Finding Contrail vRouter Next-Hop

2021.5.6 HyungKwang Choi (s99225078@gmail.com)

Finding Contrail vRouter Next-Hop

1. Basic concept of vRouter NH and steps 3

1.1 Lab Environment. 4

1.2 command lists at a glance. 4

1.3 Command lists used frequently 5

1.4 How to login vRouter of compute nodes 5

2. Finding vRouter NH in lab#1 : L2 switching (family bridge) 6

2.1. Be minded 6

2.2. ping from 40.0.0.4 to 40.0.0.3 6

3. Finding vRouter NH in lab#4 (L3 traffic to internet) 8

3.1. Be minded 8

3.2. CASE1 : ping from 60.0.0.3 to 201.0.0.1 (Internet) 8

3.3 CASE2 : ping from 60.0.0.3 to 40.0.0.6 (different VN) 15

4. EVPN route type 20

1. Basic concept of vRouter NH and steps

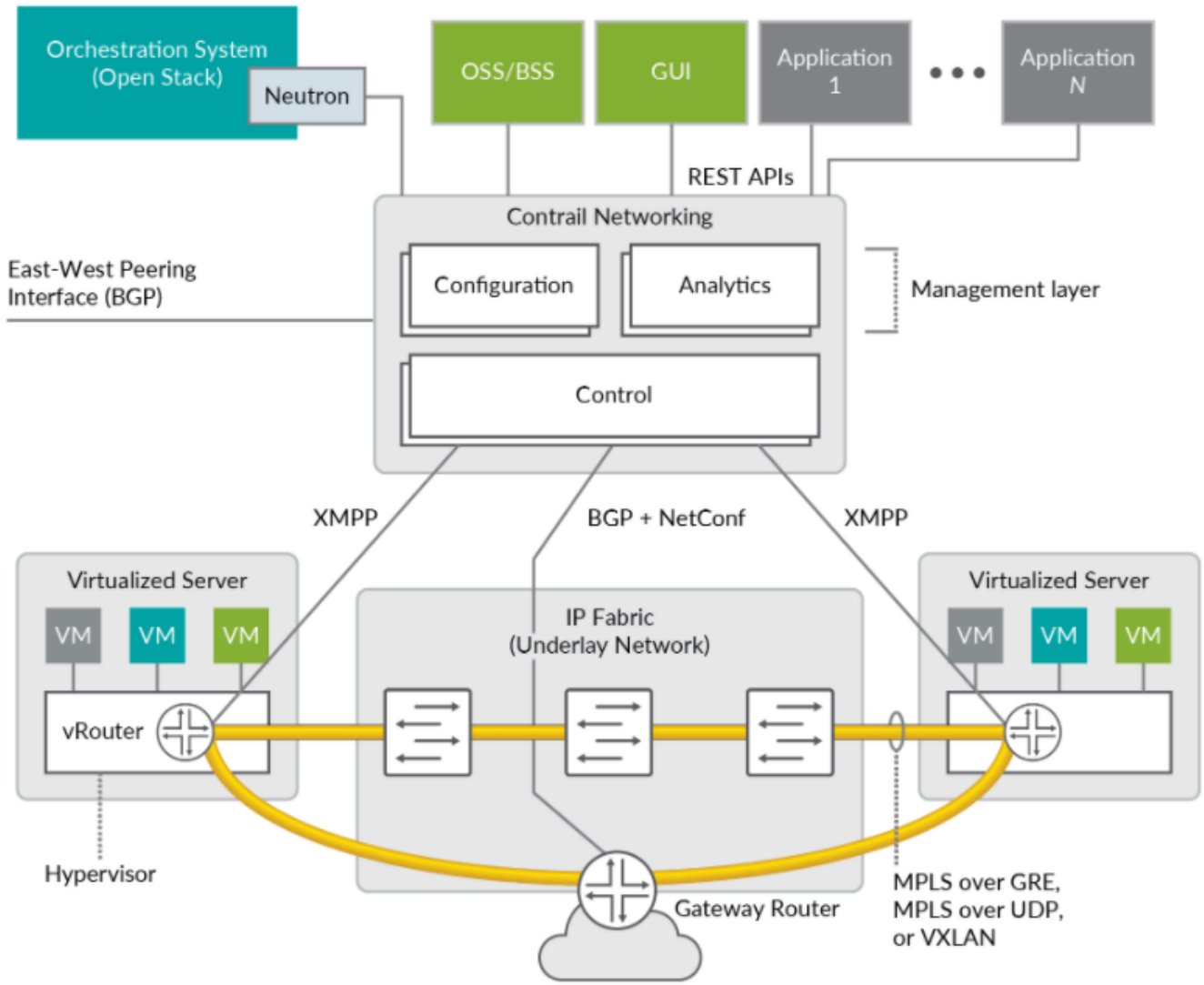
As you see below picture, each Compute node has one vRouter, each VM (per instance) has it's own VRF under the vRouter. FIB is on vRouter which resides in kernel.

vRouter creates/establishes a connection with physical/virtual router or underlying IP Fabric tunnel like "MPLS over GRE, MPLS over UDP, VXLAN"

But not in case Physical router/Gateway, if it's internal network such as L2 family bridge, vxlan encapsulation used.

For details, let's figure out by lab tests below.

Figure 1: Contrail Networking Overview



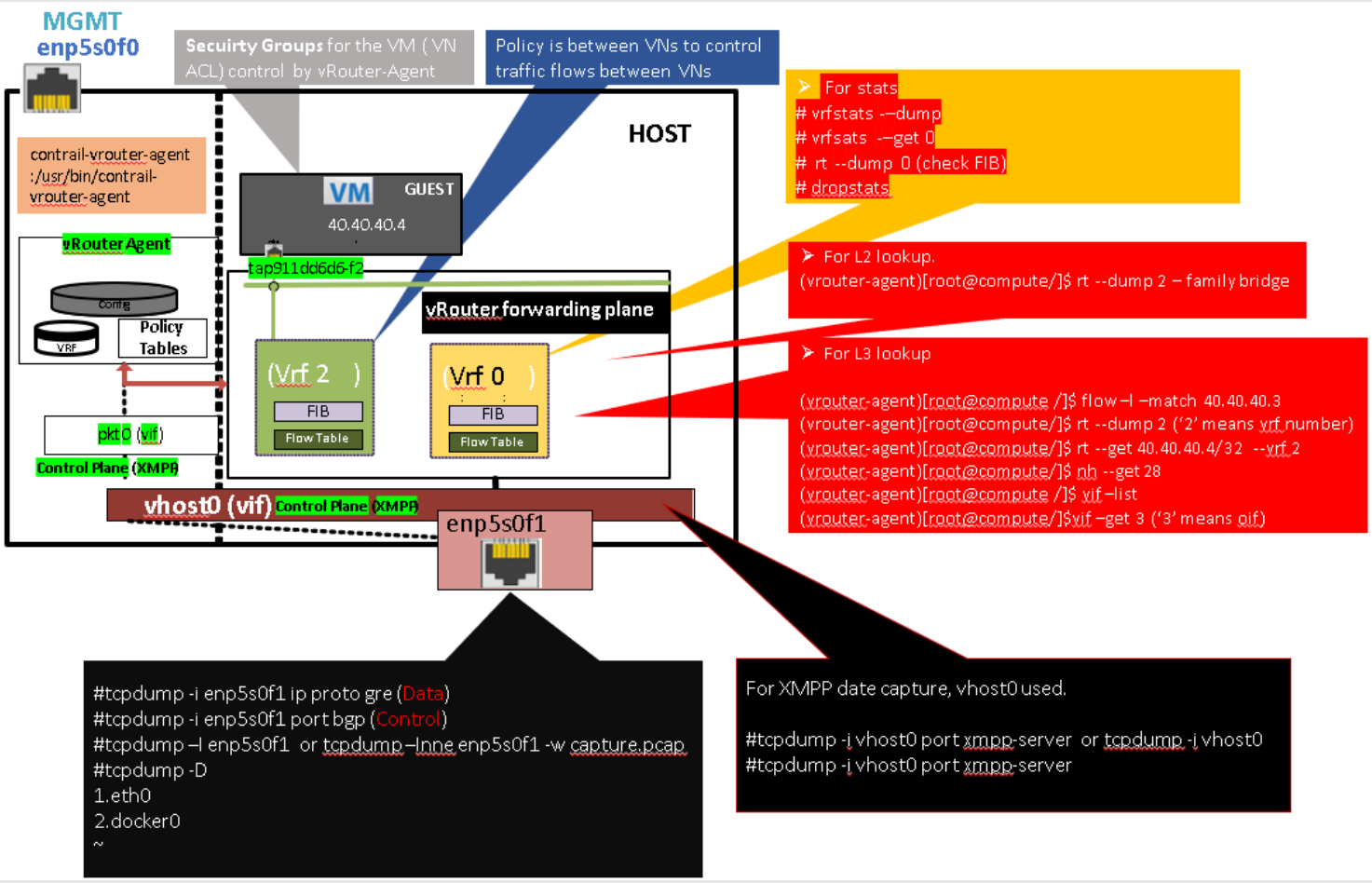
1.1 Lab Environment.

- Contrail v2005 + CentOS 7.7
- Lab test setup/configuration : “Contrail Networking Lab Tests_v.4.pdf”

1.2 command lists at a glance.

command lists.pptx

Please find the attached “command lists.pptx”



1.3 Command lists used frequently

1) On vRouter-agent.

Commands	Usage
flow -l	flow -l
flow -l --match <IP address>	flow -l --match 201.0.0.1
rt --get <IP address> --vrf <vrf instance number>	rt --get 201.0.0.1/32 --vrf 2
rt --dump <vrf instance number>	rt –-dump 0
nh --get <vrf instance number>	nh --get 49
vif --list	vif --list
vif --get <OIF number>	vif --get 0
vrfstats –-dump	vrfstats –-dump
vrfstats –-get <vrf instance number>	vrfstats –-get 0
dropstats	dropstats

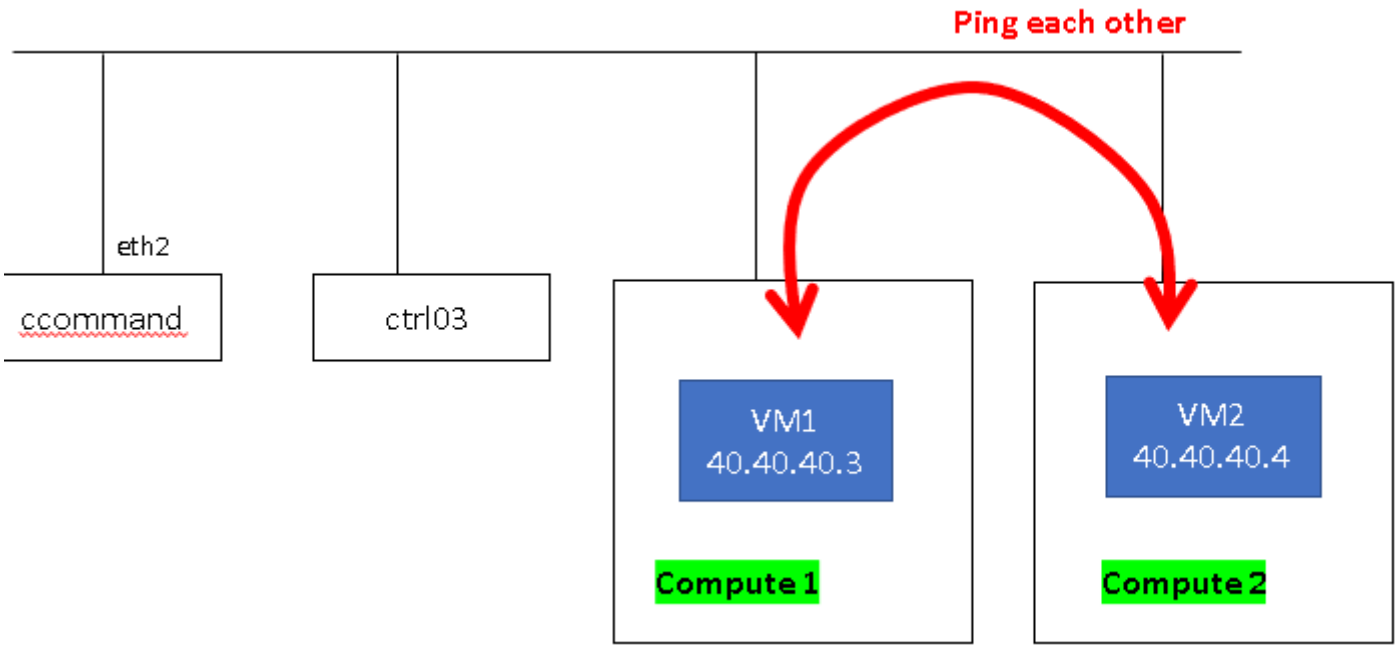
2) Install tcpdump.

```
[root@compute2-225 ~]# yum -y install tcpdump
[root@compute2-225 ~]# tcpdump -i <physical interface-name>
 ex)   tcpdump -i enp5s0f1
```

1.4 How to login vRouter of compute nodes

```
[root@compute2-225 ~]# docker ps -a | grep agent
b7c6766bfb09        hub.juniper.net/contrail/contrail-vrouter-agent:2005.62          "/entrypoint.sh /usr   2
weeks ago         Up 2 weeks                                      vrouter_vrouter-agent_1

[root@compute2-225 ~]# docker exec -it vrouter_vrouter-agent_1 bash

(vrouter-agent)[root@compute2-225 /]$
```

2. Finding vRouter NH in lab#1 : L2 switching (family bridge)



2.1. Be minded

1). Key point at this test : for L2 communication is conducted on family bridge table.

2). For lab setup/configuration, please refer to my previous post “Contrail Networking Lab Tests_v.4.pdf”.

- Find the subject “2. Lab test #1 : Creating 2 VMs and the same VNs (Virtual Network)”

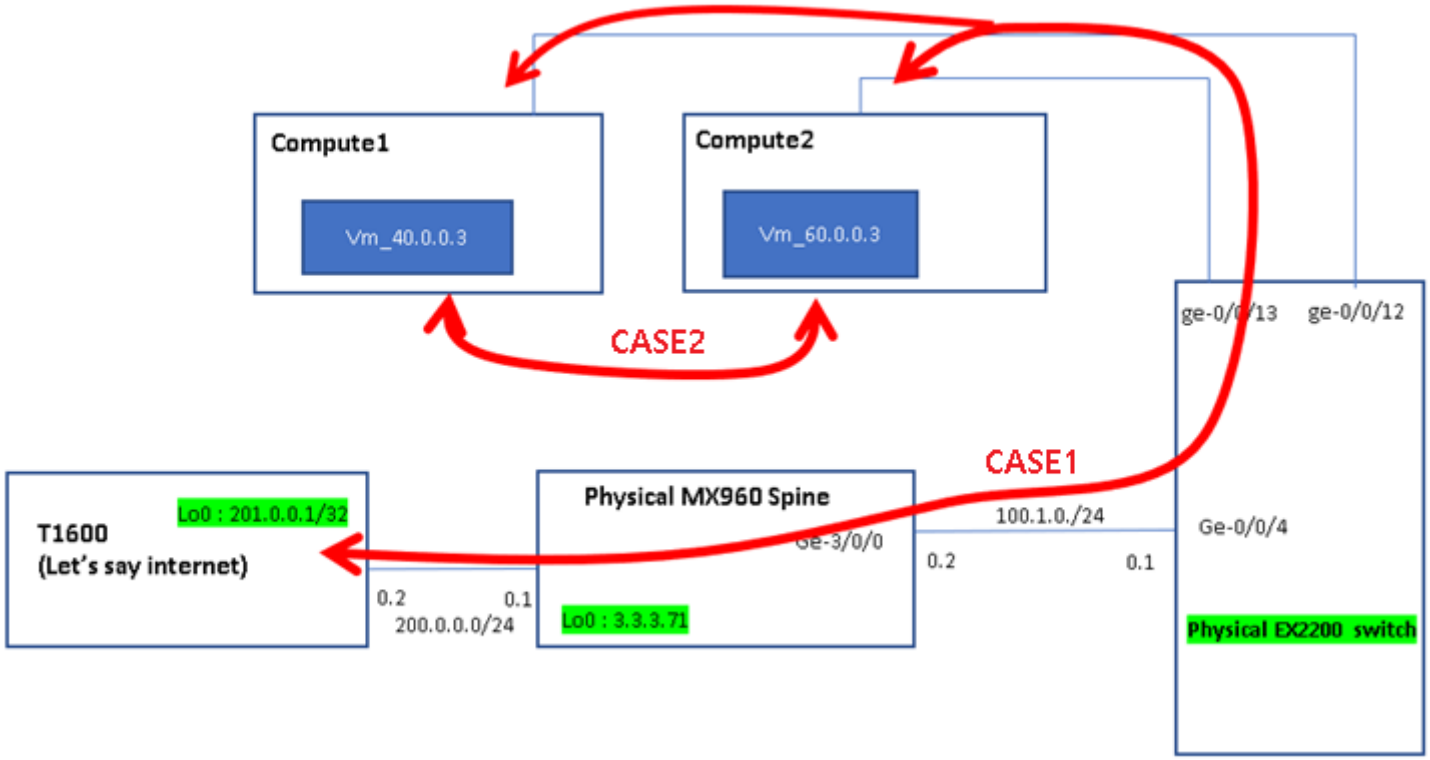
2.2. ping from 40.0.0.4 to 40.0.0.3

```
QOS:-1 Ref:13
          RX packets:2003720  bytes:217529615 errors:0
          TX packets:2367868  bytes:241743463 errors:0
          Drops:322276

(vrouter-agent)[root@compute2-225 /]$ tcpdump -i enp5s0f1 -v

20:05:24.908393 IP (tos 0x0, ttl 64, id 34551, offset 0, flags [none], proto UDP (17), length 134)
    compute2-225.juniper.net.52609 > compute1-224.juniper.net.4789: VXLAN, flags [I] (0x08), vni 3
IP (tos 0x0, ttl 64, id 34551, offset 0, flags [DF], proto ICMP (1), length 84)
    40.0.0.4 > 40.0.0.3: ICMP echo request, id 59393, seq 2180, length 64
```

2). Compute1 node (40.0.0.4 --→ 40.0.0.3: Ping request)

```
[root@compute1-224 ~]# docker exec -it vrouter_vrouter-agent_1 bash

(vrouter-agent)[root@compute1-224 /]$ tcpdump -i enp5s0f1 -v

20:45:57.743473 IP (tos 0x0, ttl 64, id 16298, offset 0, flags [none], proto UDP (17), length 134)
    compute2-225.juniper.net.52609 > compute1-224.juniper.net.4789: VXLAN, flags [I] (0x08), vni 3
IP (tos 0x0, ttl 64, id 16298, offset 0, flags [DF], proto ICMP (1), length 84)

(vrouter-agent)[root@compute1-224 /]$ flow -l
Flow table(size 161218560, entries 629760)

    Index               Source:Port/Destination:Port                      Proto(V)
-------------------------------------------------------------------------------
   195260<=>346372      40.0.0.4:59393                                      1 (2)
                        40.0.0.3:0
(Gen: 1, K(nh):17, Action:F, Flags:, QOS:-1, S(nh):29,  Stats:4316/422968,
 SPort 60652, TTL 0, Sinfo 100.0.0.225)

   346372<=>195260      40.0.0.3:59393                                      1 (2)
                        40.0.0.4:0
(Gen: 1, K(nh):17, Action:F, Flags:, QOS:-1, S(nh):17,  Stats:4317/423066,
 SPort 60703, TTL 0, Sinfo 3.0.0.0)

(vrouter-agent)[root@compute1-224 /]$ nh --get 17
Id:17         Type:Encap          Fmly: AF_INET  Rid:0  Ref_cnt:4          Vrf:2
              Flags:Valid, Policy, Etree Root,
              EncapFmly:0806 Oif:3 Len:14
              Encap Data: 02 f8 66 7b 4c b8 00 00 5e 00 01 00 08 00


(vrouter-agent)[root@compute1-224 /]$ vif --get 3
Vrouter Interface Table

vif0/3      OS: tapf8667b4c-b8 NH: 17  ←======= VM
            Type:Virtual HWaddr:00:00:5e:00:01:00 IPaddr:40.0.0.3
            Vrf:2 Mcast Vrf:2 Flags:PL3L2DEr QOS:-1 Ref:7
            RX packets:18520  bytes:1074373 errors:0
            TX packets:20511  bytes:1207048 errors:0
            ISID: 0 Bmac: 02:f8:66:7b:4c:b8
            Drops:21
```

3. Finding vRouter NH in lab#4 (L3 traffic to internet)



3.1. Be minded

1). Key point at this test : This is for L3 communication.

- CASE1 : To internet (EVPN type5) : Ping 60.0.0.3/40.0.0.3/(compute 1/2) to 201.0.0.1 (internet)
- CASE2 : L3 routing : Ping between VMs (VM_40 <-> VM_60)

2). For lab setup, please refer to my previous post "Contrail Networking Lab Tests_v.4.pdf".

- Find the subject "**5. Lab test #4 : Ping to Internet and Ping between VMs (L3 Gateway)"**

3.2. CASE1 : ping from 60.0.0.3 to 201.0.0.1 (Internet)

```
1). Find Flow Direction on Compute2 node (60.0.0.3 --> 201.0.0.1: Ping request)

Please login vrouter-Agent of compute node.
[root@compute2-225 ~]# docker exec -it vrouter_vrouter-agent_1 bash
```

```
(vrouter-agent)[root@compute2-225 /]$ flow -l --match 201.0.0.1
Flow table(size 161218560, entries 629760)

Entries: Created 6034 Added 6010 Deleted 11648 Changed 11703Processed 6034 Used Overflow entries 0
(Created Flows/CPU: 902 831 776 1322 953 1250)(oflows 0)

Action:F=Forward, D=Drop N=NAT(S=SNAT, D=DNAT, Ps=SPAT, Pd=DPAT, L=Link Local Port)
 Other:K(nh)=Key_Nexthop, S(nh)=RPF_Nexthop
 Flags:E=Evicted, Ec=Evict Candidate, N=New Flow, M=Modified Dm=Delete Marked
TCP(r=reverse):S=SYN, F=FIN, R=RST, C=HalfClose, E=Established, D=Dead

Listing flows matching ([201.0.0.1]:*)

    Index                Source:Port/Destination:Port                     Proto(V)
-----------------------------------------------------------------------------------
   126220<=>196528       201.0.0.1:60673                                   1 (2)<=vrf number  "2"
                         60.0.0.3:0
(Gen: 1, K(nh):17, Action:F, Flags:, QOS:-1, S(nh):49,  Stats:14/1176,
 SPort 58091, TTL 0, Sinfo 3.3.3.71)

   196528<=>126220       60.0.0.3:60673                                    1 (2)
                         201.0.0.1:0
(Gen: 1, K(nh):17, Action:F, Flags:, QOS:-1, S(nh):17,  Stats:14/1372,
 SPort 59359, TTL 0, Sinfo 3.0.0.0)


(vrouter-agent)[root@compute2-225 /]$ rt --get 201.0.0.1/32 --vrf 2  <=== put VRF number  '2'
Match 201.0.0.1/32 in vRouter inet4 table 0/2/unicast

Flags: L=Label Valid, P=Proxy ARP, T=Trap ARP, F=Flood ARP
vRouter inet4 routing table 0/2/unicast
Destination           PPL        Flags        Label         Nexthop    Stitched MAC(Index)
0.0.0.0/0               0           LP           18            49        -    <==== route nh 49, mpls label 18

(vrouter-agent)[root@compute2-225 /]$ nh --get 49
Id:49         Type:Tunnel         Fmly: AF_INET  Rid:0  Ref_cnt:1783       Vrf:0
              Flags:Valid, MPLSoGRE, Etree Root, <==== MPLS Gre tunnel encap
              Oif:0 Len:14 Data:2c 6b f5 90 d5 c0 c4 54 44 54 c3 6b 08 00 <==Oif = Outgoing Interface & mac
              Sip:100.0.0.225 Dip:3.3.3.71       <== Dip: MX spine loopback, encapsulated in to GRE tunnel.

(vrouter-agent)[root@compute2-225 /]$ vif --get 0
Vrouter Interface Table

Flags: P=Policy, X=Cross Connect, S=Service Chain, Mr=Receive Mirror
       Mt=Transmit Mirror, Tc=Transmit Checksum Offload, L3=Layer 3, L2=Layer 2
       D=DHCP, Vp=Vhost Physical, Pr=Promiscuous, Vnt=Native Vlan Tagged
       Mnp=No MAC Proxy, Dpdk=DPDK PMD Interface, Rfl=Receive Filtering Offload, Mon=Interface is Monitored
       Uuf=Unknown Unicast Flood, Vof=VLAN insert/strip offload, Df=Drop New Flows, L=MAC Learning Enabled
       Proxy=MAC Requests Proxied Always, Er=Etree Root, Mn=Mirror without Vlan Tag, HbsL=HBS Left Intf
       HbsR=HBS Right Intf, Ig=Igmp Trap Enabled

vif0/0      OS: enp5s0f1 (Speed 1000, Duplex 1) NH: 4  <== physical interface enp5s0f1, it mapped to vrf0/0.
            Type:Physical HWaddr:c4:54:44:54:c3:6b IPaddr:0.0.0.0
            Vrf:0 Mcast Vrf:65535 Flags:TcL3L2VpEr QOS:-1 Ref:13
            RX packets:1651577  bytes:184514771 errors:0
            TX packets:1984789  bytes:209650754 errors:0
```

```
            Drops:321582

(vrouter-agent)[root@compute2-225 /]$ exit


[root@compute2-225 ~]# ip a  ←== To check physical interface  "enp5s0f1"

3: enp5s0f1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether c4:54:44:54:c3:6b brd ff:ff:ff:ff:ff:ff
    inet6 fe80::c654:44ff:fe54:c36b/64 scope link
       valid_lft forever preferred_lft forever

// All info checked above, are encapsulated into GRE tunnel, and be seen on tcpdump.
  In short Vrouter(100.0.0.225) and MX960 loopback(3.3.3.71), is GRE tunnel encapsulated with MPLS label.

[root@compute2-225 ~]# tcpdump -i enp5s0f1

20:56:46.590101 IP compute2-225.juniper.net > 3.3.3.71: GREv0, length 92: MPLS (label 18, exp 0, [S], ttl 63)
IP 60.0.0.3 > 201-0-0-1.dsl.telesp.net.br: ICMP echo request, id 60673, seq 1084, length 64
```

```
2). Find Flow Direction on MX960 Spine node (60.0.0.3 --→ 201.0.0.1: Ping request)

jun@MX960_spine# show chassis | display set
set chassis fpc 3 pic 0 tunnel-services

jun@MX960_spine# run show dynamic-tunnels database  ←== Check GRE tunnel interface status, if it's created
properly or not.

Tunnel to: 100.0.0.225/32 State: Up
  Reference count: 1
  Next-hop type: gre
    Source address: 3.3.3.71
    Next hop: gr-3/0/0.32770
      State: Up


jun@MX960_spine# run show interfaces gr-3/0/0.32770
  Logical interface gr-3/0/0.32770 (Index 358) (SNMP ifIndex 1283)
    Flags:  Up  Point-To-Point  SNMP-Traps  0x4000  IP-Header  100.0.0.225:3.3.3.71:47:df:64:0000000800000000
Encapsulation: GRE-NULL
    Copy-tos-to-outer-ip-header: Off, Copy-tos-to-outer-ip-header-transit: Off
    force-control-packets-on-transit-path: Off
    Gre keepalives configured: Off, Gre keepalives adjacency state: down
    Input packets : 8  ←==== (60.0.0.3 --→ 201.0.0.1: Ping request) check if it's increasing or not.
    Output packets: 8
    Protocol inet, MTU: 1476
    Max nh cache: 0, New hold nh limit: 0, Curr nh cnt: 0, Curr new hold cnt: 0, NH drop cnt: 0
      Flags: None
    Protocol mpls, MTU: 1464, Maximum labels: 3
      Flags: Is-Primary

jun@MX960_spine# run show route table mpls.0
```

```
mpls.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

18                 *[VPN/0] 17:01:10
                    >  via lsi.0 (_contrail_60_net-l3-5), Pop   <-- = GRE MPLS label 18 popped.
19                 *[VPN/0] 15:55:34
                    >  via lsi.1 (_contrail_40_net-l3-3), Pop

jun@MX960_spine# run show bgp summary
Threading mode: BGP I/O
Default eBGP mode: advertise - accept, receive - accept
Groups: 1 Peers: 1 Down peers: 0
Table          Tot Paths  Act Paths Suppressed    History Damp State    Pending
bgp.rtarget.0
                       8          5          0          0          0          0
bgp.l3vpn.0
                       3          3          0          0          0          0
bgp.l3vpn-inet6.0
                       0          0          0          0          0          0
bgp.evpn.0
                       8          8          0          0          0          0
Peer    AS      InPkt     OutPkt    OutQ   Flaps Last Up/Dwn State|#Active/Received/Accepted/Damped...
100.0.0.222          64512       2120       2327       0       0    17:14:40 Establ
  bgp.rtarget.0: 5/8/8/0
  bgp.l3vpn.0: 3/3/3/0
  bgp.l3vpn-inet6.0: 0/0/0/0
  bgp.evpn.0: 8/8/8/0
  _contrail_60_net-l3-5.inet.0: 1/1/1/0  <==== GRE MPLS 18 popped , and packets go to EVPN type5 routing-
instance
  _contrail-l2.evpn.0: 8/8/8/0
  __default_evpn__.evpn.0: 0/0/0/0
  _contrail_40_net-l3-3.inet.0: 2/2/2/0


jun@MX960_spine# run show route table _contrail_60_net-l3-5.inet.0

_contrail_60_net-l3-5.inet.0: 5 destinations, 6 routes (5 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

0.0.0.0/0          *[Static/5] 17:07:15
                       to table inet.0   <==== going to  'inet.0' , then to internet.
```

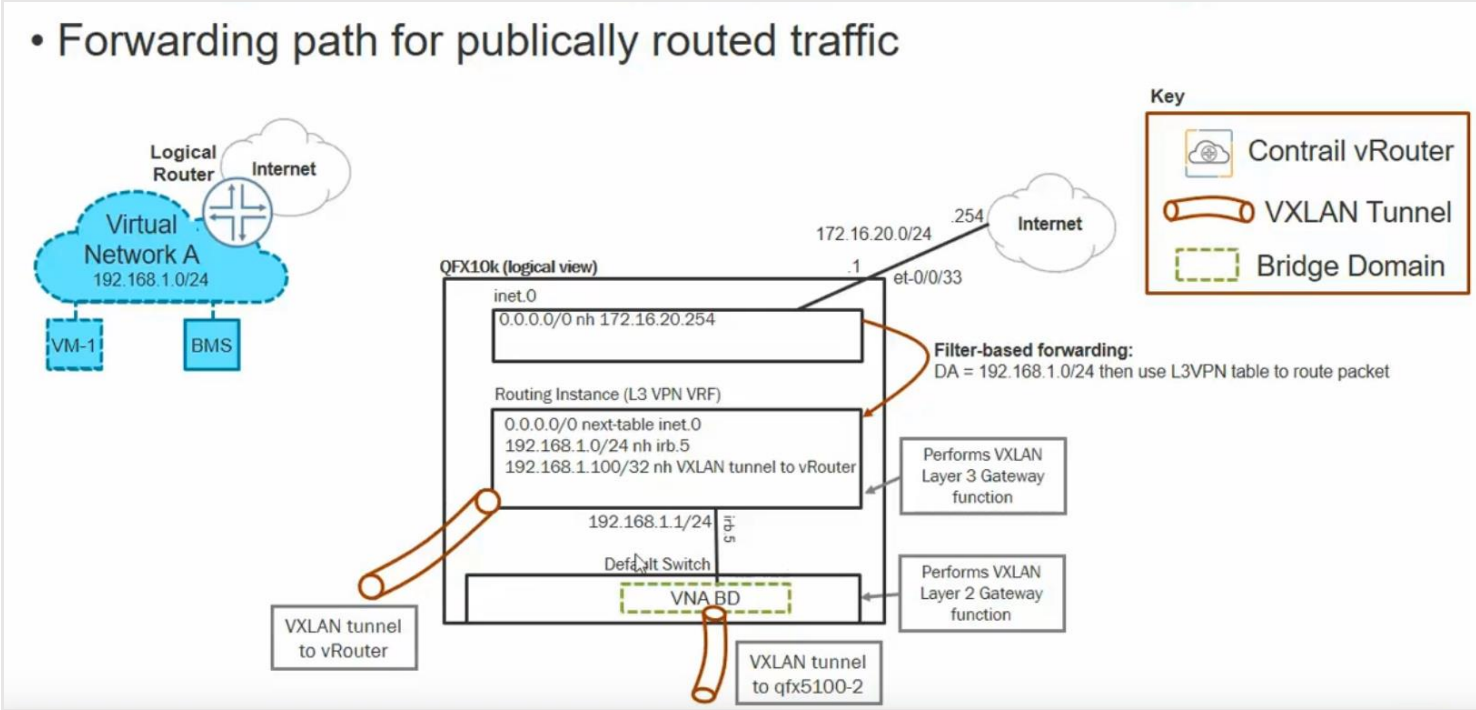
3). Find Flow Direction on MX960 Spine node (201.0.0.1 -→ 60.0.0.3: Ping reply)

For "Contrail DC-Gateway functionality", you must understand the picture below.

> Key important info

1. During contrail 'Fabric' registration, for spine role, you added "DC-gateway" role. That is for "Filter-based forwarding".
   Because of "Filter-based forwarding", return traffic from the internet is going from inet.0 to **_contrail_60_net-l3-5.inet.0**.
2. When I studied JNCIE-DC, for L2 switching (traffic between VLAN) I set "instance virtual-swtich". For L3 traffic, I set "instance **virtual-router**".
   But in contrail, not "**instance virtual-router**" **for L3 traffic**, but "**instance vrf**". It's to communicate internet with EVPN type5. (EVPN Type5 is a method for internet via Instance VRF)

3. reference below picture : Juniper Learning byte youtube
[Contrail Enterprise Multicloud: QFX10000 as DC Gateway]




```
jun@MX960_spine# show forwarding-options | display inheritance
##
## 'inet' was inherited from group '__contrail_overlay_networking__'
##
family inet {
    ##
    ## 'filter' was inherited from group '__contrail_overlay_networking__'
    ##
    filter {
        ##
        ## 'redirect_to_public_vrf_filter' was inherited from group '__contrail_overlay_networking__'
        ##
        input redirect_to_public_vrf_filter; <== FBF for return traffic.
    }
}

jun@MX960_spine# show | display set | match "redirect_to_public_vrf_filter"

set groups __contrail_overlay_networking__ forwarding-options family inet filter input redirect_to_public_vrf_filter
set groups __contrail_overlay_networking__ firewall family inet filter redirect_to_public_vrf_filter term term-3 from destination-address 40.0.0.0/24
set groups __contrail_overlay_networking__ firewall family inet filter redirect_to_public_vrf_filter term term-3 then routing-instance _contrail_40_net-l3-3
set groups __contrail_overlay_networking__ firewall family inet filter redirect_to_public_vrf_filter term term-5 from destination-address 60.0.0.0/24
set groups __contrail_overlay_networking__ firewall family inet filter redirect_to_public_vrf_filter term term-5 then routing-instance _contrail_60_net-l3-5
set groups __contrail_overlay_networking__ firewall family inet filter redirect_to_public_vrf_filter term default-term then accept


jun@MX960_spine# run show route table _contrail_60_net-l3-5.inet.0

_contrail_60_net-l3-5.inet.0: 5 destinations, 6 routes (5 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both
```

```
0.0.0.0/0          *[Static/5] 17:07:15
                      to table inet.0
60.0.0.0/24        *[Direct/0] 16:01:39
                    >  via irb.5
                    [Static/5] 17:07:15
                      Discard
60.0.0.1/32        *[Local/0] 17:07:14
                      Local via irb.5
60.0.0.3/32        *[BGP/170] 15:35:56, MED 100, localpref 200, from 100.0.0.222
                     AS path: ?, validation-state: unverified
                    >  via gr-3/0/0.32770, Push 21   <=== to compute node, GRE MPLS label 21 encap
60.0.0.4/32        *[Local/0] 16:01:39
                      Local via irb.5


jun@MX960_spine# run show interfaces gr-3/0/0.32770
  Logical interface gr-3/0/0.32770 (Index 358) (SNMP ifIndex 1283)
    Flags:  Up  Point-To-Point  SNMP-Traps  0x4000  IP-Header  100.0.0.225:3.3.3.71:47:df:64:0000000800000000
Encapsulation: GRE-NULL
    Copy-tos-to-outer-ip-header: Off, Copy-tos-to-outer-ip-header-transit: Off
    force-control-packets-on-transit-path: Off
    Gre keepalives configured: Off, Gre keepalives adjacency state: down
    Input packets : 1526
    Output packets: 1526   <== check if it's increasing to compute node.
```

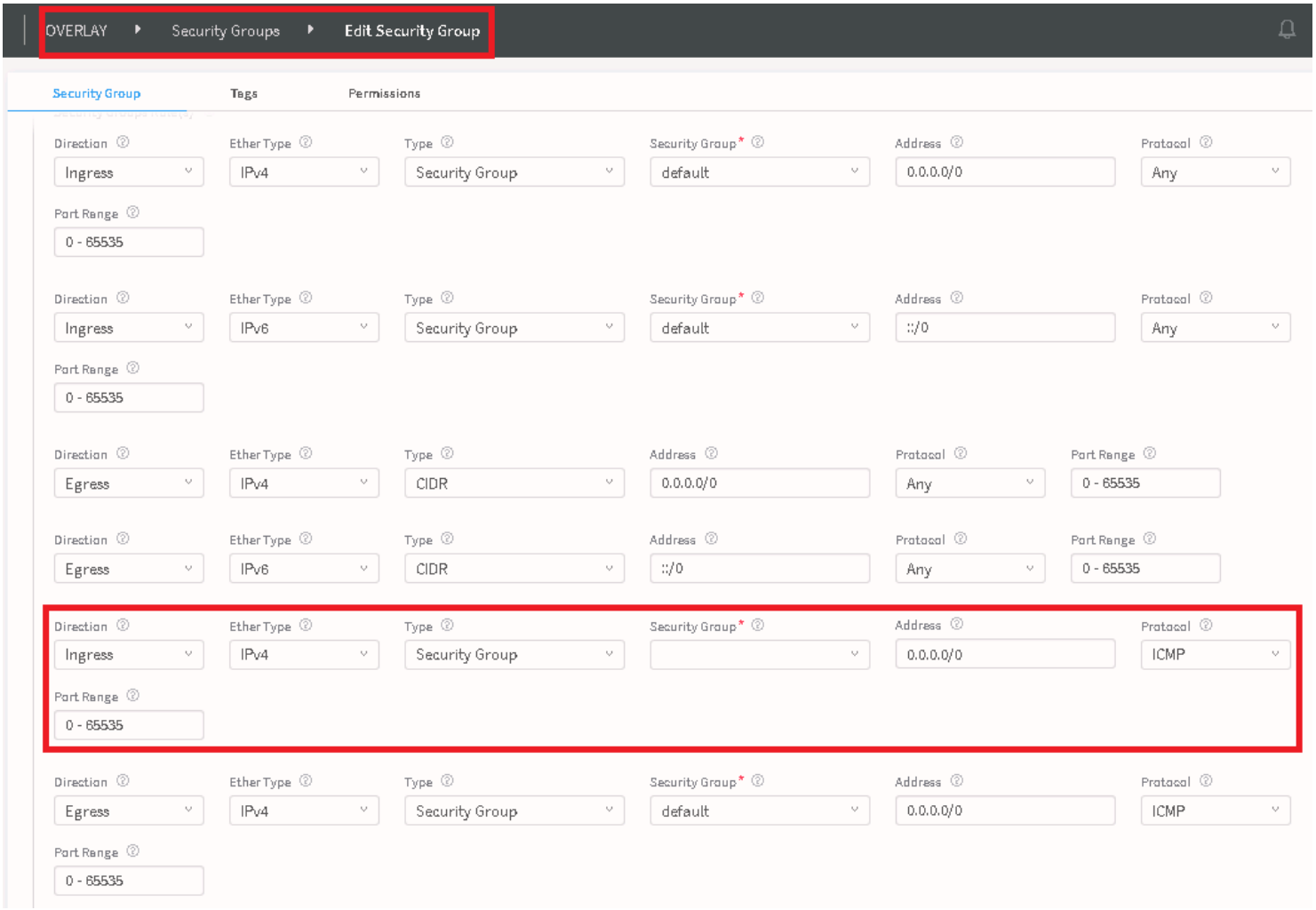
```
4). Find Flow Direction on Compute2 node (201.0.0.1 -> 60.0.0.3: Ping reply)

[root@compute2-225 ~]# tcpdump -i enp5s0f1    <=== check if label/packet info is correct or not.

20:56:46.590734 IP 3.3.3.71 > compute2-225.juniper.net: GREv0, length 92: MPLS (label 21, exp 0, [S], ttl 63)
IP 201-0-0-1.dsl.telesp.net.br > 60.0.0.3: ICMP echo reply, id 60673, seq 1084, length 64

(vrouter-agent)[root@compute2-225 /]$ flow -l --match 201.0.0.1
Flow table(size 161218560, entries 629760)

Entries: Created 6034 Added 6010 Deleted 11650 Changed 11705Processed 6034 Used Overflow entries 0
(Created Flows/CPU: 902 831 776 1322 953 1250)(oflows 0)

Action:F=Forward, D=Drop N=NAT(S=SNAT, D=DNAT, Ps=SPAT, Pd=DPAT, L=Link Local Port)
 Other:K(nh)=Key_Nexthop, S(nh)=RPF_Nexthop
 Flags:E=Evicted, Ec=Evict Candidate, N=New Flow, M=Modified Dm=Delete Marked
TCP(r=reverse):S=SYN, F=FIN, R=RST, C=HalfClose, E=Established, D=Dead

Listing flows matching ([201.0.0.1]:*)

    Index               Source:Port/Destination:Port                      Proto(V)
-----------------------------------------------------------------------------------
   126220<=>196528      201.0.0.1:60673                                     1 (2)
                        60.0.0.3:0
(Gen: 1, K(nh):17, Action:F, Flags:, QOS:-1, S(nh):49,  Stats:7669/644196,
 SPort 58091, TTL 0, Sinfo 3.3.3.71)
```

```
(vrouter-agent)[root@compute2-225 /]$ nh --get 17
Id:17         Type:Encap          Fmly: AF_INET  Rid:0  Ref_cnt:4          Vrf:2
              Flags:Valid, Policy, Etree Root,
              EncapFmly:0806 Oif:3 Len:14  <===== Outgoing Interface 3
              Encap Data: 02 e5 30 bc a4 e0 00 00 5e 00 01 00 08 00

(vrouter-agent)[root@compute2-225 /]$ vif --get 3
Vrouter Interface Table

vif0/3      OS: tape530bca4-e0 NH: 17    <===== VM_60 instance.
            Type:Virtual HWaddr:00:00:5e:00:01:00 IPaddr:60.0.0.3
            Vrf:2 Mcast Vrf:2 Flags:PL3L2DEr QOS:-1 Ref:6
            RX packets:79178  bytes:7254747 errors:0
            TX packets:79403  bytes:7247512 errors:0
            ISID: 0 Bmac: 02:e5:30:bc:a4:e0
            Drops:19
```

3.3 CASE2 : ping from 60.0.0.3 to 40.0.0.6 (different VN)

> Before going to test, please set 'Security Group' like below. If you set, your ping is not reachable to 40.0.0.6.

The reason why you set like below, to find out where packet gets drop.



1). Find Flow Direction on Compute2 node (60.0.0.3 --→ 40.0.0.6: Ping request)

```
Please login vrouter-Agent of compute node.
[root@compute2-225 ~]# docker exec -it vrouter_vrouter-agent_1 bash


(vrouter-agent)[root@compute2-225 /]$ flow -l --match 40.0.0.6

Listing flows matching ([40.0.0.6]:*)

    Index                Source:Port/Destination:Port                     Proto(V)
-----------------------------------------------------------------------------------
    30152<=>43472        40.0.0.6:61185                                     1 (2) ←== vrf 2
                         60.0.0.3:0
(Gen: 1, K(nh):17, Action:F, Flags:, QOS:-1, S(nh):49,  Stats:0/0,  SPort 49796,
 TTL 0, Sinfo 0.0.0.0)

(vrouter-agent)[root@compute2-225 /]$ rt --get 40.0.0.6/32 --vrf 2
```

```
Match 40.0.0.6/32 in vRouter inet4 table 0/2/unicast

Flags: L=Label Valid, P=Proxy ARP, T=Trap ARP, F=Flood ARP
vRouter inet4 routing table 0/2/unicast
Destination          PPL        Flags        Label         Nexthop    Stitched MAC(Index)
0.0.0.0/0              0           LP         18             49        -

(vrouter-agent)[root@compute2-225 /]$ nh --get 49
Id:49         Type:Tunnel         Fmly: AF_INET  Rid:0  Ref_cnt:1783       Vrf:0
              Flags:Valid, MPLSoGRE, Etree Root,
              Oif:0 Len:14 Data:2c 6b f5 90 d5 c0 c4 54 44 54 c3 6b 08 00
              Sip:100.0.0.225 Dip:3.3.3.71

(vrouter-agent)[root@compute2-225 /]$ vif --get 0
Vrouter Interface Table

vif0/0      OS: enp5s0f1 (Speed 1000, Duplex 1) NH: 4
            Type:Physical HWaddr:c4:54:44:54:c3:6b IPaddr:0.0.0.0
            Vrf:0 Mcast Vrf:65535 Flags:TcL3L2VpEr QOS:-1 Ref:13
            RX packets:1671009  bytes:186776711 errors:0
            TX packets:2005019  bytes:211884428 errors:0
            Drops:321595

(vrouter-agent)[root@compute2-225 /]$ exit
exit
[root@compute2-225 ~]# tcpdump -i enp5s0f1

IP compute2-225.juniper.net > 3.3.3.71: GREv0, length 92: MPLS (label 18, exp 0, [S], ttl 63) IP 60.0.0.3 >
40.0.0.6: ICMP echo request, id 61185, seq 367, length 64
```

2). Find Flow Direction on MX960 Spine node (60.0.0.3 --> 40.0.0.6: Ping request)

```
jun@MX960_spine# run show interfaces gr-3/0/0.32770
  Logical interface gr-3/0/0.32770 (Index 358) (SNMP ifIndex 1283)
    Flags:  Up  Point-To-Point  SNMP-Traps  0x4000  IP-Header  100.0.0.225:3.3.3.71:47:df:64:0000000800000000
Encapsulation: GRE-NULL
    Copy-tos-to-outer-ip-header: Off, Copy-tos-to-outer-ip-header-transit: Off
    force-control-packets-on-transit-path: Off
    Gre keepalives configured: Off, Gre keepalives adjacency state: down
    Input packets : 230  <== increasing.
    Output packets: 0
    Protocol inet, MTU: 1476
    Max nh cache: 0, New hold nh limit: 0, Curr nh cnt: 0, Curr new hold cnt: 0, NH drop cnt: 0
      Flags: None
    Protocol mpls, MTU: 1464, Maximum labels: 3
      Flags: Is-Primary


jun@MX960_spine# run show route table mpls.0

mpls.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

18                 *[VPN/0] 18:59:29
```

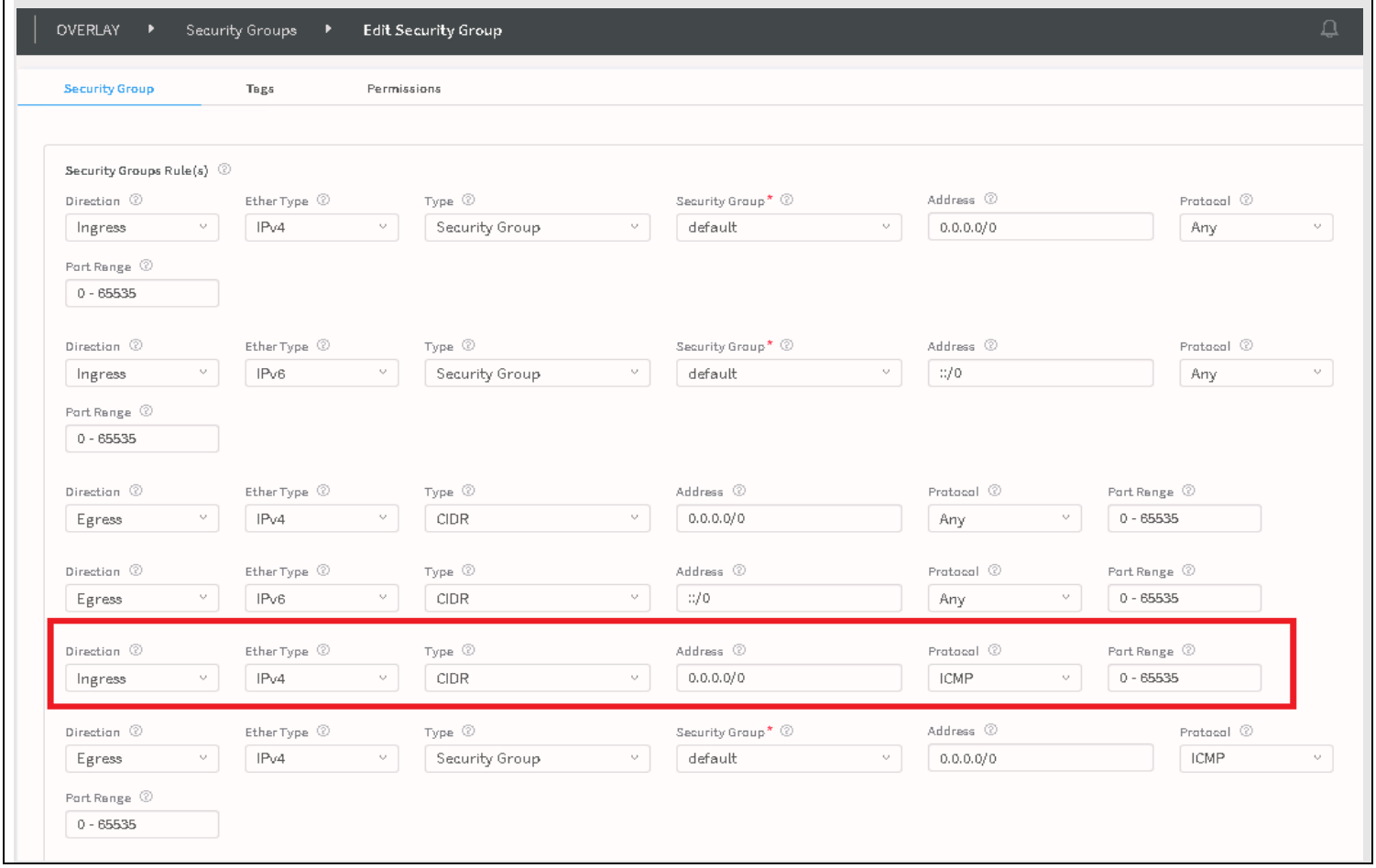
```
                    >  via lsi.0 (_contrail_60_net-l3-5), Pop
19                 *[VPN/0] 17:53:53
                    >  via lsi.1 (_contrail_40_net-l3-3), Pop

[edit]
jun@MX960_spine# run show route table _contrail_60_net-l3-5

_contrail_60_net-l3-5.inet.0: 5 destinations, 6 routes (5 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

0.0.0.0/0          *[Static/5] 18:59:42  <= 40.0.0.6 re-direct to inet.0
                       to table inet.0
60.0.0.0/24        *[Direct/0] 17:54:06
                    >  via irb.5
                    [Static/5] 18:59:42
                       Discard
60.0.0.1/32        *[Local/0] 18:59:41
                       Local via irb.5
60.0.0.3/32        *[BGP/170] 17:28:23, MED 100, localpref 200, from 100.0.0.222
                      AS path: ?, validation-state: unverified
                    >  via gr-3/0/0.32770, Push 21
60.0.0.4/32        *[Local/0] 17:54:06
                       Local via irb.5

_contrail_60_net-l3-5.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

ff02::2/128        *[INET6/0] 18:59:42
                       MultiRecv


[edit]
jun@MX960_spine# show forwarding-options | display inheritance
##
## 'inet' was inherited from group '__contrail_overlay_networking__'
##
family inet {
    ##
    ## 'filter' was inherited from group '__contrail_overlay_networking__'
    ##
    filter {
        ##
        ## 'redirect_to_public_vrf_filter' was inherited from group '__contrail_overlay_networking__'
        ##
        input redirect_to_public_vrf_filter;
    }
}

[edit]
jun@MX960_spine# show | display set | match "redirect_to_public_vrf_filter"

set groups __contrail_overlay_networking__ forwarding-options family inet filter input redirect_to_public_vrf_filter
set groups __contrail_overlay_networking__ firewall family inet filter redirect_to_public_vrf_filter term term-3 from destination-address 40.0.0.0/24
set groups __contrail_overlay_networking__ firewall family inet filter redirect_to_public_vrf_filter term term-3 then routing-instance _contrail_40_net-l3-3

[edit]
```

```
jun@MX960_spine# run show route table _contrail_40_net-l3-3

_contrail_40_net-l3-3.inet.0: 6 destinations, 7 routes (6 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

0.0.0.0/0          *[Static/5] 17:55:12
                       to table inet.0
40.0.0.0/24        *[Direct/0] 17:55:12
                    >  via irb.3
                    [Static/5] 17:55:12
                       Discard
40.0.0.1/32        *[Local/0] 17:55:12
                       Local via irb.3
40.0.0.3/32        *[BGP/170] 17:55:07, MED 100, localpref 200, from 100.0.0.222
                      AS path: ?, validation-state: unverified
                    >  via gr-3/0/0.32769, Push 21
40.0.0.4/32        *[Local/0] 17:55:12
                       Local via irb.3
40.0.0.6/32        *[BGP/170] 17:55:07, MED 100, localpref 200, from 100.0.0.222
                      AS path: ?, validation-state: unverified
                    >  via gr-3/0/0.32769, Push 37  <== GRE encap MPLS label 37


[edit]
jun@MX960_spine# run show interfaces gr-3/0/0.32769
  Logical interface gr-3/0/0.32769 (Index 367) (SNMP ifIndex 1282)
    Flags: Up Point-To-Point SNMP-Traps 0x4000 IP-Header 100.0.0.224:3.3.3.71:47:df:64:0000000800000000
Encapsulation: GRE-NULL
    Copy-tos-to-outer-ip-header: Off, Copy-tos-to-outer-ip-header-transit: Off
    force-control-packets-on-transit-path: Off
    Gre keepalives configured: Off, Gre keepalives adjacency state: down
    Input packets : 0
    Output packets: 160  <===== packet going out. But no PING reply..let's see below why..
    Protocol inet, MTU: 1476
    Max nh cache: 0, New hold nh limit: 0, Curr nh cnt: 0, Curr new hold cnt: 0, NH drop cnt: 0
      Flags: None
    Protocol mpls, MTU: 1464, Maximum labels: 3
      Flags: None
```

```
3). Find Flow Direction on Compute1 node (60.0.0.3 → 40.0.0.6: Ping reply)

[root@compute1-224 ~]# docker exec -it vrouter_vrouter-agent_1 bash

(vrouter-agent)[root@compute1-224 /]$  tcpdump -i enp5s0f1  <==ping packet came in with proper MPLS label.

23:13:47.108782 IP 3.3.3.71 > compute1-224.juniper.net: GREv0, length 92: MPLS (label 37, exp 0, [S], ttl 62)
IP 60.0.0.3 > 40.0.0.6: ICMP echo request, id 61185, seq 1160, length 64


(vrouter-agent)[root@compute1-224 /]$ flow  -l --match 60.0.0.3


Listing flows matching ([60.0.0.3]:*)
```

```
   Index                Source:Port/Destination:Port                    Proto(V)
------------------------------------------------------------------------------
   244092<=>399260      60.0.0.3:61185                                   1 (2)
                        40.0.0.6:0
(Gen: 1, K(nh):50, Action:D(SG), Flags:, QOS:-1, S(nh):29,  Stats:1334/112056,
 SPort 55138, TTL 0, Sinfo 3.3.3.71)
```

For flow "60.0.0.3" Action is D (Drop). Drop reason is SG = Security Group.
Check Security group and modify it properly like below.



4. EVPN route type