

Lab Task 2

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242CS008

- ip a / ip address

```
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip address
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: eno1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether c0:18:03:c1:8a:2d brd ff:ff:ff:ff:ff:ff
    altname enp0s31f6
    inet 10.100.12.218/22 brd 10.100.15.255 scope global dynamic noprefixroute eno1
        valid_lft 19736sec preferred_lft 19736sec
```

```
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# 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: eno1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether c0:18:03:c1:8a:2d brd ff:ff:ff:ff:ff:ff
    altname enp0s31f6
    inet 10.100.12.218/22 brd 10.100.15.255 scope global dynamic noprefixroute eno1
        valid_lft 19916sec preferred_lft 19916sec
```

- Ip link

```
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip link
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: eno1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP mode DEFAULT group default qlen 1000
    link/ether c0:18:03:c1:8a:2d brd ff:ff:ff:ff:ff:ff
    altname enp0s31f6
```

- Create network namespace

```
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip netns add red
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip netns
red
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip netns add blue
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip netns
red
blue
```

- Add Link (Add eth0 and eth1)

```
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip link add eth0 type veth peer name eth1
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip link
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: eno1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP mode DEFAULT group default qlen 1000
    link/ether c0:18:03:c1:8a:2d brd ff:ff:ff:ff:ff:ff
    altname enp0s31f6
3: eth1@eth0: <BROADCAST,MULTICAST,M-DOWN> mtu 1500 qdisc noop state DOWN mode DEFAULT group default qlen 1000
    link/ether 5e:93:2e:db:a2:5b brd ff:ff:ff:ff:ff:ff
4: eth0@eth1: <BROADCAST,MULTICAST,M-DOWN> mtu 1500 qdisc noop state DOWN mode DEFAULT group default qlen 1000
    link/ether 1a:f8:f7:83:6d:64 brd ff:ff:ff:ff:ff:ff
```

- Shift ethernet interface to namespace

```
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip link set eth0 netns red
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip link
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: eno1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP mode DEFAULT group default qlen 1000
    link/ether c0:18:03:c1:8a:2d brd ff:ff:ff:ff:ff:ff
    altname enp0s31f6
3: eth1@if4: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN mode DEFAULT group default qlen 1000
    link/ether 5e:93:2e:db:a2:5b brd ff:ff:ff:ff:ff:ff link-netns red
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip netns exec red bash
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip link
Object "ink" is unknown, try "ip help".
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip link
1: lo: <LOOPBACK> mtu 65536 qdisc noop state DOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
4: eth0@if3: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN mode DEFAULT group default qlen 1000
    link/ether 1a:f8:f7:83:6d:64 brd ff:ff:ff:ff:ff:ff link-netnsid 0
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# exit
exit
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab#
```

```
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip link set eth1 netns blue
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip link
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: eno1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP mode DEFAULT group default qlen 1000
    link/ether c0:18:03:c1:8a:2d brd ff:ff:ff:ff:ff:ff
    altname enp0s31f6
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip netns exec blue bash
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip link
1: lo: <LOOPBACK> mtu 65536 qdisc noop state DOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
3: eth1@if4: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN mode DEFAULT group default qlen 1000
    link/ether 5e:93:2e:db:a2:5b brd ff:ff:ff:ff:ff:ff link-netns red
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# exit
exit
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab#
```

- Turn on all interface

```
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip netns exec red ip link set lo up
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip netns exec blue ip link set lo up
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip netns exec red ip link set eth0 up
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip netns exec blue ip link set eth1 up
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip netns exec red ip link
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
4: eth0@if3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP mode DEFAULT group default qlen 1000
    link/ether 1a:f8:f7:83:6d:64 brd ff:ff:ff:ff:ff:ff link-netns blue
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip netns exec blue ip link
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
3: eth1@if4: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP mode DEFAULT group default qlen 1000
    link/ether 5e:93:2e:db:a2:5b brd ff:ff:ff:ff:ff:ff link-netns red
root@csdept-HP:/home/anandmk/Anand/NitkS2/Network/Lab#
```

- Assign ip

```
root@csedept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip netns exec red ip address add 10.0.0.1/24 dev eth0
root@csedept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ip netns exec blue ip address add 10.0.0.2/24 dev eth1
```

- Ping

```
root@csedept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ping 10.0.0.2
PING 10.0.0.2 (10.0.0.2) 56(84) bytes of data.
64 bytes from 10.0.0.2: icmp_seq=1 ttl=64 time=0.092 ms
64 bytes from 10.0.0.2: icmp_seq=2 ttl=64 time=0.053 ms
64 bytes from 10.0.0.2: icmp_seq=3 ttl=64 time=0.055 ms
64 bytes from 10.0.0.2: icmp_seq=4 ttl=64 time=0.052 ms
64 bytes from 10.0.0.2: icmp_seq=5 ttl=64 time=0.059 ms
64 bytes from 10.0.0.2: icmp_seq=6 ttl=64 time=0.053 ms
64 bytes from 10.0.0.2: icmp_seq=7 ttl=64 time=0.056 ms
64 bytes from 10.0.0.2: icmp_seq=8 ttl=64 time=0.056 ms
64 bytes from 10.0.0.2: icmp_seq=9 ttl=64 time=0.049 ms
64 bytes from 10.0.0.2: icmp_seq=10 ttl=64 time=0.053 ms
64 bytes from 10.0.0.2: icmp_seq=11 ttl=64 time=0.051 ms
64 bytes from 10.0.0.2: icmp_seq=12 ttl=64 time=0.054 ms
64 bytes from 10.0.0.2: icmp_seq=13 ttl=64 time=0.059 ms
64 bytes from 10.0.0.2: icmp_seq=14 ttl=64 time=0.052 ms
64 bytes from 10.0.0.2: icmp_seq=15 ttl=64 time=0.057 ms
64 bytes from 10.0.0.2: icmp_seq=16 ttl=64 time=0.052 ms
64 bytes from 10.0.0.2: icmp_seq=17 ttl=64 time=0.075 ms
64 bytes from 10.0.0.2: icmp_seq=18 ttl=64 time=0.056 ms
64 bytes from 10.0.0.2: icmp_seq=19 ttl=64 time=0.057 ms
64 bytes from 10.0.0.2: icmp_seq=20 ttl=64 time=0.067 ms

root@csedept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# ping 10.0.0.1
PING 10.0.0.1 (10.0.0.1) 56(84) bytes of data.
64 bytes from 10.0.0.1: icmp_seq=1 ttl=64 time=0.042 ms
64 bytes from 10.0.0.1: icmp_seq=2 ttl=64 time=0.055 ms
64 bytes from 10.0.0.1: icmp_seq=3 ttl=64 time=0.056 ms
64 bytes from 10.0.0.1: icmp_seq=4 ttl=64 time=0.067 ms
64 bytes from 10.0.0.1: icmp_seq=5 ttl=64 time=0.060 ms
64 bytes from 10.0.0.1: icmp_seq=6 ttl=64 time=0.055 ms
64 bytes from 10.0.0.1: icmp_seq=7 ttl=64 time=0.048 ms
64 bytes from 10.0.0.1: icmp_seq=8 ttl=64 time=0.065 ms
64 bytes from 10.0.0.1: icmp_seq=9 ttl=64 time=0.043 ms
64 bytes from 10.0.0.1: icmp_seq=10 ttl=64 time=0.053 ms
64 bytes from 10.0.0.1: icmp_seq=11 ttl=64 time=0.055 ms
64 bytes from 10.0.0.1: icmp_seq=12 ttl=64 time=0.054 ms
64 bytes from 10.0.0.1: icmp_seq=13 ttl=64 time=0.055 ms
64 bytes from 10.0.0.1: icmp_seq=14 ttl=64 time=0.062 ms
64 bytes from 10.0.0.1: icmp_seq=15 ttl=64 time=0.056 ms
64 bytes from 10.0.0.1: icmp_seq=16 ttl=64 time=0.056 ms
64 bytes from 10.0.0.1: icmp_seq=17 ttl=64 time=0.055 ms
64 bytes from 10.0.0.1: icmp_seq=18 ttl=64 time=0.059 ms
64 bytes from 10.0.0.1: icmp_seq=19 ttl=64 time=0.056 ms
64 bytes from 10.0.0.1: icmp_seq=20 ttl=64 time=0.054 ms
```

- Evaluate Network Performance

```
root@csedept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# iperf -c 10.0.0.2
Client connecting to 10.0.0.2, TCP port 5001
TCP window size: 85.0 KByte (default)
[ 1] local 10.0.0.1 port 55420 connected with 10.0.0.2 port 5001
[ ID] Interval      Transfer    Bandwidth
[ 1] 0.0000-10.0149 sec 79.3 GBytes 68.0 Gbits/sec
root@csedept-HP:/home/anandmk/Anand/NitkS2/Network/Lab#

root@csedept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# iperf -s
Server listening on TCP port 5001
TCP window size: 128 KByte (default)
[ 1] local 10.0.0.2 port 5001 connected with 10.0.0.1 port 55420
[ ID] Interval      Transfer    Bandwidth
[ 1] 0.0000-10.0003 sec 79.3 GBytes 68.1 Gbits/sec
root@csedept-HP:/home/anandmk/Anand/NitkS2/Network/Lab#
```

- Traffic Control subsystem

```
root@csedept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# tc qdisc show dev eth0
qdisc noqueue 0: root refcnt 2
root@csedept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# tc qdisc add dev eth0 root
netem delay 5ms rate 10mbit
root@csedept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# tc qdisc show dev eth0
qdisc netem 8001: root refcnt 13 limit 1000 delay 5ms rate 10Mbit
root@csedept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# iperf -c 10.0.0.2
Client connecting to 10.0.0.2, TCP port 5001
TCP window size: 85.0 KByte (default)
[ 1] local 10.0.0.1 port 53688 connected with 10.0.0.2 port 5001
[ ID] Interval      Transfer    Bandwidth
[ 1] 0.0000-12.9640 sec 14.8 MBytes 9.54 Mbits/sec
root@csedept-HP:/home/anandmk/Anand/NitkS2/Network/Lab#

root@csedept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# tc qdisc show dev eth1
qdisc noqueue 0: root refcnt 2
root@csedept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# tc qdisc add dev eth1 root
netem delay 10ms rate 500mbit
root@csedept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# tc qdisc show dev eth1
qdisc netem 8002: root refcnt 13 limit 1000 delay 10ms rate 50Mbit
root@csedept-HP:/home/anandmk/Anand/NitkS2/Network/Lab# iperf -s
Server listening on TCP port 5001
TCP window size: 128 KByte (default)
[ 1] local 10.0.0.2 port 5001 connected with 10.0.0.1 port 53688
[ ID] Interval      Transfer    Bandwidth
[ 1] 0.0000-12.9418 sec 14.8 MBytes 9.56 Mbits/sec
root@csedept-HP:/home/anandmk/Anand/NitkS2/Network/Lab#
```