

Fehlerbehebung bei EVPN/VxLAN in Umgebungen mit mehreren Standorten

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Einleitung

In diesem Dokument wird die Fehlerbehebung für Ethernet VPN/Virtual Extensible LAN (EVPN/VxLAN) in Umgebungen mit mehreren Standorten beschrieben.

Voraussetzungen

Anforderungen

Cisco empfiehlt, dass Sie über Kenntnisse in folgenden Bereichen verfügen:

- Multiprotocol Label Switching (MPLS) Layer 3-VPN
- Multiprotocol-Border Gateway Protocol (MP-BGP)
- EVPN

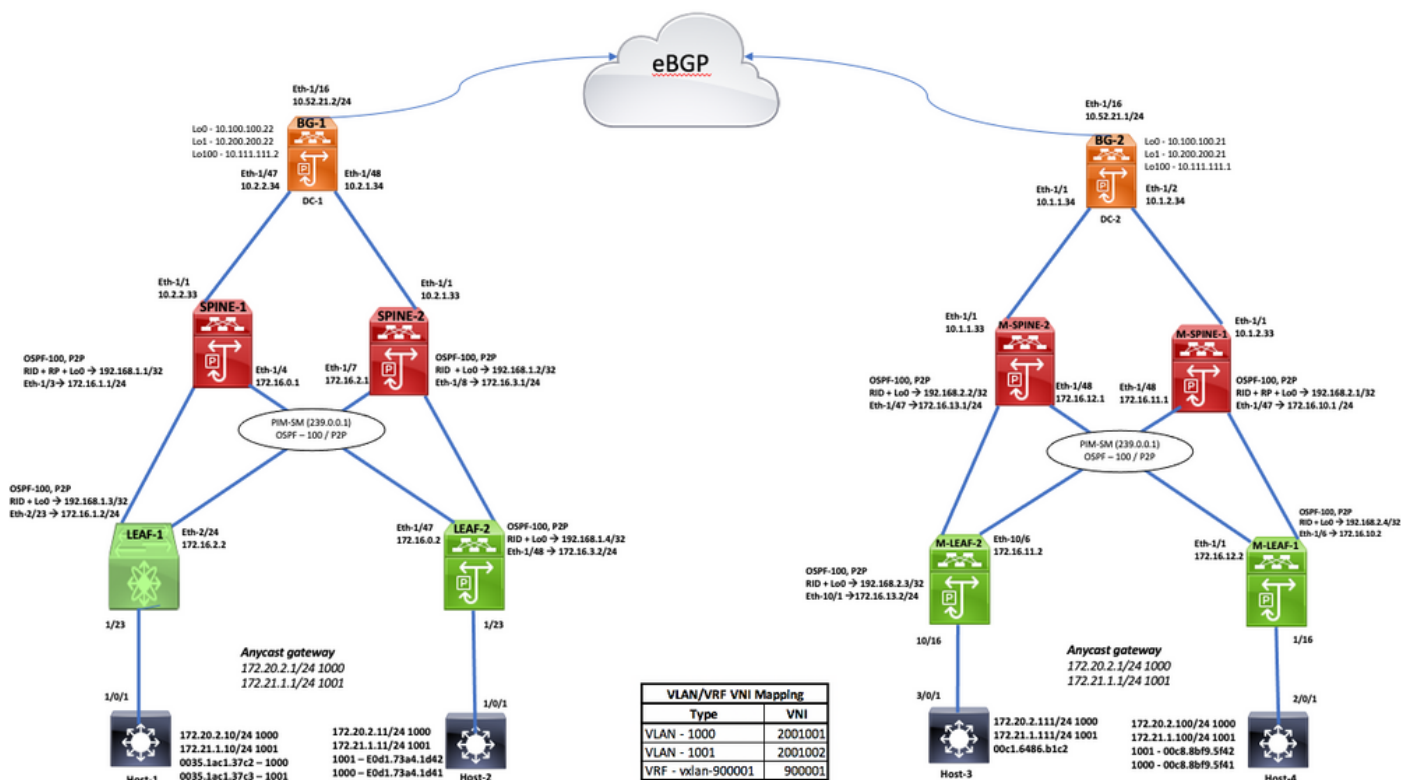
Verwendete Komponenten

Die Informationen in diesem Dokument basierend auf folgenden Software- und Hardware-Versionen:

leaf1#	N5K-C5672UP-16G-SUP	System: Version 7.3(0)N1(1)
Leaf2#	N9K-C92160YC-X	NXOS: Version 9.2(3)
Spine1#	N9K-C9396PX	NXOS: Version 9.2(3)
Spine 2#	N9K-C9396PX	NXOS: Version 9.2(3)
MultisiteBG1#	N9K-C93108TC-EX	NXOS: Version 9.2(3)
MultisiteBG2#	N9K-C93108TC-FX	NXOS: Version 9.3(1)
Multisitespine2#	N9K-C9372TX-E	NXOS: Version 9.2(3)
Multistespine1#	N9K-C92160YC-X	NXOS: Version 9.2(3)
Mehrfachleaf1#	N9K-C93108TC-EX	NXOS: Version 7.0(3)I7(5)

Die Informationen in diesem Dokument beziehen sich auf Geräte in einer speziell eingerichteten Testumgebung. Alle Geräte, die in diesem Dokument benutzt wurden, begannen mit einer gelöschten (Nichterfüllungs) Konfiguration. Wenn Ihr Netzwerk in Betrieb ist, stellen Sie sicher, dass Sie die möglichen Auswirkungen aller Befehle verstehen.

Topologie



In diesem Dokument wird beschrieben, woher der Datenverkehr stammt (DC-1, Host1/2 - 172.20.2.10/11) und anschließend mit unseren Paketen bis zum Ziel DC-2, Host4 (172.20.2.100) weitergeleitet wird.

Überprüfung der Kontrollebene



Datenverkehrsfluss:

Sc

schritt 1: Suchen Sie nach der richtigen IP, VLAN auf dem Quellknoten.

```
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#
```

Nun haben Sie die Erreichbarkeit vom Quellknoten zu dessen SVI-GW von Vlan-1000.

```
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#
```

Schritt 2: Fahren Sie mit dem First-Hop (**Leaf1**) fort, und überprüfen Sie die Vorgänge auf Layer-2- und Layer-3-Ebene.

Sehen Sie nun nach, ob **leaf1** die MAC, ARP vom Quellknoten abrufft oder nicht.

Ja, die MAC-Adresse (0035.1ac1.37c2) und die IP-Adresse 172.20.2.10 des Quellknotens werden auf eth1/23 bis Vlan1000 erfasst.

```
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#

```

Überprüfung der ARP-Tabelle im Source-Leaf

```
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#
```

Dies zeigt, wie leaf1 die Nachricht erhält, um einen IP/MAC-Eintrag des Quellknotens zu erstellen.

```

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#

Nachdem Sie überprüft haben, wie der MAC/IP-Eintrag in Leaf1 aussieht, ist dies einer der wichtigen Beobachtungspunkte, an denen die MAC/MAC-IP-Informationen mit BGP verknüpft werden und als l2vpn/evpn-Routen angekündigt werden.

```
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:
```


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#

Routenüberprüfung von DC-1 Leaf1 zu Spine2

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-redirect, 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#
```

Da es mehrere Spines gibt, überprüfen Sie die verschiedenen Befehle auf den verschiedenen Spines, um dies zu bestätigen (halten Sie Routen-Updates intakt).

In DC-1 haben SPINE-1 und SPINE-2 eine EVPN-Nachbarschaft mit Leaf1, Leaf2 und BGW-1

```
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#
```

Sie haben die SPINE-Ebene erreicht und können nun sehen, ob sie an das Border Gateway (DC-1, BGW-1) weitergeleitet wird oder nicht.

```
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#

Überprüfen Sie den GRENZEN-Layer von RZ-1, von wo aus die Routen an einen anderen Standort propagiert werden.

Sie können dann sehen, mit wem, welche Arten von Routen und wie viele Routen in BGW-1 ausgetauscht werden

RZ-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
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
```

```
MultisiteBG1#
```

Sobald die Routen bei DC-2/BGW-2 empfangen wurden, wird die Routenankündigung für das verbundene SPINE-1 angezeigt (192.168.2.1).

RZ-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#
```

```
MultisiteBG2#show bgp l2vpn evpn neighbors 192.168.2.1 advertised-routes | i 0035.1ac1.37c2 p 1 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#
```

Routen werden außerdem DC-2, Leaf-1 angekündigt, mit dem das Ziel verbunden ist.

DC-2 Spine-to-Leaf-Routenankündigung

```
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
```



```

C 1001    0035.1ac1.37c3    dynamic  0          F        F        nve1(10.111.111.1)
* 1001    00c8.8bf9.5f42    dynamic  0          F        F        Eth1/16
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 lernte Host-4-Mac über Vlan1000.

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#

Fehlerbehebung auf Datenebene

Die Datenplanüberprüfung wird auf mehreren Geräten getestet, um die verschiedenen Methoden und Varianten der Paketerfassung zu verstehen.



vergrößern.

Sie können von Host-4 aus einen einfachen Ping an Host-2 senden. Obwohl es sich um einen Transit-Datenverkehr für LEAF-Switches handelt, überprüfen Sie dennoch, ob Sie diese Pakete ordnungsgemäß verarbeiten können. Bestätigen Sie unter DC-1/Leaf-2.

Um zu bestätigen, überwachen Sie die Schnittstelle eth-1/23, und starten Sie diese Pakete an die CPU und führen Sie ethanalyzer/dmirror für die gleiche.

Konfigurieren der Überwachungssitzung

```

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#ethanalyzer 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#ethanalyzer 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#
  
```

Wenn Sie Daten von der Quelle senden und auf dem Ziel-Leaf erfassen möchten, gehen Sie folgendermaßen vor:

1. Initiieren eines Ping von Host-4 zu Host-2.
2. QUELLE: 172.20.2.100 // Src MAC address: 00:C8:8B:F9:5F:41

3. ZIEL: 172.20.2.11 // Ziel-MAC-Adresse: E0:D1:73:A4:1D:41
4. Paketgröße: 777
5. Nicht fragmentieren: JA
6. Datenmuster-Zeichenfolge: beef

In diesem Beispiel haben Sie genügend Paketzähler, sodass Sie Pakete auf den Quell- und Zielseiten erfassen können.

```

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#

```

Grundlegende Prüfungen für First HopDC-2, Leaf-1



```

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#

```



```
Src MAC address: 00:C8:8B:F9:5F:41
.lq 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#
```

Wenn Sie pcap als "pcap" anzeigen möchten, lassen Sie es kontinuierlich pingen. Die Überwachungssitzung wird auf dem Quell- und dem Ziel-Leaf konfiguriert.

Überwachungssitzung auf Quellleaf

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

Sitzung auf Ziel-Leaf überwachen

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

Erfassung auf Quell-Leaf

```
MultisteLeaf1#ethanalyzer 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]
```


Frame 4 (795 bytes on wire, 795 bytes captured)

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#

Grundlegende Prüfungen für Last-Hop DC-1, Leaf-2



```
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 FDO22111H2V
```

```
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)
```


0290 be ef be ef be ef be ef be ef be ef be ef be ef be ef
02a0 be ef 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 be ef
02c0 be ef 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 be ef
02e0 be ef be ef be ef be ef be ef be ef be ef 00
Data: 00000000147F4ADBEEFBEEFBEEFBEEFBEEFBEEFBEEFBEEFBEEFBEEF...
[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

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