

# 멀티 사이트 설정에서 EVPN/VxLAN 문제 해결

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## 소개

이 문서에서는 멀티 사이트 설정에서 이더넷 VPN/EVPN/VxLAN(Virtual Extensible LAN)의 문제를 해결하는 방법에 대해 설명합니다.

## 사전 요구 사항

### 요구 사항

다음 주제에 대한 지식을 보유하고 있으면 유용합니다.

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

### 사용되는 구성 요소

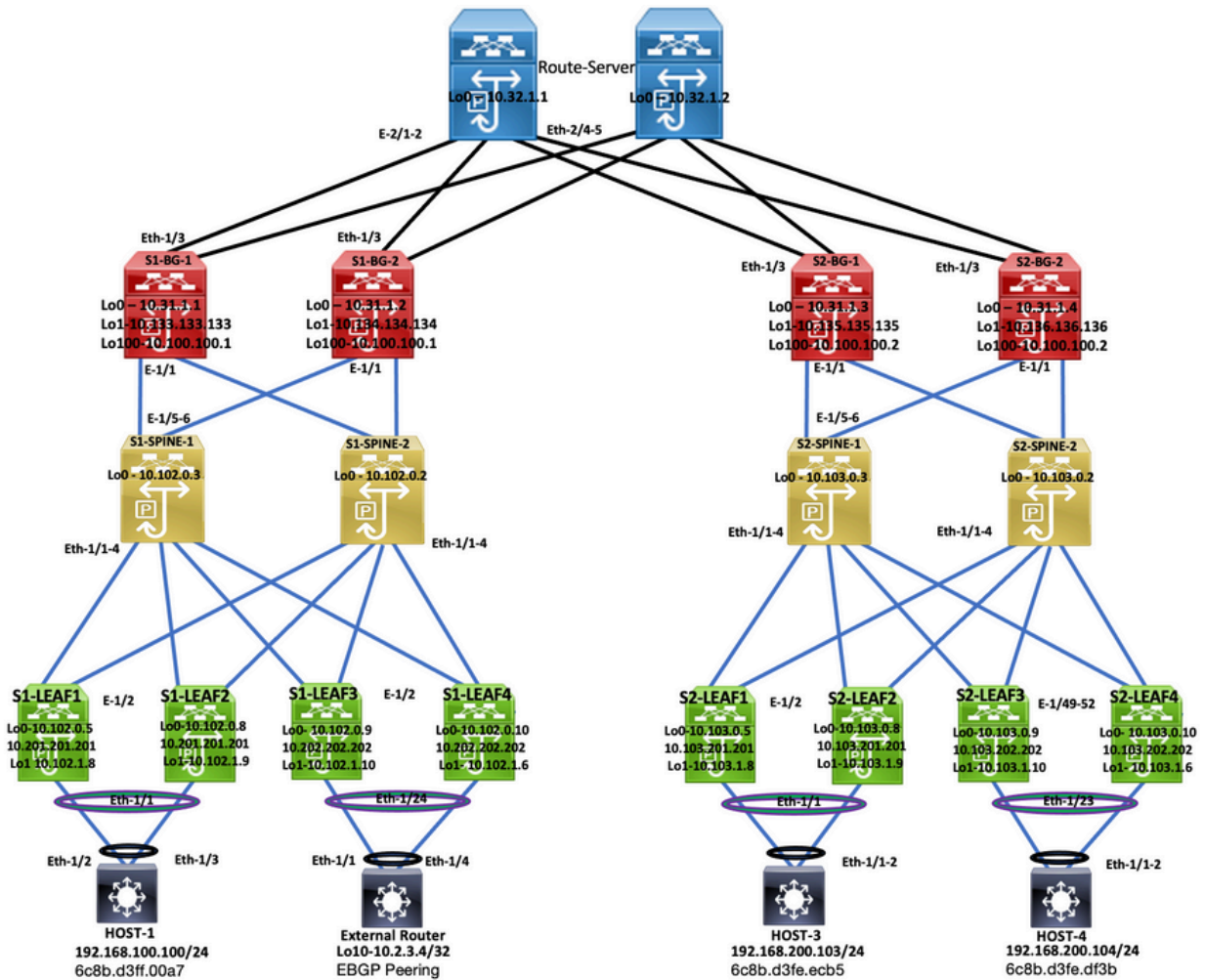
이 문서의 정보는 다음 소프트웨어 및 하드웨어 버전을 기반으로 합니다.

모든 사이트 리프	N9K-C9336C-FX2	NXOS: 10.2(3)
S1_스파인1	N9K-C9364C	NXOS: 10.2(4)
S1_스파인2	N9K-C9364C	NXOS: 9.3(5)
S1_Border Gateway1, S2_Border Gateway2, S2_Border Gateway1	N9K-C9332C	NXOS: 9.3(9)
S1_Border Gateway2	N9K-C9332C	NXOS: 10.2(4)

경로 서버	N9K-C9396PX	NXOS: 9.2(2)
호스트-1	N3K-C3264C-E	NXOS: 9.3(5)
Host-2 및 Host-3	N3K-C3264C-E	NXOS: 9.2(2)

이 문서의 정보는 특정 랩 환경의 디바이스를 토대로 작성되었습니다. 이 문서에 사용된 모든 디바이스는 초기화된(기본) 컨피그레이션으로 시작되었습니다. 현재 네트워크가 작동 중인 경우 모든 명령의 잠재적인 영향을 미리 숙지하시기 바랍니다.

## 토폴로지



토폴로지

이 문서에서는 트래픽이 DC-2 Host-3(192.168.200.104/24)에서 시작된 위치에 대해 설명한 다음 대상 DC-1 Host-2(10.2.3.4)까지 패킷과 함께 이동합니다.

## 컨트롤 플레인 확인

컨트롤 플레인을 확인하려면 다음 명령을 입력합니다.

```
<#root>
```

HOST\_3#

show ip int brief

IP Interface Status for VRF "default"(1)  
Interface IP Address Interface Status

Vlan100 192.168.100.103 protocol-up/link-up/admin-up

Vlan200 192.168.200.103 protocol-up/link-up/admin-up  
HOST\_3#

External\_Router#  
External\_Router#

show ip int brie

IP Interface Status for VRF "default"(1)  
Interface IP Address Interface Status

Vlan100 192.168.100.102 protocol-up/link-up/admin-up  
Vlan200 192.168.200.102 protocol-up/link-up/admin-up

Lo10 10.2.3.4 protocol-up/link-up/admin-up

External\_Router#

HOST\_3#  
HOST\_3#

ping 10.2.3.4 source 192.168.100.103

PING 10.2.3.4 (10.2.3.4) from 192.168.100.103: 56 data bytes  
64 bytes from 10.2.3.4: icmp\_seq=0 ttl=250 time=1.153 ms  
64 bytes from 10.2.3.4: icmp\_seq=1 ttl=250 time=0.569 ms  
64 bytes from 10.2.3.4: icmp\_seq=2 ttl=250 time=0.562 ms  
64 bytes from 10.2.3.4: icmp\_seq=3 ttl=250 time=0.525 ms  
64 bytes from 10.2.3.4: icmp\_seq=4 ttl=250 time=0.527 ms  
--- 10.2.3.4 ping statistics ---  
5 packets transmitted, 5 packets received, 0.00% packet loss  
round-trip min/avg/max = 0.525/0.667/1.153 ms  
HOST\_3#

<#root>

S2-Leaf1#

show bgp l2vpn evp vrf vrf\_2

BGP routing table information for VRF default, address family L2VPN EVPN  
BGP table version is 4420, Local Router ID is 10.103.0.5  
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: 10.103.0.5:5 (L3VNI 4000502)  
\*>i[5]:[0]:[0]:[24]:[192.168.100.0]/224  
10.100.100.2 100 0 300 100 i

```
*>i[5]:[0]:[0]:[32]:[10.2.3.4]/224
      10.100.100.2                    100          0 300 100 65111 i

*>i[5]:[0]:[0]:[32]:[10.100.100.1]/224
      10.100.100.2                    100          0 300 100 i

*>i[5]:[0]:[0]:[32]:[10.100.100.2]/224
      10.100.100.2                    100          0 300 100 i
```

S2-Leaf2#

```
show bgp l2vpn evpn vrf vrf_2
```

BGP routing table information for VRF default, address family L2VPN EVPN  
 BGP table version is 4389, Local Router ID is 10.103.0.8  
 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: 10.103.0.8:5 (L3VNI 4000502)					
*>i[5]:[0]:[0]:[24]:[192.168.100.0]/224	10.100.100.2		100	0 300 100	i
*>i[5]:[0]:[0]:[32]:[10.2.3.4]/224	10.100.100.2		100	0 300 100 65111	i
*>i[5]:[0]:[0]:[32]:[10.100.100.1]/224	10.100.100.2		100	0 300 100	i
*>i[5]:[0]:[0]:[32]:[10.100.100.2]/224	10.100.100.2		100	0 300 100	i

S2-Leaf2#

S2-leaf3#

```
show bgp l2vpn evpn vrf vrf_2
```

BGP routing table information for VRF default, address family L2VPN EVPN  
 BGP table version is 4196, Local Router ID is 10.103.0.9  
 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: 10.103.0.9:5 (L3VNI 4000502)					
*>i[5]:[0]:[0]:[24]:[192.168.100.0]/224	10.100.100.2		100	0 300 100	i
*>i[5]:[0]:[0]:[32]:[10.2.3.4]/224	10.100.100.2		100	0 300 100 65111	i
*>i[5]:[0]:[0]:[32]:[10.100.100.1]/224	10.100.100.2		100	0 300 100	i
*>i[5]:[0]:[0]:[32]:[10.100.100.2]/224	10.100.100.2		100	0 300 100	i

S2-Leaf4#

S2-Leaf4#

```
show bgp l2vpn evpn vrf vrf_2
```

BGP routing table information for VRF default, address family L2VPN EVPN  
BGP table version is 4381, Local Router ID is 10.102.0.10  
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: 10.102.0.10:5 (L3VNI 4000502)

\*>i[5]:[0]:[0]:[24]:[192.168.100.0]/224  
10.100.100.2 100 0 300 100 i

\*>i[5]:[0]:[0]:[32]:[10.2.3.4]/224  
10.100.100.2 100 0 300 100 65111 i

\*>i[5]:[0]:[0]:[32]:[10.100.100.1]/224  
10.100.100.2 100 0 300 100 i

\*>i[5]:[0]:[0]:[32]:[10.100.100.2]/224  
10.100.100.2 100 0 300 100 i

S2-Leaf4#

S2-Leaf4#

<#root>

S2-Spine1#

show bgp l2vpn evpn

BGP routing table information for VRF default, address family L2VPN EVPN  
BGP table version is 1235, Local Router ID is 10.103.0.3  
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, 2 - best2

Network Next Hop Metric LocPrf Weight Path

Route Distinguisher: 200:4000502

\* i[5]:[0]:[0]:[24]:[192.168.100.0]/224

10.100.100.2 100 0 300 100

\*>i 10.100.100.2 100 0 300 100 i

\* i[5]:[0]:[0]:[32]:[10.2.3.4]/224

10.100.100.2 100 0 300 100 65111 i

\*>i 10.100.100.2 100 0 300 100 65111 i

\* i[5]:[0]:[0]:[32]:[10.100.100.1]/224

10.100.100.2 100 0 300 100 i

\*>i 10.100.100.2 100 0 300 100 i

\* i[5]:[0]:[0]:[32]:[10.100.100.2]/224

10.100.100.2 100 0 300 100 i

\*>i 10.100.100.2 100 0 300 100 i

<#root>

S2-BG1#

show ip int brie

IP Interface Status for VRF "default"(1)

Interface	IP Address	Interface Status
Lo0	10.31.1.3	protocol-up/link-up/admin-up
Lo1	10.135.135.135	protocol-up/link-up/admin-up
Lo100	10.100.100.2	protocol-up/link-up/admin-up
Eth1/1	192.168.17.12	protocol-up/link-up/admin-up
Eth1/3	10.150.152.1	protocol-up/link-up/admin-up

S2-BG1#

show ip route 10.2.3.4 vrf vrf\_2

IP Route Table for VRF "vrf\_2"

'\*' denotes best ucast next-hop  
'\*\*' denotes best mcast next-hop  
'[x/y]' denotes [preference/metric]  
'%<string>' in via output denotes VRF <string>

10.2.3.4/32, ubest/mbest: 1/0

\*via 10.100.100.1%default, [20/0], 04:09:46, bgp-200, external, tag 300, segid: 4000502 tunnelid: 0xa64

S2-BG1#

S2-BG1#

show bgp l2vpn evpn

BGP routing table information for VRF default, address family L2VPN EVPN

BGP table version is 6206, Local Router ID is 10.31.1.3

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, 2 - best2

Network	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 100:4000502					
*>e[5]:[0]:[0]:[24]:[192.168.100.0]/224	10.100.100.1			0 300 100	i
*>e[5]:[0]:[0]:[32]:[10.2.3.4]/224	10.100.100.1			0 300 100 65111	i
*>e[5]:[0]:[0]:[32]:[10.100.100.1]/224	10.100.100.1			0 300 100	i
*>e[5]:[0]:[0]:[32]:[10.100.100.2]/224	10.100.100.1			0 300 100	i

<#root>

S2-BG2#

show ip int brief

IP Interface Status for VRF "default"(1)

Interface	IP Address	Interface Status
Lo0	10.31.1.4	protocol-up/link-up/admin-up
Lo1	10.136.136.136	protocol-up/link-up/admin-up
Lo100	10.100.100.2	protocol-up/link-up/admin-up
Eth1/1	192.168.18.12	protocol-up/link-up/admin-up
Eth1/3	10.150.153.1	protocol-up/link-up/admin-up
S2-BG2#		
S2-BG2#		
S2-BG2#		

show ip route 10.2.3.4 vrf vrf\_2

IP Route Table for VRF "vrf\_2"

'\*' denotes best ucast next-hop  
'\*\*' denotes best mcast next-hop  
'[x/y]' denotes [preference/metric]  
'%<string>' in via output denotes VRF <string>

10.2.3.4/32, ubest/mbest: 1/0

\*via 10.100.100.1%default, [20/0], 04:15:13, bgp-200, external, tag 300, segid: 4000502 tunnelid: 0

S2-BG2#

S2-BG2#

show bgp l2vpn evpn

BGP routing table information for VRF default, address family L2VPN EVPN

BGP table version is 5455, Local Router ID is 10.31.1.4

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-injected

Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup, 2 - best2

Network	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 100:4000502					
*>e[5]:[0]:[0]:[24]:[192.168.100.0]/224	10.100.100.1			0 300 100	i
*>e[5]:[0]:[0]:[32]:[10.2.3.4]/224	10.100.100.1			0 300 100 65111	i
*>e[5]:[0]:[0]:[32]:[10.100.100.1]/224	10.100.100.1			0 300 100	i
*>e[5]:[0]:[0]:[32]:[10.100.100.2]/224	10.100.100.1			0 300 100	i

<#root>

Router\_Server#

show ip int brief

IP Interface Status for VRF "default"(1)

Interface	IP Address	Interface Status
-----------	------------	------------------

```
Lo0                10.32.1.1        protocol-up/link-up/admin-up
Eth2/1             10.150.150.2    protocol-up/link-up/admin-up
Eth2/2             10.150.151.2    protocol-up/link-up/admin-up
Eth2/4             10.150.152.2    protocol-up/link-up/admin-up
Eth2/5             10.150.153.2    protocol-up/link-up/admin-up
```

```
Router_Server#
Router_Server#
```

```
show ip route 10.100.100.1
```

```
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>
```

```
10.100.100.1/32, ubest/mbest: 2/0
```

```
*via 10.150.150.1, [20/0], 4d22h, bgp-300, external, tag 100
*via 10.150.151.1, [20/0], 4d22h, bgp-300, external, tag 100
```

```
Router_Server#
Router_Server#
Router_Server#
```

```
show ip route 10.100.100.2
```

```
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>
```

```
10.100.100.2/32, ubest/mbest: 2/0
```

```
*via 10.150.152.1, [20/0], 3w5d, bgp-300, external, tag 200
*via 10.150.153.1, [20/0], 3w5d, bgp-300, external, tag 200
```

```
Router_Server#
Router_Server#
```

```
show bgp l2vpn evpn
```

```
BGP routing table information for VRF default, address family L2VPN EVPN
```

```
BGP table version is 4574, Local Router ID is 10.32.1.1
```

```
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-injected
```

```
Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup, 2 - best2
```

Network	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 200:4000100					
* e[2]:[0]:[0]:[48]:[6c8b.d3fe.ecb5]:[32]:[192.168.100.103]/272	10.100.100.2	2000		0 200	i
*>e	10.100.100.2	2000		0 200	i
Route Distinguisher: 100:4000502					
*>e[5]:[0]:[0]:[24]:[192.168.100.0]/224	10.100.100.1	2000		0 100	i
* e	10.100.100.1	2000		0 100	i
* e[5]:[0]:[0]:[32]:[10.2.3.4]/224					



```

          10.100.100.1          2000          0 100 65111 i
*>e          10.100.100.1          2000          0 100 65111 i

*>e[5]:[0]:[0]:[32]:[10.100.100.1]/224
          10.100.100.1          2000          0 100 i
* e          10.100.100.1          2000          0 100 i
*>e[5]:[0]:[0]:[32]:[10.100.100.2]/224
>          10.100.100.1          2000          0 100 i
* e          10.100.100.1          2000          0 100 i

```

<#root>

S1\_B2#

S1\_B2#

show ip int brie

```

IP Interface Status for VRF "default"(1)
Interface      IP Address      Interface Status
Lo0            10.31.1.2       protocol-up/link-up/admin-up
Lo1            10.134.134.134  protocol-up/link-up/admin-up
Lo100         10.100.100.1    protocol-up/link-up/admin-up
Eth1/1        192.168.16.12   protocol-up/link-up/admin-up
Eth1/3        10.150.151.1    protocol-up/link-up/admin-up
S1_B2#
S1_B2#

```

sho ip route 192.168.100.103 vrf vrf\_2

```

IP Route Table for VRF "vrf_2"
'*' denotes best ucast next-hop
'***' denotes best mcast next-hop
'[x/y]' denotes [preference/metric]
'%<string>' in via output denotes VRF <string>

```

```

192.168.100.103/32, ubest/mbest: 1/0
  *via 10.100.100.2%default, [20/0], 4d23h, bgp-100, external, tag 300, segid: 4000502 tunnelid: 0xa6

```

S1\_B2#

S1\_B2#

show ip route 10.2.3.4 vrf vrf\_2

```

IP Route Table for VRF "vrf_2"
'*' denotes best ucast next-hop
'***' denotes best mcast next-hop
'[x/y]' denotes [preference/metric]
'%<string>' in via output denotes VRF <string>

```

```

10.2.3.4/32, ubest/mbest: 1/0
  *via 10.102.1.10%default, [200/0], 05:04:19, bgp-100, internal, tag 65111, segid: 4000502 tunnelid:

```

S1\_B2#

S1\_B2#

S1\_B2#

show bgp l2vpn evpn

BGP routing table information for VRF default, address family L2VPN EVPN  
BGP table version is 5449, Local Router ID is 10.31.1.2  
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-redist, I-injected  
Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup, 2 - best2

Network	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 200:4000100					
*>e[2]:[0]:[0]:[48]:[6c8b.d3fe.df3b]:[32]:[192.168.100.104]/272	10.100.100.2			0 300 200	i
*>e[2]:[0]:[0]:[48]:[6c8b.d3fe.ecb5]:[32]:[192.168.100.103]/272	10.100.100.2			0 300 200	i

<#root>

Route Distinguisher: 200:4000200					
*>e[2]:[0]:[0]:[48]:[6c8b.d3fe.df3b]:[32]:[192.168.100.104]/272	10.100.100.2			0 300 200	i
*>e[2]:[0]:[0]:[48]:[6c8b.d3fe.ecb5]:[32]:[192.168.100.103]/272	10.100.100.2			0 300 200	i

Route Distinguisher: 10.102.0.9:5					
*>i[2]:[0]:[0]:[48]:[cc7f.76fa.118f]:[0]:[0.0.0.0]/216	10.202.202.202		100	0	i
*>i[5]:[0]:[0]:[24]:[192.168.100.0]/224	10.102.1.10		100	0	i
*>i[5]:[0]:[0]:[32]:[10.2.3.4]/224	10.102.1.10		100	0 65111	i
*>i[5]:[0]:[0]:[32]:[10.100.100.2]/224	10.102.1.10		100	0	i

Route Distinguisher: 10.102.0.10:5					
*>i[2]:[0]:[0]:[48]:[cc7f.76c6.a673]:[0]:[0.0.0.0]/216	10.202.202.202		100	0	i
*>i[5]:[0]:[0]:[24]:[192.168.100.0]/224	10.102.1.6		100	0	i
*>i[5]:[0]:[0]:[32]:[10.2.3.4]/224	10.102.1.6		100	0 65111	i
*>i[5]:[0]:[0]:[32]:[10.100.100.1]/224	10.102.1.6		100	0	i

Route Distinguisher: 10.31.1.2:5 (L3VNI 4000502)					
*>l[5]:[0]:[0]:[24]:[192.168.100.0]/224	10.134.134.134		100	0	i
*>l[5]:[0]:[0]:[32]:[10.2.3.4]/224	10.134.134.134		100	0 65111	i
*>l[5]:[0]:[0]:[32]:[10.100.100.1]/224	10.134.134.134		100	0	i
*>l[5]:[0]:[0]:[32]:[10.100.100.2]/224	10.134.134.134		100	0	i

S1\_B2#

<#root>

S1-Bg1#

show ip int brie

IP Interface Status for VRF "default"(1)

Interface	IP Address	Interface Status
Lo0	10.31.1.1	protocol-up/link-up/admin-up
Lo1	10.133.133.133	protocol-up/link-up/admin-up
Lo100	10.100.100.1	protocol-up/link-up/admin-up
Eth1/1	192.168.15.12	protocol-up/link-up/admin-up
Eth1/3	10.150.150.1	protocol-up/link-up/admin-up

S1-Bg1#

S1-Bg1#

show ip route 10.100.100.2 vrf vrf\_2

IP Route Table for VRF "vrf\_2"

'\*' denotes best unicast next-hop  
'\*\*' denotes best multicast next-hop  
'[x/y]' denotes [preference/metric]  
'%<string>' in via output denotes VRF <string>

10.100.100.2/32, ubest/mbest: 1/0

\*via 10.102.1.10%default, [200/0], 4d23h, bgp-100, internal, tag 100, segid: 4000502 tunnelid: 0xa66

S1-Bg1#

S1-Bg1#

show ip route 192.168.100.103 vrf vrf\_2

IP Route Table for VRF "vrf\_2"

'\*' denotes best unicast next-hop  
'\*\*' denotes best multicast next-hop  
'[x/y]' denotes [preference/metric]  
'%<string>' in via output denotes VRF <string>

192.168.100.103/32, ubest/mbest: 1/0

\*via 10.100.100.2%default, [20/0], 4d23h, bgp-100, external, tag 300, segid: 4000502 tunnelid: 0xa64

S1-Bg1#

S1-Bg1#

show ip route 10.2.3.4 vrf vrf\_2

IP Route Table for VRF "vrf\_2"

'\*' denotes best unicast next-hop  
'\*\*' denotes best multicast next-hop  
'[x/y]' denotes [preference/metric]  
'%<string>' in via output denotes VRF <string>

10.2.3.4/32, ubest/mbest: 1/0

\*via 10.102.1.10%default, [200/0], 05:21:41, bgp-100, internal, tag 65111, segid: 4000502 tunnelid:

S1-Bg1#

S1-Bg1#

show bgp l2vpn evpn

BGP routing table information for VRF default, address family L2VPN EVPN

BGP table version is 6654, Local Router ID is 10.31.1.1

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-injected

Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup, 2 - best2

Network	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 200:4000100					
*>e[2]:[0]:[0]:[48]:[6c8b.d3fe.df3b]:[32]:[192.168.100.104]/272	10.100.100.2			0 300 200	i
*>e[2]:[0]:[0]:[48]:[6c8b.d3fe.ecb5]:[32]:[192.168.100.103]/272	10.100.100.2			0 300 200	i
Route Distinguisher: 200:4000200					
*>e[2]:[0]:[0]:[48]:[6c8b.d3fe.df3b]:[32]:[192.168.200.104]/272	10.100.100.2			0 300 200	i
*>e[2]:[0]:[0]:[48]:[6c8b.d3fe.ecb5]:[32]:[192.168.200.103]/272	10.100.100.2			0 300 200	i
Route Distinguisher: 10.31.1.1:32867 (L2VNI 4000100)					
*>e[2]:[0]:[0]:[48]:[6c8b.d3fe.ecb5]:[32]:[192.168.100.103]/272	10.100.100.2			0 300 200	i
*>i[2]:[0]:[0]:[48]:[6c8b.d3fe.ff09]:[32]:[192.168.100.102]/272	10.202.202.202	100		0	i
* i	10.202.202.202	100		0	i
*>i[2]:[0]:[0]:[48]:[6c8b.d3ff.00a7]:[32]:[192.168.100.100]/272	10.201.201.201	100		0	i
* i	10.201.201.201	100		0	i
*>e[2]:[0]:[0]:[48]:[6c8b.d3fe.ecb5]:[32]:[192.168.200.103]/272	10.100.100.2			0 300 200	i
*>i[2]:[0]:[0]:[48]:[6c8b.d3fe.ff09]:[32]:[192.168.200.102]/272	10.202.202.202	100		0	i
* i	10.202.202.202	100		0	i
*>i[2]:[0]:[0]:[48]:[6c8b.d3ff.00a7]:[32]:[192.168.200.100]/272	10.201.201.201	100		0	i
* i	10.201.201.201	100		0	i
Route Distinguisher: 10.102.0.10:5					
*>i[2]:[0]:[0]:[48]:[cc7f.76c6.a673]:[0]:[0.0.0.0]/216	10.202.202.202	100		0	i
*>i[5]:[0]:[0]:[24]:[192.168.100.0]/224	10.102.1.6	100		0	i
*>i[5]:[0]:[0]:[32]:[10.2.3.4]/224	10.102.1.6	100		0 65111	i
*>i[5]:[0]:[0]:[32]:[10.100.100.1]/224	10.102.1.6	100		0	i

```

Route Distinguisher: 10.31.1.1:5 (L3VNI 4000502)
*>1[5]:[0]:[0]:[24]:[192.168.100.0]/224
    10.133.133.133          100          0 i
*>1[5]:[0]:[0]:[32]:[10.2.3.4]/224
    10.133.133.133          100          0 65111 i
*>1[5]:[0]:[0]:[32]:[10.100.100.1]/224
    10.133.133.133          100          0 i
*>1[5]:[0]:[0]:[32]:[10.100.100.2]/224
    10.133.133.133          100          0 i
S1-Bg1#

```

<#root>

S1-Leaf1#

show ip int brief

```

IP Interface Status for VRF "default"(1)
Interface      IP Address      Interface Status
Lo0            10.102.0.5      protocol-up/link-up/admin-up
Lo1            10.102.1.8      protocol-up/link-up/admin-up
Eth1/2         192.168.17.12   protocol-up/link-up/admin-up
S1-Leaf1#

```

S1-Leaf1#

show bgp l2vpn evpn vrf vrf\_2

```

BGP routing table information for VRF default, address family L2VPN EVPN
BGP table version is 918, Local Router ID is 10.102.0.5
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: 10.102.0.5:5 (L3VNI 4000502)
*>i[2]:[0]:[0]:[48]:[6c8b.d3fe.ecb5]:[32]:[192.168.100.103]/272
    10.100.100.1          100          0 300 200 i
*>i[2]:[0]:[0]:[48]:[6c8b.d3fe.ecb5]:[32]:[192.168.200.103]/272
    10.100.100.1          100          0 300 200 i
*>i[5]:[0]:[0]:[24]:[192.168.100.0]/224
    10.102.1.10          100          0 i
* i          10.102.1.6          100          0 i
*>i[5]:[0]:[0]:[32]:[10.2.3.4]/224
    10.102.1.10          100          0 65111 i
* i          10.102.1.6          100          0 65111 i

*>i[5]:[0]:[0]:[32]:[10.100.100.1]/224
    10.102.1.6          100          0 i
*>i[5]:[0]:[0]:[32]:[10.100.100.2]/224
    10.102.1.10          100          0 i
S1-Leaf1#

```

S1-Leaf2#

show ip int brie

```

IP Interface Status for VRF "default"(1)
Interface          IP Address      Interface Status
Lo0                10.102.0.8     protocol-up/link-up/admin-up
Lo1                10.102.1.9     protocol-up/link-up/admin-up
Eth1/2            192.168.18.12  protocol-up/link-up/admin-up
S1-Leaf2#
S1-Leaf2#
S1-Leaf2#

```

```
show bgp l2vpn evpn vrf vrf_2
```

```

BGP routing table information for VRF default, address family L2VPN EVPN
BGP table version is 680, Local Router ID is 10.102.0.8
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: 10.102.0.8:5 (L3VNI 4000502)
*>i[2]:[0]:[0]:[48]:[6c8b.d3fe.ecb5]:[32]:[192.168.100.103]/272
      10.100.100.1          100          0 300 200 i
*>i[2]:[0]:[0]:[48]:[6c8b.d3fe.ecb5]:[32]:[192.168.200.103]/272
      10.100.100.1          100          0 300 200 i
*>i[5]:[0]:[0]:[24]:[192.168.100.0]/224
      10.102.1.10          100          0 i
* i          10.102.1.6          100          0 i
* i[5]:[0]:[0]:[32]:[10.2.3.4]/224
      10.102.1.6          100          0 65111 i
*>i          10.102.1.10          100          0 65111 i
*>i[5]:[0]:[0]:[32]:[10.100.100.1]/224
      10.102.1.6          100          0 i
*>i[5]:[0]:[0]:[32]:[10.100.100.2]/224
      10.102.1.10          100          0 i
S1-Leaf3#
S1-Leaf3#

```

```
show ip int brie
```

```

IP Interface Status for VRF "default"(1)
Interface          IP Address      Interface Status
Lo0                10.102.0.9     protocol-up/link-up/admin-up
Lo1                10.102.1.10    protocol-up/link-up/admin-up
Eth1/2            192.168.19.12  protocol-up/link-up/admin-up
S1-Leaf3#
S1-Leaf3#
S1-Leaf3#
S1-Leaf3#

```

```
show bgp l2vpn evpn vrf vrf_2
```

```

BGP routing table information for VRF default, address family L2VPN EVPN
BGP table version is 5431, Local Router ID is 10.102.0.9
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: 10.102.0.9:5 (L3VNI 4000502)

```
*>i[2]:[0]:[0]:[48]:[6c8b.d3fe.ecb5]:[32]:[192.168.100.103]/272
    10.100.100.1 100 0 300 200 i
* i[5]:[0]:[0]:[24]:[192.168.100.0]/224
    10.102.1.6 100 0 i
*>| 10.102.1.10 100 32768 i
* i[5]:[0]:[0]:[32]:[10.2.3.4]/224
    10.102.1.6 100 0 65111 i
*>1 10.102.1.10 0 65111 i
*>i[5]:[0]:[0]:[32]:[10.100.100.1]/224
    10.102.1.6 100 0 i
*>|[5]:[0]:[0]:[32]:[10.100.100.2]/224
    10.102.1.10 100 32768 i
```

S1-Leaf3#

S1\_Leaf4#

S1\_Leaf4#

show ip int brief

IP Interface Status for VRF "default"(1)

Interface	IP Address	Interface Status
Lo0	10.102.0.10	protocol-up/link-up/admin-up
Lo1	10.102.1.6	protocol-up/link-up/admin-up
Eth1/2	192.168.20.12	protocol-up/link-up/admin-up
S1_Leaf4#		
S1_Leaf4#		
S1_Leaf4#		

show bgp l2vpn evpn vrf vrf\_2

BGP routing table information for VRF default, address family L2VPN EVPN

BGP table version is 5118, Local Router ID is 10.102.0.10

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: 10.102.0.10:5 (L3VNI 4000502)					
*>i[2]:[0]:[0]:[48]:[6c8b.d3fe.ecb5]:[32]:[192.168.100.103]/272	10.100.100.1		100	0 300 200	i
*>i[2]:[0]:[0]:[48]:[6c8b.d3fe.ecb5]:[32]:[192.168.200.103]/272	10.100.100.1		100	0 300 200	i
*>i[2]:[0]:[0]:[48]:[6c8b.d3ff.00a7]:[32]:[192.168.100.100]/272	10.201.201.201		100	0	i
* i	10.201.201.201		100	0	i
* i[5]:[0]:[0]:[24]:[192.168.100.0]/224	10.102.1.10		100	0	i
*>	10.102.1.6		100	32768	i
*> [5]:[0]:[0]:[32]:[10.2.3.4]/224					

```

                10.102.1.6                                0 65111 i
* i                10.102.1.10                            100      0 65111 i
*>| [5]:[0]:[0]:[32]:[10.100.100.1]/224
                10.102.1.6                                100    32768 i
*>| [5]:[0]:[0]:[32]:[10.100.100.2]/224
                10.102.1.10                            100      0 i
S1_Leaf4#

```

## 데이터 플레인 확인

다양한 패킷 캡처 방법 및 변형을 이해하기 위해 여러 디바이스에서 데이터 계획 검증을 테스트합니다.

Host-3의 소스 IP 주소 192.168.100.103에서 외부 라우터 루프백 100 "10.2.3.4"를 ping합니다.

```
<#root>
```

```
HOST_3#
```

```
HOST_3#
```

```
ping 10.2.3.4 source 192.168.100.103
```

```

PING 10.2.3.4 (10.2.3.4) from 192.168.100.103: 56 data bytes
64 bytes from 10.2.3.4: icmp_seq=0 ttl=250 time=1.153 ms
64 bytes from 10.2.3.4: icmp_seq=1 ttl=250 time=0.569 ms
64 bytes from 10.2.3.4: icmp_seq=2 ttl=250 time=0.562 ms
64 bytes from 10.2.3.4: icmp_seq=3 ttl=250 time=0.525 ms
64 bytes from 10.2.3.4: icmp_seq=4 ttl=250 time=0.527 ms
--- 10.2.3.4 ping statistics ---
5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 0.525/0.667/1.153 ms
HOST_3#

```

Ethanalzyer는 사이트 2 Leaf-1 및 Leaf-2에서 어떤 leaf가 외부 라우터 루프백 10.2.3.4 연결성에 대한 트래픽을 수신/전달하는지 확인합니다.

```
<#root>
```

```
S2-Leaf1(config-monitor)#
```

```
sho clock
```

```

Warning: No NTP peer/server configured. Time may be out of sync.
07:11:37.455 UTC Tue Feb 21 2023
Time source is NTP
S2-Leaf1(config-monitor)#

```



```
S2-Leaf1(config-monitor)#
```

```
show run section monitor
```

```
show running-config | section monitor
icam monitor scale
monitor session 1
  source interface port-channel100 both
  destination interface sup-eth0
  no shut
```

```
S2-Leaf1(config-monitor)#
```

```
S2-Leaf2(config-monitor)#
```

```
S2-Leaf2(config-monitor)#
```

```
ethalyzer local interface inband display-filter "ip.addr==10.2.3.4 && ip.addr==192.168.100.103 && icmp"
```

```
Capturing on 'ps-inb'
```

```
1385 2023-02-21 07:10:46.424195144 192.168.100.103 → 10.2.3.4 ICMP 102 Echo (ping) request id=0xdd1f, s
1386 2023-02-21 07:10:46.424818423 10.2.3.4 → 192.168.100.103 ICMP 98 Echo (ping) reply id=0xdd1f, s
1387 2023-02-21 07:10:46.425263621 192.168.100.103 → 10.2.3.4 ICMP 102 Echo (ping) request id=0xdd1f,
1388 2023-02-21 07:10:46.425486046 10.2.3.4 → 192.168.100.103 ICMP 98 Echo (ping) reply id=0xdd1f, s
1389 2023-02-21 07:10:46.425856150 192.168.100.103 → 10.2.3.4 ICMP 102 Echo (ping) request id=0xdd1f,
1390 2023-02-21 07:10:46.426095692 10.2.3.4 → 192.168.100.103 ICMP 98 Echo (ping) reply id=0xdd1f, s
1391 2023-02-21 07:10:46.426438174 192.168.100.103 → 10.2.3.4 ICMP 102 Echo (ping) request id=0xdd1f,
1392 2023-02-21 07:10:46.426642605 10.2.3.4 → 192.168.100.103 ICMP 98 Echo (ping) reply id=0xdd1f, s
1393 2023-02-21 07:10:46.427004108 192.168.100.103 → 10.2.3.4 ICMP 102 Echo (ping) request id=0xdd1f,
1394 2023-02-21 07:10:46.427210984 10.2.3.4 → 192.168.100.103 ICMP 98 Echo (ping) reply id=0xdd1f, s
```

```
10
```

```
S2-Leaf2(config-monitor)#
```

```
S2-Leaf2(config-monitor)#
```

```
sho clock
```

```
Warning: No NTP peer/server configured. Time may be out of sync.
```

```
07:12:31.069 UTC Tue Feb 21 2023
```

```
Time source is NTP
```

```
S2-Leaf2(config-monitor)#
```

확인된 CLI 출력인 Site 2 Leaf-2는 외부 라우터 10.2.3.4에 대한 ICMP(Internet Control Message Protocol) 요청을 수신하여 전달합니다.

다음 CLI 예에서는 사이트 1에서 어떤 leaf가 대상 10.2.3.4로 패킷을 전달하는지 확인합니다.

```
<#root>
```

```
S1-Leaf3(config-monitor)#
```

```
S1-Leaf3(config-monitor)#
```

```
ethalyzer local interface inband display-filter "ip.addr==10.2.3.4 && ip.addr==192.168.100.103 && icmp"
```

```
Capturing on 'ps-inb'
```

```
253 2023-02-21 07:10:50.379741403 192.168.100.103 → 10.2.3.4 ICMP 98 Echo (ping) request id=0xdd1f, s
254 2023-02-21 07:10:50.380357311 10.2.3.4 → 192.168.100.103 ICMP 102 Echo (ping) reply id=0xdd1f, s
255 2023-02-21 07:10:50.380810012 192.168.100.103 → 10.2.3.4 ICMP 98 Echo (ping) request id=0xdd1f, s
256 2023-02-21 07:10:50.381025676 10.2.3.4 → 192.168.100.103 ICMP 102 Echo (ping) reply id=0xdd1f, s
257 2023-02-21 07:10:50.381401968 192.168.100.103
```

```
→ 10.2.3.4      ICMP 98 Echo (ping) request  id=0xdd1f, seq=512/2, ttl=251
258 2023-02-21 07:10:50.381631838      10.2.3.4 → 192.168.100.103 ICMP 102 Echo (ping) reply  id=0xdd1f, s
259 2023-02-21 07:10:50.381984272 192.168.100.103 → 10.2.3.4      ICMP 98 Echo (ping) request id=0xdd1f, s
260 2023-02-21 07:10:50.382176820      10.2.3.4 → 192.168.100.103 ICMP 102 Echo (ping) reply  id=0xdd1f, s
261 2023-02-21 07:10:50.382549820 192.168.100.103 → 10.2.3.4      ICMP 98 Echo (ping) request id=0xdd1f, s
262 2023-02-21 07:10:50.382746640      10.2.3.4 → 192.168.100.103 ICMP 102 Echo (ping) reply  id=0xdd1f, s
```

```
S1-Leaf3(config-monitor)#
```

```
sho clock
```

```
Warning: No NTP peer/server configured. Time may be out of sync.
```

```
07:11:22.514 UTC Tue Feb 21 2023
```

```
Time source is NTP
```

```
S1-Leaf3(config-monitor)#
```

```
S1-Leaf3(config-monitor)#
```

```
show run section monitor
```

```
show running-config | section monitor
```

```
monitor session 1
```

```
source interface port-channel2 both
```

```
destination interface sup-eth0
```

```
no shut
```

```
S1-Leaf3(config-monitor)#
```

```
S1-Leaf3(config-monitor)#
```

```
show moni sess 1
```

```
session 1
```

```
-----
type           : local
state          : up
acl-name       : acl-name not specified
source intf    :
  rx           : Po2
  tx           : Po2
  both         : Po2
source VLANs   :
  rx           :
  tx           :
  both         :
filter VLANs   : filter not specified
source fwd drops :
destination ports : sup-eth0
source VSANs   :
  rx           :
```

```
S1-Leaf3(config-monitor)#
```

```
S1-Leaf4(config-monitor)#
```

```
ethalyzer local interface inband display-filter "ip.addr==192.168.100.103" limit-captured-frames 0
```

```
Capturing on 'ps-inb'
```

```
S1-Leaf4(config-monitor)#
```

```
S1-Leaf4(config-monitor)#
```

```
sho clock
```

```
Warning: No NTP peer/server configured. Time may be out of sync.
07:11:15.187 UTC Tue Feb 21 2023
Time source is NTP
S1_Leaf4(config-monitor)#
```

고객은 Host-3에서 외부 라우터로의 연결 문제에 직면한다고 응답합니다. 고객은 VXLAN 패브릭의 모든 것이 정상인지 확인하고자 하며, Cisco Leaf가 트래픽을 외부 라우터로 전달한다는 확인이 필요합니다. 이 문제를 해결하는 단계는 다음과 같습니다.

1. 외부 라우터에 대해 ping을 시작하고 IP 주소 10.2.3.4에 연결할 수 있는지 확인합니다.
2. Embedded Logic Analyzer Module(ELAM)이 S1-Leaf3 및 S1-Leaf4에서 모두 캡처하여 트리거되는지 확인합니다(토폴로지 및 트래픽 흐름 기준).
3. ELAM 캡처를 사용하여 패킷이 인터페이스 밖으로 전달되고 외부 라우터를 가리키는지 확인합니다.
4. 사이트 2- ethanalyzer를 사용하면 ICMP 요청을 확인하고 응답할 수 있습니다. 회신이 없으면 원격지에서 문제가 발생합니다.
5. Host-4에서 10.2.3.4에 연결할 수 있고 Host-3에 문제가 있는 경우 호스트 관련 문제가 될 수 있습니다. ACL(Access Control List), CRC(Cyclic Redundancy Check) 오류 및 해싱 링크를 확인합니다.

```
<#root>
```

```
HOST_3#
```

```
ping 10.2.3.4 source 192.168.100.103
```

```
PING 10.2.3.4 (10.2.3.4) from 192.168.100.103: 56 data bytes
Request 0 timed out
Request 1 timed out
Request 2 timed out
Request 3 timed out
Request 4 timed out
--- 10.2.3.4 ping statistics ---
5 packets transmitted, 0 packets received, 100.00% packet loss
HOST_3#
```

```
Host4#
```

```
ping 10.2.3.4 source 192.168.100.104
```

```
PING 10.2.3.4 (10.2.3.4) from 192.168.100.104: 56 data bytes
64 bytes from 10.2.3.4: icmp_seq=0 ttl=250 time=1.266 ms
64 bytes from 10.2.3.4: icmp_seq=1 ttl=250 time=0.62 m
64 bytes from 10.2.3.4: icmp_seq=2 ttl=250 time=0.603 ms
64 bytes from 10.2.3.4: icmp_seq=3 ttl=250 time=0.474 ms
64 bytes from 10.2.3.4: icmp_seq=4 ttl=250 time=0.457 ms
--- 10.2.3.4 ping statistics ---
5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 0.457/0.684/1.266 ms
```

# 데이터 플레인 확인

ELAM 캡처를 사용하여 포트 ASIC, 슬라이스 및 SrcId 확인

```
<#root>
```

```
show hardware internal tah interface
```

```
show system internal ethpm info interface
```

```
| i i src
```

```
<#root>
```

```
S1-Leaf3(TAH-elam)#
```

```
debug platform internal tah elam asic 0
```

```
S1-Leaf3(TAH-elam)#
```

```
trigger init asic 0 slice 1 in-select 7 out-select 0 use-src-id 8
```

```
Slot 1: param values: asic 0, slice 1, lu-a2d 1, in-select 7, out-select 0, src_id 8  
S1-Leaf3(TAH-elam-insel7)#
```

```
set inner ipv4 src_ip 192.168.100.103
```

```
S1-Leaf3(TAH-elam-insel7)#
```

```
start
```

```
S1-Leaf3(TAH-elam-insel7)#
```



```
S1_Leaf4(TAH-elam-inse17)#
```

```
report
```

```
ELAM not triggered yet on slot - 1, asic - 0, slice - 1
```

```
S1_Leaf4(TAH-elam-inse17)#
```

ELAM 출력의 결론은 leaf가 트래픽을 외부 라우터로 전달하지만 외부 라우터에서 응답이 없다는 것입니다. 따라서 외부 라우터 팀에 ICMP 응답에 대해 확인합니다.

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