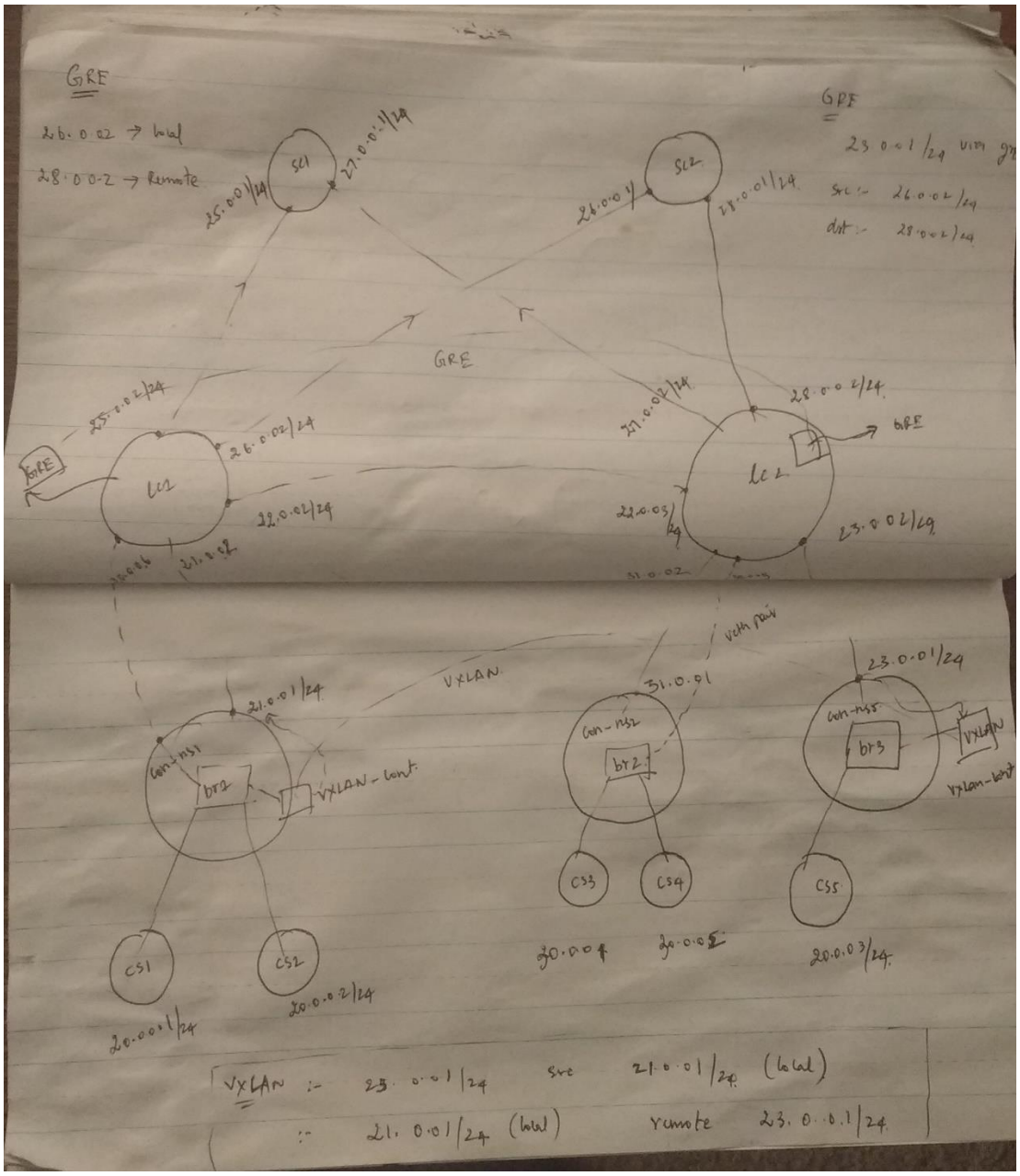
1. Bridge 1 and Bridge 3 are in same network. Traffic between the containers connected to bridge 1 and bridge 3 should use L2 Overlay

Here is the topology and its connections:



Here is the list of containers in the hypervisor

```
[sudo] password for ece792:
root@ece792-Standard-PC-i440FX-PIIX-1996:/home/ece792# docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS               NAMES
6f432419fae6        allutil_image       "/bin/bash"         21 hours ago        Up 21 hours                             lc2
8015c76fb745        allutil_image       "/bin/bash"         21 hours ago        Up 20 hours                             lc1
7119e645b7cb        allutil_image       "/bin/bash"         21 hours ago        Up 21 hours                             sc2
1710f5b6ddca        allutil_image       "/bin/bash"         21 hours ago        Up 21 hours                             sc1
b80ed10ee269        allutil_image       "/bin/bash"         21 hours ago        Up 21 hours                             cs5
2d22bb398409        allutil_image       "/bin/bash"         21 hours ago        Up 21 hours                             cs4
db273ea1445a        allutil_image       "/bin/bash"         21 hours ago        Up 21 hours                             cs3
df6bd55873a3        allutil_image       "/bin/bash"         21 hours ago        Up 21 hours                             cs2
c1a6f8c932cd        allutil_image       "/bin/bash"         21 hours ago        Up 21 hours                             cs1
14dfdf86ed2d        iserver             "/bin/bash"         23 hours ago        Up 23 hours                             CCI
838fa13bcdbf        iserver             "/bin/bash"         23 hours ago        Up 23 hours                             CSI
c98146bde2f2        ubuntu              "/bin/bash"         42 hours ago        Up 42 hours                             base_image
root@ece792-Standard-PC-i440FX-PIIX-1996:/home/ece792#
```

Here is the snapshots of cs1 & cs2 & cs5 containers configs & routes:

CS1-config & Forwarding table :

```
rtt min/avg/max/mdev = 0.256/0.301/0.346/0.045 ms
root@c1a6f8c932cd:/# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: gre0@NONE: <NOARP> mtu 1476 qdisc noop state DOWN group default qlen 1000
    link/gre 0.0.0.0 brd 0.0.0.0
3: gretap0@NONE: <BROADCAST,MULTICAST> mtu 1462 qdisc noop state DOWN group default qlen 1000
    link/ether 00:00:00:00:00:00 brd ff:ff:ff:ff:ff:ff
7: cs1_br1@if8: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether ca:89:60:e4:98:80 brd ff:ff:ff:ff:ff:ff link-netnsid 1
    inet 20.0.0.1/24 scope global cs1_br1
       valid_lft forever preferred_lft forever
    inet6 fe80::c889:60ff:fee4:9880/64 scope link
       valid_lft forever preferred_lft forever
458: eth0@if459: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:ac:11:00:05 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 172.17.0.5/16 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::42:acff:fe11:5/64 scope link
       valid_lft forever preferred_lft forever
root@c1a6f8c932cd:/# route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         172.17.0.1      0.0.0.0         UG    0      0        0 eth0
20.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 cs1_br1
30.0.0.0        20.0.0.6        255.255.255.0   UG    0      0        0 cs1_br1
172.17.0.0      0.0.0.0         255.255.0.0     U     0      0        0 eth0
root@c1a6f8c932cd:/#
```

CS2 config & forwarding table :

```
2 packets transmitted, 2 received, 0% packet loss, time 1002ms
rtt min/avg/max/mdev = 0.273/0.383/0.493/0.110 ms
root@df6bd55873a3:/# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: gre0@NONE: <NOARP> mtu 1476 qdisc noop state DOWN group default qlen 1000
    link/gre 0.0.0.0 brd 0.0.0.0
3: gretap0@NONE: <BROADCAST,MULTICAST> mtu 1462 qdisc noop state DOWN group default qlen 1000
    link/ether 00:00:00:00:00:00 brd ff:ff:ff:ff:ff:ff
11: cs2_br1@if12: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether 66:4a:19:31:4d:16 brd ff:ff:ff:ff:ff:ff link-netnsid 1
    inet 20.0.0.2/24 scope global cs2_br1
       valid_lft forever preferred_lft forever
    inet6 fe80::644a:19ff:fe31:4d16/64 scope link
       valid_lft forever preferred_lft forever
460: eth0@if461: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:ac:11:00:06 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 172.17.0.6/16 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::42:acff:fe11:6/64 scope link
       valid_lft forever preferred_lft forever
root@df6bd55873a3:/# route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         172.17.0.1      0.0.0.0         UG    0      0        0 eth0
20.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 cs2_br1
172.17.0.0      0.0.0.0         255.255.0.0     U     0      0        0 eth0
root@df6bd55873a3:/#
```

CS3 config & forwarding table :

```
root@db273ea1445a:/# ip route add 20.0.0.0/24 via 30.0.0.3
root@db273ea1445a:/# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: gre0@NONE: <NOARP> mtu 1476 qdisc noop state DOWN group default qlen 1000
    link/gre 0.0.0.0 brd 0.0.0.0
3: gretap0@NONE: <BROADCAST,MULTICAST> mtu 1462 qdisc noop state DOWN group default qlen 1000
    link/ether 00:00:00:00:00:00 brd ff:ff:ff:ff:ff:ff
8: cs3-br@if7: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether 52:09:ed:b4:97:30 brd ff:ff:ff:ff:ff:ff link-netnsid 1
    inet 30.0.0.1/24 scope global cs3-br
       valid_lft forever preferred_lft forever
    inet6 fe80::5009:edff:feb4:9730/64 scope link
       valid_lft forever preferred_lft forever
462: eth0@if463: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:ac:11:00:07 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 172.17.0.7/16 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::42:acff:fe11:7/64 scope link
       valid_lft forever preferred_lft forever
root@db273ea1445a:/# route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         172.17.0.1      0.0.0.0         UG    0      0        0 eth0
20.0.0.0        30.0.0.3        255.255.255.0   UG    0      0        0 cs3-br
30.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 cs3-br
172.17.0.0      0.0.0.0         255.255.0.0     U     0      0        0 eth0
root@db273ea1445a:/#
```

Refresh

CS4 config & forwarding table:

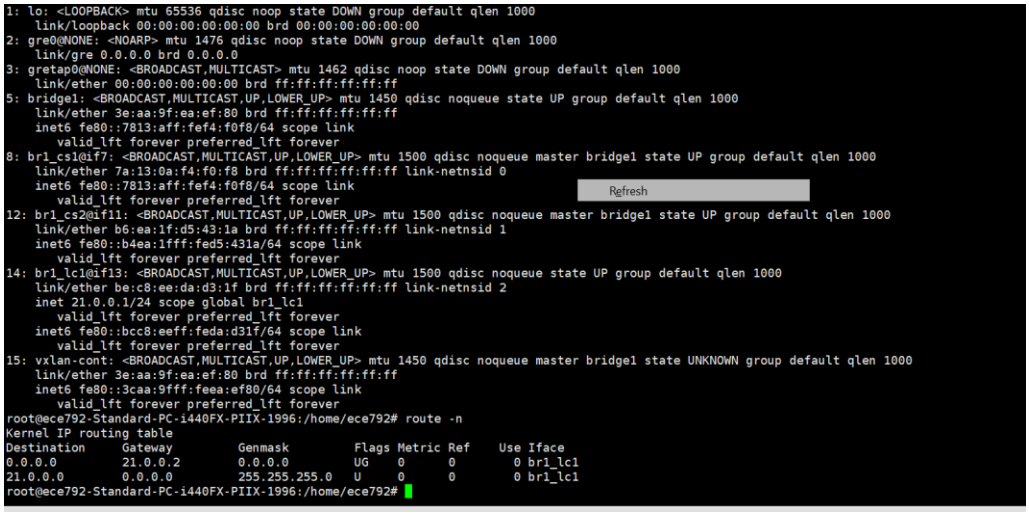
```
rtt min/avg/max/mdev = 0.086/0.086/0.087/0.009 ms
root@2d22bb398409:/# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: gre0@NONE: <NOARP> mtu 1476 qdisc noop state DOWN group default qlen 1000
    link/gre 0.0.0.0 brd 0.0.0.0
3: gretap0@NONE: <BROADCAST,MULTICAST> mtu 1462 qdisc noop state DOWN group default qlen 1000
    link/ether 00:00:00:00:00:00 brd ff:ff:ff:ff:ff:ff
9: cs4-br@if10: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether ae:13:f7:0e:bd:c8 brd ff:ff:ff:ff:ff:ff link-netnsid 1
    inet 30.0.0.2/24 scope global cs4-br
       valid_lft forever preferred_lft forever
    inet6 fe80::ac13:f7ff:fe0e:bdc8/64 scope link
       valid_lft forever preferred_lft forever
464: eth0@if465: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:ac:11:00:08 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 172.17.0.8/16 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::42:acff:fe11:8/64 scope link
       valid_lft forever preferred_lft forever
root@2d22bb398409:/# route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         172.17.0.1      0.0.0.0         UG    0      0        0 eth0
20.0.0.0        30.0.0.3        255.255.255.0   UG    0      0        0 cs4-br
30.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 cs4-br
172.17.0.0      0.0.0.0         255.255.0.0     U     0      0        0 eth0
root@2d22bb398409:/#
```

CS5 config & forwarding table :

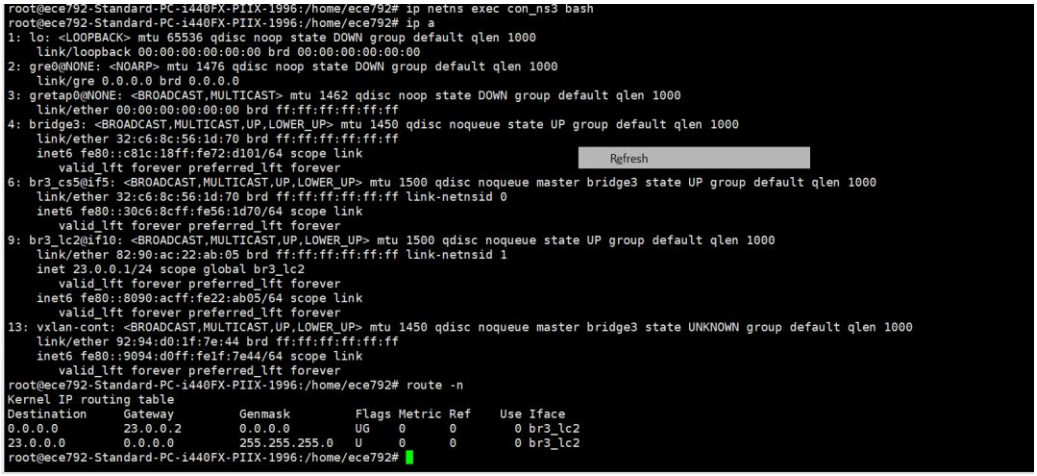
```
Last login: Thu Nov 29 18:33:05 2018 from 192.168.122.1
ece792@ece792-Standard-PC-i440FX-PIIX-1996:~$ sudo su
[sudo] password for ece792:
root@ece792-Standard-PC-i440FX-PIIX-1996:/home/ece792# docker exec -it --privileged cs5 bash
root@b80ed10ee269:/# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: gre0@NONE: <NOARP> mtu 1476 qdisc noop state DOWN group default qlen 1000
    link/gre 0.0.0.0 brd 0.0.0.0
3: gretap0@NONE: <BROADCAST,MULTICAST> mtu 1462 qdisc noop state DOWN group default qlen 1000
    link/ether 00:00:00:00:00:00 brd ff:ff:ff:ff:ff:ff
5: cs5_br3@if6: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether ea:36:90:91:bd:87 brd ff:ff:ff:ff:ff:ff link-netnsid 1
    inet 20.0.0.3/24 scope global cs5_br3
       valid_lft forever preferred_lft forever
    inet6 fe80::e836:90ff:fe91:bd87/64 scope link
       valid_lft forever preferred_lft forever
466: eth0@if467: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:ac:11:00:09 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 172.17.0.9/16 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::42:acff:fe11:9/64 scope link
       valid_lft forever preferred_lft forever
root@b80ed10ee269:/# route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         172.17.0.1      0.0.0.0         UG    0      0        0 eth0
20.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 cs5_br3
172.17.0.0      0.0.0.0         255.255.0.0     U     0      0        0 eth0
root@b80ed10ee269:/#
```

Refresh

Here is the config of con_ns1 namespace which has the bridge (bridge1) connected to cs1 and cs2



Here is the config of con_ns3 which has the bridge3(br3) connected to cs5 container:



Here are the configs of lc1 & lc2 containers :

Lc1 config (leaf container1)

```
    link/ether 00:00:00:00:00:00 brd ff:ff:ff:ff:ff:ff
4: gretun-cont@NONE: <POINTOPOINT,NOARP,UP,LOWER_UP> mtu 1476 qdisc noqueue state UNKNOWN group default qlen 1000
    link/gre 26.0.0.2 peer 28.0.0.2
    inet6 fe80::200:5efe:1a00:2/64 scope link
       valid_lft forever preferred_lft forever
12: lc1_lc2@if11: <BROADCAST,MULTICAST> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether 8a:97:01:83:e1:33 brd ff:ff:ff:ff:ff:ff link-netnsid 5
    inet 22.0.0.2/24 scope global lc1_lc2
       valid_lft forever preferred_lft forever
13: lc1_br1@if14: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether 32:fb:c6:aa:73:50 brd ff:ff:ff:ff:ff:ff link-netnsid 3
    inet 21.0.0.2/24 scope global lc1_br1
       valid_lft forever preferred_lft forever
    inet6 fe80::30fb:c6ff:feaa:7350/64 scope link
       valid_lft forever preferred_lft forever
484: eth0@if485: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:ac:11:00:0c brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 172.17.0.12/16 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::42:acff:fe11:c/64 scope link
       valid_lft forever preferred_lft forever
487: lc1_sc1@if486: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether 02:f8:d0:dc:03:b4 brd ff:ff:ff:ff:ff:ff link-netnsid 1
    inet 25.0.0.2/24 scope global lc1_sc1
       valid_lft forever preferred_lft forever
    inet6 fe80::f8:d0ff:fedc:3b4/64 scope link
       valid_lft forever preferred_lft forever
489: lc1_sc2@if488: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether 72:de:43:b4:d1:64 brd ff:ff:ff:ff:ff:ff link-netnsid 2
    inet 26.0.0.2/24 scope global lc1_sc2
       valid_lft forever preferred_lft forever
    inet6 fe80::70de:43ff:feb4:d164/64 scope link
       valid_lft forever preferred_lft forever
root@8015c76fb745:/#
```

Refresh

Forwarding table of lc1:

```
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         172.17.0.1      0.0.0.0         UG    0      0        0 eth0
20.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 lc1-bridge1
21.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 lc1_br1
23.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 gretun-cont
25.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 lc1_sc1
26.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 lc1_sc2
27.0.0.0        25.0.0.1        255.255.255.0   UG    0      0        0 lc1_sc1
28.0.0.0        26.0.0.1        255.255.255.0   UG    0      0        0 lc1_sc2
30.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 gretun-cont
41.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 lc1-csX-ns
43.0.0.0        26.0.0.1        255.255.255.0   UG    0      0        0 lc1_sc2
100.0.0.0       0.0.0.0         255.255.255.0   U     0      0        0 lc1-csX1-br
101.0.0.0       0.0.0.0         255.255.255.0   U     0      0        0 gretun-csX1
110.0.0.0       0.0.0.0         255.255.255.0   U     0      0        0 lc1-csA-br
111.0.0.0       26.0.0.1        255.255.255.0   UG    0      0        0 lc1_sc2
172.17.0.0      0.0.0.0         255.255.0.0     U     0      0        0 eth0
root@8015c76fb745:/#
```

LC2 config (lc2) config :

```
6: gretun-cont@NONE: <POINTOPOINT,NOARP,UP,LOWER_UP> mtu 1476 qdisc noqueue state UNKNOWN group default qlen 1000
    link/gre 28.0.0.2 peer 26.0.0.2
    inet6 fe80::200:5efe:1c00:2/64 scope link
       valid_lft forever preferred_lft forever
10: lc2_br3@if9: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether ea:31:a6:3c:b0:32 brd ff:ff:ff:ff:ff:ff link-netnsid 3
    inet 23.0.0.2/24 scope global lc2_br3
       valid_lft forever preferred_lft forever
    inet6 fe80::e831:a6ff:fe3c:b032/64 scope link
       valid_lft forever preferred_lft forever
11: lc2_lc1@if12: <BROADCAST,MULTICAST> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether 5e:cd:16:70:e7:08 brd ff:ff:ff:ff:ff:ff link-netnsid 4
    inet 22.0.0.3/24 scope global lc2_lc1
       valid_lft forever preferred_lft forever
474: eth0@if475: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:ac:11:00:0d brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 172.17.0.13/16 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::42:acff:fe11:d/64 scope link
       valid_lft forever preferred_lft forever
481: lc2_sc1@if480: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether 52:b0:b1:40:4a:a0 brd ff:ff:ff:ff:ff:ff link-netnsid 1
    inet 27.0.0.2/24 scope global lc2_sc1
       valid_lft forever preferred_lft forever
    inet6 fe80::50b0:b1ff:fe40:4aa0/64 scope link
       valid_lft forever preferred_lft forever
483: lc2_sc2@if482: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether 2a:74:8f:95:32:78 brd ff:ff:ff:ff:ff:ff link-netnsid 2
    inet 28.0.0.2/24 scope global lc2_sc2
       valid_lft forever preferred_lft forever
    inet6 fe80::2874:8fff:fe95:3278/64 scope link
       valid_lft forever preferred_lft forever
root@6f432419fae6:/#
```

Refresh

Forwarding table of lc2:

```
root@6f432419fae6:/# route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         172.17.0.1      0.0.0.0         UG    0      0        0 eth0
20.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 gretun-cont
21.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 gretun-cont
23.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 lc2_br3
25.0.0.0        27.0.0.1        255.255.255.0   UG    0      0        0 lc2_sc1
26.0.0.0        28.0.0.1        255.255.255.0   UG    0      0        0 lc2_sc2
27.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 lc2_sc1
28.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 lc2_sc2
30.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 lc2-br2
41.0.0.0        28.0.0.1        255.255.255.0   UG    0      0        0 lc2_sc2
43.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 lc2-csY-ns
100.0.0.0       0.0.0.0         255.255.255.0   U     0      0        0 gretun-csY1
101.0.0.0       0.0.0.0         255.255.255.0   U     0      0        0 lc2-csY1-br
110.0.0.0       28.0.0.1        255.255.255.0   UG    0      0        0 lc2_sc2
111.0.0.0       0.0.0.0         255.255.255.0   U     0      0        0 lc2-csB-br
172.17.0.0      0.0.0.0         255.255.0.0     U     0      0        0 eth0
root@6f432419fae6:/#
```

sc1 config & forward table:

```
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: gre0@NONE: <NOARP> mtu 1476 qdisc noop state DOWN group default qlen 1000
    link/gre 0.0.0.0 brd 0.0.0.0
3: gretap0@NONE: <BROADCAST,MULTICAST> mtu 1462 qdisc noop state DOWN group default qlen 1000
    link/ether 00:00:00:00:00:00 brd ff:ff:ff:ff:ff:ff
468: eth0@if469: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:ac:11:00:0a brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 172.17.0.10/16 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::42:acff:fe11:a/64 scope link
       valid_lft forever preferred_lft forever
480: sc1_lc2@if481: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether 6e:6f:74:a1:53:cc brd ff:ff:ff:ff:ff:ff link-netnsid 2
    inet 27.0.0.1/24 scope global sc1_lc2
       valid_lft forever preferred_lft forever
    inet6 fe80::6c6f:74ff:fea1:53cc/64 scope link
       valid_lft forever preferred_lft forever
486: sc1_lc1@if487: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether 72:45:bc:3e:1e:a1 brd ff:ff:ff:ff:ff:ff link-netnsid 1
    inet 25.0.0.1/24 scope global sc1_lc1
       valid_lft forever preferred_lft forever
    inet6 fe80::7045:bcff:fe3e:1ea1/64 scope link
       valid_lft forever preferred_lft forever
root@1710f5b6ddca:/# route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         172.17.0.1      0.0.0.0         UG    0      0        0 eth0
25.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 sc1_lc1
27.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 sc1_lc2
172.17.0.0      0.0.0.0         255.255.0.0     U     0      0        0 eth0
root@1710f5b6ddca:/#
```

Refresh

Sc2 config & forwarding table:

```
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: gre0@NONE: <NOARP> mtu 1476 qdisc noop state DOWN group default qlen 1000
    link/gre 0.0.0.0 brd 0.0.0.0
3: gretap0@NONE: <BROADCAST,MULTICAST> mtu 1462 qdisc noop state DOWN group default qlen 1000
    link/ether 00:00:00:00:00:00 brd ff:ff:ff:ff:ff:ff
470: eth0@if471: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:ac:11:00:0b brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 172.17.0.11/16 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::42:acff:fe11:b/64 scope link
       valid_lft forever preferred_lft forever
482: sc2_lc2@if483: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether ca:81:a7:25:97:67 brd ff:ff:ff:ff:ff:ff link-netnsid 2
    inet 28.0.0.1/24 scope global sc2_lc2
       valid_lft forever preferred_lft forever
    inet6 fe80::c881:a7ff:fe25:9767/64 scope link
       valid_lft forever preferred_lft forever
488: sc2_lc1@if489: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether 06:15:d5:2e:26:61 brd ff:ff:ff:ff:ff:ff link-netnsid 1
    inet 26.0.0.1/24 scope global sc2_lc1
       valid_lft forever preferred_lft forever
    inet6 fe80::415:d5ff:fe2e:2661/64 scope link
       valid_lft forever preferred_lft forever
root@7119e645b7cb:/# route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         172.17.0.1      0.0.0.0         UG    0      0        0 eth0
26.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 sc2_lc1
28.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 sc2_lc2
172.17.0.0      0.0.0.0         255.255.0.0     U     0      0        0 eth0
root@7119e645b7cb:/#
```

Refresh

Vxlan configuration in con_ns1 namespace:

```
root@ece792-Standard-PC-i440FX-PIIX-1996:/home/ece792# ip -d link vxlan-cont
Command "vxlan-cont" is unknown, try "ip link help".
root@ece792-Standard-PC-i440FX-PIIX-1996:/home/ece792# ip -d link show vxlan-cont
15: vxlan-cont: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1450 qdisc noqueue master bridge1 state UNKNOWN mode DEFAULT group default qlen 1000
    link/ether 3e:aa:9f:ea:ef:80 brd ff:ff:ff:ff:ff:ff promiscuity 1
    vxlan id 30 remote 23.0.0.1 dev br1_lc1 srcport 0 0 dstport 4900 ageing 300
    bridge_slave state forwarding priority 32 cost 100 hairpin off guard off root_block off fastleave off learning on flood on addrgenmode eui64
root@ece792-Standard-PC-i440FX-PIIX-1996:/home/ece792#
```

Vxlan configuration in con_ns3 namespace :

```
root@ece792-Standard-PC-i440FX-PIIX-1996:/home/ece792# ip -d link show vxlan-cont
13: vxlan-cont: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1450 qdisc noqueue master bridge3 state UNKNOWN mode DEFAULT group default qlen 1000
    link/ether 92:94:d0:1f:7e:44 brd ff:ff:ff:ff:ff:ff promiscuity 1
    vxlan id 30 remote 21.0.0.1 dev br3_lc2 srcport 0 0 dstport 4900 ageing 300
    bridge_slave state forwarding priority 32 cost 100 hairpin off guard off root_block off fastleave off learning on flood on addrgenmode eui64
root@ece792-Standard-PC-i440FX-PIIX-1996:/home/ece792#
```

Gre tunnel configuration in lc1:

```
root@8015c76fb745:/# ip tunnel show
gretun-cont: gre/ip remote 28.0.0.2 local 26.0.0.2 ttl inherit
gre0: gre/ip remote any local any ttl inherit nopmtudisc
root@8015c76fb745:/#
```

Gre tunnel configuration in lc2:

```
root@6f432419fae6:/# ip tunnel show
gre0: gre/ip remote any local any ttl inherit nopmtudisc
gretun-cont: gre/ip remote 26.0.0.2 local 28.0.0.2 ttl inherit
root@6f432419fae6:/#
```

Packet capture at cs1 (20.0.0.1) connected to lc1 via bridge1 to cs5 (20.0.0.3) which is connected to bridge3 to lc2:

Packet capture at cs1:

```
root@c1a6f8c932cd:/# ping 20.0.0.3
PING 20.0.0.3 (20.0.0.3) 56(84) bytes of data.
64 bytes from 20.0.0.3: icmp_seq=1 ttl=64 time=0.271 ms
64 bytes from 20.0.0.3: icmp_seq=2 ttl=64 time=0.275 ms
64 bytes from 20.0.0.3: icmp_seq=3 ttl=64 time=0.242 ms
64 bytes from 20.0.0.3: icmp_seq=4 ttl=64 time=0.280 ms
64 bytes from 20.0.0.3: icmp_seq=5 ttl=64 time=0.224 ms
64 bytes from 20.0.0.3: icmp_seq=6 ttl=64 time=0.264 ms
64 bytes from 20.0.0.3: icmp_seq=7 ttl=64 time=0.195 ms
64 bytes from 20.0.0.3: icmp_seq=8 ttl=64 time=0.192 ms
64 bytes from 20.0.0.3: icmp_seq=9 ttl=64 time=0.199 ms
64 bytes from 20.0.0.3: icmp_seq=10 ttl=64 time=0.269 ms
64 bytes from 20.0.0.3: icmp_seq=11 ttl=64 time=0.194 ms
64 bytes from 20.0.0.3: icmp_seq=12 ttl=64 time=0.189 ms
^C
--- 20.0.0.3 ping statistics ---
12 packets transmitted, 12 received, 0% packet loss, time 11249ms
rtt min/avg/max/mdev = 0.189/0.232/0.280/0.041 ms
root@c1a6f8c932cd:/# ping 20.0.0.2
PING 20.0.0.2 (20.0.0.2) 56(84) bytes of data.
64 bytes from 20.0.0.2: icmp_seq=1 ttl=64 time=0.172 ms
64 bytes from 20.0.0.2: icmp_seq=2 ttl=64 time=0.084 ms
64 bytes from 20.0.0.2: icmp_seq=3 ttl=64 time=0.084 ms
64 bytes from 20.0.0.2: icmp_seq=4 ttl=64 time=0.090 ms
64 bytes from 20.0.0.2: icmp_seq=5 ttl=64 time=0.094 ms
64 bytes from 20.0.0.2: icmp_seq=6 ttl=64 time=0.108 ms
64 bytes from 20.0.0.2: icmp_seq=7 ttl=64 time=0.108 ms
64 bytes from 20.0.0.2: icmp_seq=8 ttl=64 time=0.087 ms
64 bytes from 20.0.0.2: icmp_seq=9 ttl=64 time=0.083 ms
^C
--- 20.0.0.2 ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 8198ms
rtt min/avg/max/mdev = 0.083/0.101/0.172/0.027 ms
root@c1a6f8c932cd:/#
```

Packet capture at **lc1-br1**(after vxlan encapsulation at lc1 entry interface):

VXLAN tunnel encapsulation at con_ns1 namespace:

local: 21.0.0.1 remote :23.0.0.1

```
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on lc1_br1, link-type EN10MB (Ethernet), capture size 262144 bytes
23:29:04.283293 IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:29:04.283438 IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:29:05.313148 IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:29:05.313335 IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:29:06.337191 IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:29:06.340126 IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:29:07.338395 IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:29:07.338592 IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:29:08.353429 IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:29:08.353566 IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:29:09.345001 ARP, Request who-has 21.0.0.1 tell 21.0.0.2, length 28
23:29:09.345071 ARP, Request who-has 21.0.0.2 tell 21.0.0.1, length 28
23:29:09.345259 ARP, Reply 21.0.0.2 is-at 32:fb:c6:aa:73:50, length 28
23:29:09.345166 ARP, Reply 21.0.0.1 is-at be:c8:ee:da:d3:1f, length 28
23:29:09.345306 IP 21.0.0.1.35691 > 23.0.0.1.4900: UDP, length 50
23:29:09.345415 IP 23.0.0.1.35691 > 21.0.0.1.4900: UDP, length 50
23:29:09.345477 IP 21.0.0.1.35691 > 23.0.0.1.4900: UDP, length 50
23:29:09.377116 IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:29:09.377238 IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:29:10.401201 IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:29:10.401417 IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:29:11.425124 IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:29:11.425262 IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:29:12.449126 IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:29:12.449266 IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
^C
25 packets captured
26 packets received by filter
1 packet dropped by kernel
```

Refresh

Packet capture at sc2_lc1 interface (at sc2 ----lc1) link after the GRE encapsulation at GRE tunnel in lc1

GRE tunnel at lc1:

Local ip :26.0.0.2 remote ip: 28.0.0.2

```
root@7119e645b7cb:/# tcpdump -i sc2_lc1 -nn
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on sc2_lc1, link-type EN10MB (Ethernet), capture size 262144 bytes
23:18:47.077109 IP 26.0.0.2 > 28.0.0.2: GREv0, length 138: IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:18:47.077202 IP 28.0.0.2 > 26.0.0.2: GREv0, length 138: IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:18:48.097184 IP 26.0.0.2 > 28.0.0.2: GREv0, length 138: IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:18:48.097325 IP 28.0.0.2 > 26.0.0.2: GREv0, length 138: IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:18:49.121149 IP 26.0.0.2 > 28.0.0.2: GREv0, length 138: IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:18:49.121413 IP 28.0.0.2 > 26.0.0.2: GREv0, length 138: IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:18:50.145131 IP 26.0.0.2 > 28.0.0.2: GREv0, length 138: IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:18:50.145287 IP 28.0.0.2 > 26.0.0.2: GREv0, length 138: IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:18:51.169152 IP 26.0.0.2 > 28.0.0.2: GREv0, length 138: IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:18:51.169301 IP 28.0.0.2 > 26.0.0.2: GREv0, length 138: IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:18:52.193132 IP 26.0.0.2 > 28.0.0.2: GREv0, length 138: IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:18:52.193310 IP 28.0.0.2 > 26.0.0.2: GREv0, length 138: IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:18:53.217179 IP 26.0.0.2 > 28.0.0.2: GREv0, length 138: IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:18:53.217421 IP 28.0.0.2 > 26.0.0.2: GREv0, length 138: IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
^C
14 packets captured
14 packets received by filter
0 packets dropped by kernel
```

Packet capture at lc2_sc1 (interface between lc2 and con_ns3 namespace)

Have only the vxlan encapsulation.

```
root@6f432419fae6:/#
root@6f432419fae6:/# tcpdump -i lc2_sc2 -nn
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on lc2_sc2, link-type EN10MB (Ethernet), capture size 262144 bytes
23:31:39.905200 IP 26.0.0.2 > 28.0.0.2: GREv0, length 138: IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:31:39.905316 IP 28.0.0.2 > 26.0.0.2: GREv0, length 138: IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:31:40.929100 IP 26.0.0.2 > 28.0.0.2: GREv0, length 138: IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:31:40.929178 IP 28.0.0.2 > 26.0.0.2: GREv0, length 138: IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:31:41.953239 IP 26.0.0.2 > 28.0.0.2: GREv0, length 138: IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:31:41.953355 IP 28.0.0.2 > 26.0.0.2: GREv0, length 138: IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:31:42.977241 IP 26.0.0.2 > 28.0.0.2: GREv0, length 138: IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:31:42.977368 IP 28.0.0.2 > 26.0.0.2: GREv0, length 138: IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:31:44.001246 IP 26.0.0.2 > 28.0.0.2: GREv0, length 138: IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:31:44.001373 IP 28.0.0.2 > 26.0.0.2: GREv0, length 138: IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:31:45.025214 IP 26.0.0.2 > 28.0.0.2: GREv0, length 138: IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:31:45.025337 IP 28.0.0.2 > 26.0.0.2: GREv0, length 138: IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:31:46.049215 IP 26.0.0.2 > 28.0.0.2: GREv0, length 138: IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:31:46.049336 IP 28.0.0.2 > 26.0.0.2: GREv0, length 138: IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:31:47.073210 IP 26.0.0.2 > 28.0.0.2: GREv0, length 138: IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:31:47.073328 IP 28.0.0.2 > 26.0.0.2: GREv0, length 138: IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
23:31:48.097168 IP 26.0.0.2 > 28.0.0.2: GREv0, length 138: IP 21.0.0.1.40809 > 23.0.0.1.4900: UDP, length 106
23:31:48.097256 IP 28.0.0.2 > 26.0.0.2: GREv0, length 138: IP 23.0.0.1.40809 > 21.0.0.1.4900: UDP, length 106
^C
18 packets captured
18 packets received by filter
0 packets dropped by kernel
```

Packet capture at cs5:

Both VXLAN and GRE headers have been decapsulated at this point.

```
root@b80ed10ee269:/# tcpdump -i cs5_br3
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on cs5_br3, link-type EN10MB (Ethernet), capture size 262144 bytes
23:14:14.305194 IP 20.0.0.1 > 20.0.0.3: ICMP echo request, id 84, seq 26, length 64
23:14:14.305225 IP 20.0.0.3 > 20.0.0.1: ICMP echo reply, id 84, seq 26, length 64
23:14:15.329341 IP 20.0.0.1 > 20.0.0.3: ICMP echo request, id 84, seq 27, length 64
23:14:15.329365 IP 20.0.0.3 > 20.0.0.1: ICMP echo reply, id 84, seq 27, length 64
23:14:16.353270 IP 20.0.0.1 > 20.0.0.3: ICMP echo request, id 84, seq 28, length 64
23:14:16.353312 IP 20.0.0.3 > 20.0.0.1: ICMP echo reply, id 84, seq 28, length 64
23:14:17.377288 IP 20.0.0.1 > 20.0.0.3: ICMP echo request, id 84, seq 29, length 64
23:14:17.377325 IP 20.0.0.3 > 20.0.0.1: ICMP echo reply, id 84, seq 29, length 64
23:14:18.401209 IP 20.0.0.1 > 20.0.0.3: ICMP echo request, id 84, seq 30, length 64
23:14:18.401234 IP 20.0.0.3 > 20.0.0.1: ICMP echo reply, id 84, seq 30, length 64
23:14:19.425281 IP 20.0.0.1 > 20.0.0.3: ICMP echo request, id 84, seq 31, length 64
23:14:19.425313 IP 20.0.0.3 > 20.0.0.1: ICMP echo reply, id 84, seq 31, length 64
23:14:20.449162 IP 20.0.0.1 > 20.0.0.3: ICMP echo request, id 84, seq 32, length 64
23:14:20.449185 IP 20.0.0.3 > 20.0.0.1: ICMP echo reply, id 84, seq 32, length 64
23:14:20.513130 ARP, Request who-has 20.0.0.3 tell 20.0.0.1, length 28
23:14:20.513145 ARP, Reply 20.0.0.3 is-at ea:36:90:91:bd:87 (oui Unknown), length 28
23:14:21.473201 IP 20.0.0.1 > 20.0.0.3: ICMP echo request, id 84, seq 33, length 64
23:14:21.473233 IP 20.0.0.3 > 20.0.0.1: ICMP echo reply, id 84, seq 33, length 64
^C
18 packets captured
18 packets received by filter
```

Refresh

Pinging between the cs1 (20.0.0.1) cs3 (30.0.0.1) and cs4(30.0.0.2)

Capture at cs1 :

```
172.17.0.0      0.0.0.0         255.255.0.0     U     0      0        0 eth0
root@c1a6f8c932cd:/# ping 30.0.0.1
PING 30.0.0.1 (30.0.0.1) 56(84) bytes of data.
64 bytes from 30.0.0.1: icmp_seq=1 ttl=62 time=0.280 ms
64 bytes from 30.0.0.1: icmp_seq=2 ttl=62 time=0.185 ms
64 bytes from 30.0.0.1: icmp_seq=3 ttl=62 time=0.244 ms
64 bytes from 30.0.0.1: icmp_seq=4 ttl=62 time=0.166 ms
64 bytes from 30.0.0.1: icmp_seq=5 ttl=62 time=0.168 ms
64 bytes from 30.0.0.1: icmp_seq=6 ttl=62 time=0.166 ms
64 bytes from 30.0.0.1: icmp_seq=7 ttl=62 time=0.213 ms
64 bytes from 30.0.0.1: icmp_seq=8 ttl=62 time=0.165 ms
64 bytes from 30.0.0.1: icmp_seq=9 ttl=62 time=0.166 ms
64 bytes from 30.0.0.1: icmp_seq=10 ttl=62 time=0.274 ms
^C
--- 30.0.0.1 ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9162ms
rtt min/avg/max/mdev = 0.165/0.202/0.280/0.047 ms
root@c1a6f8c932cd:/# ping 30.0.0.2
PING 30.0.0.2 (30.0.0.2) 56(84) bytes of data.
64 bytes from 30.0.0.2: icmp_seq=1 ttl=62 time=0.283 ms
64 bytes from 30.0.0.2: icmp_seq=2 ttl=62 time=0.258 ms
64 bytes from 30.0.0.2: icmp_seq=3 ttl=62 time=0.266 ms
64 bytes from 30.0.0.2: icmp_seq=4 ttl=62 time=0.263 ms
64 bytes from 30.0.0.2: icmp_seq=5 ttl=62 time=0.220 ms
64 bytes from 30.0.0.2: icmp_seq=6 ttl=62 time=0.179 ms
64 bytes from 30.0.0.2: icmp_seq=7 ttl=62 time=0.259 ms
^C
--- 30.0.0.2 ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6133ms
rtt min/avg/max/mdev = 0.179/0.246/0.283/0.038 ms
root@c1a6f8c932cd:/#
```

Capture at gretun-cont in lc1:

```
root@8015c76fb745:/# tcpdmp -i gretun-cont -nn
bash: tcpdmp: command not found
root@8015c76fb745:/# tcpdump -i gretun-cont -nn
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on gretun-cont, link-type LINUX_SLL (Linux cooked), capture size 262144 bytes
02:06:09.121326 IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 48, length 64
02:06:09.121492 IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 48, length 64
02:06:10.145195 IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 49, length 64
02:06:10.145346 IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 49, length 64
02:06:11.169316 IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 50, length 64
02:06:11.180379 IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 50, length 64
02:06:12.169643 IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 51, length 64
02:06:12.169745 IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 51, length 64
02:06:13.185133 IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 52, length 64
02:06:13.185326 IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 52, length 64
^C
10 packets captured
10 packets received by filter
```

Capture at gretun in lc2:

```
root@8015c76fb745:/# tcpdmp -i gretun-cont -nn
bash: tcpdmp: command not found
root@8015c76fb745:/# tcpdump -i gretun-cont -nn
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on gretun-cont, link-type LINUX_SLL (Linux cooked), capture size 262144 bytes
02:06:09.121326 IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 48, length 64
02:06:09.121492 IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 48, length 64
02:06:10.145195 IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 49, length 64
02:06:10.145346 IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 49, length 64
02:06:11.169316 IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 50, length 64
02:06:11.180379 IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 50, length 64
02:06:12.169643 IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 51, length 64
02:06:12.169745 IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 51, length 64
02:06:13.185133 IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 52, length 64
02:06:13.185326 IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 52, length 64
^C
10 packets captured
10 packets received by filter
```

Capture at sc2-lc1 node (connection between lc1-sc2):

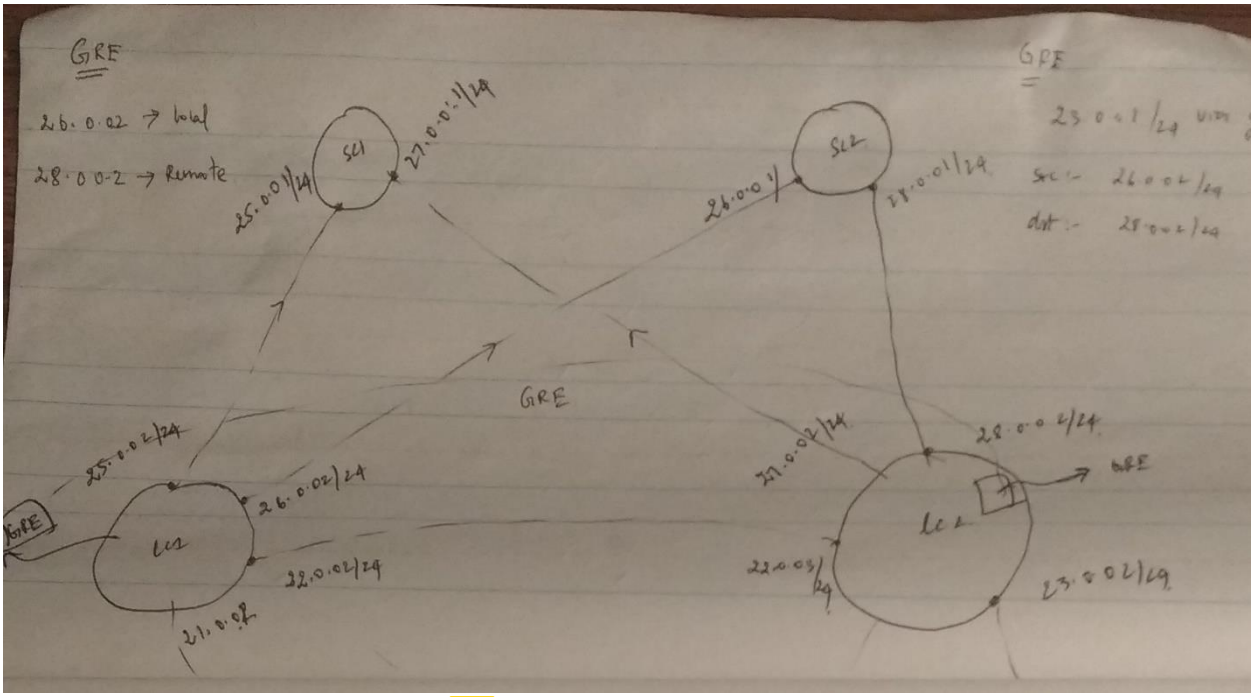
```
root@7119e645b7cb:/# tcpdump -i sc2_lc1 -nn
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on sc2_lc1, link-type EN10MB (Ethernet), capture size 262144 bytes
02:10:26.017274 IP 26.0.0.2 > 28.0.0.2: GREv0, length 88: IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 299, length 64
02:10:26.017390 IP 28.0.0.2 > 26.0.0.2: GREv0, length 88: IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 299, length 64
02:10:27.041312 IP 26.0.0.2 > 28.0.0.2: GREv0, length 88: IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 300, length 64
02:10:27.041450 IP 28.0.0.2 > 26.0.0.2: GREv0, length 88: IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 300, length 64
02:10:28.065124 IP 26.0.0.2 > 28.0.0.2: GREv0, length 88: IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 301, length 64
02:10:28.065220 IP 28.0.0.2 > 26.0.0.2: GREv0, length 88: IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 301, length 64
02:10:29.089135 IP 26.0.0.2 > 28.0.0.2: GREv0, length 88: IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 302, length 64
02:10:29.089223 IP 28.0.0.2 > 26.0.0.2: GREv0, length 88: IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 302, length 64
02:10:30.113163 IP 26.0.0.2 > 28.0.0.2: GREv0, length 88: IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 303, length 64
02:10:30.113287 IP 28.0.0.2 > 26.0.0.2: GREv0, length 88: IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 303, length 64
02:10:31.137165 IP 26.0.0.2 > 28.0.0.2: GREv0, length 88: IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 304, length 64
02:10:31.137266 IP 28.0.0.2 > 26.0.0.2: GREv0, length 88: IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 304, length 64
02:10:32.161115 IP 26.0.0.2 > 28.0.0.2: GREv0, length 88: IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 305, length 64
02:10:32.161230 IP 28.0.0.2 > 26.0.0.2: GREv0, length 88: IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 305, length 64
^C
14 packets captured
14 packets received by filter
```

Capture at cs4 :

```
root@2d22bb398409:/# tcpdump -i cs4-br
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on cs4-br, link-type EN10MB (Ethernet), capture size 262144 bytes
02:12:07.393162 IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 398, length 64
02:12:07.393189 IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 398, length 64
02:12:08.417199 IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 399, length 64
02:12:08.417235 IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 399, length 64
02:12:09.441221 IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 400, length 64
02:12:09.441266 IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 400, length 64
02:12:09.569031 ARP, Request who-has 30.0.0.2 tell 30.0.0.3, length 28
02:12:09.569062 ARP, Reply 30.0.0.2 is-at ae:13:f7:0e:bd:c8 (oui Unknown), length 28
02:12:10.465212 IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 401, length 64
02:12:10.465248 IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 401, length 64
02:12:11.489174 IP 20.0.0.1 > 30.0.0.2: ICMP echo request, id 167, seq 402, length 64
02:12:11.489201 IP 30.0.0.2 > 20.0.0.1: ICMP echo reply, id 167, seq 402, length 64
^C
12 packets captured
12 packets received by filter
0 packets dropped by kernel
root@2d22bb398409:/#
```

(Part2):

The lc1 and lc2 and sc1 and sc2 topology and configurations are below.



Please refer to Readme file.

2.1 Iperf performance on the virtual machines:

Iperf output on the client VM:

```
iperf Done.
[root@client ~]# iperf3 -c 10.0.0.2 -u -b 0
Connecting to host 10.0.0.2, port 5201
[  4] local 10.0.0.1 port 53014 connected to 10.0.0.2 port 5201
[ ID] Interval           Transfer     Bandwidth       Total Datagrams
[  4]   0.00-1.01   sec  1.39 MBytes  11.6 Mbits/sec  1010
[  4]   1.01-2.01   sec  1.37 MBytes  11.4 Mbits/sec  990
[  4]   2.01-3.01   sec  1.10 MBytes  9.28 Mbits/sec  800
[  4]   3.01-4.01   sec  1.08 MBytes  9.05 Mbits/sec  780
[  4]   4.01-5.02   sec   594 KBytes  4.83 Mbits/sec  420
[  4]   5.02-6.00   sec  1004 KBytes  8.35 Mbits/sec  710
[  4]   6.00-7.00   sec  1.35 MBytes  11.4 Mbits/sec  980
[  4]   7.00-8.01   sec  1.44 MBytes  12.0 Mbits/sec  1040
[  4]   8.01-9.01   sec  1.20 MBytes  10.0 Mbits/sec  870
[  4]   9.01-10.01  sec  1.41 MBytes  11.8 Mbits/sec  1020
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bandwidth       Jitter    Lost/Total Datagrams
[  4]   0.00-10.01  sec  11.9 MBytes  9.97 Mbits/sec  2.512 ms  0/8619 (0%)
[  4] Sent 8619 datagrams
```

Iperf output on the server VM:

```
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bandwidth       Jitter    Lost/Total Datagrams
[  5]   0.00-10.05  sec  0.00 Bytes  0.00 bits/sec  3.904 ms  0/6645 (0%)
-----------------------------------------------------------
Server listening on 5201
-----------------------------------------------------------
Accepted connection from 10.0.0.1, port 58966
[  5] local 10.0.0.2 port 5201 connected to 10.0.0.1 port 53014
[ ID] Interval           Transfer     Bandwidth       Jitter    Lost/Total Datagrams
[  5]   0.00-1.00   sec  1.35 MBytes  11.3 Mbits/sec  1.537 ms  0/975 (0%)
[  5]   1.00-2.02   sec  1.35 MBytes  11.1 Mbits/sec  2.793 ms  0/974 (0%)
[  5]   2.02-3.00   sec  1.10 MBytes  9.37 Mbits/sec  1.646 ms  0/798 (0%)
[  5]   3.00-4.00   sec  1.11 MBytes  9.35 Mbits/sec  2.621 ms  0/806 (0%)
[  5]   4.00-5.00   sec   587 KBytes  4.81 Mbits/sec  2.886 ms  0/415 (0%)
[  5]   5.00-6.00   sec   952 KBytes  7.79 Mbits/sec  1.419 ms  0/673 (0%)
[  5]   6.00-7.00   sec  1.37 MBytes  11.5 Mbits/sec  1.466 ms  0/993 (0%)
[  5]   7.00-8.00   sec  1.43 MBytes  12.0 Mbits/sec  1.340 ms  0/1032 (0%)
[  5]   8.00-9.00   sec  1.22 MBytes  10.2 Mbits/sec  2.774 ms  0/884 (0%)
[  5]   9.00-10.00  sec  1.44 MBytes  12.1 Mbits/sec  2.591 ms  0/1040 (0%)
[  5]  10.00-10.06  sec  41.0 KBytes  5.23 Mbits/sec  2.512 ms  0/29 (0%)
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bandwidth       Jitter    Lost/Total Datagrams
[  5]   0.00-10.06  sec  0.00 Bytes  0.00 bits/sec  2.512 ms  0/8619 (0%)
-----------------------------------------------------------
Server listening on 5201
-----------------------------------------------------------
```

Trace ouput for the the server vm ip_rcv() function:

Ran the following commands before taking the trace output :

echo function_graph > current_tracer
echo ip-* > set_ftrace_filter
echo <PID of IPERF3> > set_ftrace_pid
echo > trace
ps -ef | grep iperf3 ------ to find pid of iperf

```
0)               |      ip_local_deliver() {
0)   0.857 us    |        ip_local_deliver_finish();
0)   2.537 us    |      }
0)   3.707 us    |    }
0)   6.843 us    |  }
0)               |  ip_rcv() {
0)               |    ip_rcv_finish() {
0)               |      ip_local_deliver() {
0)   4.065 us    |        ip_local_deliver_finish();
0) ! 6563.898 us |      }
0) ! 6564.891 us |    }
0) ! 6567.814 us |  }
0)               |  ip_rcv() {
0)               |    ip_rcv_finish() {
0)               |      ip_local_deliver() {
0)   1.414 us    |        ip_local_deliver_finish();
0)   5.236 us    |      }
0)   6.797 us    |    }
0) + 15.932 us   |  }
0)               |  ip_rcv() {
0)               |    ip_rcv_finish() {
0)               |      ip_local_deliver() {
0)   1.427 us    |        ip_local_deliver_finish();
0)   3.436 us    |      }
0)   4.818 us    |    }
0)   9.405 us    |  }
0)               |  ip_rcv() {
```

Here the ip_rcv function is taking around 6000 u[illegible]cause of which the throughput is low when compared to the containers.

2.2 Iperf throughput on the container side :

Iperf calculation on client container:

```
iperf Done.
root@14dfdf86ed2d:/# iperf3 -c 172.17.0.3 -u -b 0
Connecting to host 172.17.0.3, port 5201
[  4] local 172.17.0.4 port 50018 connected to 172.17.0.3 port 5201
[ ID] Interval           Transfer     Bandwidth       Total Datagrams
[  4]   0.00-1.00   sec   533 MBytes  4.47 Gbits/sec  68180
[  4]   1.00-2.00   sec   562 MBytes  4.71 Gbits/sec  71920
[  4]   2.00-3.00   sec   546 MBytes  4.58 Gbits/sec  69930
[  4]   3.00-4.00   sec   534 MBytes  4.48 Gbits/sec  68300
[  4]   4.00-5.00   sec   461 MBytes  3.87 Gbits/sec  59010
[  4]   5.00-6.00   sec   614 MBytes  5.15 Gbits/sec  78590
[  4]   6.00-7.00   sec   602 MBytes  5.05 Gbits/sec  77010
[  4]   7.00-8.00   sec   642 MBytes  5.38 Gbits/sec  82170
[  4]   8.00-9.00   sec   524 MBytes  4.40 Gbits/sec  67120
[  4]   9.00-10.00  sec   535 MBytes  4.49 Gbits/sec  68530
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bandwidth       Jitter    Lost/Total Datagrams
[  4]   0.00-10.00  sec  5.42 GBytes  4.66 Gbits/sec  0.006 ms  131428/710760 (18%)
[  4] Sent 710760 datagrams
```

Iperf calculation on server container:

```
-----------------------------------------------------------
Server listening on 5201
-----------------------------------------------------------
Accepted connection from 172.17.0.4, port 59192
[  5] local 172.17.0.3 port 5201 connected to 172.17.0.4 port 50018
[ ID] Interval           Transfer     Bandwidth       Jitter    Lost/Total Datagrams
[  5]   0.00-1.00   sec   348 MBytes  2.92 Gbits/sec  0.057 ms  20056/64594 (31%)
[  5]   1.00-2.00   sec   486 MBytes  4.07 Gbits/sec  0.011 ms  11916/74071 (16%)
[  5]   2.00-3.00   sec   491 MBytes  4.12 Gbits/sec  0.019 ms  5440/68277 (8%)
[  5]   3.00-4.00   sec   452 MBytes  3.79 Gbits/sec  0.005 ms  9567/67425 (14%)
[  5]   4.00-5.00   sec   363 MBytes  3.04 Gbits/sec  0.114 ms  12088/58570 (21%)
[  5]   5.00-6.00   sec   447 MBytes  3.75 Gbits/sec  0.003 ms  21803/79008 (28%)
[  5]   6.00-7.00   sec   462 MBytes  3.88 Gbits/sec  0.005 ms  19435/78570 (25%)
[  5]   7.00-8.00   sec   604 MBytes  5.07 Gbits/sec  0.059 ms  3506/80842 (4.3%)
[  5]   8.00-9.00   sec   387 MBytes  3.24 Gbits/sec  0.004 ms  19944/69439 (29%)
[  5]   9.00-10.00  sec   459 MBytes  3.85 Gbits/sec  0.006 ms  7212/65995 (11%)
[  5]  10.00-10.04  sec  27.4 MBytes  5.32 Gbits/sec  0.006 ms  461/3969 (12%)
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bandwidth       Jitter    Lost/Total Datagrams
[  5]   0.00-10.04  sec  0.00 Bytes  0.00 bits/sec  0.006 ms  131428/710760 (18%)
-----------------------------------------------------------
Server listening on 5201
-----------------------------------------------------------
```

Trace output for the the server container ip_rcv() function:

echo function_graph > current_tracer
echo ip-* > set_ftrace_filter
echo <PID of IPERF3> > set_ftrace_pid
echo > trace
ps -ef | grep iperf3 ------ to find pid of iperf

```
1)   9.031 us    |      }
1) + 16.851 us   |    }
1) + 24.270 us   |  }
1)               |  ip_rcv() {
1)   0.080 us    |    ip_sabotage_in [br_netfilter]();
1)               |    ip_rcv_finish() {
1)               |      ip_local_deliver() {
1) + 10.970 us   |        ip_local_deliver_finish();
1) + 13.745 us   |      }
1) + 16.344 us   |    }
1) + 23.949 us   |  }
1)   0.272 us    |  ip_mc_drop_socket();
1)               |  ip_queue_xmit() {
```

Here the ip_rcv function is taking around 10 us because of which the throughput is higher which is around 4gbps.

2.3 comparision between the iperf performance in containers & Virtual machines :

From the trace output :

Ip_rcv() is taking around 6ms in the virtual machines where as ip_rcv() function is taking in around 10ms

Which is the reason the container iperf throughput is higher in containers when compared to iperf throughput in VM

Trace output in containers:

```
1)   9.031 us    |      }
1) + 16.851 us   |    }
1) + 24.270 us   |  }
1)               |  ip_rcv() {
1)   0.080 us    |    ip_sabotage_in [br_netfilter]();
1)               |    ip_rcv_finish() {
1)               |      ip_local_deliver() {
1) + 10.970 us   |        ip_local_deliver_finish();
1) + 13.745 us   |      }
1) + 16.344 us   |    }
1) + 23.949 us   |  }
1)   0.272 us    |  ip_mc_drop_socket();
1)               |  ip_queue_xmit() {
```

Trace output in Virtual machines:

```
0)               |      ip_local_deliver() {
0)   0.857 us    |        ip_local_deliver_finish();
0)   2.537 us    |      }
0)   3.707 us    |    }
0)   6.843 us    |  }
0)               |  ip_rcv() {
0)               |    ip_rcv_finish() {
0)               |      ip_local_deliver() {
0)   4.065 us    |        ip_local_deliver_finish();
0) ! 6563.898 us |      }
0) ! 6564.891 us |    }
0) ! 6567.814 us |  }
0)               |  ip_rcv() {
0)               |    ip_rcv_finish() {
0)               |      ip_local_deliver() {
0)   1.414 us    |        ip_local_deliver_finish();
0)   5.236 us    |      }
0)   6.797 us    |    }
0) + 15.932 us   |  }
0)               |  ip_rcv() {
0)               |    ip_rcv_finish() {
0)               |      ip_local_deliver() {
0)   1.427 us    |        ip_local_deliver_finish();
0)   3.436 us    |      }
0)   4.818 us    |    }
0)   9.405 us    |  }
0)               |  ip_rcv() {
```

2.4 iperf performance with different packet sizes in container:

Iperf performance with packet size of 200:

```
iperf Done.
root@14dfdf86ed2d:/# iperf3 -c 172.17.0.3 -u -b 0 -l 200
Connecting to host 172.17.0.3, port 5201
[  4] local 172.17.0.4 port 43527 connected to 172.17.0.3 port 5201
[ ID] Interval           Transfer     Bandwidth       Total Datagrams
[  4]   0.00-1.00   sec  14.4 MBytes   121 Mbits/sec  75650
[  4]   1.00-2.00   sec  13.7 MBytes   115 Mbits/sec  71940
[  4]   2.00-3.00   sec  16.3 MBytes   137 Mbits/sec  85500
[  4]   3.00-4.00   sec  16.2 MBytes   136 Mbits/sec  85140
[  4]   4.00-5.00   sec  13.1 MBytes   110 Mbits/sec  68750
[  4]   5.00-6.00   sec  13.2 MBytes   110 Mbits/sec  69050
[  4]   6.00-7.00   sec  17.2 MBytes   144 Mbits/sec  90190
[  4]   7.00-8.00   sec  13.4 MBytes   112 Mbits/sec  70350
[  4]   8.00-9.00   sec  14.8 MBytes   124 Mbits/sec  77660
[  4]   9.00-10.00  sec  16.7 MBytes   140 Mbits/sec  87700
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bandwidth       Jitter    Lost/Total Datagrams
```

Iperf performance with packet size of 400:

```
iperf Done.
root@14dfdf86ed2d:/# iperf3 -c 172.17.0.3 -u -b 0 -l 400
Connecting to host 172.17.0.3, port 5201
[  4] local 172.17.0.4 port 58897 connected to 172.17.0.3 port 5201
[ ID] Interval           Transfer     Bandwidth       Total Datagrams
[  4]   0.00-1.00   sec  15.7 MBytes   132 Mbits/sec  41190
[  4]   1.00-2.00   sec  26.9 MBytes   226 Mbits/sec  70550
[  4]   2.00-3.00   sec  31.9 MBytes   267 Mbits/sec  83570
[  4]   3.00-4.00   sec  34.8 MBytes   292 Mbits/sec  91200
[  4]   4.00-5.00   sec  31.9 MBytes   267 Mbits/sec  83560
[  4]   5.00-6.00   sec  21.9 MBytes   184 Mbits/sec  57510
[  4]   6.00-7.00   sec  37.5 MBytes   314 Mbits/sec  98200
[  4]   7.00-8.00   sec  32.0 MBytes   269 Mbits/sec  83960
[  4]   8.00-9.00   sec  30.8 MBytes   258 Mbits/sec  80760
[  4]   9.00-10.00  sec  28.8 MBytes   241 Mbits/sec  75460
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bandwidth       Jitter    Lost/Total Datagrams
[  4]   0.00-10.00  sec   292 MBytes   245 Mbits/sec  0.005 ms  46891/765960 (6.1%)
[  4] Sent 765960 datagrams

iperf Done.
root@14dfdf86ed2d:/#
```

Iperf performance with packet size of 800:

```
iperf Done.
root@14dfdf86ed2d:/# iperf3 -c 172.17.0.3 -u -b 0 -l 800
Connecting to host 172.17.0.3, port 5201
[  4] local 172.17.0.4 port 44854 connected to 172.17.0.3 port 5201
[ ID] Interval           Transfer     Bandwidth       Total Datagrams
[  4]   0.00-1.00   sec  63.9 MBytes   536 Mbits/sec  83810
[  4]   1.00-2.00   sec  50.2 MBytes   421 Mbits/sec  65770
[  4]   2.00-3.00   sec  55.8 MBytes   468 Mbits/sec  73120
[  4]   3.00-4.00   sec  57.9 MBytes   486 Mbits/sec  75940
[  4]   4.00-5.00   sec  59.0 MBytes   495 Mbits/sec  77300
[  4]   5.00-6.00   sec  64.9 MBytes   545 Mbits/sec  85130
[  4]   6.00-7.00   sec  65.7 MBytes   551 Mbits/sec  86060
[  4]   7.00-8.00   sec  62.3 MBytes   523 Mbits/sec  81720
[  4]   8.00-9.00   sec  78.7 MBytes   660 Mbits/sec  103110
[  4]   9.00-10.00  sec  57.6 MBytes   483 Mbits/sec  75550
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bandwidth       Jitter    Lost/Total Datagrams
[  4]   0.00-10.00  sec   616 MBytes   517 Mbits/sec  0.011 ms  99103/807510 (12%)
[  4] Sent 807510 datagrams

iperf Done.
root@14dfdf86ed2d:/#
```

With doubling the packet size the throughput is getting doubled

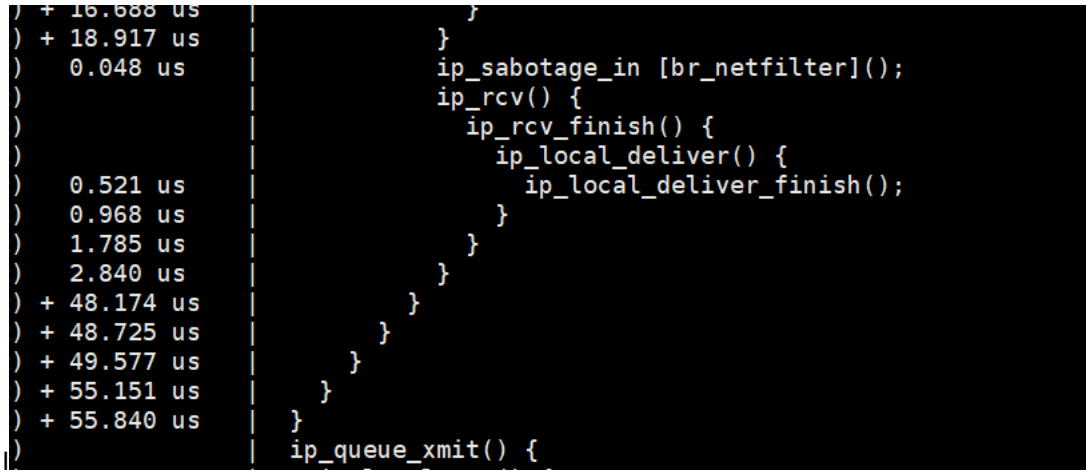
With increase in packet size the throughput is getting increased because

The number of cpu cycles taken to send packets is same irrespective of packet size

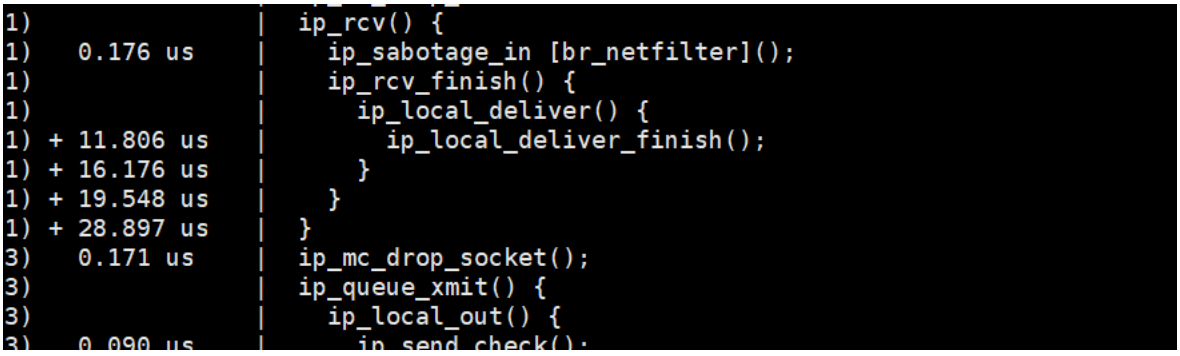
where as in smaller packet the number of cpu cycles taken to send the same data is higher when compared to higher sized packets.

Which is the reason the performance is better in higher sized packets.

Ip_rcv() function is taking time around 56us in case of packet size = 400:



Ip_rcv() function takes time of around 28 us in case of packet size =800



The time taken by the ip_rcv() function becomes half in packet size of 800 when compared to the ip_rcv() function time if packet size is 400