EX硬件：ACI信息包转发深潜。

目录

简介

本文描述不同的转发方案使用“EX”基于ACI交换机在应用程序中心基础设施(ACI)。 它将显示如何验证硬件正确地被编程，并且我们转发信息包到正确目的地终端(EP)在适当的终端组(EPGs)。

先决条件

要求

本文档没有任何特定的要求。

使用的组件

本文档中的信息基于下列硬件和软件版本：

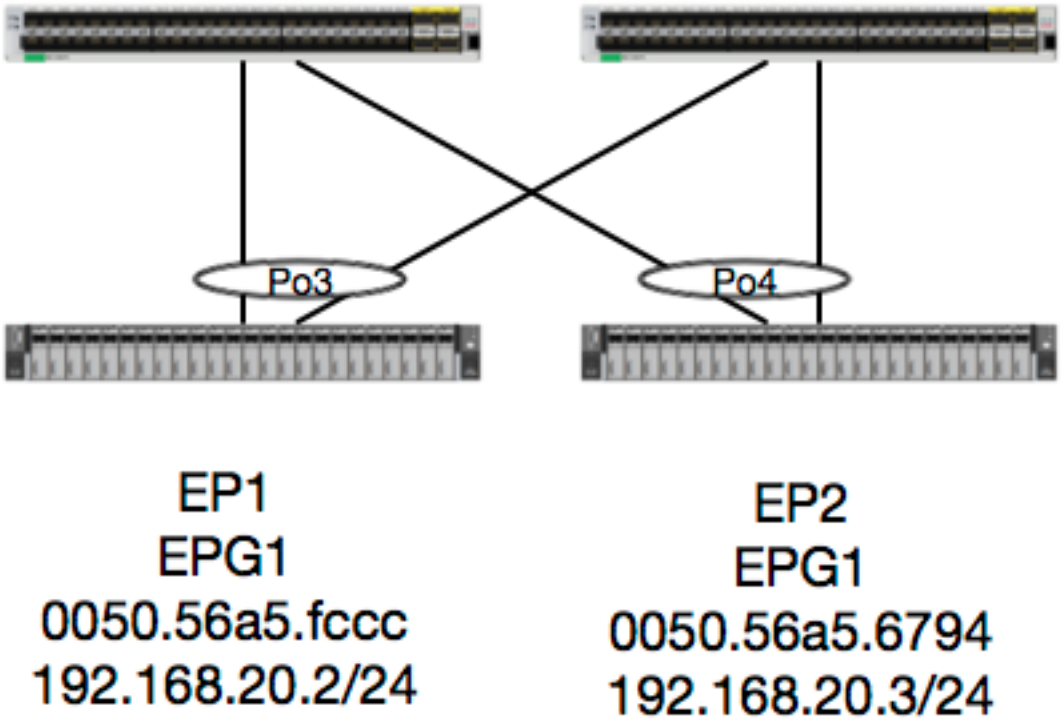
- 使用EX硬件，包括两脊椎交换机和两分支交换机的ACI结构
- 有去其中每一个分支的两uplink端口的一台ESXi主机交换
- 作为路由器的连结5000设备。
- 使用初始建立的应用程序策略基础设施控制器(APIC)

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您使用的是真实网络，请确保您已经了解所有命令的潜在影响。

方案

在同样EPG/Same分支的2个EP -交换机帧

拓扑



给出此拓扑，流从EP1到EP2是L2流并且应该本地交换在任何分支源数据流进来在。 检查的第一件事与第2层(L2)流是确定mac的地址表是否和交换机收到帧的地方：

```
leaf4# show mac address-table | grep fccc
* 30       0050.56a5.fccc    dynamic      -       F    F    po3
leaf4# show mac address-table | grep 6794
* 30       0050.56a5.6794    dynamic      -       F    F    po4
```

为了看到封装VLAN，我们能检查EP数据库：

```
leaf4# show endpoint mac 0050.56a5.fccc
Legend:
 O - peer-attached    H - vtep            a - locally-aged     S - static
 V - vpc-attached     p - peer-aged       L - local            M - span
 s - static-arp       B - bounce
+-----------------------------------+--------------+----------------+-------------+----------
---+
      VLAN/                          Encap          MAC Address       MAC Info/
```

```
Interface
      Domain                            VLAN            IP Address        IP Info
+-----------------------------------+--------------+-----------------+-------------+----------
---+
30                                      vlan-2268    0050.56a5.fccc LV
po3
Joey-Tenant:Joey-Internal               vlan-2268      192.168.20.2 LV
po3


calo2-leaf4# show endpoint mac 0050.56a5.6794
Legend:
 O - peer-attached    H - vtep             a - locally-aged     S - static
 V - vpc-attached     p - peer-aged        L - local            M - span
 s - static-arp       B - bounce
+-----------------------------------+--------------+-----------------+-------------+----------
---+
      VLAN/                         Encap           MAC Address       MAC Info/
Interface
      Domain                            VLAN            IP Address        IP Info
+-----------------------------------+--------------+-----------------+-------------+----------
---+
30                                      vlan-2268    0050.56a5.6794 LV
po4
Joey-Tenant:Joey-Internal               vlan-2268      192.168.20.3 LV
po4
```

我们认识FD_VLAN 30匹配，但是我们能总是验证在软件的映射：

```
leaf4# show vlan extended | grep 2268
 30   enet  CE         vlan-2268
```

当然并且，我们能检查硬件确定VLAN 30映射到VLAN 2268作为前面板封装。

```
leaf4# vsh_lc
module-1# show system internal eltmc info vlan 30


            vlan_id:             30   :::      hw_vlan_id:             22
          vlan_type:         FD_VLAN   :::         bd_vlan:             28
   access_encap_type:         802.1q   :::    access_encap:           2268
   fabric_encap_type:          VXLAN   :::    fabric_encap:          11960
              sclass:          32778   :::           scope:             11
           untagged:               0
     acess_encap_hex:          0x8dc   :::  fabric_enc_hex:         0x2eb8
      pd_vlan_ft_mask:            0x8
    fd_learn_disable:               0
        qos_class_id:               0   :::      qos_pap_id:              0
          qq_met_ptr:              25   :::      ipmc_index:              0
   ingressBdAclLabel:               0   ::: ingBdAclLblMask:              0
    egressBdAclLabel:               0   ::: egrBdAclLblMask:              0
         qos_map_idx:               0   :::     qos_map_pri:              0
        qos_map_dscp:               0   :::      qos_map_tc:              0
        vlan_ft_mask:          0xe30
           hw_bd_idx:               0   :::      hw_epg_idx:          11267
          intf_count:               2   ::: glbl_scp_if_cnt:              2

<SNIPPED>
```

假设EP在软件了解，我们能也验证硬件编程了这些EP的L2信息。 在新的硬件中，有是硬件的软件状态的硬件抽象层(HAL)。 HAL的工作是采取编程请求和推进他们对硬件。

为了查看L2关于终端的硬件信息，我们能查看在HAL的L2表为特定MAC地址：

```
leaf4# vsh_lc
module-1# show platform internal hal ep l2 mac 0050.56a5.fccc
LEGEND:
-------
BDId:              BD Id                                                  BD Name:        BD
Name
T:                 EP Type (Pl: Physical Vl: Virtual Xr: Remote           EP Mac:         Mac
L2 IfId:           L2 Interface                                           L2 IfName:      L2
IfName
FDId:              FD Id                                                  FD Name:        FD
Name
S Class:           S Class                                                Age Intvl:      Age
Interval
P A:               Packet Action (F: Forward, T: Trap to CPU,
                                  L: Log & Forward, D: Drop, N: None)
S T:               Static Ep                                              S E:
Secure EP
L D:               Learn Disable                                          B N D:          Bind
Notify Disable
E N D:             Epg Notify Disable                                     B E:
Bounce Enable
I D L:             IVxlan Dont Learn                                      SPI:
Source Policy Incomplete
DPI:               Dest Policy Incomplete                                 SPA:
Source Policy Applied
DPA:               Dest Policy Applied                                    DSS:            Dest
Shared Service
IL:                Is Local                                               VUB:            Vnid
Use Bd
SO:                SA Only

 L2 EP Count: 1

================================================================================================
======================
                                                                                          B E
I S D S D D   V
     BD           EP               L2       L2               FD        S     Age   P S S L N N
B D P P P P S I U S
BdId Name      T  Mac              IfId     Ifname      FDId Name      Class Intvl A T E D D D
E L I I A A S L B O
================================================================================================
======================
1c   BD-28     Pl 00:50:56:a5:fc:cc 16000002 Po3         1e   FD-30     800a  29f   F 0 0 0 1 0
0 0 0 0 0 0 0 1 0 0


module-1# show platform internal hal ep l2 mac 0050.56a5.6794
================================================================================================
======================
                                                                                          B E
I S D S D D   V
     BD           EP               L2       L2               FD        S     Age   P S S L N N
B D P P P P S I U S
BdId Name      T  Mac              IfId     Ifname      FDId Name      Class Intvl A T E D D D
E L I I A A S L B O
================================================================================================
======================
1c   BD-28     Pl 00:50:56:a5:67:94 16000003 Po4         1e   FD-30     800a  29f   F 0 0 0 1 0
0 0 0 0 0 0 0 1 0 0
```

即然我们映射硬件，请执行伊拉姆和发现信息包哪里应该是。

伊拉姆

```
leaf4# vsh_lc
module-1# debug platform internal tah elam asic 0
module-1(DBG-TAH-elam)# trigger reset
module-1(DBG-TAH-elam)# trigger init in-select 6 out-select 0
module-1(DBG-TAH-elam-insel6)# set outer l2 src_mac 0050.56a5.fccc dst_mac 0050.56a5.6794
module-1(DBG-TAH-elam-insel6)# start
module-1(DBG-TAH-elam-insel6)# stat
ELAM STATUS
===========
Asic 0 Slice 0 Status Armed
Asic 0 Slice 1 Status Triggered

module-1(DBG-TAH-elam-insel6)# report | grep ovec
  sug_elam_out_sidebnd_no_spare_vec.ovector_idx: 0x9E
```

极大，因此Leaf4接收了在Asic的帧0片式1。 使用是非常重要的新的硬件的伊拉姆，有新字段，当排除故障时：ovector_idx。 此索引是物理端口索引应该转发帧/信息包在外面。 一旦有ovector_idx，我们能使用此命令查找什么端口映射对：

```
module-1(DBG-TAH-elam-insel6)# show platform internal hal l2 port gpd
Legend:
-------
IfId:       Interface Id                                    IfName:      Interface Name
I P:        Is PC Mbr                                       IfId:           Interface Id
Uc PC Cfg:      UcPcCfg Idx                                 Uc PC MbrId:    Uc Pc Mbr Id
As:             Asic                                        AP:             Asic Port
Sl:             Slice                                       Sp:             Slice Port
Ss:             Slice SrcId                                 Ovec:           Ovector (slice |
srcid)
L S:            Local Slot                                  Reprogram:
L3:             Is L3
    P:    PifTable                                          Xla Idx:        Xlate Idx
    RP:   Rw PifTable                                       Ovx Idx:        OXlate Idx
    IP:   If Profile Table                                  N L3:           Num. of L3 Ifs
    RS:   Rw SrcId Table                                    NI L3:          Num. of Infra L3 Ifs
    DP:   DPort Table                                       Vif Tid:        Vif Tid
    SP:   SrcPortState Table                                RwV Tid:        RwVif Tid
    RSP:  RwSrcPortstate Table                              Ing Lbl:        Ingress Acl Label
    UC:   UCPcCfg                                           Egr Lbl:        Egress Acl Label
    UM:   UCPcMbr                                           Reprogram:
PROF ID:        Lport Profile Id
    VS:   VifStateTable                                     HI:             LportProfile Hw
Install
    RV:   Rw VifTable
Num. of Sandboxes: 1

Sandbox_ID: 0, BMP: 0x0
 Port Count: 8

================================================================================================
==========================================
                        Uc   Uc                            |       Reprogram       |
| Rep |
                     I PC   Pc                         L |   R I R D    R  U U X | L Xla Ovx N
NI Vif    RwV    Ing  Egr  | V R | PROF H
IfId     Ifname      P Cfg  MbrID As AP Sl Sp Ss Ovec S | P P P S P Sp Sp C M L | 3 Idx Idx L3
```

```
L3 Tid    Tid    Lbl  Lbl  | S V | ID   I
=============================================================================================================
=============================================
1a004000 Eth1/5      1 0    1d    0  d  0  c  18 18   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
-      -      800  0      0 1   0    0
1a005000 Eth1/6      1 0    b     0  e  0  d  1a 1a   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
-      -      800  0      0 1   0    0
1a006000 Eth1/7      0 26   5     0  f  0  e  1c 1c   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
D-256  -      800  0      0 1   e    0
1a007000 Eth1/8      0 2e   7     0  10 0  f  1e 1e   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
D-84   -      800  0      0 1   30   0
1a01e000 Eth1/31     1 0    2d    0  37 1  e  1c 9c   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
-      -      0    0      0 1   0    0
1a01f000 Eth1/32     1 0    3d    0  38 1  f  1e 9e   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
-      -      0    0      0 1   0    0
1a030000 Eth1/49     0 2    1     0  49 1  20 38 b8   1   0 0 0 0 0 0  0  0 0 0   1 8   6   2  2
D-24d  -      400  0      0 0   1    0
1a031000 Eth1/50     0 3    3     0  29 1  0  0  80   1   0 0 0 0 0 0  0  0 0 0   1 9   7   2  2
D-350  -      400  0      0 0   1    0
```

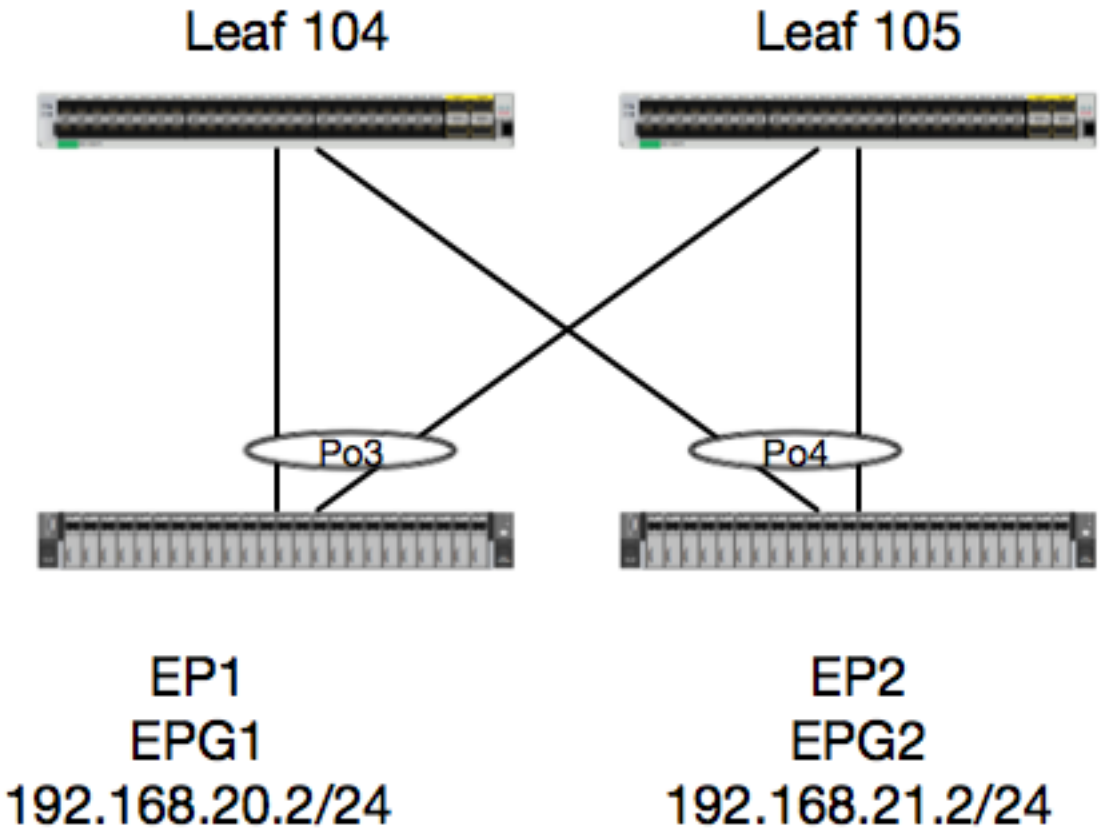
交换机认为应该转发信息包在以太网接口1/32外面。 该PO4我们获悉mac addess的地方？

```
leaf4# show port-channel summary
Flags:  D - Down        P - Up in port-channel (members)
        I - Individual  H - Hot-standby (LACP only)
        s - Suspended   r - Module-removed
        S - Switched    R - Routed
        U - Up (port-channel)
        M - Not in use. Min-links not met
        F - Configuration failed
--------------------------------------------------------------------------------
Group Port-       Type     Protocol  Member Ports
      Channel
--------------------------------------------------------------------------------
1     Po1(SU)     Eth      LACP      Eth1/5(P)
2     Po2(SU)     Eth      LACP      Eth1/6(P)
3     Po3(SU)     Eth      LACP      Eth1/31(P)
4     Po4(SU)     Eth      LACP      Eth1/32(P)
```

是，因此信息包增殖比转发在接口1/32外面到目的地主机。

在另外EPG/Same分支的2个EP -路由信息包

拓扑



在本例中，我们将跟踪一个信息包的信息包流从EP1到他们在同一个vPC分支对存在的EP2。 使用不同的BD'S，两个EP是用不同的EPG。

总是要执行的第一件事是检查EP数据库发现我们是否了解EP ：

```
leaf4# show endpoint ip 192.168.20.2
Legend:
 O - peer-attached    H - vtep             a - locally-aged     S - static
 V - vpc-attached     p - peer-aged        L - local            M - span
 s - static-arp       B - bounce
+-----------------------------------+--------------+-----------------+-------------+----------
---+
      VLAN/                          Encap           MAC Address       MAC Info/
Interface
      Domain                         VLAN            IP Address        IP Info
+-----------------------------------+--------------+-----------------+-------------+----------
---+
30                                       vlan-2268    0050.56a5.fccc LV
po3
Joey-Tenant:Joey-Internal                vlan-2268      192.168.20.2 LV
po3


calo2-leaf4# show endpoint ip 192.168.21.2
Legend:
 O - peer-attached    H - vtep             a - locally-aged     S - static
 V - vpc-attached     p - peer-aged        L - local            M - span
 s - static-arp       B - bounce
+-----------------------------------+--------------+-----------------+-------------+----------
---+
      VLAN/                          Encap           MAC Address       MAC Info/
Interface
```

```
      Domain                            VLAN            IP Address        IP Info
+-----------------------------------+--------------+-----------------+-------------+----------
---+
8                                       vlan-2200     0050.56a5.0c11 LV
po4
Joey-Tenant:Joey-Internal               vlan-2200       192.168.21.2 LV
po4
```

因为我们了解EP并且认识IP信息，我们在硬件方面的应该能查看EP了解信息：

```
leaf4# vsh_lc
module-1# show platform internal hal ep l3 all
LEGEND:
-------
VrfName:           Vrf Name                                                  T:              Type
(Pl: Physical, Vl: Virtual, Xr: Remote)
EP IP:             Endpoint IP
S Class:           S Class                                                   Age Intvl:      Age
Interval
S T:               Static Ep                                                 S E:
Secure EP
L D:               Learn Disable                                             B N D:          Bind
Notify Disable
E N D:             Epg Notify Disable                                        B E:
Bounce Enable
I D L:             IVxlan Dont Learn                                         SPI:
Source Policy Incomplete
DPI:               Dest Policy Incomplete                                    SPA:
Source Policy Applied
DPA:               Dest Policy Applied                                       DSS:            Dest
Shared Service
IL:                Is Local                                                  VUB:            Vnid
Use Bd
SO:                SA Only                                                   EP NH L3IfName: EP
Next Hop L3 If Name
NHT:               Next Hop Type (L2: L2 Entry L3: L3 Next Hop)              BD Name:        L2 NH
BD Name
EP Mac:            EP Mac                                                    L3 IfName:      L3 NH
If Name
L2 IfName:         L2 If Name                                                FD Name:        L2
Entry FD Name
IP:                L3 NH IP

 L3 EP Count: 12

================================================================================================
================================================================================
                                                                  B E   I S D S D D   V   EP-NH
N  |
Vrf              EP                              S     Age   S S L N N B D P P P P S I U S L3
H  | BD        EP                L3           L2          FD
Name          T  IP                             Class Intvl T E D D D E L I I A A S L B O
IfName       T  | Name      Mac                IfName       Ifname      Name      IP
================================================================================================
================================================================================
common*rewall Pl 10.6.112.1                      1     0     1 0 0 0 0 0 1 1 0 0 0 0 1 0 0 -
L3   -         00:00:00:00:00:00 -           -           -         0.0.0.0
common*rewall Pl 10.6.114.1                      1     0     1 0 0 0 0 0 1 1 0 0 0 0 1 0 0 -
L3   -         00:00:00:00:00:00 -           -           -         0.0.0.0
common*rewall Pl 10.6.114.129                    1     0     1 0 0 0 0 0 1 1 0 0 0 0 1 0 0 -
L3   -         00:00:00:00:00:00 -           -           -         0.0.0.0
common*efault Pl 100.100.101.1                   1     0     1 0 0 0 0 0 1 1 0 0 0 0 1 0 0 -
```

```
L3   -         00:00:00:00:00:00 -           -           -         0.0.0.0
Joey-T*ternal Pl 192.168.1.1                   1     0     1 0 0 0 0 0 1 1 0 0 0 0 1 0 0 -
L3   -         00:00:00:00:00:00 -           -           -         0.0.0.0
Joey-T*ternal Xr 192.168.1.100                 8013  128   0 0 0 1 0 0 0 0 0 0 0 0 0 1 0 -
L3   -         00:0c:0c:0c:0c:0c Tunnel2     Tunnel2     -         0.0.0.0
Joey-T*ernal2 Pl 192.168.3.1                   1     0     1 0 0 0 0 0 1 1 0 0 0 0 1 0 0 -
L3   -         00:00:00:00:00:00 -           -           -         0.0.0.0
Joey-T*ternal Pl 192.168.20.1                  1     0     1 0 0 0 0 0 1 1 0 0 0 0 1 0 0 -
L3   -         00:00:00:00:00:00 -           -           -         0.0.0.0
Joey-T*ternal Pl 192.168.20.2                  800a  0     0 0 0 0 0 0 0 0 0 0 0 1 0 0 -
L2   BD-28     00:50:56:a5:fc:cc -           Po3         FD-30     -
Joey-T*ternal Pl 192.168.21.1                  1     0     1 0 0 0 0 0 1 1 0 0 0 0 1 0 0 -
L3   -         00:00:00:00:00:00 -           -           -         0.0.0.0
Joey-T*ternal Pl 192.168.21.2                  800c  0     0 0 0 0 0 0 0 0 0 0 0 1 0 0 -
L2   BD-7      00:50:56:a5:0c:11 -           Po4         FD-8      -
Joey-T*ternal Pl 2001:0:0:100::1               1     0     1 0 0 0 0 0 1 1 0 0 0 0 1 0 0 -
L3   -         00:00:00:00:00:00 -           -           -         0.0.0.0
```

HAL Layer3 (l3)表是非常uself，因为提供我们l3了解的EP VLAN/Port信息。 我们知道目的地存在Po4，因此应该转发信息包在Po4的所有端口外面。

请运行伊拉姆和发现什么我们获得!

伊拉姆

```
leaf4# vsh_lc
module-1# debug platform internal tah elam asic 0 module-1(DBG-TAH-elam)# trigger init in-select
6 out-select 0
module-1(DBG-TAH-elam-insel6)# set outer ipv4 src_ip 192.168.20.2 dst_ip 192.168.21.2
module-1(DBG-TAH-elam-insel6)# start
module-1(DBG-TAH-elam-insel6)# stat
ELAM STATUS
===========
Asic 0 Slice 0 Status Armed
Asic 0 Slice 1 Status Armed

module-1(DBG-TAH-elam-insel6)# stat
ELAM STATUS
===========
Asic 0 Slice 0 Status Armed
Asic 0 Slice 1 Status Triggered

module-1(DBG-TAH-elam-insel6)# report | grep ovec
  sug_elam_out_sidebnd_no_spare_vec.ovector_idx: 0x9E
```

极大，因此我们触发了信息包和我们发现“ovector_idx”是0x9E。 ovector索引是流出的phycial接口索引应该转发信息包在外面。 请发现什么端口有该索引：

```
module-1(DBG-TAH-elam-insel6)# show platform internal hal l2 port gpd
Legend:
-------
IfId:       Interface Id                                IfName:      Interface Name
I P:        Is PC Mbr                                   IfId:           Interface Id
Uc PC Cfg:      UcPcCfg Idx                             Uc PC MbrId:    Uc Pc Mbr Id
As:             Asic                                    AP:             Asic Port
Sl:             Slice                                   Sp:             Slice Port
Ss:             Slice SrcId                             Ovec:           Ovector (slice |
srcid)
L S:            Local Slot                              Reprogram:
```

```
L3:             Is L3
    P:    PifTable                                          Xla Idx:        Xlate Idx
    RP:   Rw PifTable                                       Ovx Idx:        OXlate Idx
    IP:   If Profile Table                                  N L3:           Num. of L3 Ifs
    RS:   Rw SrcId Table                                    NI L3:          Num. of Infra L3 Ifs
    DP:   DPort Table                                       Vif Tid:        Vif Tid
    SP:   SrcPortState Table                                RwV Tid:        RwVif Tid
    RSP:  RwSrcPortstate Table                              Ing Lbl:        Ingress Acl Label
    UC:   UCPcCfg                                           Egr Lbl:        Egress Acl Label
    UM:   UCPcMbr                                           Reprogram:
PROF ID:        Lport Profile Id
    VS:   VifStateTable                                     HI:             LportProfile Hw
Install
    RV:   Rw VifTable
Num. of Sandboxes: 1

Sandbox_ID: 0, BMP: 0x0
 Port Count: 8

================================================================================================
==========================================
                        Uc   Uc                          |       Reprogram       |
| Rep |
                     I PC   Pc                       L |   R I R D    R  U U X | L Xla Ovx N
NI Vif    RwV    Ing  Egr  | V R | PROF H
IfId     Ifname      P Cfg  MbrID As AP Sl Sp Ss Ovec S | P P P S P Sp Sp C M L | 3 Idx Idx L3
L3 Tid    Tid    Lbl  Lbl  | S V | ID   I
================================================================================================
==========================================
1a004000 Eth1/5      1 0    1d    0  d  0  c  18 18   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
-      -      800  0      0 1   0    0
1a005000 Eth1/6      1 0    b     0  e  0  d  1a 1a   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
-      -      800  0      0 1   0    0
1a006000 Eth1/7      0 26   5     0  f  0  e  1c 1c   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
D-256  -      800  0      0 1   c    0
1a007000 Eth1/8      0 2f   7     0  10 0  f  1e 1e   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
D-199  -      800  0      0 1   2e   0
1a01e000 Eth1/31     1 0    2d    0  37 1  e  1c 9c   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
-      -      0    0      0 1   0    0
1a01f000 Eth1/32     1 0    3d    0  38 1  f  1e 9e   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
-      -      0    0      0 1   0    0
1a030000 Eth1/49     0 2    1     0  49 1  20 38 b8   1   0 0 0 0 0 0  0  0 0 0   1 6   4   2  2
D-24d  -      400  0      0 0   1    0
1a031000 Eth1/50     0 3    3     0  29 1  0  0  80   1   0 0 0 0 0 0  0  0 0 0   1 5   3   2  2
D-350  -      400  0      0 0   1    0
```

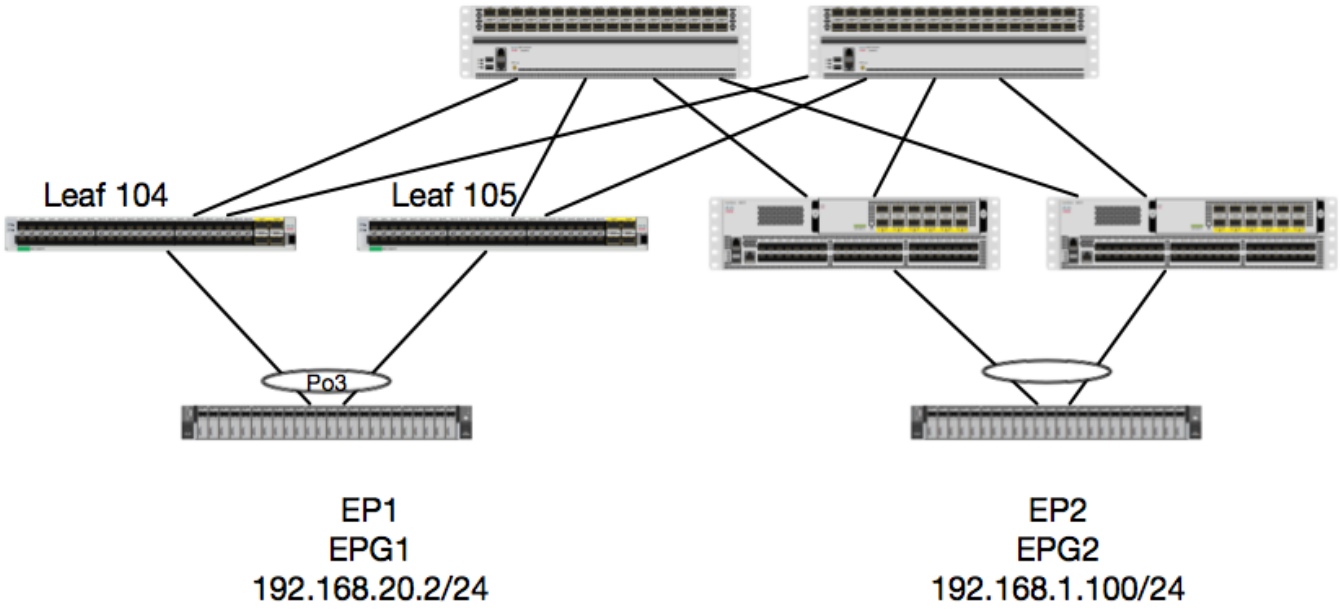
是那正确的，查找，如我们应该传送它端口1/32 ？

```
leaf4# show port-channel summary
Flags:  D - Down        P - Up in port-channel (members)
        I - Individual  H - Hot-standby (LACP only)
        s - Suspended   r - Module-removed
        S - Switched    R - Routed
        U - Up (port-channel)
        M - Not in use. Min-links not met
        F - Configuration failed
--------------------------------------------------------------------------------
Group Port-       Type     Protocol  Member Ports
      Channel
--------------------------------------------------------------------------------
1     Po1(SU)     Eth      LACP      Eth1/5(P)
2     Po2(SU)     Eth      LACP      Eth1/6(P)
3     Po3(SU)     Eth      LACP      Eth1/31(P)
```

```
4     Po4(SU)     Eth      LACP      Eth1/32(P)
```
是，这是正确的。

在另外EPG/Different分支的2个EP -路由信息包

拓扑



在本例中，我们将跟踪一个信息包的信息包流从EP1到EP1在一个EX vPC对存在的EP2，并且EP2在一个远程生成1 vPC分支对存在。 使用不同的BD'S，两个EP是用不同的EPG。

再次，请检查哪里了解EP ：

```
leaf4# show endpoint ip 192.168.20.2
Legend:
 O - peer-attached    H - vtep             a - locally-aged     S - static
 V - vpc-attached     p - peer-aged        L - local            M - span
 s - static-arp       B - bounce
+---------------------------------+--------------+----------------+-------------+----------
---+
      VLAN/                          Encap           MAC Address       MAC Info/
Interface
      Domain                         VLAN            IP Address        IP Info
+---------------------------------+--------------+----------------+-------------+----------
---+
30                                      vlan-2268    0050.56a5.fccc LV
po3
Joey-Tenant:Joey-Internal               vlan-2268      192.168.20.2 LV
po3


calo2-leaf4# show endpoint ip 192.168.1.100
Legend:
 O - peer-attached    H - vtep             a - locally-aged     S - static
 V - vpc-attached     p - peer-aged        L - local            M - span
 s - static-arp       B - bounce
+---------------------------------+--------------+----------------+-------------+----------
---+
```

```
      VLAN/                           Encap           MAC Address       MAC Info/
Interface
      Domain                          VLAN            IP Address        IP Info
+---------------------------------+---------------+-----------------+--------------+----------
---+
Joey-Tenant:Joey-Internal                              192.168.1.100
tunnel2
```

现在，请验证什么硬件编程了：

```
leaf4# vsh_lc
module-1# show platform internal hal ep l3 all
LEGEND:
-------
VrfName:           Vrf Name                                                T:              Type
(Pl: Physical, Vl: Virtual, Xr: Remote)
EP IP:             Endpoint IP
S Class:           S Class                                                 Age Intvl:      Age
Interval
S T:               Static Ep                                               S E:
Secure EP
L D:               Learn Disable                                           B N D:          Bind
Notify Disable
E N D:             Epg Notify Disable                                      B E:
Bounce Enable
I D L:             IVxlan Dont Learn                                       SPI:
Source Policy Incomplete
DPI:               Dest Policy Incomplete                                  SPA:
Source Policy Applied
DPA:               Dest Policy Applied                                     DSS:            Dest
Shared Service
IL:                Is Local                                                VUB:            Vnid
Use Bd
SO:                SA Only                                                 EP NH L3IfName: EP
Next Hop L3 If Name
NHT:               Next Hop Type (L2: L2 Entry L3: L3 Next Hop)            BD Name:        L2 NH
BD Name
EP Mac:            EP Mac                                                  L3 IfName:      L3 NH
If Name
L2 IfName:         L2 If Name                                              FD Name:        L2
Entry FD Name
IP:                L3 NH IP

 L3 EP Count: 12

================================================================================================
================================================================================
                                                                  B E   I S D S D D   V   EP-NH
N  |
Vrf             EP                              S     Age   S S L N N B D P P P P S I U S L3
H  | BD        EP               L3           L2          FD
Name          T  IP                           Class Intvl T E D D D E L I I A A S L B O
IfName       T   | Name      Mac               IfName       Ifname      Name      IP
================================================================================================
================================================================================
common*rewall Pl 10.6.112.1                     1     0     1 0 0 0 0 0 1 1 0 0 0 0 1 0 0 -
L3   -         00:00:00:00:00:00 -           -           -         0.0.0.0
common*rewall Pl 10.6.114.1                     1     0     1 0 0 0 0 0 1 1 0 0 0 0 1 0 0 -
L3   -         00:00:00:00:00:00 -           -           -         0.0.0.0
common*rewall Pl 10.6.114.129                   1     0     1 0 0 0 0 0 1 1 0 0 0 0 1 0 0 -
L3   -         00:00:00:00:00:00 -           -           -         0.0.0.0
common*efault Pl 100.100.101.1                  1     0     1 0 0 0 0 0 1 1 0 0 0 0 1 0 0 -
L3   -         00:00:00:00:00:00 -           -           -         0.0.0.0
```

```
Joey-T*ternal Pl 192.168.1.1                    1     0     1 0 0 0 0 0 1 1 0 0 0 0 1 0 0 -
L3   -         00:00:00:00:00:00 -            -           -         0.0.0.0
Joey-T*ternal Xr 192.168.1.100                  8013  128   0 0 0 1 0 0 0 0 0 0 0 0 1 0 -
L3   -         00:0c:0c:0c:0c:0c Tunnel2      Tunnel2     -         0.0.0.0
Joey-T*ernal2 Pl 192.168.3.1                    1     0     1 0 0 0 0 0 1 1 0 0 0 0 1 0 0 -
L3   -         00:00:00:00:00:00 -            -           -         0.0.0.0
Joey-T*ternal Pl 192.168.20.1                   1     0     1 0 0 0 0 0 1 1 0 0 0 0 1 0 0 -
L3   -         00:00:00:00:00:00 -            -           -         0.0.0.0
Joey-T*ternal Pl 192.168.20.2                   800a  0     0 0 0 0 0 0 0 0 0 0 0 1 0 0 -
L2   BD-28     00:50:56:a5:fc:cc -            Po3         FD-30     -
Joey-T*ternal Pl 192.168.21.1                   1     0     1 0 0 0 0 0 1 1 0 0 0 0 1 0 0 -
L3   -         00:00:00:00:00:00 -            -           -         0.0.0.0
Joey-T*ternal Pl 192.168.21.2                   800c  0     0 0 0 0 0 0 0 0 0 0 0 1 0 0 -
L2   BD-7      00:50:56:a5:0c:11 -            Po4         FD-8      -
Joey-T*ternal Pl 2001:0:0:100::1                1     0     1 0 0 0 0 0 1 1 0 0 0 0 1 0 0 -
L3   -         00:00:00:00:00:00 -            -           -         0.0.0.0
```

硬件认为EP在隧道2.存在。 什么是隧道的2目的地？

```
module-1# show system internal eltmc info interface tunnel2
           IfInfo:
          interface:        Tunnel2   :::         ifindex:      402718722
                iod:             66   :::           state:             up
                Mod:              0   :::            Port:              0
       Tunnel Index:              0   :::   Tunnel Dst ip:     0xc0a87843
       Tunnel Encap:          ivxlan   ::: Tunnel VPC Peer:              0
   Tunnel Dst ip str: 192.168.120.67   :::      Tunnel ept:            0x1

         [SDK Info]:
         tunnl_name:
             vrf_id:              2   :::        if_index:     0x18010002
         hwencapidx:              0   :::       encaptype:              1
          mac_proxy:              0   :::        v4_proxy:              0
           v6_proxy:              0   :::    ip_addr_type:              0
       ipv4_address:     0xc0a87843

[SDB INFO]:
                iod:             66
         pc_if_index:              0
        fab_if_index:              0
               sv_if:              0
             src_idx:              0
            int_vlan:              0
          encap_vlan:              0
     mod_port_status:     0x41620003
           v6_tbl_id:     0x80000002
           v4_tbl_id:            0x2
         router_mac:00.00.00.00.00.00
         unnumbered:              0
           trunk_id:              0
         tunnel_mod:              0
        tunnel_port:              0
            tep_ip:     0xc0a87843
         ip_if_mode:              0
         sdk_vrf_id:              2
                mtu:           9366   :::        ipmtu_id:              0
      is_fex_fabric:              0
```

因为目的地存在vPC，该目的地IP应该是远程分支的vPC虚拟IP。 请检查一个远程分支和看：

```
leaf1# show system internal epm vpc
```

```
Local TEP IP                 : 192.168.160.95
Peer TEP IP                  : 192.168.160.93
vPC configured               : Yes
vPC VIP                      : 192.168.120.67
MCT link status              : Up
Local vPC version bitmap     : 0x7
Peer vPC version bitmap      : 0x7
Negotiated vPC version       : 3
Peer advertisement received  : Yes
Tunnel to vPC peer           : Up
```

完善，因此它了解从远程vPC对的目的地EP。 请发现什么伊拉姆看到，并且请验证我们转发信息包correectly ：

伊拉姆

```
module-1# debug platform internal tah elam asic 0
module-1(DBG-TAH-elam)# trigger init in-select 6 out-select 0
module-1(DBG-TAH-elam-insel6)# set outer ipv4 src_ip 192.168.20.2 dst_ip 192.168.1.100
module-1(DBG-TAH-elam-insel6)# start
module-1(DBG-TAH-elam-insel6)# stat
ELAM STATUS
===========
Asic 0 Slice 0 Status Armed
Asic 0 Slice 1 Status Triggered
```

现在，与在EX硬件的远端目的地，有是非常重要的，当排除信息包流故障时的2伊拉姆值。 ovector_idx喜欢前面和encap_idx ：

```
module-1(DBG-TAH-elam-insel6)# report | grep ovec
  sug_elam_out_sidebnd_no_spare_vec.ovector_idx: 0xB8
module-1(DBG-TAH-elam-insel6)# report | grep encap
  sug_lurw_vec.encap_l2_idx: 0x0
  sug_lurw_vec.encap_pcid: 0x0
  sug_lurw_vec.encap_idx: 0x6
  sug_lurw_vec.encap_vld: 0x1
```

在EX硬件上，我们有能力驱动应该转发在外面信息包的目的地端口。 前面，我们通常检查encap idx并且验证目的地idx是正确的隧道。 这里我们能验证对8B的什么端口映射：

```
module-1(DBG-TAH-elam-insel6)# show platform internal hal l2 port gpd
Legend:
-------
IfId:       Interface Id                                IfName:      Interface Name
I P:        Is PC Mbr                                   IfId:           Interface Id
Uc PC Cfg:      UcPcCfg Idx                             Uc PC MbrId:    Uc Pc Mbr Id
As:             Asic                                    AP:             Asic Port
Sl:             Slice                                   Sp:             Slice Port
Ss:             Slice SrcId                             Ovec:           Ovector (slice |
srcid)
L S:            Local Slot                              Reprogram:
L3:             Is L3
    P:    PifTable                                      Xla Idx:        Xlate Idx
    RP:   Rw PifTable                                   Ovx Idx:        OXlate Idx
    IP:   If Profile Table                              N L3:           Num. of L3 Ifs
    RS:   Rw SrcId Table                                NI L3:          Num. of Infra L3 Ifs
    DP:   DPort Table                                   Vif Tid:        Vif Tid
    SP:   SrcPortState Table                            RwV Tid:        RwVif Tid
```

```
    RSP:  RwSrcPortstate Table                                  Ing Lbl:        Ingress Acl Label
    UC:   UCPcCfg                                               Egr Lbl:        Egress Acl Label
    UM:   UCPcMbr                                               Reprogram:
PROF ID:        Lport Profile Id
    VS:   VifStateTable                                         HI:             LportProfile Hw
Install
    RV:   Rw VifTable
Num. of Sandboxes: 1

Sandbox_ID: 0, BMP: 0x0
 Port Count: 8

================================================================================================
==========================================
                       Uc   Uc                          |       Reprogram       |
| Rep |
                     I PC   Pc                       L |   R I R D    R  U U X | L Xla Ovx N
NI Vif    RwV    Ing  Egr  | V R | PROF H
IfId     Ifname      P Cfg  MbrID As AP Sl Sp Ss Ovec S | P P P S P Sp Sp C M L | 3 Idx Idx L3
L3 Tid    Tid    Lbl  Lbl  | S V | ID   I
================================================================================================
==========================================
1a004000 Eth1/5      1 0    1d    0  d  0  c  18 18   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
-      -      800  0      0 1   0    0
1a005000 Eth1/6      1 0    b     0  e  0  d  1a 1a   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
-      -      800  0      0 1   0    0
1a006000 Eth1/7      0 26   5     0  f  0  e  1c 1c   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
D-256  -      800  0      0 1   c    0
1a007000 Eth1/8      0 2f   7     0  10 0  f  1e 1e   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
D-199  -      800  0      0 1   2e   0
1a01e000 Eth1/31     1 0    2d    0  37 1  e  1c 9c   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
-      -      0    0      0 1   0    0
1a01f000 Eth1/32     1 0    3d    0  38 1  f  1e 9e   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
-      -      0    0      0 1   0    0
1a030000 Eth1/49     0 2    1     0  49 1  20 38 b8   1   0 0 0 0 0 0  0  0 0 0   1 6   4   2  2
D-24d  -      400  0      0 0   1    0
1a031000 Eth1/50     0 3    3     0  29 1  0  0  80   1   0 0 0 0 0 0  0  0 0 0   1 5   3   2  2
D-350  -      400  0      0 0   1    0
```

交换机认为应该转发它到在接口Eth1/49的脊椎。 但是如何能验证encap是正确的？

我们首先需要查看关于隧道的硬件信息。 我们能通过运行此HAL命令执行此：

```
module-1(DBG-TAH-elam-insel6)# show platform internal hal tunnel rtep pi
Non-Sandbox Mode
LEGEND:
-------
Tun Ifid:  Tunnel Ifid                                          IfName:     Tunnel If Name
Lid:       Logical Id                                           ET:        Encap Type V:
Vxlan I: IVxlan N: NVGRE
VrfId:     Vrf Id                                               Vrf Name: Vrf Name
IP:        Tunnel's IP
Hw Enc:    Hw Encap Idx                                         IVP:        Is VPC Peer
IL:        Is Local                                             P4:         Proxy for v4
P6:        Proxy for V6                                         PM:         Proxy for Mac
II:        Is Ingress Only                                      IC:         Is Copy Service
C OBd:     Copy Service Outer Bd                                U D:        Use DF
NBT:       Next Base Type E: ECMP N: Next-Hop                   NB Id:      Next Base Id
NH cnt:    Next Hop Count                                       VrfId:      Vrf Id
Vrf Name:  Vrf Name                                             IP:         IP Address
Mac:       Mac                                                  L3 IfId:    L3 IfId
L3IfName:  L3 If Name                                           L2 IfId:    L2 IfId
L2IfName:  L2 If Name
```

```
Num. of Sandboxes: 1

Sandbox_ID: 0, BMP: 0x0
 Remote Tep Count: 15

================================================================================================
================================================================================================
=======
                                                                  I                  N N
|

                     E             Vrf                       Hw   V I P P P I I C   U B B
NH  |        Vrf                                      L3       L3           L2       L2

IfId     Ifname       T Lid  VrfId  Name         IP            Enc  P L 4 6 M I C OBd D T Id
Cnt | VrfId  Name         IP            Mac               IfId     IfName       IfId     IfName

================================================================================================
================================================================================================
=======
18010002 Tunnel2      I 3005 2      overlay-1    192.168.120.670    0 0 0 0 0 0 0 1   0 E 2
2     2      overlay-1    0.0.0.0       0d:0d:0d:0d:0d:00 1a030001 Eth1/49.1    1a030000 Eth1/4
9

2      overlay-1    0.0.0.0       0d:0d:0d:0d:0d:00 1a031002 Eth1/50.2    1a031000 Eth1/5
0
```

此输出产生我们我们关心的一些值：

IfId -接口ID分配到隧道

IP -目的地的IP。 这应该匹配ELTMC。

L3 IfId -交换机能使用转发到适当的目的地的第3层接口。

一旦我们认识IfId，我们能验证我们在elam获得匹配隧道目的地的encap ：

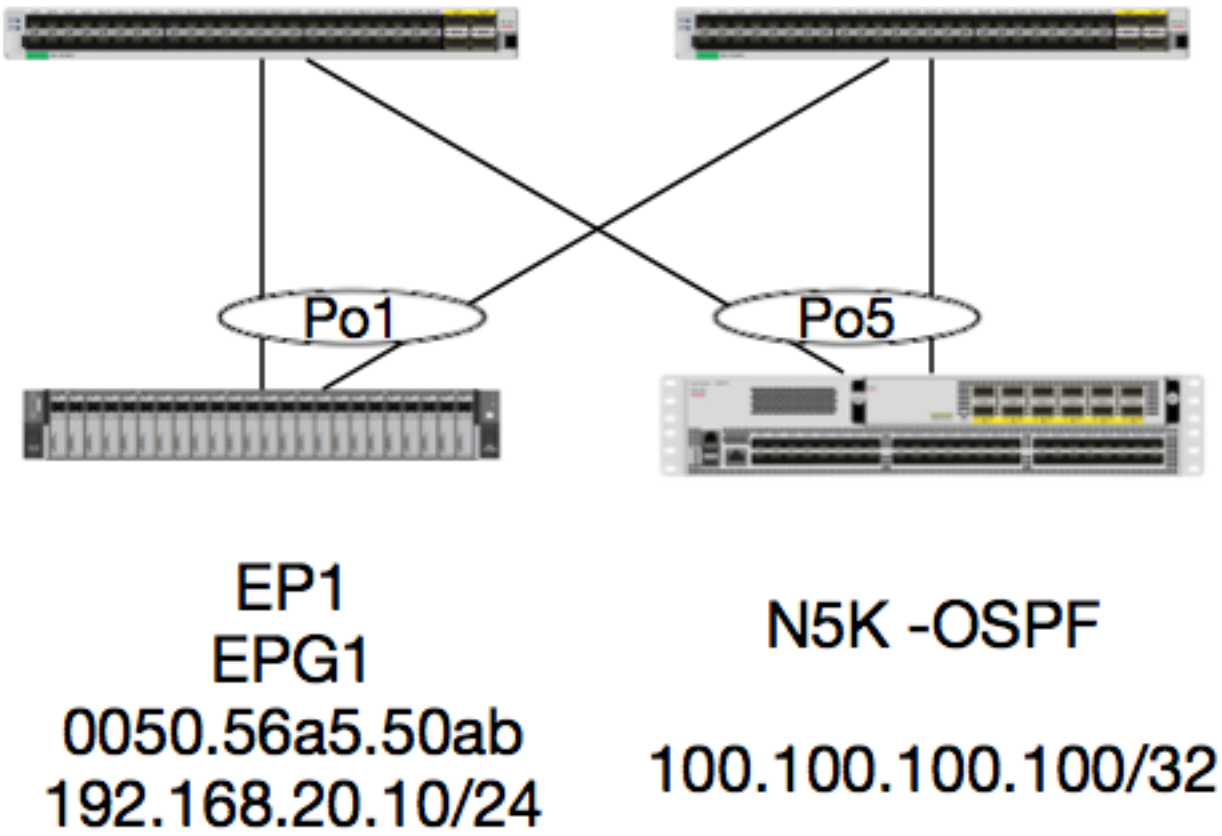
```
module-1(DBG-TAH-elam-insel9)# show platform internal hal tunnel rtep apd
Non-Sandbox Mode
LEGEND:
-------
ifId:        Interface Id                              IP:           IP address
HwVrfId:     Hardware Vrf Id                           SrcTepIdx:    Source Tep Index
BDXlate:     Egress BDXlate                            DstInfoIdx:   Destination info index
RwEncapIdx:  Rw Encap Index                            ECMPIdx:      ECMP Index
Num:         Number of hops                            ECMPMbrIdx:   ECMP member Index
L2 Index:    L2 Index                                  RwDmacIdx:    Rw Dmax Index

Num. of Sandboxes: 1

Sandbox_ID: 0, BMP: 0x0
 Remote Tep Count: 15

================================================================================================
==============================
ifId     IP             HwVrfId BDXlate SrcTepIdx DstInfoIdx RwEncapIdx ECMPIdx  ECMPMbrIdx Num
L2Index  RwDmacIdx
================================================================================================
==============================
18010002 192.168.120.67 2       1       3a9a      3005       6           0        0          2
```

```
1a030000 0         <---- RwEncapIdx is 6!  Same as the "encap_idx" in the ELAM Report.

1a031000 1
```

此隧道有RwEncapIdx (重写Encap索引) 6，是什么在elam显示了。

1个EP --> L3外的路由的流

拓扑



在本例中，我们将跟踪一个信息包的信息包流自发送ICMP的EP1的到在运行OSPF的N5K的一环回。 N5K通过在同一个对的L3Out被连接EX交换机。

因为我们验证了编程在本文初的本地EP，假设EP在硬件方面正确地了解和继续到路由验证。

首先，请检查OSPF状态和路由表：

```
leaf6# show ip ospf neighbors vrf jr:sb
 OSPF Process ID default VRF jr:sb
 Total number of neighbors: 2
 Neighbor ID     Pri State            Up Time  Address         Interface
 27.27.27.1        1 FULL/BDR         00:22:39 10.10.27.1      Vlan28   <---- Leaf5
 27.27.27.3        1 FULL/DROTHER     00:22:37 10.10.27.3      Vlan28   <----  N5K

leaf6# show ip route vrf jr:sb 100.100.100.100
IP Route Table for VRF "jr:sb"
'*' denotes best ucast next-hop
'**' denotes best mcast next-hop
'[x/y]' denotes [preference/metric]
'%<string>' in via output denotes VRF <string>
```

```
100.100.100.100/32, ubest/mbest: 1/0
    *via 10.10.27.3, vlan28, [110/5], 00:16:58, ospf-default, intra
```

因此我们知道routng表表示下一跳作为5K在10.10.27.3。 好开始，但是如何能验证什么硬件有？

在硬件方面请首先检查邻接表确定我们有ARP被解决对10.10.27.3，并且那编程与正确的接口：

```
leaf6# vsh_lc
module-1# show forwarding adjacency

IPv4 adjacency information, adjacency count 20

next-hop        rewrite info   interface       phy i/f
--------------  -------------- --------------- ---------------
10.10.27.1      0022.bdf8.19ff Vlan28          Tunnel3
10.10.27.3      8c60.4f02.88fc Vlan28          port-channel5
```

MAC地址匹配在5K ：

```
ACI-5548-B# show interface vlan 3117
Vlan3117 is up, line protocol is up
  Hardware is EtherSVI, address is  8c60.4f02.88fc
  Internet Address is 10.10.27.3/29
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec
```

在EX平台上，有分配到VRF的“hw_vrf_idx”。 当我们验证硬件编程，此索引将被参考。 请查找索引：

```
module-1# show system internal eltmc info vrf jr:sb
VRF-TABLE: jr:sb
            vrf_type:         tenant   :::      context_id:              6
       overlay_index:              0   :::            vnid:        2129921
               scope:              5   :::          sclass:          16386
         v4_table_id:            0x5   :::     v6_table_id:     0x80000005
          intf_count:              5   :::   intrn_vlan_id:              0
            VRF Intf:         Vlan11   ::: src_plcy_incomp:              0
            vnid_hex:       0x208001   :::  ingress_policy:            0x1
       vrf_intf_list: Vlan28,Vlan16,Vlan9,Vlan11,loopback2,
          hw_vrf_idx:           4612   ::: nb_egr_outer_bd:              0
     sb_egr_outer_bd:              0
         vrf_bd_list: 28,16,11,9,
     sb_egr_outer_bd:              0   :::      sdk_vrf_id:              5

          [SDK Info]:
            vrf_name:          jr:sb
              vrf_id:              5   :::      hw_vrf_idx:           4612
            vrf_vnid:        2129921   :::        is_infra:              0
      tornbinfrahwbd:              0   :::  torsbinfrahwbd:              0
   ingressBdAclLabel:              0   ::: ingBdAclLblMask:              0
    egressBdAclLabel:              0   ::: egrBdAclLblMask:              0
            sg_label:              5   :::          sclass:          16386
       sp_incomplete:              1   :::      sclassprio:              3

[SDB INFO]:
v4 table
            vrf type:              1
              vrf id:              5
                vnid:        2129921
 internal infra vlan:              0
 external router mac:00:22:bd:f8:19:ff
v6 table
```

```
           vrf type:              1
             vrf id:              5
               vnid:        2129921
 internal infra vlan:              0
 external router mac:00:22:bd:f8:19:ff
::::
```

在我们发现邻接后， HAL应该编程路由。 使用以下命令，我们能检查此：

```
module-1# show platform internal hal l3 routes | head

-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
LEGEND:
|
-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
LID: Logical ID           RID: Route ID               PID: Physical ID       NB-ID:Next-Base ID
HIT IDX: Next-Hop HitIndex   CLP : Class Priority       TBI: Trie Base Index             |
SC : Sup-Copy             SSR: Src Sup-Redirect       DSR: Dst Sup-Redirect  TDD  :TTL Disable
NB: NextBaseType             SDC : Src Direct Connect   TRO: Trie Offset                |
SPI: Src Policy Inc       DPI: Dst Policy Inc         DR : Default Route     LE   :Learn Enable
[E:Ecmp/A:Adj]              ILL : Is Link Local        ISS: Is Shared Services          |
RT : Route Type           FWD: Forwarding             HR : Host Routes       EP   :Ext Prefixes
DLR: Default Lpm Route       CLSS: Class Id             RDEL: Route in Deletion          |
BNE: Bind Notify Enable   SNE: Sclass Notify Enable   BE : Bounce Enable     IDL  :Ivxlan
DoNotLearn  DL : Dest Local              SA  : Src Only             AI : Age Interval
|
SF : Static Flag          SH : Src Hit                DH: Dest Hit
|
module-1# show platform internal hal l3 routes

-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
LEGEND:
|
-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
LID: Logical ID           RID: Route ID               PID: Physical ID       NB-ID:Next-Base ID
HIT IDX: Next-Hop HitIndex   CLP : Class Priority       TBI: Trie Base Index             |
SC : Sup-Copy             SSR: Src Sup-Redirect       DSR: Dst Sup-Redirect  TDD  :TTL Disable
NB: NextBaseType             SDC : Src Direct Connect   TRO: Trie Offset                |
SPI: Src Policy Inc       DPI: Dst Policy Inc         DR : Default Route     LE   :Learn Enable
[E:Ecmp/A:Adj]              ILL : Is Link Local        ISS: Is Shared Services          |
RT : Route Type           FWD: Forwarding             HR : Host Routes       EP   :Ext Prefixes
DLR: Default Lpm Route       CLSS: Class Id             RDEL: Route in Deletion          |
BNE: Bind Notify Enable   SNE: Sclass Notify Enable   BE : Bounce Enable     IDL  :Ivxlan
DoNotLearn  DL : Dest Local              SA  : Src Only             AI : Age Interval
|
SF : Static Flag          SH : Src Hit                DH: Dest Hit
|
-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
|     |                                          |   |     |          | LID |<-----------------
- Trie ------------>|<Dleft Trie>|                                                              |
| VRF |                Prefix/Len                | RT| RID |    LID   | Type| PID | FPID/| HIT
|N|  NB-ID  |  NB Hw | PID | FPID/|   TBI   |TRO|Ifindex|CLSS|CLP| AI |SH|DH| Flags            |
|-----|-----------------------------------------|---|-----|----------|-----|     | TID  | IDX
|B|         |  Idx   |     |  TID |---------|---|-------|----|---|----|--|--|------------------|
|-----|-----------------------------------------|---|-----|----------|-----|<-----------------
- DLEFT ------------>|-----|------|---------|---|-------|----|---|----|--|--|------------------|
|     |                                          |   |     |          |     | PID | FPID/| HIT
|N|  NB-ID  |  NB Hw |     |      |         |   |       |    |   |    |  |  |                  |
```

```
|     |                                          |   |     |          |     |     |  TID | IDX
|B|         |  Idx   |     |      |         |   |       |    |   |    |  |  |                  |
|     |                                          |   |     |          |     |<-----------------
- TCAM ------------>|     |      |         |   |       |    |   |    |  |  |                  |
|     |                                          |   |     |          |     | PID | TCAM | HIT
|N|  NB-ID  |  NB Hw |     |      |         |   |       |    |   |    |  |  |                  |
|     |                                          |   |     |          |     |     |  ID  | IDX
|B|         |  Idx   |     |      |         |   |       |    |   |    |  |  |                  |
-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
|Sandbox_ID: 0  Asic Bitmap: 0x0
-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------
```

```
module-1# show platform internal hal l3 routes | egrep 100.100.100.100
| 4612|                      100.100.100.100/ 32| UC|   e4|      4a04| TRIE|   10| 5/  0|
6010|A|     7567|    802e| 186a| 1/  2|       10|  0|      0|   f|  3|   0| 0| 0|spi,dpi
```

此输出提供我们关于下一跳路由的信息。 4612是小的hw_vrf_idx ：sb VRF。 为了我们验证下一跳，“NB在TCAM的Hw Idx”将使用下张表：

```
module-1# show platform internal hal l3 nexthops
Non-Sandbox Mode
LEGEND:
-------
NHOP ID       : Nhop Identifier (Hex)            CONS          : H/W S/W info Consistency
TYPE          : Nexthop Type                     ACTN          : Nexthop Action
Vrf           : L3 Vrf of the Nhop               L3 INTF       : L3 interface index (Hex)
L2 INTF       : L2 interface index (Hex)         BDID Or RwVRF : Bridge Domain Id Or Rewrite
Vrfid (Hex)
INFR          : ACI Infra valid                  PVRF          : Preserve VRF
LRN           : Learn Enabled                    VRFR          : VRF Rewrite
PID           : Physical ID                      FPID          : FP of this nexthop
TLID          : Tile Id within FP                HIT IDX       : Location of this Nhop (Hex)

Mac Entry:
TYP         : Type                      INTF        : Interface related Info (Hex)
LRN         : Learn Info                DL          : Destination Local
MLD         : Unused                    VNB         : Vnid use BD
DFL         : Default Entry             VLD         : MacKey Valid
FT          : FID Type                  FV          : FID Valid
FID         : FID value (Hex)           Mac         : L2 MAC Address
L2 Ifabric Info:
CLSS        : Source Class                          CLP         : Source Class Priority
EPG         : EndPoint Group                        BNE         : Bind Notification Enabled
SNE         : Source Address Notification Enabled CNE         : Source class Notification
Enabled
DL          : iVxlan DL                             SPI         : Source Policy Incomplete
DPI         : Dest Policy Incomplete
IP Address  : IP address

Sandbox_ID: 0  Asic Bitmap: 0x0
Summary info for 31 L3 Nexthop objects
         C T A                      BDID  I P   V         T    |---------------------Mac Entry-
------------------|----L2 Ifabric Info----|
 NHOP    O Y C         L3       L2    Or   N V L R         L HIT|T        L   M V D V|----------
----Mac Key-------|     C      B S C   S D|
  ID     N P T        INTF     INTF  RwVRF F R R F      FP I IDX|Y  INTF  R D L N F L|F F  FID
|     L      N N N D P P|
 (Hex)   S E N Vrf    (H)       (H)   (H)  R F N R PID  ID D (H)|P  (H)   N L D B L D|T V  (H)
Mac          |CLSS P EPG  E E E L I I| IP Address
--------+-+-+-+----+--------+--------+----+-+-+-+-+----+--+-+----+-+------+-+-+-+-+-+-+-+-+-----
-+-----------------+----+-+----+-+-+-+-+-+-+----------------------------
```

```
module-1# show platform internal hal l3 nexthops | grep 802e
    7567 N I F    5  901001c 16000004   1c 0 0 0 0   2e  9 0 802e 0     22 0 0 0 0 0 1 1 1
1214 8c:60:4f:02:88:fc    0 0 2c0d 0 0 0 0 0 0 10.10.27.3
```

这里，我们采取“NB Hw Idx”并且映射它对“HIT IDX”。 这显示我们条目与下一跳MAC/IP相应。 这是查看"l3 defip等同显示”并且"l3出口在生成1 ACI分支交换机的Broadcom显示”。

我们能看到，表有正确的信息：

L2 INTF ：0x16000004 ---> IfIndex Port-Channel 5

HIT IDX ： 从Nb驱动的索引在hal l3路由的Hw Idx

MAC ： 8c:60:4f:02:88:fc -->下一跳SVI MAC在5K的

EPG ： L3 EPG SCLASS

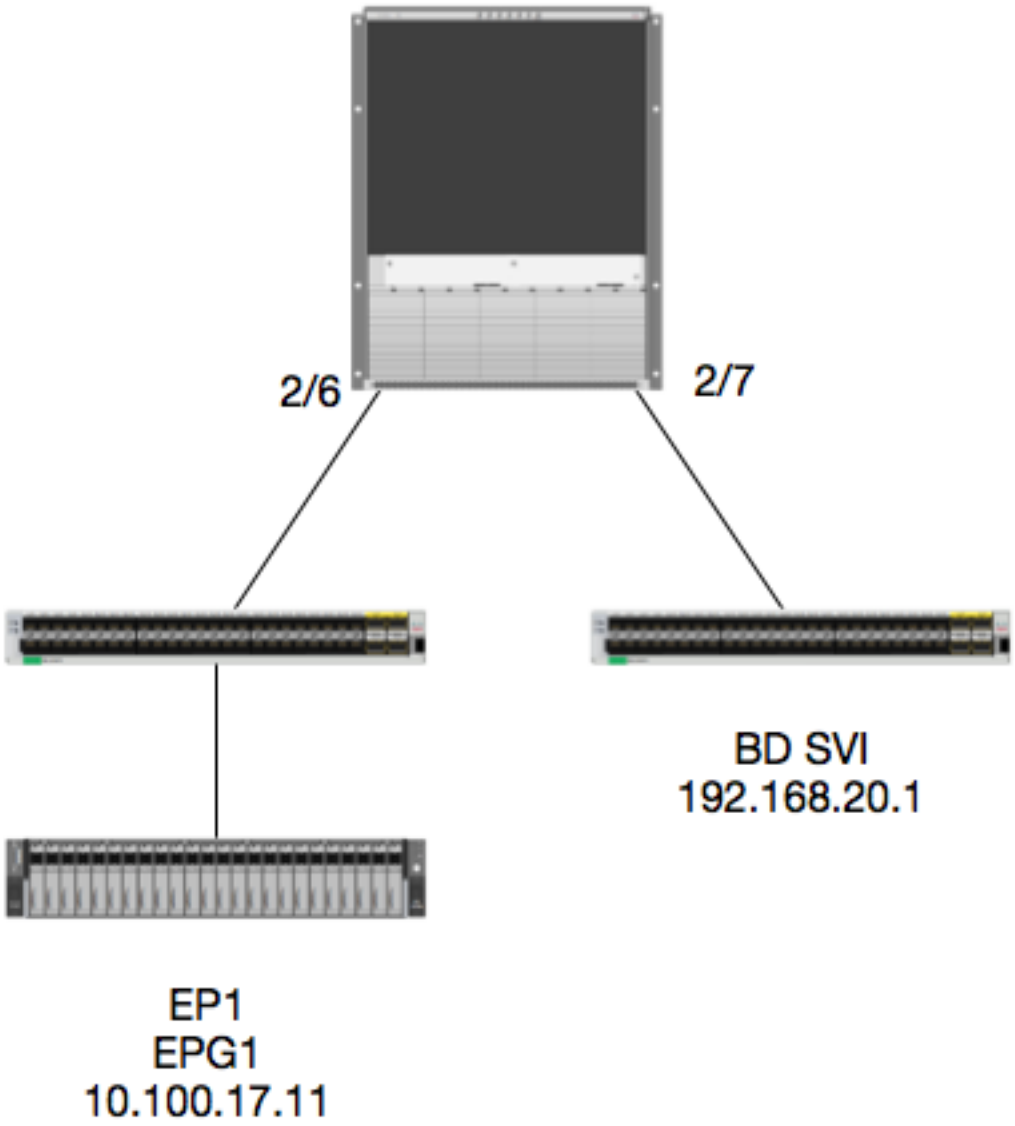
IP地址：10.10.27.3 ---> SVI下一跳IP在5K的

伊拉姆

```
leaf6# pwd
/var/sysmgr/tmp_logs

leaf6# cat elam_report.txt | grep ip.da
    sug_pr_lu_vec_l3v.ip.da: 0x00000000000000000064646464
leaf6# cat elam_report.txt | grep ip.sa
    sug_pr_lu_vec_l3v.ip.sa: 0x00000000000000000C0A8140A

leaf6# cat elam_report.txt | grep adj
    sug_lurw_vec.dst_addr.adj: 0x8C604F0288FC
      sug_lurw_vec.dst_addr.adj.padfield: 0x04F0288FC
      sug_lurw_vec.dst_addr.adj.idx: 0x2318
  sug_lurw_vec.adj_vld: 0x0

leaf6# cat elam_report.txt | grep macdarslt.hit_idx
        sug_fpc_lookup_vec.fplu_vec.rslt.macdarslt.hit_idx: 0x802E
```

1个EP -->远程EP或SVI -脊椎验证

拓扑



逻辑

在本例中，我们将跟踪一个信息包的信息包流自EP1的被注定对远程BD交换的虚拟接口(SVI)。 此示例的目的将将验证保证脊椎的转发信息包被发送到正确的分支。 假设信息包被发送了到在入口分支的脊椎代理。

在脊椎，请首先验证委员会Oracles协议(小屋)目的地IP的，因为信息包被发送到查找的脊椎代理：

```
calo1-spine1# show coop internal info ip-db | grep -A 10 192.168.20.1
IP address : 192.168.20.1
Vrf : 2129921
Flags : 0
EP vrf vnid : 2129921
EP IP :  192.168.20.1
Publisher Id : 10.0.224.88
Record timestamp : 11 04 2016 16:41:16 422062712
Publish timestamp : 11 04 2016 16:41:16 424633605
Seq No: 0
Remote publish timestamp: 01 01 1970 00:00:00 0
URIB Tunnel Info
Num tunnels : 1
Tunnel address : 10.0.224.88    <---- REMOTE LEAF
```

```
Tunnel ref count : 1
```
请验证什么分支有该TEP地址：

```
spine1# acidiag fnvread | grep 10.0.224.88
     105        1          calo1-leaf5      FDO20160TPS     10.0.224.88/32    leaf
active   0
```
因为我们知道信息包进入在模块2的脊椎，端口6，我们能附有模块2并且查看端口布局。

```
spine1# vsh
Cisco iNX-OS Debug Shell
This shell should only be used for internal commands and exists
for legacy reasons. User should use ibash infrastructure as this
will be deprecated.
calo1-spine1# attach module 2
Attaching to module 2 ...
To exit type 'exit', to abort type '$.'
No directory, logging in with HOME=/
Bad terminal type: "xterm-256color". Will assume vt100.
Cisco iNX-OS Debug Shell
This shell should only be used for internal commands and exists
for legacy reasons. User should use ibash infrastructure as this
will be deprecated.
Loading parse tree (LC). Please be patient...
module-2#

module-2# show platform internal hal l2 port gpd
Legend:
-------
IfId:       Interface Id                                    IfName:      Interface Name
I P:        Is PC Mbr                                       IfId:           Interface Id
Uc PC Cfg:      UcPcCfg Idx                                 Uc PC MbrId:    Uc Pc Mbr Id
As:             Asic                                        AP:             Asic Port
Sl:             Slice                                       Sp:             Slice Port
Ss:             Slice SrcId                                 Ovec:           Ovector (slice |
srcid)
L S:            Local Slot                                  Reprogram:
L3:             Is L3
    P:    PifTable                                          Xla Idx:        Xlate Idx
    RP:   Rw PifTable                                       Ovx Idx:        OXlate Idx
    IP:   If Profile Table                                  N L3:           Num. of L3 Ifs
    RS:   Rw SrcId Table                                    NI L3:          Num. of Infra L3 Ifs
    DP:   DPort Table                                       Vif Tid:        Vif Tid
    SP:   SrcPortState Table                                RwV Tid:        RwVif Tid
    RSP:  RwSrcPortstate Table                              Ing Lbl:        Ingress Acl Label
    UC:   UCPcCfg                                           Egr Lbl:        Egress Acl Label
    UM:   UCPcMbr                                           Reprogram:
PROF ID:        Lport Profile Id
    VS:   VifStateTable                                     HI:             LportProfile Hw
Install
    RV:   Rw VifTable
Num. of Sandboxes: 1

Sandbox_ID: 0, BMP: 0x0
 Port Count: 7

================================================================================================
==========================================
                        Uc   Uc                          |       Reprogram       |
| Rep |
                     I PC   Pc                       L |   R I R D    R  U U X | L Xla Ovx N
```

```
NI Vif    RwV    Ing  Egr  | V R | PROF H
IfId     Ifname      P Cfg  MbrID As AP Sl Sp Ss Ovec S | P P P S P Sp Sp C M L | 3 Idx Idx L3
L3 Tid    Tid    Lbl  Lbl  | S V | ID   I
=============================================================================================
==========================================
1f5      SpInBndMgmt 0 9de  1a    0  0  0  0  0    0   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
D-2d4  D-3e1  0    0      0 0   1    0
1a080000 Eth2/1      0 9a   1c    0  11 0  10 20 20   1   0 0 0 0 0 0  0  0 0 0   1 b   b   1  1
D-f3   D-61   100  0      0 0   1    0
1a081000 Eth2/2      0 9b   22    0  d  0  c  18 18   1   0 0 0 0 0 0  0  0 0 0   1 c   c   1  1
D-1ee  D-30b  100  0      0 0   1    0
1a084000 Eth2/5      0 9e   1e    0  3d 1  14 28 a8   1   0 0 0 0 0 0  0  0 0 0   1 1   1   1  1
D-19a  D-2ee  100  0      0 0   1    0
1a085000 Eth2/6      0 9f   24    0  39 1  10 20 a0   1   0 0 0 0 0 0  0  0 0 0   1 e   e   1  1
D-87   D-184  100  0      0 0   1    0
1a086000 Eth2/7      0 a0   26    0  35 1  c  18 98   1   0 0 0 0 0 0  0  0 0 0   1 d   d   1  1
D-1d0  D-357  100  0      0 0   1    0
1a088000 Eth2/9      0 a2   20    1  d  0  c  18 18   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
D-3ea  D-1a9  100  0      0 0   1    0
```

以太网2/6是连接生叶6在ASIC 0片式1的接口

现在我们知道运行我们的伊拉姆的哪个ASIC的。 ASIC 0。

```
module-2# debug platform internal tah elam asic 0
module-2(DBG-TAH-elam)# trigger reset
module-2(DBG-TAH-elam)# trigger init in-select 13 out-select 0
module-2(DBG-TAH-elam-insel13)# set inner ipv4 src_ip 10.100.17.11 dst_ip 192.168.20.1
module-2(DBG-TAH-elam-insel13)# start
stat
module-2(DBG-TAH-elam-insel13)# stat
ELAM STATUS
===========
Asic 0 Slice 0 Status Armed
Asic 0 Slice 1 Status Armed

module-2(DBG-TAH-elam-insel13)# stat
ELAM STATUS
===========
Asic 0 Slice 0 Status Triggered   <---- Packet triggered from FM
Asic 0 Slice 1 Status Triggered   <---- Packet triggered from Front Panel
```

查看伊拉姆，我们能找到ovector索引：

```
Front Panel ELAM drove sug_elam_out_sidebnd_no_spare_vec.ovector_idx: 0xB8
```

现在，如何映射0xb8对端口？ 因为我们知道信息包应该获得发送到一个结构模块(FM)查找的，我们能查看内部端口映射查找目的FM ：

```
module-2# show platform internal hal l2 internal-port pi
Num. of Sandboxes: 1
Legend:
-------
IfId:      Interface Id               IfName:     Interface Name
As:        Asic                       AP:         Asic Port
Sl:        Slice                      SP:         Slice Port
Ss:        Slice SrcId                Ovec:       Ovector
UcPcCfgId: Uc Pc CfgId                Lb Mbrid:   LB MbrId

Sandbox_ID: 0, BMP: 0x0
 Internal Port Count: 32
```

```
=====================================================================
                                                        UcPc  Lb
IfId     IfName                      As AP Sl SP Ss Ovec CfgId MbrId
=====================================================================
7d       -                           0  21 0  20 38 38   0     4
7e       -                           0  29 1  0  0  80   0     8
7f       -                           1  21 0  20 38 38   0     c
80       -                           1  29 1  0  0  80   0     10
81       -                           2  21 0  20 38 38   0     14
82       -                           2  29 1  0  0  80   0     18
83       -                           3  21 0  20 38 38   0     1c
84       -                           3  29 1  0  0  80   0     20
95       -                           0  19 0  18 30 30   0     3
96       -                           0  49 1  20 38 b8   0     7
97       -                           1  19 0  18 30 30   0     b
98       -                           1  49 1  20 38 b8   0     f
99       -                           2  19 0  18 30 30   0     13
9a       -                           2  49 1  20 38 b8   0     17
9b       -                           3  19 0  18 30 30   0     1b
9c       -                           3  49 1  20 38 b8   0     1f
ad       -                           0  25 0  24 40 40   0     1
ae       -                           0  41 1  18 30 b0   0     6
af       -                           1  25 0  24 40 40   0     9
b0       -                           1  41 1  18 30 b0   0     e
b1       -                           2  25 0  24 40 40   0     11
b2       -                           2  41 1  18 30 b0   0     16
b3       -                           3  25 0  24 40 40   0     19
b4       -                           3  41 1  18 30 b0   0     1e
dd       -                           0  15 0  14 28 28   0     2
de       -                           0  4d 1  24 40 c0   0     5
df       -                           1  15 0  14 28 28   0     a
e0       -                           1  4d 1  24 40 c0   0     d
e1       -                           2  15 0  14 28 28   0     12
e2       -                           2  4d 1  24 40 c0   0     15
e3       -                           3  15 0  14 28 28   0     1a
e4       -                           3  4d 1  24 40 c0   0     1d
```

使用ASIC0/Ovec B8，我们获得Mbrld 0x7，片式不重要。

此Mbrld是在USD的接口该映射对在FM的一个接口。 记住此Mbrld在十六进制，并且必须转换成十进制。

我们能发现FM通过查看USD建立接口和检查端口7 ：

```
module-2# show platform internal usd port info | grep -A 3 "Int 7"(if the interface has multiple
digits, will be "Int##" with no space)

Port  73.0 (Int 7) : Admin UP Link UP Remote slot22.asic0
                slice:1 slice port:32 lcl srcid:56 gbl srcid:184
                asic mrl:0xd07c010, mac mrl:0x12c84010, mac:16, chan:0
                speed 106G serdes: 0x328 0x329 0x32a 0x32b
```

“slot”是基于的0，并且FM编号是基于的1，因此我们需要加1到列出的编号这里。 这意味着应该发送信息包到FM 23。

集成IP

正如在高山，有作为外面IP地址用于的集成IP确定小屋查找的哈希。 为了查找此，您需要运行此命令和grep内在DST IP的 ：

```
module-2(DBG-TAH-elam-insel7)# show forwarding route synthetic vrf all | grep 192.168.20.1
SYNTH-88        1.203.211.185/32    0x208001          192.168.20.1
```

这表示我们， 1.203.211.185是我们的集成IP。 基于此，我们能也设置“外面DST IP”在我们的FM elam是这。 我们在FM应该触发：

结构模块伊拉姆

```
module-23(DBG-TAH-elam-insel7)# trigger reset
module-23(DBG-TAH-elam)# trigger init in-select 13 out-select 0
module-23(DBG-TAH-elam-insel13)# set outer ipv4 dst_ip 1.203.211.185   <----- DST IP IS THE
SYNTHETIC IP
module-23(DBG-TAH-elam-insel13)# set inner ipv4 src_ip 10.100.17.11 dst_ip 192.168.20.1
module-23(DBG-TAH-elam-insel13)# start
stat
module-23(DBG-TAH-elam-insel13)# stat
ELAM STATUS
===========
Asic 0 Slice 0 Status Armed
Asic 0 Slice 1 Status Armed
Asic 0 Slice 2 Status Armed
Asic 0 Slice 3 Status Armed
Asic 0 Slice 4 Status Armed
Asic 0 Slice 5 Status Armed

module-23(DBG-TAH-elam-insel13)# stat
ELAM STATUS
===========
Asic 0 Slice 0 Status Armed
Asic 0 Slice 1 Status Armed
Asic 0 Slice 2 Status Triggered    <---- Triggered on SLICE 2
Asic 0 Slice 3 Status Armed
Asic 0 Slice 4 Status Armed
Asic 0 Slice 5 Status Armed
```

明显地，请转存报告全文，但是请查看ovector_idx为我们触发的此信息包：

lac_elam_out_sidebnd_no_spare_vec.ovector_idx ：0x20 **<-----**用于下面命令的Ovector索引

我们如何推测接口有该ovector ？。 在FM，请运行此：

****由于烦扰CSCvf42796 ，请添附所有FM命令与“|没有”。否则，某些条目在最终输出中不可以显示。**

```
module-23(DBG-TAH-elam-insel13)# show platform internal hal l2 port gpd | no-more
Legend:
-------
IfId:       Interface Id                                    IfName:      Interface Name
I P:        Is PC Mbr                                       IfId:           Interface Id
Uc PC Cfg:      UcPcCfg Idx                                 Uc PC MbrId:    Uc Pc Mbr Id
As:             Asic                                        AP:             Asic Port
Sl:             Slice                                       Sp:             Slice Port
Ss:             Slice SrcId                                 Ovec:           Ovector (slice |
srcid)
L S:            Local Slot                                  Reprogram:
L3:             Is L3
    P:    PifTable                                          Xla Idx:        Xlate Idx
    RP:   Rw PifTable                                       Ovx Idx:        OXlate Idx
```

```
    IP:   If Profile Table                                  N L3:           Num. of L3 Ifs
    RS:   Rw SrcId Table                                    NI L3:          Num. of Infra L3 Ifs
    DP:   DPort Table                                       Vif Tid:        Vif Tid
    SP:   SrcPortState Table                                RwV Tid:        RwVif Tid
    RSP:  RwSrcPortstate Table                              Ing Lbl:        Ingress Acl Label
    UC:   UCPcCfg                                           Egr Lbl:        Egress Acl Label
    UM:   UCPcMbr                                           Reprogram:
PROF ID:        Lport Profile Id
    VS:   VifStateTable                                     HI:             LportProfile Hw
Install
    RV:   Rw VifTable
Num. of Sandboxes: 1

Sandbox_ID: 1, BMP: 0x1
 Port Count: 8

================================================================================================================
=========================================
                       Uc   Uc                          |       Reprogram       |
| Rep |
                     I PC   Pc                        L |   R I R D    R  U U X | L Xla Ovx N
NI Vif    RwV    Ing  Egr  | V R | PROF H
IfId     Ifname      P Cfg  MbrID As AP Sl Sp Ss Ovec S | P P P S P Sp Sp C M L | 3 Idx Idx L3
L3 Tid    Tid    Lbl  Lbl  | S V | ID   I
================================================================================================================
=========================================
ae       fc0-lc1:0-0 1 0    3     0 11 0 10 20 20 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 - - 0 0 0 0 0
0
af       fc0-lc1:0-1 1 0    4     0  3d 2  c  18 98   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
-      -      0    0      0 0   0    0
b0       fc0-lc1:1-0 1 0    13    0  d  0  c  18 18   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
-      -      0    0      0 0   0    0
b1       fc0-lc1:1-1 1 0    14    0  39 2  8  10 90   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
-      -      0    0      0 0   0    0
b2       fc0-lc1:2-0 1 0    23    0  5d 3  14 28 e8   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
-      -      0    0      0 0   0    0
b3       fc0-lc1:2-1 1 0    24    0  21 1  8  10 50   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
-      -      0    0      0 0   0    0
b4       fc0-lc1:3-0 1 0    33    0  51 3  8  10 d0   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
-      -      0    0      0 0   0    0
```

该ovector映射对LC1 (在slot 2的线卡，因为是基于的0)，在ASIC 0/片式0。 我们从在LC最初运行的伊拉姆知道，我们在此片式触发了：

```
module-2# debug platform internal tah elam asic 0
module-2(DBG-TAH-elam)# trigger reset
module-2(DBG-TAH-elam)# trigger init in-select 13 out-select 0
module-2(DBG-TAH-elam-insel13)# set inner ipv4 src_ip 10.100.17.11 dst_ip 192.168.20.1
module-2(DBG-TAH-elam-insel13)# start
stat
module-2(DBG-TAH-elam-insel13)# stat
ELAM STATUS
===========
Asic 0 Slice 0 Status Armed
Asic 0 Slice 1 Status Armed

module-2(DBG-TAH-elam-insel13)# stat
ELAM STATUS
===========
Asic 0 Slice 0 Status Triggered   <---- Packet triggered from FM
Asic 0 Slice 1 Status Triggered   <---- Packet triggered from Front Panel
```

在此伊拉姆的ovector是sug_elam_out_sidebnd_no_spare_vec.ovector_idx ：0x98，我们从“hal

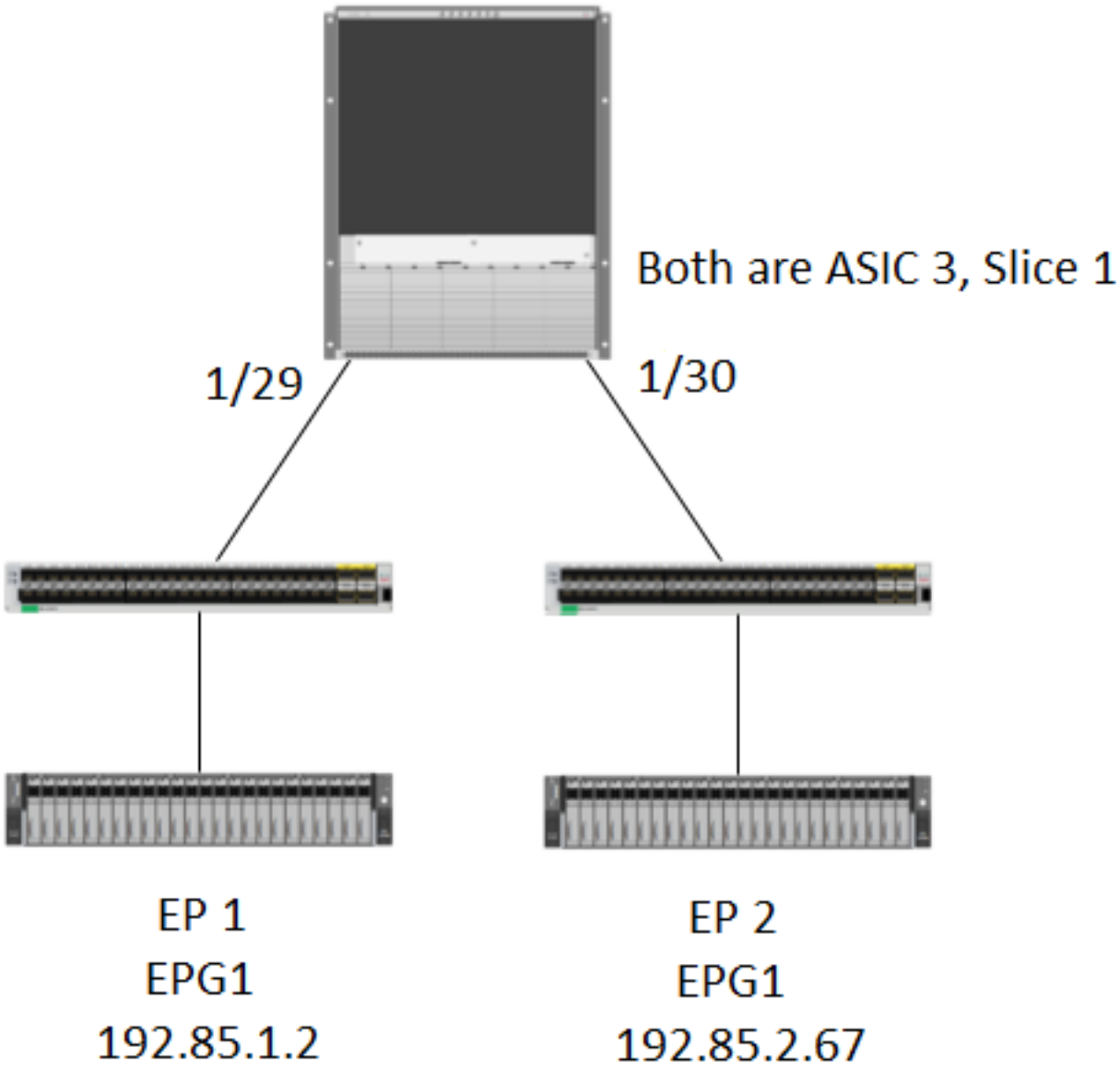
l2端口gpd”认识，映射对在LC的正确的接口：

```
================================================================================================================
=========================================
                       Uc   Uc                            |       Reprogram       |
| Rep |
                     I PC   Pc                          L |   R I R D    R  U U X | L Xla Ovx N
NI Vif    RwV    Ing  Egr  | V R | PROF H
IfId     Ifname      P Cfg  MbrID As AP Sl Sp Ss Ovec S | P P P S P Sp Sp C M L | 3 Idx Idx L3
L3 Tid    Tid    Lbl  Lbl  | S V | ID   I
================================================================================================================
=========================================
1f5      SpInBndMgmt 0 9de  1a    0  0  0  0  0  0    0   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
D-2d4  D-3e1  0    0      0 0   1    0
1a080000 Eth2/1      0 9a   1c    0  11 0  10 20 20   1   0 0 0 0 0 0  0  0 0 0   1 b   b   1  1
D-f3   D-61   100  0      0 0   1    0
1a081000 Eth2/2      0 9b   22    0  d  0  c  18 18   1   0 0 0 0 0 0  0  0 0 0   1 c   c   1  1
D-1ee  D-30b  100  0      0 0   1    0
1a084000 Eth2/5      0 9e   1e    0  3d 1  14 28 a8   1   0 0 0 0 0 0  0  0 0 0   1 1   1   1  1
D-19a  D-2ee  100  0      0 0   1    0
1a085000 Eth2/6      0 9f   24    0  39 1  10 20 a0   1   0 0 0 0 0 0  0  0 0 0   1 e   e   1  1
D-87   D-184  100  0      0 0   1    0
1a086000 Eth2/7      0 a0   26    0  35 1  c 18 98    1   0 0 0 0 0 0  0  0 0 0   1 d   d   1  1  D-
1d0  D-357  100  0      0 0   1    0
1a088000 Eth2/9      0 a2   20    1  d  0  c  18 18   1   0 0 0 0 0 0  0  0 0 0   0 0   0   0  0
D-3ea  D-1a9  100  0      0 0   1    0
```

以太网2/7是连接生叶5.的接口。

额外的方案：获得不在“hal内部端口pi”输出中的Ovector

拓扑



逻辑

有我们捉住一个信息包不安排在“**显示平台内部hal l2内部端口pi的**” Ovector表的一些方案。 在下面的方案中，我们实际上捉住回来从FM的信息包，因此我们需要查看一张不同的表发现哪个前面板端口信息包选择。

注意以上的拓扑是中转流量获知的一个完全不同的环境(没有代理路由)。 模块是N9K-X9732C-EX。

```
@module-1# debug platform internal tah elam asic 3
@module-1(DBG-elam)# trigger reset
@module-1(DBG-elam)# trigg init in-select 13 out-select 0
@module-1(DBG-elam-insel13)# set inner ipv4 src_ip 192.85.1.2 dst_ip 192.85.2.67
@module-1(DBG-elam-insel13)# star
@module-1(DBG-elam-insel13)# stat
ELAM STATUS
===========
Asic 3 Slice 0 Status Armed
Asic 3 Slice 1 Status Triggered
```

```
@module-1(DBG-elam-insel13)# report | grep ovector
 sug_elam_out_sidebnd_no_spare_vec.ovector_idx: 0xA0 <<<<<<<<<<<<<<<< now we look for this in
the "hal internal-port pi" command


@module-1# show platform internal hal l2 internal-port pi
No sandboxes exist
Num. of Sandboxes: 1
Legend:
-------
IfId:      Interface Id               IfName:     Interface Name
As:        Asic                       AP:         Asic Port
Sl:        Slice                      SP:         Slice Port
Ss:        Slice SrcId                Ovec:       Ovector
UcPcCfgId: Uc Pc CfgId                Lb Mbrid:   LB MbrId

Sandbox_ID: 0, BMP: 0x0
 Internal Port Count: 24

=====================================================================
                                                      UcPc  Lb
IfId     IfName                       As AP Sl SP Ss Ovec CfgId MbrId
=====================================================================
7d       -                            0  21 0  20 38 38   0     4
7e       -                            0  29 1  0  0  80   0     8
7f       -                            1  21 0  20 38 38   0     c
80       -                            1  29 1  0  0  80   0     10
81       -                            2  21 0  20 38 38   0     14
82       -                            2  29 1  0  0  80   0     18
83       -                            3  21 0  20 38 38   0     1c
84       -                            3  29 1  0  0  80   0     20
ad       -                            0  25 0  24 40 40   0     1
ae       -                            0  41 1  18 30 b0   0     6
af       -                            1  25 0  24 40 40   0     9
b0       -                            1  41 1  18 30 b0   0     e
b1       -                            2  25 0  24 40 40   0     11
b2       -                            2  41 1  18 30 b0   0     16
b3       -                            3  25 0  24 40 40   0     19
b4       -                            3  41 1  18 30 b0   0     1e
dd       -                            0  15 0  14 28 28   0     2
de       -                            0  4d 1  24 40 c0   0     5
df       -                            1  15 0  14 28 28   0     a
e0       -                            1  4d 1  24 40 c0   0     d
e1       -                            2  15 0  14 28 28   0     12
e2       -                            2  4d 1  24 40 c0   0     15
e3       -                            3  15 0  14 28 28   0     1a
e4       -                            3  4d 1  24 40 c0   0     1d  <<<<<<<  we cant find an
entry that matches 0xA0


@module-1# show platform internal hal l2 port gpd
Legend:
-------
<snip>

Sandbox_ID: 0, BMP: 0x0
 Port Count: 6

=============================================================================================================
=========================================
                      Uc   Uc                          |       Reprogram
|                                        | Rep |
                    I PC   Pc                       L |   R I R D    R  U U X | L Xla Ovx N  NI
Vif    RwV    Ing  Egr  | V R | PROF H
```

```
IfId     Ifname      P Cfg  MbrID As AP Sl Sp Ss Ovec S | P P P S P Sp Sp C M L | 3 Idx Idx L3
L3 Tid    Tid    Lbl  Lbl  | S V | ID   I
=============================================================================================
=========================================
1f5      SpInBndMgmt 0 9de  1a    0  0  0  0  0  0    0   0 0 0 0 0 0  0  0 0 0   0 0   0   0
0  D-2d4  D-3e1  0    0      0 0   1    0
1a000000 Eth1/1      0 1b   1c    0  11 0  10 20 20   1   0 0 0 0 0 0  0  0 0 0   1 1   1   1
1  D-13b  D-33b  500  0      1 0   3    0
1a01c000 Eth1/29     0 37   1e    3  3d 1  14 28 a8   1   0 0 0 0 0 0  0  0 0 0   1 8   8   1
1  D-3f2  D-7a   100  0      0 0   2    0
1a01d000 Eth1/30     0 38   20    3  39 1  10 20 a0   1   0 0 0 0 0 0  0  0 0 0   1 5   5   1
1  D-36e  D-362  100  0      0 0   2    0
1a01e000 Eth1/31     0 39   22    3  35 1  c  18 98   1   0 0 0 0 0 0  0  0 0 0   1 9   9   1
1  D-273  D-8    100  0      0 0   2    0
1a01f000 Eth1/32     0 3a   24    3  31 1  8  10 90   1   0 0 0 0 0 0  0  0 0 0   1 a   a   1
1  D-154  D-5d   100  0      0 0   2    0
```

1/30是连接生叶102的phys接口，验证由拓扑， ASIC 3，片式1