

```
Dec 17 10:07
nirmala@ASUSVivobook: ~
nirmala@ASUSVivobook:~$ sudo ip netns add hostA
nirmala@ASUSVivobook:~$ sudo ip netns add hostB
nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ip link set lo up
nirmala@ASUSVivobook:~$ sudo ip netns exec hostB ip link set lo up
nirmala@ASUSVivobook:~$ ip netns list
hostB
hostA
nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ip addr
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
nirmala@ASUSVivobook:~$ sudo ip netns exec hostB ip addr
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
nirmala@ASUSVivobook:~$
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Dec 17 10:33
nirmala@ASUSVivobook: ~
    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
nirmala@ASUSVivobook:~$ sudo ip netns exec hostB ip addr
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
nirmala@ASUSVivobook:~$ sudo ip link set vethA netns hostA
Cannot find device 'vethA'
nirmala@ASUSVivobook:~$ sudo ip link add vethA type veth peer name vethB
nirmala@ASUSVivobook:~$ sudo ip link set vethA netns hostA
nirmala@ASUSVivobook:~$ sudo ip link set vethB netns hostB
nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ip addr add 10.0.0.1/24 dev vethA
nirmala@ASUSVivobook:~$ sudo ip netns exec hostB ip addr add 10.0.0.2/24 dev vethB
nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ip link set vethA up
Cannot find device 'vethA'
nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ip link set vethA up
nirmala@ASUSVivobook:~$ sudo ip netns exec hostB ip link set vethB up
nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ping -c 3 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=0.081 ms
64 bytes from 10.0.0.2: icmp_seq=2 ttl=64 time=0.031 ms
64 bytes from 10.0.0.2: icmp_seq=3 ttl=64 time=0.043 ms

--- 10.0.0.2 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 286ms
rtt min/avg/max/mdev = 0.031/0.051/0.081/0.021 ms
nirmala@ASUSVivobook:~$
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Dec 17, 11:44
nirmala@ASUSVivobook: ~
nirmala@ASUSVivobook:~$ sudo ip netns exec router sysctl -w net.ipv4.ip_forward=1
net.ipv4.ip_forward = 1
nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ip route add default via 10.0.1.1
nirmala@ASUSVivobook:~$ sudo ip netns exec hostB ip route add default via 10.0.2.1
nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ping -c 3 10.0.1.1
PING 10.0.1.1 (10.0.1.1) 56(84) bytes of data:
64 bytes from 10.0.1.1: icmp_seq=1 ttl=64 time=0.097 ms
64 bytes from 10.0.1.1: icmp_seq=2 ttl=64 time=0.078 ms
64 bytes from 10.0.1.1: icmp_seq=3 ttl=64 time=0.071 ms

--- 10.0.1.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2102ms
rtt min/avg/max/ndev = 0.071/0.082/0.097/0.011 ms
nirmala@ASUSVivobook:~$ sudo ip netns exec hostB ping -c 3 10.0.2.1
PING 10.0.2.1 (10.0.2.1) 56(84) bytes of data:
64 bytes from 10.0.2.1: icmp_seq=1 ttl=64 time=0.103 ms
64 bytes from 10.0.2.1: icmp_seq=2 ttl=64 time=0.050 ms
64 bytes from 10.0.2.1: icmp_seq=3 ttl=64 time=0.085 ms

--- 10.0.2.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2394ms
rtt min/avg/max/ndev = 0.050/0.079/0.103/0.022 ms
nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ping -c 3 10.0.2.2
PING 10.0.2.2 (10.0.2.2) 56(84) bytes of data:
64 bytes from 10.0.2.2: icmp_seq=1 ttl=63 time=0.166 ms
64 bytes from 10.0.2.2: icmp_seq=2 ttl=63 time=0.065 ms
64 bytes from 10.0.2.2: icmp_seq=3 ttl=63 time=0.105 ms

--- 10.0.2.2 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2048ms
rtt min/avg/max/ndev = 0.065/0.112/0.166/0.041 ms
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```
Dec 17, 11:44
nirmala@ASUSVivobook: ~
nirmala@ASUSVivobook:~$ sudo ip netns exec router sysctl -w net.ipv4.ip_forward=1
net.ipv4.ip_forward = 1
nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ip route add default via 10.0.1.1
nirmala@ASUSVivobook:~$ sudo ip netns exec hostB ip route add default via 10.0.2.1
nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ping -c 3 10.0.1.1
PING 10.0.1.1 (10.0.1.1) 56(84) bytes of data:
64 bytes from 10.0.1.1: icmp_seq=1 ttl=64 time=0.097 ms
64 bytes from 10.0.1.1: icmp_seq=2 ttl=64 time=0.078 ms
64 bytes from 10.0.1.1: icmp_seq=3 ttl=64 time=0.071 ms

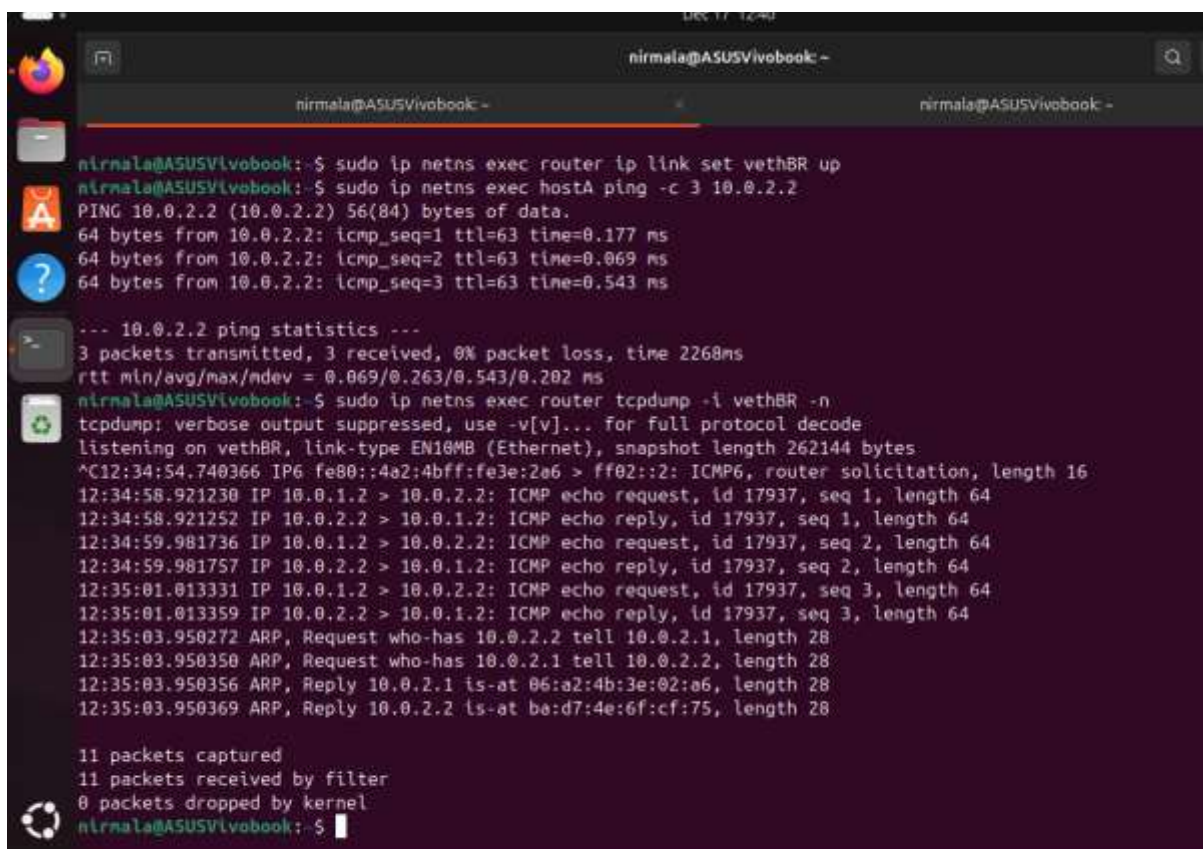
--- 10.0.1.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2102ms
rtt min/avg/max/ndev = 0.071/0.082/0.097/0.011 ms
nirmala@ASUSVivobook:~$ sudo ip netns exec hostB ping -c 3 10.0.2.1
PING 10.0.2.1 (10.0.2.1) 56(84) bytes of data:
64 bytes from 10.0.2.1: icmp_seq=1 ttl=64 time=0.103 ms
64 bytes from 10.0.2.1: icmp_seq=2 ttl=64 time=0.050 ms
64 bytes from 10.0.2.1: icmp_seq=3 ttl=64 time=0.085 ms

--- 10.0.2.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2394ms
rtt min/avg/max/ndev = 0.050/0.079/0.103/0.022 ms
nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ping -c 3 10.0.2.2
PING 10.0.2.2 (10.0.2.2) 56(84) bytes of data:
64 bytes from 10.0.2.2: icmp_seq=1 ttl=63 time=0.166 ms
64 bytes from 10.0.2.2: icmp_seq=2 ttl=63 time=0.065 ms
64 bytes from 10.0.2.2: icmp_seq=3 ttl=63 time=0.105 ms

--- 10.0.2.2 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2048ms
rtt min/avg/max/ndev = 0.065/0.112/0.166/0.041 ms
```

```
nirmala@ASUSVivobook:~$ ip netns exec hostA ip route del 10.0.2.0/24 via 10.0.1.1
setting the network namespace "hostA" failed: Operation not permitted
nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ip route del 10.0.2.0/24 via 10.0.1.1
RTNETLINK answers: No such process
nirmala@ASUSVivobook:~$ sudo ip netns exec c hostA ip route
Cannot open network namespace "c": No such file or directory
nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ip route
default via 10.0.1.1 dev vethA
10.0.1.0/24 dev vethA proto kernel scope link src 10.0.1.2
nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ip route del default
nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ping -c 3 10.0.2.2
ping: connect: Network is unreachable
nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ip route add 10.0.2.0/24 via 10.0.1.1
nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ping -c 3 10.0.2.2
PING 10.0.2.2 (10.0.2.2) 56(84) bytes of data:
64 bytes from 10.0.2.2: icmp_seq=1 ttl=63 time=0.093 ms
64 bytes from 10.0.2.2: icmp_seq=2 ttl=63 time=0.127 ms
64 bytes from 10.0.2.2: icmp_seq=3 ttl=63 time=0.086 ms

--- 10.0.2.2 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2673ms
rtt min/avg/max/ndev = 0.086/0.102/0.127/0.017 ms
```



```
nirmala@ASUSVivobook:~$ sudo ip netns exec router ip link set vethBR up
nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ping -c 3 10.0.2.2
PING 10.0.2.2 (10.0.2.2) 56(84) bytes of data:
64 bytes from 10.0.2.2: icmp_seq=1 ttl=63 time=0.177 ms
64 bytes from 10.0.2.2: icmp_seq=2 ttl=63 time=0.069 ms
64 bytes from 10.0.2.2: icmp_seq=3 ttl=63 time=0.543 ms

--- 10.0.2.2 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2268ms
rtt min/avg/max/ndev = 0.069/0.263/0.543/0.202 ms
nirmala@ASUSVivobook:~$ sudo ip netns exec router tcpdump -i vethBR -n
tcpdump: verbose output suppressed, use -v[v]... for full protocol decode
listening on vethBR, link-type EN10MB (Ethernet), snapshot length 262144 bytes
^C12:34:54.740366 IP 6 fe80::4a2:4bff:fe3e:2a6 > ff02::2: ICMP6, router solicitation, length 16
12:34:58.921230 IP 10.0.1.2 > 10.0.2.2: ICMP echo request, id 17937, seq 1, length 64
12:34:58.921252 IP 10.0.2.2 > 10.0.1.2: ICMP echo reply, id 17937, seq 1, length 64
12:34:59.981736 IP 10.0.1.2 > 10.0.2.2: ICMP echo request, id 17937, seq 2, length 64
12:34:59.981757 IP 10.0.2.2 > 10.0.1.2: ICMP echo reply, id 17937, seq 2, length 64
12:35:01.013331 IP 10.0.1.2 > 10.0.2.2: ICMP echo request, id 17937, seq 3, length 64
12:35:01.013359 IP 10.0.2.2 > 10.0.1.2: ICMP echo reply, id 17937, seq 3, length 64
12:35:03.950272 ARP, Request who-has 10.0.2.2 tell 10.0.2.1, length 28
12:35:03.950350 ARP, Request who-has 10.0.2.1 tell 10.0.2.2, length 28
12:35:03.950356 ARP, Reply 10.0.2.1 is-at 06:a2:4b:3e:02:a6, length 28
12:35:03.950369 ARP, Reply 10.0.2.2 is-at ba:d7:4e:6f:cf:75, length 28

11 packets captured
11 packets received by filter
0 packets dropped by kernel
nirmala@ASUSVivobook:~$
```

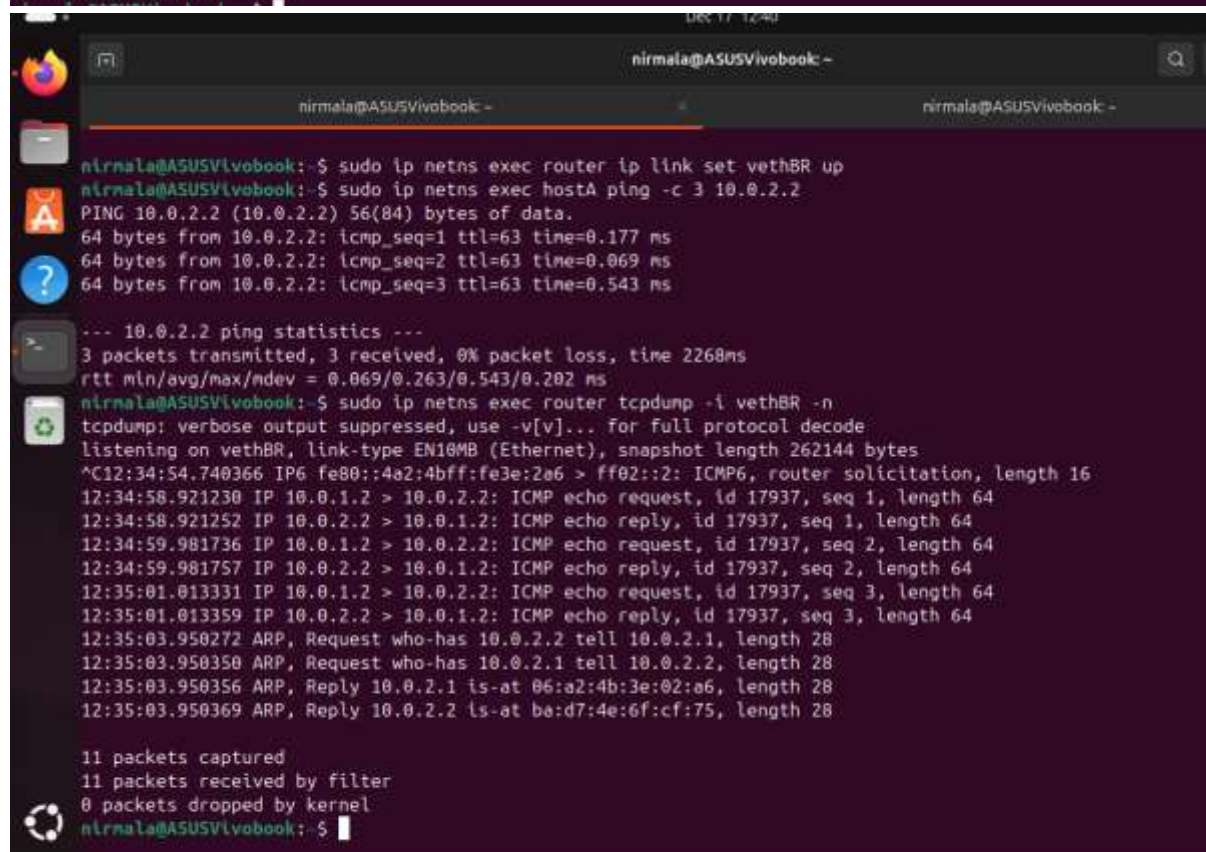


```
nirmala@ASUSVivobook:~$ sudo ip netns exec router sysctl -w net.ipv4.ip_forward=0
[sudo] password for nirmala:
net.ipv4.ip_forward = 0
nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ping -c 3 10.0.2.2
PING 10.0.2.2 (10.0.2.2) 56(84) bytes of data.

--- 10.0.2.2 ping statistics ---
3 packets transmitted, 0 received, 100% packet loss, time 2037ms

nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ping -c 3 10.0.1.1
PING 10.0.1.1 (10.0.1.1) 56(84) bytes of data.
64 bytes from 10.0.1.1: icmp_seq=1 ttl=64 time=0.071 ms
64 bytes from 10.0.1.1: icmp_seq=2 ttl=64 time=0.100 ms
64 bytes from 10.0.1.1: icmp_seq=3 ttl=64 time=0.083 ms

--- 10.0.1.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2046ms
rtt min/avg/max/mdev = 0.071/0.084/0.100/0.011 ms
nirmala@ASUSVivobook:~$ sudo ip netns exec router sysctl -w net.ipv4.ip_forward=1
net.ipv4.ip_forward = 1
```



```
nirmala@ASUSVivobook:~$ sudo ip netns exec router ip link set vethBR up
nirmala@ASUSVivobook:~$ sudo ip netns exec hostA ping -c 3 10.0.2.2
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64 bytes from 10.0.2.2: icmp_seq=3 ttl=63 time=0.543 ms

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12:35:03.950272 ARP, Request who-has 10.0.2.2 tell 10.0.2.1, length 28
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