアドレス : 00:C8:8B:F9:5F:41
3. 宛先 : 172.20.2.11 // Dst MACアドレス : E0:D1:73:A4:1D:41

- 4. [Packet Size]:777
- 5. Do-Not-Fragment : はい
- 6. データパターン文字列 : ビーフ

この例では、送信元と宛先のリーフでパケットをキャプチャできるように、十分な数のパケットが存在します。

```
toMultisiteLeaf1#ping 172.20.2.11 repeat 200000 data beef df-bit validate size 777
Type escape sequence to abort.
Sending 200000, 777-byte ICMP Echos to 172.20.2.11, timeout is 2 seconds:
Packet sent with the DF bit set
Packet has data pattern 0xBEEF
Reply data will be validated
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

<.....>
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Success rate is 100 percent (7376/7376), round-trip min/avg/max = 1/5/151 ms
toMultisiteLeaf1#
```

First HopDC-2、Leaf-1の基本チェック



```
MultisteLeaf1#show module
Mod Ports Module-Type Model Status
-----
1 54 48x10GT + 6x40G/100G Ethernet Module N9K-C93108TC-EX active *

Mod Sw Hw Slot
-----
1 7.0(3)I7(5) 1.3 NA

Mod MAC-Address(es) Serial-Num
-----
1 00-be-75-f4-54-46 to 00-be-75-f4-54-95 FDO220225UX

Mod Online Diag Status
-----
1 Pass

* this terminal session
MultisteLeaf1#
```



```
.1q Tag0 VLAN: 1000, cos = 0x0
```

```
Dst IPv4 address: 172.20.2.11
Src IPv4 address: 172.20.2.100
Ver = 4, DSCP = 0, Don't Fragment = 1
Proto = 1, TTL = 255, More Fragments = 0
Hdr len = 20, Pkt len = 777, Checksum = 0xcffe
```

```
L4 Protocol : 1
ICMP type : 8
ICMP code : 0
```

```
Drop Info:
-----
```

```
LUA:
LUB:
LUC:
LUD:
Final Drops:
```

```
module-1(TAH-elam-insel6)# exit
module-1(TAH-elam)# exit
module-1# exit
MultisteLeaf1#
```

pcapとして表示する場合は、pingを継続して実行します。モニタセッションは送信元リーフと宛先リーフで設定されます。

ソースリーフ上のセッションの監視

```
MultisteLeaf1#show run | section monitor
monitor session 1
source interface Ethernet1/16 both
destination interface sup-eth0
no shut
MultisteLeaf1#
```

宛先リーフでのセッションの監視

```
leaf2(config)#show run | section monitor
monitor session 1
source interface Ethernet1/23 both
destination interface sup-eth0
no shut
leaf2(config)#
```

ソースリーフでのキャプチャ

```
MultisteLeaf1#ethalyzer local interface inband display-filter "ip.addr==172.20.2.100 && ip.addr==172.20.2.11 && icmp" limit-captured-frames 0 detail
```

```
Capturing on inband
Frame 1 (791 bytes on wire, 791 bytes captured)
Arrival Time: May 31, 2020 15:44:46.767411000
[Time delta from previous captured frame: 0.000000000 seconds]
[Time delta from previous displayed frame: 0.000000000 seconds]
```


Arrival Time: May 31, 2020 15:44:46.888728000
[Time delta from previous captured frame: 0.047867000 seconds]
[Time delta from previous displayed frame: 0.047867000 seconds]
[Time since reference or first frame: 0.121317000 seconds]
Frame Number: 4
Frame Length: 795 bytes
Capture Length: 795 bytes
[Frame is marked: False]
[Protocols in frame: eth:vlan:ip:icmp:data]
Ethernet II, Src: 00:c8:8b:f9:5f:41 (00:c8:8b:f9:5f:41), Dst: e0:d1:73:a4:1d:41 (e0:d1:73:a4:1d:41)
Destination: e0:d1:73:a4:1d:41 (e0:d1:73:a4:1d:41)
Address: e0:d1:73:a4:1d:41 (e0:d1:73:a4:1d:41)
.... 0 = IG bit: Individual address (unicast)
...0. = LG bit: Globally unique address (factory default)
Source: 00:c8:8b:f9:5f:41 (00:c8:8b:f9:5f:41)
Address: 00:c8:8b:f9:5f:41 (00:c8:8b:f9:5f:41)
.... 0 = IG bit: Individual address (unicast)
...0. = LG bit: Globally unique address (factory default)
Type: 802.1Q Virtual LAN (0x8100)
802.1Q Virtual LAN, PRI: 0, CFI: 0, ID: 1000
000. = Priority: 0
...0 = CFI: 0
.... 0011 1110 1000 = ID: 1000
Type: IP (0x0800)
Internet Protocol, Src: 172.20.2.100 (172.20.2.100), Dst: 172.20.2.11 (172.20.2.11)
Version: 4
Header length: 20 bytes
Differentiated Services Field: 0x00 (DSCP 0x00: Default; ECN: 0x00)
0000 00.. = Differentiated Services Codepoint: Default (0x00)
.... 0. = ECN-Capable Transport (ECT): 0
.... 0 = ECN-CE: 0
Total Length: 777
Identification: 0xaf65 (44901)
Flags: 0x02 (Don't Fragment)
0.. = Reserved bit: Not Set
.1. = Don't fragment: Set
..0 = More fragments: Not Set
Fragment offset: 0
Time to live: 255
Protocol: ICMP (0x01)
Header checksum: 0xbd1b [correct]
[Good: True]
[Bad : False]
Source: 172.20.2.100 (172.20.2.100)
Destination: 172.20.2.11 (172.20.2.11)
Internet Control Message Protocol
Type: 8 (Echo (ping) request)
Code: 0 ()
Checksum: 0x704a [correct]
Identifier: 0x001c
Sequence number: 7430 (0x1d06)
Data (749 bytes)

0000 00 00 00 00 14 67 5f aa be ef be ef be ef be efg_.....
0010 be ef be ef be ef be ef be ef be ef be ef be ef
0020 be ef be ef be ef be ef be ef be ef be ef be ef
0030 be ef be ef be ef be ef be ef be ef be ef be ef
0040 be ef be ef be ef be ef be ef be ef be ef be ef
0050 be ef be ef be ef be ef be ef be ef be ef be ef
0060 be ef be ef be ef be ef be ef be ef be ef be ef
0070 be ef be ef be ef be ef be ef be ef be ef be ef
0080 be ef be ef be ef be ef be ef be ef be ef be ef
0090 be ef be ef be ef be ef be ef be ef be ef be ef

```

00a0 be ef be ef be ef be ef be ef be ef be ef be ef .....
00b0 be ef be ef be ef be ef be ef be ef be ef be ef .....
00c0 be ef be ef be ef be ef be ef be ef be ef be ef .....
00d0 be ef be ef be ef be ef be ef be ef be ef be ef .....
00e0 be ef be ef be ef be ef be ef be ef be ef be ef .....
00f0 be ef be ef be ef be ef be ef be ef be ef be ef .....
0100 be ef be ef be ef be ef be ef be ef be ef be ef .....
0110 be ef be ef be ef be ef be ef be ef be ef be ef .....
0120 be ef be ef be ef be ef be ef be ef be ef be ef .....
0130 be ef be ef be ef be ef be ef be ef be ef be ef .....
0140 be ef be ef be ef be ef be ef be ef be ef be ef .....
0150 be ef be ef be ef be ef be ef be ef be ef be ef .....
0160 be ef be ef be ef be ef be ef be ef be ef be ef .....
0170 be ef be ef be ef be ef be ef be ef be ef be ef .....
0180 be ef be ef be ef be ef be ef be ef be ef be ef .....
0190 be ef be ef be ef be ef be ef be ef be ef be ef .....
01a0 be ef be ef be ef be ef be ef be ef be ef be ef .....
01b0 be ef be ef be ef be ef be ef be ef be ef be ef .....
01c0 be ef be ef be ef be ef be ef be ef be ef be ef .....
01d0 be ef be ef be ef be ef be ef be ef be ef be ef .....

```

MultisteLeaf1#

最終ホップDC-1、リーフ-2の基本チェック



```
leaf2#show module
```

```
Mod Ports Module-Type Model Status
```

```
-----
1 54 48x10G + 4x40G + 2x100G Ethernet Modu N9K-C92160YC-X active *
```

```
Mod Sw Hw Slot
```

```
-----
1 9.2(3) 1.3 NA
```

```
Mod MAC-Address(es) Serial-Num
```

```
-----
1 70-79-b3-3e-81-1c to 70-79-b3-3e-81-69 F022111H2V
```

```
Mod Online Diag Status
```

```
-----
1 Pass
```

```
* this terminal session
```

```
leaf2#show cdp neighbors
```

```
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
```

```
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 Port ID
```

```
Toleaf2 Eth1/23 142 S I WS-C3750X-24S Gig1/0/1 <<<<<<<<<<<<<<< Towards Host-2
```

```
switch(SAL2024RRYF)
```

```
Eth1/47 175 R S I s N9K-C9372PX-E Eth1/4
```

```
spine2(SAL1949UELD)
```

```
Eth1/48 121 R S s N9K-C9396PX Eth1/8
```


02a0 be ef be ef be ef be ef be ef be ef be ef be ef
02b0 be ef be ef be ef be ef be ef be ef be ef be ef
02c0 be ef be ef be ef be ef be ef be ef be ef be ef
02d0 be ef be ef be ef be ef be ef be ef be ef be ef
02e0 be ef be ef be ef be ef be ef be ef be ef 00

Data: 00000000147F4ADBEEFBEEFBEEFBEEFBEEFBEEFBEEFBEEFBEEF...

[Length: 749]

Frame 2 (791 bytes on wire, 791 bytes captured)

Arrival Time: May 31, 2020 15:45:55.694904000

[Time delta from previous captured frame: 0.020346000 seconds]

[Time delta from previous displayed frame: 0.020346000 seconds]

[Time since reference or first frame: 0.020346000 seconds]

Frame Number: 2

Frame Length: 791 bytes

Capture Length: 791 bytes

[Frame is marked: False]

[Protocols in frame: eth:ip:icmp:data]

Ethernet II, Src: 00:c8:8b:f9:5f:41 (00:c8:8b:f9:5f:41), Dst: e0:d1:73:a4:1d:41 (e0:d1:73:a4:1d:41)

Destination: e0:d1:73:a4:1d:41 (e0:d1:73:a4:1d:41)

Address: e0:d1:73:a4:1d:41 (e0:d1:73:a4:1d:41)

.... 0 = IG bit: Individual address (unicast)

... 0 = LG bit: Globally unique address (factory default)

Source: 00:c8:8b:f9:5f:41 (00:c8:8b:f9:5f:41)

Address: 00:c8:8b:f9:5f:41 (00:c8:8b:f9:5f:41)

.... 0 = IG bit: Individual address (unicast)

... 0 = LG bit: Globally unique address (factory default)

Type: IP (0x0800)

Internet Protocol, Src: 172.20.2.100 (172.20.2.100), Dst: 172.20.2.11 (172.20.2.11)

Version: 4

Header length: 20 bytes

Differentiated Services Field: 0x00 (DSCP 0x00: Default; ECN: 0x00)

0000 00.. = Differentiated Services Codepoint: Default (0x00)

... 0 = ECN-Capable Transport (ECT): 0

... 0 = ECN-CE: 0

Total Length: 777

Identification: 0x8237 (33335)

Flags: 0x02 (Don't Fragment)

0.. = Reserved bit: Not Set

.1. = Don't fragment: Set

..0 = More fragments: Not Set

Fragment offset: 0

Time to live: 255

Protocol: ICMP (0x01)

Header checksum: 0xea49 [correct]

[Good: True]

[Bad : False]

Source: 172.20.2.100 (172.20.2.100)

Destination: 172.20.2.11 (172.20.2.11)

Internet Control Message Protocol

Type: 8 (Echo (ping) request)

Code: 0 ()

Checksum: 0x980f [correct]

Identifier: 0x001f

Sequence number: 2515 (0x09d3)

Data (749 bytes)

0000 00 00 00 00 14 7f 4a fd be ef be ef be ef be efJ.....
0010 be ef be ef be ef be ef be ef be ef be ef be ef
0020 be ef be ef be ef be ef be ef be ef be ef be ef
0030 be ef be ef be ef be ef be ef be ef be ef be ef
0040 be ef be ef be ef be ef be ef be ef be ef be ef
0050 be ef be ef be ef be ef be ef be ef be ef be ef

翻訳について

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