Networking Training Program 2025

Name: Aswath S

University: VIT Vellore

Reg.No: 21BEC2188

Question-15:

Download iperf in laptop/phone and make sure they are in same network. Try different iperf commands with tcp, udp, birectional, reverse, multicast, parallel options and analyze the bandwidth and rate of transmission, delay, jitter etc.

TCP Test:

```
C:\iperf>iperf3 -c 192.168.29.14
Connecting to host 192.168.29.14, port 5201
[  5] local 192.168.29.3 port 51402 connected to 192.168.29.14 port 5201
[ ID] Interval           Transfer     Bitrate
[  5]   0.00-1.00   sec   229 MBytes  1.92 Gbits/sec
[  5]   1.00-2.00   sec   250 MBytes  2.10 Gbits/sec
[  5]   2.00-3.00   sec   308 MBytes  2.59 Gbits/sec
[  5]   3.00-4.00   sec   373 MBytes  3.13 Gbits/sec
[  5]   4.00-5.00   sec   326 MBytes  2.74 Gbits/sec
[  5]   5.00-6.00   sec   321 MBytes  2.69 Gbits/sec
[  5]   6.00-7.00   sec   329 MBytes  2.76 Gbits/sec
[  5]   7.00-8.00   sec   321 MBytes  2.69 Gbits/sec
[  5]   8.00-9.00   sec   286 MBytes  2.40 Gbits/sec
[  5]   9.00-10.00  sec   329 MBytes  2.76 Gbits/sec
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bitrate
[  5]   0.00-10.00  sec  3.00 GBytes  2.58 Gbits/sec                  sender
[  5]   0.00-10.02  sec  3.00 GBytes  2.57 Gbits/sec                  receiver

iperf Done.

C:\iperf>
```

Client Machine (192.168.29.3) is initiating a connection. Server Machine (192.168.29.14) is accepting the connection on port 5201.

Transfer (229 MBytes): The amount of data sent. Bitrate (1.92 Gbits/sec): The speed of data transmission.

- **The speed fluctuates between 1.92 Gbps to 3.13 Gbps.**
- **The highest throughput occurs at 3.00-4.00 sec (3.13 Gbps).**
- **The network is high-speed and stable.**

```
C:\iperf>iperf3 -c 192.168.29.14 --bidir
Connecting to host 192.168.29.14, port 5201
[  5] local 192.168.29.3 port 51486 connected to 192.168.29.14 port 5201
[  7] local 192.168.29.3 port 51487 connected to 192.168.29.14 port 5201
[ ID][Role] Interval           Transfer     Bitrate
[  5][TX-C]   0.00-1.00   sec  95.5 MBytes   801 Mbits/sec
[  7][RX-C]   0.00-1.00   sec   129 MBytes  1.08 Gbits/sec
[  5][TX-C]   1.00-2.00   sec  69.5 MBytes   583 Mbits/sec
[  7][RX-C]   1.00-2.00   sec   153 MBytes  1.28 Gbits/sec
[  5][TX-C]   2.00-3.00   sec  61.8 MBytes   518 Mbits/sec
[  7][RX-C]   2.00-3.00   sec   140 MBytes  1.18 Gbits/sec
[  5][TX-C]   3.00-4.00   sec  55.2 MBytes   463 Mbits/sec
[  7][RX-C]   3.00-4.00   sec   155 MBytes  1.30 Gbits/sec
[  5][TX-C]   4.00-5.00   sec  54.2 MBytes   455 Mbits/sec
[  7][RX-C]   4.00-5.00   sec   150 MBytes  1.26 Gbits/sec
[  5][TX-C]   5.00-6.00   sec  51.6 MBytes   433 Mbits/sec
[  7][RX-C]   5.00-6.00   sec   154 MBytes  1.29 Gbits/sec
[  5][TX-C]   6.00-7.00   sec  61.9 MBytes   519 Mbits/sec
[  7][RX-C]   6.00-7.00   sec   164 MBytes  1.37 Gbits/sec
[  5][TX-C]   7.00-8.00   sec  69.8 MBytes   585 Mbits/sec
[  7][RX-C]   7.00-8.00   sec   162 MBytes  1.36 Gbits/sec
[  5][TX-C]   8.00-9.00   sec  61.9 MBytes   519 Mbits/sec
[  7][RX-C]   8.00-9.00   sec   160 MBytes  1.35 Gbits/sec
[  5][TX-C]   9.00-10.00  sec  59.6 MBytes   500 Mbits/sec
[  7][RX-C]   9.00-10.00  sec   170 MBytes  1.42 Gbits/sec
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID][Role] Interval           Transfer     Bitrate         Retr
[  5][TX-C]   0.00-10.00  sec   641 MBytes   538 Mbits/sec                  sender
[  5][TX-C]   0.00-10.02  sec   641 MBytes   536 Mbits/sec                  receiver
[  7][RX-C]   0.00-10.00  sec  1.51 GBytes  1.29 Gbits/sec    0             sender
[  7][RX-C]   0.00-10.02  sec  1.50 GBytes  1.29 Gbits/sec                  receiver

iperf Done.
```

A bidirectional network performance test, meaning data is sent and received simultaneously between the client (192.168.29.3) and the server (192.168.29.14).

TX-C (Client → Server), RX-C (Server → Client), Retransmissions (Retr): 0, meaning no packet loss.

```
C:\iperf>iperf3 -c 192.168.29.14 -P 2
Connecting to host 192.168.29.14, port 5201
[  5] local 192.168.29.3 port 51516 connected to 192.168.29.14 port 5201
[  7] local 192.168.29.3 port 51517 connected to 192.168.29.14 port 5201
[ ID] Interval           Transfer     Bitrate
[  5]   0.00-1.00   sec   175 MBytes  1.46 Gbits/sec
[  7]   0.00-1.00   sec   116 MBytes   975 Mbits/sec
[SUM]   0.00-1.00   sec   291 MBytes  2.44 Gbits/sec
- - - - - - - - - - - - - - - - - - - - - - - - -
[  5]   1.00-2.00   sec   205 MBytes  1.72 Gbits/sec
[  7]   1.00-2.00   sec   118 MBytes   993 Mbits/sec
[SUM]   1.00-2.00   sec   324 MBytes  2.72 Gbits/sec
- - - - - - - - - - - - - - - - - - - - - - - - -
[  5]   2.00-3.00   sec   210 MBytes  1.76 Gbits/sec
[  7]   2.00-3.00   sec   108 MBytes   904 Mbits/sec
[SUM]   2.00-3.00   sec   318 MBytes  2.67 Gbits/sec
- - - - - - - - - - - - - - - - - - - - - - - - -
[  5]   3.00-4.00   sec   197 MBytes  1.65 Gbits/sec
[  7]   3.00-4.00   sec  84.9 MBytes   712 Mbits/sec
[SUM]   3.00-4.00   sec   282 MBytes  2.36 Gbits/sec
- - - - - - - - - - - - - - - - - - - - - - - - -
[  5]   4.00-5.00   sec   146 MBytes  1.22 Gbits/sec
[  7]   4.00-5.00   sec   119 MBytes   996 Mbits/sec
[SUM]   4.00-5.00   sec   264 MBytes  2.22 Gbits/sec
- - - - - - - - - - - - - - - - - - - - - - - - -
[  5]   5.00-6.00   sec  96.8 MBytes   811 Mbits/sec
[  7]   5.00-6.00   sec   168 MBytes  1.41 Gbits/sec
[SUM]   5.00-6.00   sec   265 MBytes  2.22 Gbits/sec
- - - - - - - - - - - - - - - - - - - - - - - - -
[  5]   6.00-7.00   sec   122 MBytes  1.03 Gbits/sec
[  7]   6.00-7.00   sec   184 MBytes  1.55 Gbits/sec
[SUM]   6.00-7.00   sec   307 MBytes  2.58 Gbits/sec
- - - - - - - - - - - - - - - - - - - - - - - - -
[  5]   7.00-8.00   sec   174 MBytes  1.46 Gbits/sec
[  7]   7.00-8.00   sec   131 MBytes  1.10 Gbits/sec
[SUM]   7.00-8.00   sec   304 MBytes  2.55 Gbits/sec
- - - - - - - - - - - - - - - - - - - - - - - - -
[  5]   8.00-9.00   sec   130 MBytes  1.09 Gbits/sec
[  7]   8.00-9.00   sec   202 MBytes  1.69 Gbits/sec
[SUM]   8.00-9.00   sec   331 MBytes  2.78 Gbits/sec
```

It is to measure network throughput.

Stream 1 ([5]): 1.46 Gbps

Stream 2 ([7]): 975 Mbps

Total Throughput ([SUM]): 2.44 Gbps (combined performance)

```
C:\iperf>iperf3 -c 192.168.29.14 -R
Connecting to host 192.168.29.14, port 5201
Reverse mode, remote host 192.168.29.14 is sending
[  5] local 192.168.29.3 port 51497 connected to 192.168.29.14 port 5201
[ ID] Interval           Transfer     Bitrate
[  5]   0.00-1.00   sec   149 MBytes  1.25 Gbits/sec
[  5]   1.00-2.00   sec   138 MBytes  1.16 Gbits/sec
[  5]   2.00-3.00   sec   157 MBytes  1.32 Gbits/sec
[  5]   3.00-4.00   sec   178 MBytes  1.50 Gbits/sec
[  5]   4.00-5.00   sec   155 MBytes  1.30 Gbits/sec
[  5]   5.00-6.00   sec   164 MBytes  1.37 Gbits/sec
[  5]   6.00-7.00   sec   159 MBytes  1.34 Gbits/sec
[  5]   7.00-8.00   sec   163 MBytes  1.37 Gbits/sec
[  5]   8.00-9.00   sec   174 MBytes  1.46 Gbits/sec
[  5]   9.00-10.00  sec   176 MBytes  1.48 Gbits/sec
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bitrate         Retr
[  5]   0.00-10.02  sec  1.58 GBytes  1.35 Gbits/sec    0             sender
[  5]   0.00-10.00  sec  1.58 GBytes  1.35 Gbits/sec                  receiver

iperf Done.
```

In reverse mode (-R), where the remote host (192.168.29.14) sends data to the client (192.168.29.3).

Total Data Transferred: 1.58 GBytes

Final Throughput: 1.35 Gbits/sec

No packet retransmissions (Retr = 0), meaning a stable connection.