Computer Networks Assignment 3

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Q1 a)Here in our case iiitd@vim2 is Client with ip 20.1.1.1/24 on enp0s8

Here in our case iiitd@vim3 is Gateway with ip 20.1.1.2/24 on enp0s8 and 40.1.1.2/24 on enp0s9

Here in our case iiitd@vim4 is Server 1 with ip 40.1.1.1/24 On enp0s8

Here in our case iiitd@vim5 is Server 2 with ip 40.1.1.3/24 On enp0s8

Steps I Followed in all the vm :-

1)edited yaml file to configure ip to an interface
2)verified the ip
3)Did sudo netplan apply

Vim2;

```
  GNU nano 6.2          /etc/netplan/01-network-manager-all.yaml
# Let NetworkManager manage all devices on this system
network:
  version: 2
  renderer: NetworkManager
  ethernets:
        enp0s8:
          addresses: [20.1.1.1/24]
          dhcp4: no
          gateway4: 20.1.1.2
```

```
iiitd@vim2:~$ sudo nano /etc/netplan/01-network-manager-all.yaml
iiitd@vim2:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fe80::80f:3c:f616:9a38  prefixlen 64  scopeid 0x20<link>
        inet6 fd00::809c:b11f:dd2:429b  prefixlen 64  scopeid 0x0<global>
        inet6 fd00::36e8:3c77:f923:8ae2  prefixlen 64  scopeid 0x0<global>
        ether 08:00:27:09:0b:d8  txqueuelen 1000  (Ethernet)
        RX packets 64659  bytes 70014773 (70.0 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 20086  bytes 4390047 (4.3 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

enp0s8: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 20.1.1.1  netmask 255.255.255.0  broadcast 20.1.1.255
        inet6 fe80::a00:27ff:fe94:c908  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:94:c9:08  txqueuelen 1000  (Ethernet)
        RX packets 71495  bytes 4754844 (4.7 MB)
        RX errors 1  dropped 0  overruns 0  frame 0
        TX packets 572  bytes 74879 (74.8 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
        device interrupt 16  base 0xd240
```

Vim3:

```
  GNU nano 6.2          /etc/netplan/01-network-manager-all.yaml
# Let NetworkManager manage all devices on this system
network:
  version: 2
  renderer: NetworkManager
  ethernets:
    enp0s8:
      addresses: [20.1.1.2/24]
      dhcp4: no
    enp0s9:
      addresses: [40.1.1.2/24]
      dhcp4: no
```

```
iiitd@vim3:~$ sudo nano /etc/netplan/01-network-manager-all.yaml
[sudo] password for iiitd:
iiitd@vim3:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fd00::cba2:4a36:8112:dd3c  prefixlen 64  scopeid 0x0<global>
        inet6 fd00::1275:25e6:cb50:c78a  prefixlen 64  scopeid 0x0<global>
        inet6 fe80::42d7:af70:6217:ddb  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:d6:40:01  txqueuelen 1000  (Ethernet)
        RX packets 78476  bytes 95193654 (95.1 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 14781  bytes 2358174 (2.3 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

enp0s8: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 20.1.1.2  netmask 255.255.255.0  broadcast 20.1.1.255
        inet6 fe80::a00:27ff:fe6c:a7dc  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:6c:a7:dc  txqueuelen 1000  (Ethernet)
        RX packets 57926  bytes 3852014 (3.8 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 251  bytes 37098 (37.0 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

enp0s9: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 40.1.1.2  netmask 255.255.255.0  broadcast 40.1.1.255
        inet6 fe80::a00:27ff:fe4c:ab1f  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:4c:ab:1f  txqueuelen 1000  (Ethernet)
        RX packets 57855  bytes 3846800 (3.8 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 247  bytes 37180 (37.1 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Vim4:

```
  GNU nano 6.2          /etc/netplan/01-network-manager-all.yaml
# Let NetworkManager manage all devices on this system
network:
  version: 2
  renderer: NetworkManager
  ethernets:
     enp0s8:
        addresses: [40.1.1.1/24]
        dhcp4: no
```

```
iiitd@vim4:~$ sudo nano /etc/netplan/01-network-manager-all.yaml
iiitd@vim4:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fd00::53c4:5f1a:9dcf:8a1f  prefixlen 64  scopeid 0x0<global>
        inet6 fd00::2070:b805:e146:20fe  prefixlen 64  scopeid 0x0<global>
        inet6 fe80::656b:220f:2ca:9768  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:04:42:f7  txqueuelen 1000  (Ethernet)
        RX packets 57717  bytes 67178317 (67.1 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 13678  bytes 2737514 (2.7 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

enp0s8: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 40.1.1.1  netmask 255.255.255.0  broadcast 40.1.1.255
        inet6 fe80::a00:27ff:fe20:9e04  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:20:9e:04  txqueuelen 1000  (Ethernet)
        RX packets 53045  bytes 3508945 (3.5 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 322  bytes 48195 (48.1 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Vim5:

```
  GNU nano 6.2          /etc/netplan/01-network-manager-all.yaml
# Let NetworkManager manage all devices on this system
network:
  version: 2
  renderer: NetworkManager
  ethernets:
    enp0s8:
      addresses: [40.1.1.3/24]
      dhcp4: no
```

```
iiitd@vim5:~$ sudo nano /etc/netplan/01-network-manager-all.yaml
iiitd@vim5:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fd00::8def:b747:911:4fe  prefixlen 64  scopeid 0x0<global>
        inet6 fe80::a07b:9cd8:8da0:a27f  prefixlen 64  scopeid 0x20<link>
        inet6 fd00::5242:f6ee:3a43:197f  prefixlen 64  scopeid 0x0<global>
        ether 08:00:27:39:1a:74  txqueuelen 1000  (Ethernet)
        RX packets 62258  bytes 71809885 (71.8 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 15864  bytes 3464972 (3.4 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

enp0s8: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 40.1.1.3  netmask 255.255.255.0  broadcast 40.1.1.255
        inet6 fe80::a00:27ff:fe66:29af  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:66:29:af  txqueuelen 1000  (Ethernet)
        RX packets 54065  bytes 3571614 (3.5 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 350  bytes 51110 (51.1 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Q 1)

b) Did routing via sudo ip route add … for both the servers and the client

Client:-

```
iiitd@vim2:~$ sudo ip route add 40.1.1.0/24 via 20.1.1.2
```

Server1:-

```
iiitd@vim4:~$ sudo ip route add 20.1.1.0/24 via 40.1.1.2
```

Server2:-

```
iiitd@vim5:~$ sudo ip route  add 20.1.1.0/24 via 40.1.1.2
```

Gateway:-

```
iiitd@vim3:~$ sudo sysctl -w net.ipv4.ip_forward=1
net.ipv4.ip_forward = 1
iiitd@vim3:~$
```

Q 2)
Part a)
Commands :-

ON Gateway :-
sudo iptables -A FORWARD -p icmp -d 40.1.1.1 -j ACCEPT
(to accept all icmp(ping) packets to 40.1.1.1)
sudo iptables -A FORWARD -d 40.1.1.1 -j DROP
(To drop all rest packets destined to 40.1.1.1)

On Gateway:-

```
iiitd@vim3:~$ sudo iptables -L
Chain INPUT (policy ACCEPT)
target     prot opt source               destination

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
iiitd@vim3:~$ sudo iptables -A FORWARD -p icmp -d 40.1.1.1 -j ACCEPT
iiitd@vim3:~$ sudo iptables -A FORWARD -d 40.1.1.1 -j DROP
iiitd@vim3:~$ sudo iptables -L
Chain INPUT (policy ACCEPT)
target     prot opt source               destination

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination
ACCEPT     icmp --  anywhere             40.1.1.1
DROP       all  --  anywhere             40.1.1.1

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
```

After the iptables entries:-

Ping works :-

```
iiitd@vim2:~$ ping -c 5 40.1.1.1
PING 40.1.1.1 (40.1.1.1) 56(84) bytes of data.
64 bytes from 40.1.1.1: icmp_seq=1 ttl=63 time=0.652 ms
64 bytes from 40.1.1.1: icmp_seq=2 ttl=63 time=0.908 ms
64 bytes from 40.1.1.1: icmp_seq=3 ttl=63 time=0.737 ms
64 bytes from 40.1.1.1: icmp_seq=4 ttl=63 time=0.822 ms
64 bytes from 40.1.1.1: icmp_seq=5 ttl=63 time=1.16 ms

--- 40.1.1.1 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4107ms
rtt min/avg/max/mdev = 0.652/0.856/1.164/0.175 ms
```

```
iiitd@vim4:~$ sudo tshark -i enp0s8 -Y "icmp"
Running as user "root" and group "root". This could be dangerous.
Capturing on 'enp0s8'
 ** (tshark:6500) 17:39:13.061931 [Main MESSAGE] -- Capture started.
 ** (tshark:6500) 17:39:13.062156 [Main MESSAGE] -- File: "/tmp/wireshark_enp0s8EVA2V2.pcapng"
  288 4.428531938     20.1.1.1 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x001a, seq=1/256, ttl=64
  289 4.428629354     20.1.1.1 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x001a, seq=1/256, ttl=63
  290 4.428668116     40.1.1.1 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x001a, seq=1/256, ttl=64 (request in 289)
  291 4.428980719     40.1.1.1 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x001a, seq=1/256, ttl=63
  322 5.464493892     20.1.1.1 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x001a, seq=2/512, ttl=64
  323 5.464691547     20.1.1.1 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x001a, seq=2/512, ttl=63
  324 5.464713898     40.1.1.1 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x001a, seq=2/512, ttl=64 (request in 323)
  325 5.465058055     40.1.1.1 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x001a, seq=2/512, ttl=63
  370 6.487559283     20.1.1.1 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x001a, seq=3/768, ttl=64
  371 6.487637240     20.1.1.1 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x001a, seq=3/768, ttl=63
  372 6.487650973     40.1.1.1 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x001a, seq=3/768, ttl=64 (request in 371)
  373 6.488042540     40.1.1.1 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x001a, seq=3/768, ttl=63
  418 7.511563053     20.1.1.1 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x001a, seq=4/1024, ttl=64
  419 7.511642402     20.1.1.1 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x001a, seq=4/1024, ttl=63
  420 7.511656436     40.1.1.1 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x001a, seq=4/1024, ttl=64 (request in 419)
  421 7.512078553     40.1.1.1 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x001a, seq=4/1024, ttl=63
  440 8.535709030     20.1.1.1 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x001a, seq=5/1280, ttl=64
  441 8.535924711     20.1.1.1 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x001a, seq=5/1280, ttl=63
  442 8.535962579     40.1.1.1 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x001a, seq=5/1280, ttl=64 (request in 441)
  443 8.536625469     40.1.1.1 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x001a, seq=5/1280, ttl=63
```

Netcat doesnt :-

```
iiitd@vim2:~$ nc 40.1.1.1 8080
hello ji
```

```
iiitd@vim4:~$ nc -l -p 8080
```

Part b)

Command :-

sudo iptables -A INPUT -s 20.1.1.1 -p tcp -j DROP (drop all tcp packet coming from 20.1.1.1

On Gateway:-

```
iiitd@vim3:~$ sudo iptables -A INPUT -s 20.1.1.1 -p tcp -j DROP
iiitd@vim3:~$ sudo iptables-save
# Generated by iptables-save v1.8.7 on Thu Oct 24 05:47:19 2024
*filter
:INPUT ACCEPT [0:0]
:FORWARD ACCEPT [0:0]
:OUTPUT ACCEPT [0:0]
-A INPUT -s 20.1.1.1/32 -p tcp -j DROP
COMMIT
# Completed on Thu Oct 24 05:47:19 2024
# Generated by iptables-save v1.8.7 on Thu Oct 24 05:47:19 2024
*nat
:PREROUTING ACCEPT [0:0]
:INPUT ACCEPT [0:0]
:OUTPUT ACCEPT [0:0]
:POSTROUTING ACCEPT [0:0]
COMMIT
# Completed on Thu Oct 24 05:47:19 2024
```

On gateway pre and post iptables entry :- first telnet world and after entry telnet doesnt

```
iiitd@vim3:~$ nc -l -p 8080
hi
^C
iiitd@vim3:~$ nc -l -p 8080
^C
iiitd@vim3:~$
```

This screenshot shows telnet works prior to iptables entry and doest after iptables entry but ping still works which shows it just block tcp packets

```
iiitd@vim2:~$ telnet 20.1.1.2 8080
Trying 20.1.1.2...
Connected to 20.1.1.2.
Escape character is '^]'.
hi
Connection closed by foreign host.
iiitd@vim2:~$ telnet 20.1.1.2 8080
Trying 20.1.1.2...
^C
iiitd@vim2:~$ ping -c 5 20.1.1.2
PING 20.1.1.2 (20.1.1.2) 56(84) bytes of data.
64 bytes from 20.1.1.2: icmp_seq=1 ttl=64 time=0.445 ms
64 bytes from 20.1.1.2: icmp_seq=2 ttl=64 time=0.530 ms
64 bytes from 20.1.1.2: icmp_seq=3 ttl=64 time=0.645 ms
64 bytes from 20.1.1.2: icmp_seq=4 ttl=64 time=0.673 ms
64 bytes from 20.1.1.2: icmp_seq=5 ttl=64 time=0.217 ms

--- 20.1.1.2 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4041ms
rtt min/avg/max/mdev = 0.217/0.502/0.673/0.164 ms
```

Q3)

Part a) Configuration check

```
iiitd@vim3:~$ sudo iptables -L
Chain INPUT (policy ACCEPT)
target     prot opt source               destination
DROP       tcp  --  20.1.1.1             anywhere

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination
ACCEPT     icmp --  anywhere             40.1.1.1
DROP       all  --  anywhere             40.1.1.1

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
```

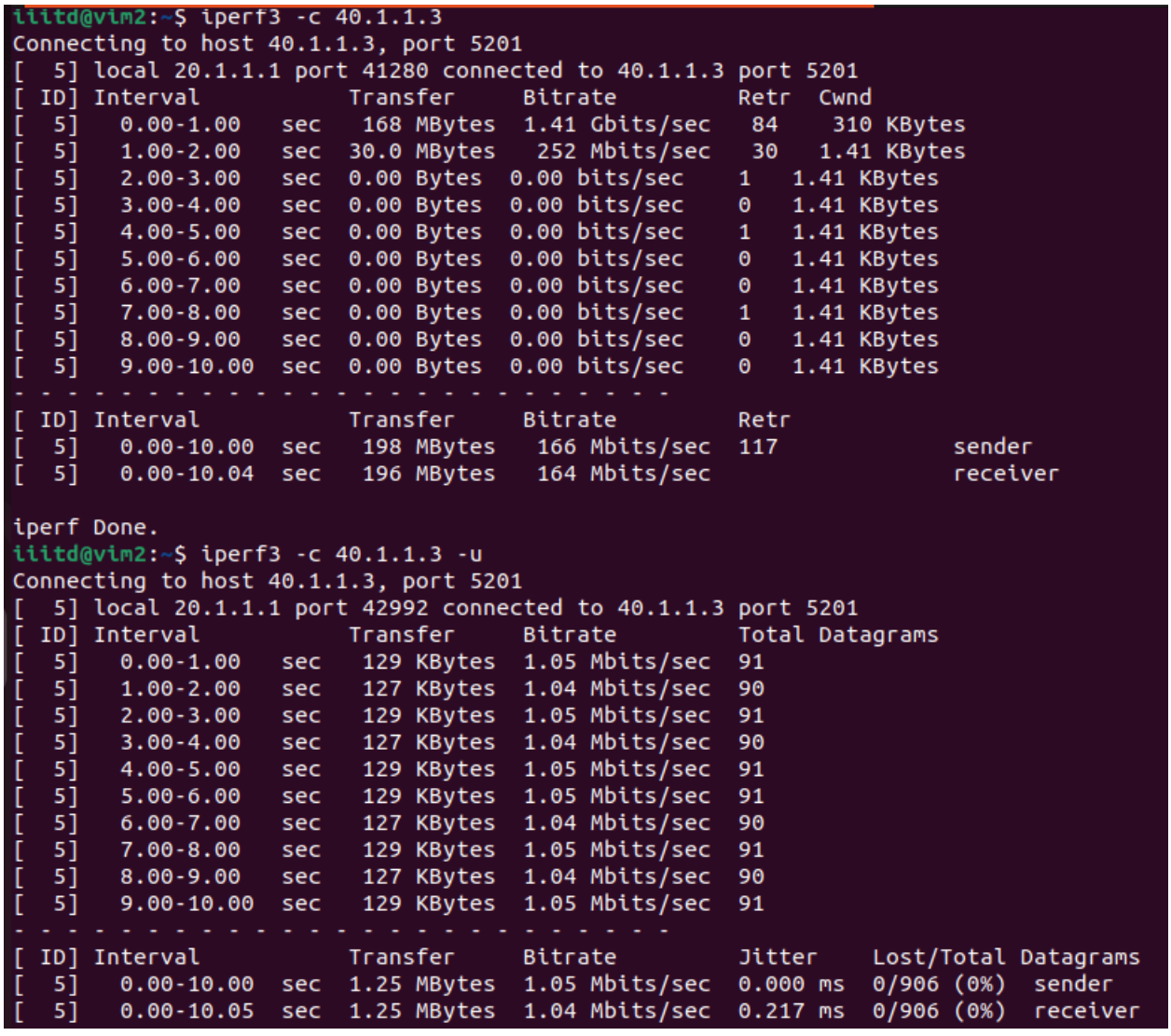
Commands :- (I mailed ma’am and she allowed for iperf3)
iperf3 -s

TCP iperf3 -c 40.1.1.3

UDP iperf3 -c 40.1.1.3 -u

Tcp has much higher bandwidth than that of udp

TCP is helped with various hardware offloads such as tso/gro where as UDP is not helped by any of those offloads as they don't apply on udp datagrams , also by default the udp packets are set to be send at a fixed rate



```
iitd@vim5:~$ iperf3 -s
-----------------------------------------------------------
Server listening on 5201
-----------------------------------------------------------
Accepted connection from 20.1.1.1, port 41266
[  5] local 40.1.1.3 port 5201 connected to 20.1.1.1 port 41280
[ ID] Interval           Transfer     Bitrate
[  5]   0.00-1.00   sec   160 MBytes  1.34 Gbits/sec
[  5]   1.00-2.00   sec  36.3 MBytes   304 Mbits/sec
[  5]   2.00-3.00   sec  0.00 Bytes  0.00 bits/sec
[  5]   3.00-4.00   sec  0.00 Bytes  0.00 bits/sec
[  5]   4.00-5.01   sec  0.00 Bytes  0.00 bits/sec
[  5]   5.01-6.00   sec  0.00 Bytes  0.00 bits/sec
[  5]   6.00-7.00   sec  0.00 Bytes  0.00 bits/sec
[  5]   7.00-8.00   sec  0.00 Bytes  0.00 bits/sec
[  5]   8.00-9.00   sec  0.00 Bytes  0.00 bits/sec
[  5]   9.00-10.00  sec  0.00 Bytes  0.00 bits/sec
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bitrate
[  5]   0.00-10.04  sec   196 MBytes   164 Mbits/sec                  receiver
-----------------------------------------------------------
Server listening on 5201
-----------------------------------------------------------
Accepted connection from 20.1.1.1, port 48930
[  5] local 40.1.1.3 port 5201 connected to 20.1.1.1 port 42992
[ ID] Interval           Transfer     Bitrate         Jitter    Lost/Total Datagrams
[  5]   0.00-1.00   sec   123 KBytes  1.01 Mbits/sec  0.097 ms  0/87 (0%)
[  5]   1.00-2.00   sec   127 KBytes  1.04 Mbits/sec  0.067 ms  0/90 (0%)
[  5]   2.00-3.00   sec   129 KBytes  1.05 Mbits/sec  0.061 ms  0/91 (0%)
[  5]   3.00-4.00   sec   127 KBytes  1.04 Mbits/sec  0.092 ms  0/90 (0%)
[  5]   4.00-5.00   sec   129 KBytes  1.05 Mbits/sec  0.131 ms  0/91 (0%)
[  5]   5.00-6.00   sec   127 KBytes  1.04 Mbits/sec  0.046 ms  0/90 (0%)
[  5]   6.00-7.00   sec   129 KBytes  1.05 Mbits/sec  0.072 ms  0/91 (0%)
[  5]   7.00-8.00   sec   129 KBytes  1.05 Mbits/sec  0.086 ms  0/91 (0%)
[  5]   8.00-9.00   sec   127 KBytes  1.04 Mbits/sec  0.091 ms  0/90 (0%)
[  5]   9.00-10.00  sec   129 KBytes  1.05 Mbits/sec  0.085 ms  0/91 (0%)
[  5]  10.00-10.05  sec  5.66 KBytes  1.02 Mbits/sec  0.217 ms  0/4 (0%)
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bitrate         Jitter    Lost/Total Datagrams
[  5]   0.00-10.05  sec  1.25 MBytes  1.04 Mbits/sec  0.217 ms  0/906 (0%)  receiver
```

Part b)

i) Min RTT :- 0.85 ms
   Max RTT :- 1.66 ms
   Avg RTT :- 1.22 ms

ii) Min RTT :- 0.549 ms
   Max RTT :- 1.33 ms
   Avg RTT :- 1.029 ms

iii) There is slight more rtt for 40.1.1.1 might be because of iptables entries destined towards 40.1.1.1 but difference is not significant .

```
iiitd@vim2:~$ ping -c 10 40.1.1.1
PING 40.1.1.1 (40.1.1.1) 56(84) bytes of data.
64 bytes from 40.1.1.1: icmp_seq=1 ttl=63 time=1.67 ms
64 bytes from 40.1.1.1: icmp_seq=2 ttl=63 time=1.46 ms
64 bytes from 40.1.1.1: icmp_seq=3 ttl=63 time=1.12 ms
64 bytes from 40.1.1.1: icmp_seq=4 ttl=63 time=0.853 ms
64 bytes from 40.1.1.1: icmp_seq=5 ttl=63 time=1.15 ms
64 bytes from 40.1.1.1: icmp_seq=6 ttl=63 time=1.47 ms
64 bytes from 40.1.1.1: icmp_seq=7 ttl=63 time=1.25 ms
64 bytes from 40.1.1.1: icmp_seq=8 ttl=63 time=1.31 ms
64 bytes from 40.1.1.1: icmp_seq=9 ttl=63 time=0.982 ms
64 bytes from 40.1.1.1: icmp_seq=10 ttl=63 time=0.946 ms

--- 40.1.1.1 ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9064ms
rtt min/avg/max/mdev = 0.853/1.220/1.666/0.246 ms
iiitd@vim2:~$ ping -c 10 40.1.1.3
PING 40.1.1.3 (40.1.1.3) 56(84) bytes of data.
64 bytes from 40.1.1.3: icmp_seq=1 ttl=63 time=1.16 ms
64 bytes from 40.1.1.3: icmp_seq=2 ttl=63 time=1.07 ms
64 bytes from 40.1.1.3: icmp_seq=3 ttl=63 time=1.27 ms
64 bytes from 40.1.1.3: icmp_seq=4 ttl=63 time=0.874 ms
64 bytes from 40.1.1.3: icmp_seq=5 ttl=63 time=1.01 ms
64 bytes from 40.1.1.3: icmp_seq=6 ttl=63 time=1.33 ms
64 bytes from 40.1.1.3: icmp_seq=7 ttl=63 time=0.764 ms
64 bytes from 40.1.1.3: icmp_seq=8 ttl=63 time=1.10 ms
64 bytes from 40.1.1.3: icmp_seq=9 ttl=63 time=1.17 ms
64 bytes from 40.1.1.3: icmp_seq=10 ttl=63 time=0.549 ms

--- 40.1.1.3 ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9037ms
rtt min/avg/max/mdev = 0.549/1.029/1.330/0.227 ms
```

Q4)

Part A)

Command Used :-

`sudo iptables -t nat -A POSTROUTING -s 20.1.1.1/24 -j SNAT --to-source 40.1.1.2`

After SNAT

```
iiitd@vim3:~$ sudo iptables -t nat -A POSTROUTING -s 20.1.1.1/24 -j SNAT --to-so
urce 40.1.1.2
iiitd@vim3:~$ sudo iptables -t nat -L
Chain PREROUTING (policy ACCEPT)
target     prot opt source               destination

Chain INPUT (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination

Chain POSTROUTING (policy ACCEPT)
target     prot opt source               destination
SNAT       all  --  20.1.1.0/24          anywhere             to:40.1.1.2
```

Part B)

Command Used :-

sudo iptables -t nat -A PREROUTING -d 40.1.1.2 -j DNAT --to-destination 20.1.1.1

(We dont need this rule to be added when snat is added by default in reverse dnat is also added)

```
iiitd@vim3:~$ sudo iptables -t nat -A PREROUTING -d 40.1.1.2 -j DNAT --to-destination 20.1.1.1
iiitd@vim3:~$ sudo iptables -t nat -L
Chain PREROUTING (policy ACCEPT)
target     prot opt source               destination
DNAT       all  --  anywhere             vim3                to:20.1.1.1

Chain INPUT (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination

Chain POSTROUTING (policy ACCEPT)
target     prot opt source               destination
SNAT       all  --  20.1.1.0/24          anywhere            to:40.1.1.2
iiitd@vim3:~$
```

Part C)

Ping command used from client onto both the server and monitored using t shark at gateway , client , both the Server . We can see that 20.1.1.1 is translated to 40.1.1.2

```
iiitd@vim2:~$ ping -c 3 40.1.1.1
PING 40.1.1.1 (40.1.1.1) 56(84) bytes of data.
64 bytes from 40.1.1.1: icmp_seq=1 ttl=63 time=1.33 ms
64 bytes from 40.1.1.1: icmp_seq=2 ttl=63 time=1.05 ms
64 bytes from 40.1.1.1: icmp_seq=3 ttl=63 time=1.09 ms

--- 40.1.1.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2002ms
rtt min/avg/max/mdev = 1.047/1.156/1.330/0.124 ms
iiitd@vim2:~$ ping -c 3 40.1.1.3
PING 40.1.1.3 (40.1.1.3) 56(84) bytes of data.
64 bytes from 40.1.1.3: icmp_seq=1 ttl=63 time=0.516 ms
64 bytes from 40.1.1.3: icmp_seq=2 ttl=63 time=1.12 ms
64 bytes from 40.1.1.3: icmp_seq=3 ttl=63 time=1.37 ms

--- 40.1.1.3 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2015ms
rtt min/avg/max/mdev = 0.516/1.001/1.365/0.357 ms
```

Client tshark:

```
iiitd@vim2:~$ sudo tshark -i enp0s8 -Y icmp
[sudo] password for iiitd:
Running as user "root" and group "root". This could be dangerous.
Capturing on 'enp0s8'
 ** (tshark:39131) 01:58:49.556015 [Main MESSAGE] -- Capture started.
 ** (tshark:39131) 01:58:49.556050 [Main MESSAGE] -- File: "/tmp/wireshark_enp0s8J3JSV2.pcapng"
  394 16.770340779     20.1.1.1 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x0027, seq=1/256, ttl=64
  395 16.770981818     40.1.1.2 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x0027, seq=1/256, ttl=63
  396 16.771493476     40.1.1.1 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0027, seq=1/256, ttl=64 (request in 395)
  397 16.771644346     40.1.1.1 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x0027, seq=1/256, ttl=63 (request in 394)
  419 17.771394155     20.1.1.1 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x0027, seq=2/512, ttl=64
  420 17.771993039     40.1.1.2 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x0027, seq=2/512, ttl=63
  421 17.772149241     40.1.1.1 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0027, seq=2/512, ttl=64 (request in 420)
  422 17.772398987     40.1.1.1 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x0027, seq=2/512, ttl=63 (request in 419)
  448 18.772379182     20.1.1.1 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x0027, seq=3/768, ttl=64
  449 18.772910751     40.1.1.2 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x0027, seq=3/768, ttl=63
  450 18.773413345     40.1.1.1 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0027, seq=3/768, ttl=64 (request in 449)
  451 18.773426178     40.1.1.1 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x0027, seq=3/768, ttl=63 (request in 448)
 1043 40.086577869     20.1.1.1 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=1/256, ttl=64
 1044 40.086943532     40.1.1.2 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=1/256, ttl=63
 1045 40.086945594     40.1.1.3 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0028, seq=1/256, ttl=64 (request in 1044)
 1046 40.087087844     40.1.1.3 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x0028, seq=1/256, ttl=63 (request in 1043)
 1085 41.100345273     20.1.1.1 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=2/512, ttl=64
 1086 41.100919990     40.1.1.2 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=2/512, ttl=63
 1087 41.101168780     40.1.1.3 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0028, seq=2/512, ttl=64 (request in 1086)
 1088 41.101441456     40.1.1.3 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x0028, seq=2/512, ttl=63 (request in 1085)
 1109 42.101300995     20.1.1.1 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=3/768, ttl=64
 1110 42.102072321     40.1.1.2 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=3/768, ttl=63
 1111 42.102368667     40.1.1.3 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0028, seq=3/768, ttl=64 (request in 1110)
 1112 42.102634911     40.1.1.3 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x0028, seq=3/768, ttl=63 (request in 1109)
```

Gateway tshark:

```
iiitd@vim3:~$ sudo tshark -i enp0s8 -Y icmp
Running as user "root" and group "root". This could be dangerous.
Capturing on 'enp0s8'
 ** (tshark:39023) 01:58:06.509485 [Main MESSAGE] -- Capture started.
 ** (tshark:39023) 01:58:06.509697 [Main MESSAGE] -- File: "/tmp/wireshark_enp0s8T3FBW2.pcapng"
 1742 59.866295113     20.1.1.1 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x0027, seq=1/256, ttl=64
 1743 59.866668568     40.1.1.2 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x0027, seq=1/256, ttl=63
 1744 59.867177067     40.1.1.1 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x0027, seq=1/256, ttl=63 (request in 1742)
 1745 59.867230322     40.1.1.1 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0027, seq=1/256, ttl=64 (request in 1743)
 1767 60.867293792     20.1.1.1 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x0027, seq=2/512, ttl=64
 1768 60.867666596     40.1.1.2 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x0027, seq=2/512, ttl=63
 1769 60.867721883     40.1.1.1 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x0027, seq=2/512, ttl=63 (request in 1767)
 1770 60.867859931     40.1.1.1 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0027, seq=2/512, ttl=64 (request in 1768)
 1796 61.868299750     20.1.1.1 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x0027, seq=3/768, ttl=64
 1797 61.868602067     40.1.1.2 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x0027, seq=3/768, ttl=63
 1798 61.868915431     40.1.1.1 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x0027, seq=3/768, ttl=63 (request in 1796)
 1799 61.868962384     40.1.1.1 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0027, seq=3/768, ttl=64 (request in 1797)
 2391 83.182522235     20.1.1.1 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=1/256, ttl=64
 2392 83.182638967     40.1.1.2 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=1/256, ttl=63
 2393 83.182753230     40.1.1.3 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0028, seq=1/256, ttl=64 (request in 2392)
 2394 83.182824192     40.1.1.3 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x0028, seq=1/256, ttl=63 (request in 2391)
 2433 84.196434247     20.1.1.1 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=2/512, ttl=64
 2434 84.196719485     40.1.1.2 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=2/512, ttl=63
 2435 84.197091334     40.1.1.3 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x0028, seq=2/512, ttl=63 (request in 2433)
 2436 84.197145474     40.1.1.3 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0028, seq=2/512, ttl=64 (request in 2434)
 2457 85.197438778     20.1.1.1 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=3/768, ttl=64
 2458 85.197863117     40.1.1.2 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=3/768, ttl=63
 2459 85.198066871     40.1.1.3 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0028, seq=3/768, ttl=64 (request in 2458)
 2460 85.198183425     40.1.1.3 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x0028, seq=3/768, ttl=63 (request in 2457)
```

```
iiitd@vim3:~$ sudo tshark -i enp0s9 -Y icmp
[sudo] password for iiitd:
Running as user "root" and group "root". This could be dangerous.
Capturing on 'enp0s9'
 ** (tshark:38999) 01:57:56.701532 [Main MESSAGE] -- Capture started.
 ** (tshark:38999) 01:57:56.701735 [Main MESSAGE] -- File: "/tmp/wireshark_enp0s9CUGWV2.pcapng"
 1705 69.663192765     40.1.1.2 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x0027, seq=1/256, ttl=63
 1706 69.663980657     40.1.1.1 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0027, seq=1/256, ttl=64 (request in 1705)
 1728 70.664170615     40.1.1.2 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x0027, seq=2/512, ttl=63
 1729 70.664529120     40.1.1.1 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0027, seq=2/512, ttl=64 (request in 1728)
 1749 71.665159627     40.1.1.2 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x0027, seq=3/768, ttl=63
 1750 71.665700149     40.1.1.1 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0027, seq=3/768, ttl=64 (request in 1749)
 2225 92.979364546     40.1.1.2 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=1/256, ttl=63
 2226 92.979644083     40.1.1.3 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0028, seq=1/256, ttl=64 (request in 2225)
 2248 93.993289850     40.1.1.2 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=2/512, ttl=63
 2249 93.993874165     40.1.1.3 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0028, seq=2/512, ttl=64 (request in 2248)
 2267 94.994356917     40.1.1.2 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=3/768, ttl=63
 2268 94.994989098     40.1.1.3 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0028, seq=3/768, ttl=64 (request in 2267)
```

Server1 tshark:

```
iiitd@vim4:~$ sudo tshark -i enp0s8 -Y "icmp"
[sudo] password for iiitd:
Running as user "root" and group "root". This could be dangerous.
Capturing on 'enp0s8'
 ** (tshark:10661) 01:58:23.023042 [Main MESSAGE] -- Capture started.
 ** (tshark:10661) 01:58:23.023240 [Main MESSAGE] -- File: "/tmp/wireshark_enp0s8P1L3V2.pcapng"
 1213 43.282742495     20.1.1.1 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x0027, seq=1/256, ttl=64
 1214 43.283267575     40.1.1.2 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x0027, seq=1/256, ttl=63
 1215 43.283317556     40.1.1.1 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0027, seq=1/256, ttl=64 (request in 1214)
 1216 43.283789718     40.1.1.1 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x0027, seq=1/256, ttl=63 (request in 1213)
 1238 44.283707858     20.1.1.1 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x0027, seq=2/512, ttl=64
 1239 44.283915303     40.1.1.2 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x0027, seq=2/512, ttl=63
 1240 44.283958016     40.1.1.1 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0027, seq=2/512, ttl=64 (request in 1239)
 1241 44.284283824     40.1.1.1 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x0027, seq=2/512, ttl=63 (request in 1238)
 1267 45.284787851     20.1.1.1 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x0027, seq=3/768, ttl=64
 1268 45.285012406     40.1.1.2 → 40.1.1.1     ICMP 98 Echo (ping) request  id=0x0027, seq=3/768, ttl=63
 1269 45.285049971     40.1.1.1 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0027, seq=3/768, ttl=64 (request in 1268)
 1270 45.285560686     40.1.1.1 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x0027, seq=3/768, ttl=63 (request in 1267)
 1862 66.598945744     20.1.1.1 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=1/256, ttl=64
 1863 66.599031175     40.1.1.2 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=1/256, ttl=63
 1864 66.599152736     40.1.1.3 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0028, seq=1/256, ttl=64 (request in 1863)
 1865 66.599304574     40.1.1.3 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x0028, seq=1/256, ttl=63 (request in 1862)
 1904 67.612794194     20.1.1.1 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=2/512, ttl=64
 1905 67.613100341     40.1.1.2 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=2/512, ttl=63
 1906 67.613362955     40.1.1.3 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0028, seq=2/512, ttl=64 (request in 1905)
 1907 67.613650977     40.1.1.3 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x0028, seq=2/512, ttl=63 (request in 1904)
 1928 68.613700121     20.1.1.1 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=3/768, ttl=64
 1929 68.614156960     40.1.1.2 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=3/768, ttl=63
 1930 68.614465620     40.1.1.3 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0028, seq=3/768, ttl=64 (request in 1929)
 1931 68.614699455     40.1.1.3 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x0028, seq=3/768, ttl=63 (request in 1928)
```

Server2 tshark:

```
iiitd@vim5:~$ sudo tshark -i enp0s8 -Y "icmp"
[sudo] password for iiitd:
Running as user "root" and group "root". This could be dangerous.
Capturing on 'enp0s8'
 ** (tshark:12801) 01:59:20.439445 [Main MESSAGE] -- Capture started.
 ** (tshark:12801) 01:59:20.439661 [Main MESSAGE] -- File: "/tmp/wireshark_enp0s8889CW2.pcapng"
  272 9.126244028     20.1.1.1 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=1/256, ttl=64
  273 9.126332661     40.1.1.2 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=1/256, ttl=63
  274 9.126346879     40.1.1.3 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0028, seq=1/256, ttl=64 (request in 273)
  275 9.126605932     40.1.1.3 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x0028, seq=1/256, ttl=63 (request in 272)
  314 10.140422710     20.1.1.1 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=2/512, ttl=64
  315 10.140709200     40.1.1.2 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=2/512, ttl=63
  316 10.140738652     40.1.1.3 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0028, seq=2/512, ttl=64 (request in 315)
  317 10.141283527     40.1.1.3 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x0028, seq=2/512, ttl=63 (request in 314)
  338 11.141730625     20.1.1.1 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=3/768, ttl=64
  339 11.142105139     40.1.1.2 → 40.1.1.3     ICMP 98 Echo (ping) request  id=0x0028, seq=3/768, ttl=63
  340 11.142135114     40.1.1.3 → 40.1.1.2     ICMP 98 Echo (ping) reply    id=0x0028, seq=3/768, ttl=64 (request in 339)
  341 11.142725297     40.1.1.3 → 20.1.1.1     ICMP 98 Echo (ping) reply    id=0x0028, seq=3/768, ttl=63 (request in 338)
```

Q5)

Part A)

```
iiitd@vim2:~$ ping -c 10 40.1.1.1
PING 40.1.1.1 (40.1.1.1) 56(84) bytes of data.
64 bytes from 40.1.1.1: icmp_seq=1 ttl=63 time=0.694 ms
64 bytes from 40.1.1.1: icmp_seq=2 ttl=63 time=1.31 ms
64 bytes from 40.1.1.1: icmp_seq=3 ttl=63 time=1.12 ms
64 bytes from 40.1.1.1: icmp_seq=4 ttl=63 time=1.03 ms
64 bytes from 40.1.1.1: icmp_seq=5 ttl=63 time=1.38 ms
64 bytes from 40.1.1.1: icmp_seq=6 ttl=63 time=1.14 ms
64 bytes from 40.1.1.1: icmp_seq=7 ttl=63 time=1.29 ms
64 bytes from 40.1.1.1: icmp_seq=8 ttl=63 time=0.987 ms
64 bytes from 40.1.1.1: icmp_seq=9 ttl=63 time=1.74 ms
64 bytes from 40.1.1.1: icmp_seq=10 ttl=63 time=1.66 ms

--- 40.1.1.1 ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9044ms
rtt min/avg/max/mdev = 0.694/1.235/1.738/0.297 ms
iiitd@vim2:~$ ping -c 10 40.1.1.3
PING 40.1.1.3 (40.1.1.3) 56(84) bytes of data.
64 bytes from 40.1.1.3: icmp_seq=1 ttl=63 time=1.31 ms
64 bytes from 40.1.1.3: icmp_seq=2 ttl=63 time=1.32 ms
64 bytes from 40.1.1.3: icmp_seq=3 ttl=63 time=1.17 ms
64 bytes from 40.1.1.3: icmp_seq=4 ttl=63 time=0.646 ms
64 bytes from 40.1.1.3: icmp_seq=5 ttl=63 time=1.62 ms
64 bytes from 40.1.1.3: icmp_seq=6 ttl=63 time=0.717 ms
64 bytes from 40.1.1.3: icmp_seq=7 ttl=63 time=1.45 ms
64 bytes from 40.1.1.3: icmp_seq=8 ttl=63 time=1.38 ms
64 bytes from 40.1.1.3: icmp_seq=9 ttl=63 time=1.22 ms
64 bytes from 40.1.1.3: icmp_seq=10 ttl=63 time=0.540 ms

--- 40.1.1.3 ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9039ms
rtt min/avg/max/mdev = 0.540/1.136/1.616/0.350 ms
```

To check whom to assign 0.8 and 0.2 probability I checked RTT as 40.1.1.3 has slightly smaller hence we assign 0.8 probability to 40.1.1.3 and 0.2 to 40.1.1.1

Commands :-

sudo iptables -t nat -A PREROUTING -p icmp -s 20.1.1.1 -m statistic --mode random --probability 0.8 -j DNAT --to-destination 40.1.1.3

(with probability 0.8 the packet will go to 40.1.1.3)

`sudo iptables -t nat -A PREROUTING -p icmp -s 20.1.1.1 -j DNAT --to-destination 40.1.1.1 (The rest of packets sent to 40.1.1.1)`

```
iiitd@vim3:~$ sudo iptables -t nat -A PREROUTING -p icmp -s 20.1.1.1 -m statisti
c --mode random --probability 0.8 -j DNAT --to-destination 40.1.1.3
iiitd@vim3:~$ sudo iptables -t nat -A PREROUTING -p icmp -s 20.1.1.1 -j DNAT --t
o-destination 40.1.1.1
iiitd@vim3:~$ sudo iptables -t nat -L
Chain PREROUTING (policy ACCEPT)
target     prot opt source               destination
DNAT       icmp --  20.1.1.1             anywhere             statistic mode ran
dom probability 0.79999999981 to:40.1.1.3
DNAT       icmp --  20.1.1.1             anywhere             to:40.1.1.1

Chain INPUT (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination

Chain POSTROUTING (policy ACCEPT)
target     prot opt source               destination
```

Reference:-

Tut 5 - Iptables
tshark(1)
iptables command in Linux with Examples - GeeksforGeeks
Iptables Dnat, Snat, And Masquerade: A Practical Guide - Sys Admin Land