# Assignment Of Lab2

**Computer1=192.168.43.73**

**Computer2=192.168.43.154**

**A)** TCP

Client 192.168.43.73 , Server 192.168.43.154

```
C:\Users\Senani>iperf3 -c 192.168.43.154
Connecting to host 192.168.43.154, port 5201
[  4] local 192.168.43.73 port 4158 connected to 192.168.43.154 port 5201
[ ID] Interval           Transfer     Bandwidth
[  4]   0.00-1.01   sec  1.62 MBytes  13.6 Mbits/sec
[  4]   1.01-2.00   sec  1.75 MBytes  14.7 Mbits/sec
[  4]   2.00-3.01   sec  1.75 MBytes  14.7 Mbits/sec
[  4]   3.01-4.01   sec  1.50 MBytes  12.6 Mbits/sec
[  4]   4.01-5.01   sec  1.38 MBytes  11.5 Mbits/sec
[  4]   5.01-6.01   sec  1.50 MBytes  12.6 Mbits/sec
[  4]   6.01-7.01   sec  1.38 MBytes  11.5 Mbits/sec
[  4]   7.01-8.01   sec  1.38 MBytes  11.5 Mbits/sec
[  4]   8.01-9.01   sec  1.38 MBytes  11.5 Mbits/sec
[  4]   9.01-10.01  sec  1.25 MBytes  10.5 Mbits/sec
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bandwidth
[  4]   0.00-10.01  sec  14.9 MBytes  12.5 Mbits/sec                  sender
[  4]   0.00-10.01  sec  14.8 MBytes  12.4 Mbits/sec                  receiver

iperf Done.
```

Figure 1

Server 192.168.43.73, Client 192.168.43.154

```
C:\Users\Senani>iperf3 -s
-----------------------------------------------------------
Server listening on 5201
-----------------------------------------------------------
Accepted connection from 192.168.43.154, port 11443
[  5] local 192.168.43.73 port 5201 connected to 192.168.43.154 port 11444
[ ID] Interval           Transfer     Bandwidth
[  5]   0.00-1.00   sec   712 KBytes  5.83 Mbits/sec
[  5]   1.00-2.00   sec  1.38 MBytes  11.6 Mbits/sec
[  5]   2.00-3.00   sec  1.51 MBytes  12.7 Mbits/sec
[  5]   3.00-4.00   sec  1.54 MBytes  12.9 Mbits/sec
[  5]   4.00-5.00   sec  1.42 MBytes  11.9 Mbits/sec
[  5]   5.00-6.00   sec  1.43 MBytes  12.0 Mbits/sec
[  5]   6.00-7.00   sec  1.43 MBytes  12.0 Mbits/sec
[  5]   7.00-8.00   sec  1.49 MBytes  12.6 Mbits/sec
[  5]   8.00-9.00   sec  1.61 MBytes  13.5 Mbits/sec
[  5]   9.00-10.00  sec  1.73 MBytes  14.5 Mbits/sec
[  5]  10.00-10.10  sec   132 KBytes  11.5 Mbits/sec
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bandwidth
[  5]   0.00-10.10  sec  0.00 Bytes  0.00 bits/sec                  sender
[  5]   0.00-10.10  sec  14.4 MBytes  11.9 Mbits/sec                  receiver
-----------------------------------------------------------
Server listening on 5201
-----------------------------------------------------------
```

Figure 2

**UDP**

Client 192.168.43.73 , Server 192.168.43.154

```
C:\Users\Senani>iperf3 -c 192.168.43.154 -p 50000 -u
Connecting to host 192.168.43.154, port 50000
[  4] local 192.168.43.73 port 53875 connected to 192.168.43.154 port 50000
[ ID] Interval           Transfer     Bandwidth       Total Datagrams
[  4]   0.00-1.01   sec   128 KBytes  1.03 Mbits/sec  16
[  4]   1.01-2.01   sec   128 KBytes  1.05 Mbits/sec  16
[  4]   2.01-3.02   sec   136 KBytes  1.11 Mbits/sec  17
[  4]   3.02-4.02   sec   120 KBytes   983 Kbits/sec  15
[  4]   4.02-5.02   sec   128 KBytes  1.05 Mbits/sec  16
[  4]   5.02-6.01   sec   128 KBytes  1.05 Mbits/sec  16
[  4]   6.01-7.01   sec   128 KBytes  1.05 Mbits/sec  16
[  4]   7.01-8.02   sec   128 KBytes  1.05 Mbits/sec  16
[  4]   8.02-9.02   sec   128 KBytes  1.05 Mbits/sec  16
[  4]   9.02-10.02  sec   128 KBytes  1.05 Mbits/sec  16
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bandwidth       Jitter    Lost/Total Datagrams
[  4]   0.00-10.02  sec  1.25 MBytes  1.05 Mbits/sec  113.106 ms  1/159 (0.63%)
[  4] Sent 159 datagrams

iperf Done.
```

Figure 3

Server 192.168.43.73, Client 192.168.43.154

```
C:\Users\Senani>iperf3 -s -p 30000
-----------------------------------------------------------
Server listening on 30000
-----------------------------------------------------------
Accepted connection from 192.168.43.154, port 11434
[  5] local 192.168.43.73 port 30000 connected to 192.168.43.154 port 49259
[ ID] Interval           Transfer     Bandwidth       Jitter    Lost/Total Datagrams
[  5]   0.00-1.00   sec   120 KBytes   980 Kbits/sec  1139382.809 ms  0/15 (0%)
[  5]   1.00-2.00   sec   128 KBytes  1.05 Mbits/sec  405708.276 ms  0/16 (0%)
[  5]   2.00-3.00   sec   128 KBytes  1.05 Mbits/sec  144462.929 ms  0/16 (0%)
[  5]   3.00-4.01   sec   144 KBytes  1.17 Mbits/sec  45213.288 ms  0/18 (0%)
[  5]   4.01-5.01   sec   152 KBytes  1.24 Mbits/sec  13267.274 ms  0/19 (0%)
[  5]   5.01-6.00   sec   144 KBytes  1.19 Mbits/sec  4154.802 ms  0/18 (0%)
[  5]   6.00-7.01   sec  80.0 KBytes   652 Kbits/sec  2179.630 ms  0/10 (0%)
[  5]   7.01-8.01   sec   112 KBytes   913 Kbits/sec  884.008 ms  1/15 (6.7%)
[  5]   8.01-9.00   sec   128 KBytes  1.06 Mbits/sec  316.255 ms  0/16 (0%)
[  5]   9.00-10.00  sec   128 KBytes  1.05 Mbits/sec  113.316 ms  0/16 (0%)
[  5]  10.00-10.03  sec  8.00 KBytes  2.34 Mbits/sec  106.405 ms  0/1 (0%)
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bandwidth       Jitter    Lost/Total Datagrams
[  5]   0.00-10.03  sec  0.00 Bytes  0.00 bits/sec  106.405 ms  1/160 (0.62%)
-----------------------------------------------------------
```

Figure 4

**B)** 3 Way HandShake

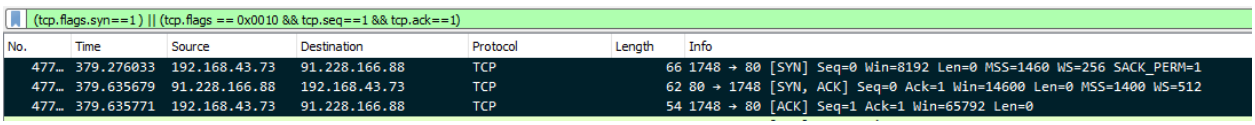


Figure 5

**C)** TCP establishment delay

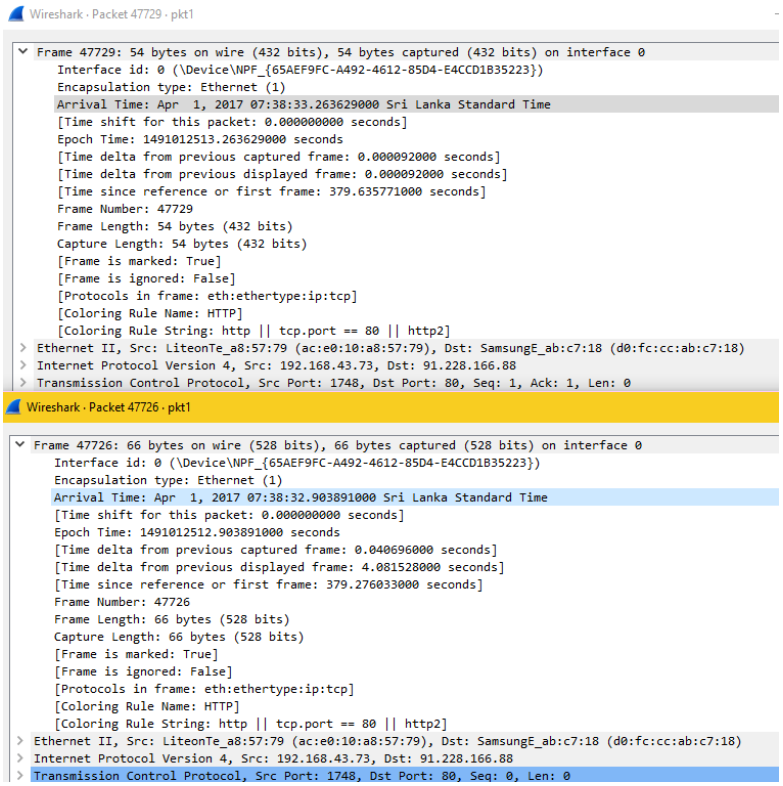


Figure 6

Establishment delay = 07:38:32.903891000 - 07:38:32.363629000
=0.540262 seconds

**D)** Wireshark converts all real sequence numbers into relative sequence numbers. Therefore it displays the sequence numbers relative to the first packet seen in the conversation. Therefore the 1st packet sequence number is 0.

**E)** **TCP operations:**
i).Maximum segment size
ii).No operation(NOP)
iii).Window scale
iv).TCP SACK permitted option

**F)**

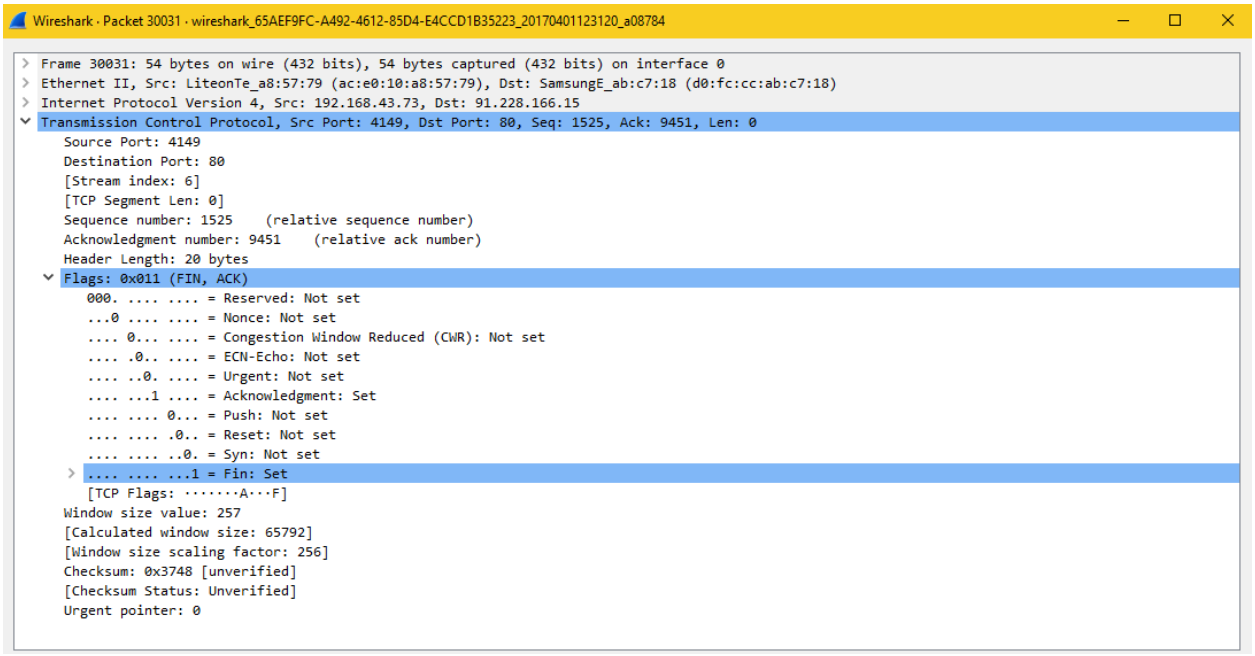


Figure 7

## F) Traffic Pattern – TCP

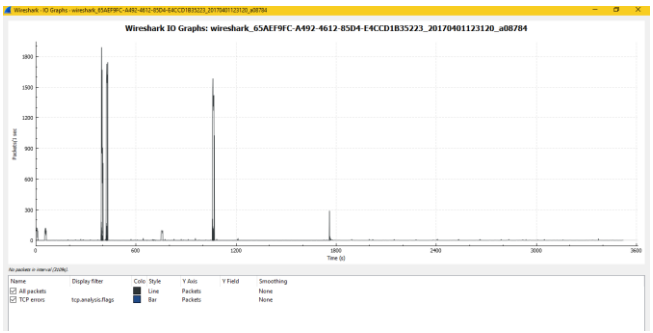


Figure 8

## Traffic Pattern- UDP

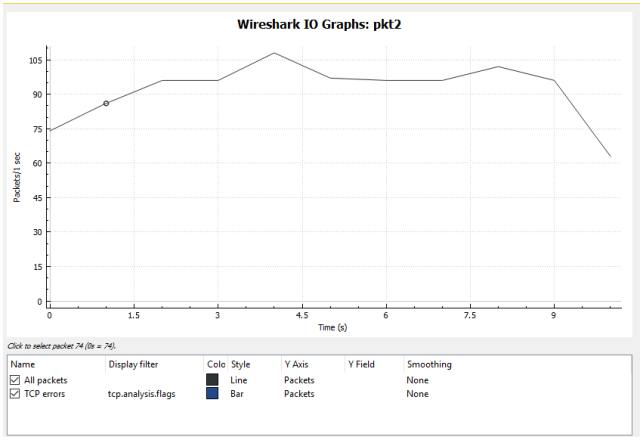


Figure 9

**H)**

**Throughputs:**

UDP is a connection less

UDP  throughput is larger than TCP throughput. Because UDP is connection less and it can send stream of packets fast. But UDP not reliable therefore packets can be loss due to connection faculties. Because of these reasons throughput can be less

**I)**

Throughput of MTU 500

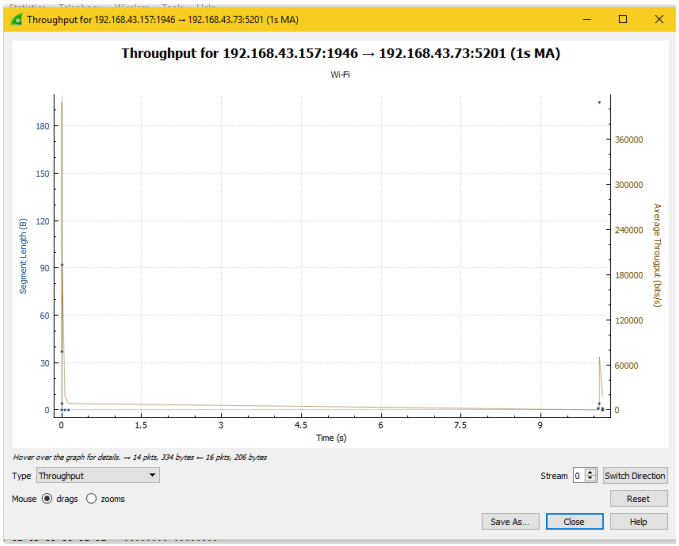


Figure 10

Throughput of MTU 1000

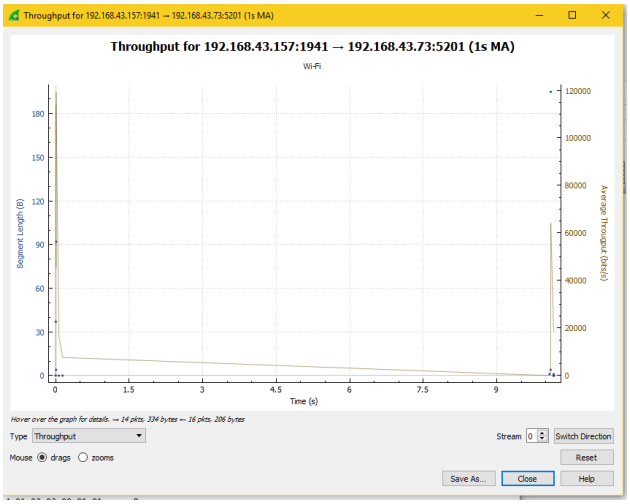


Figure 11

Throughput of MTU 1500

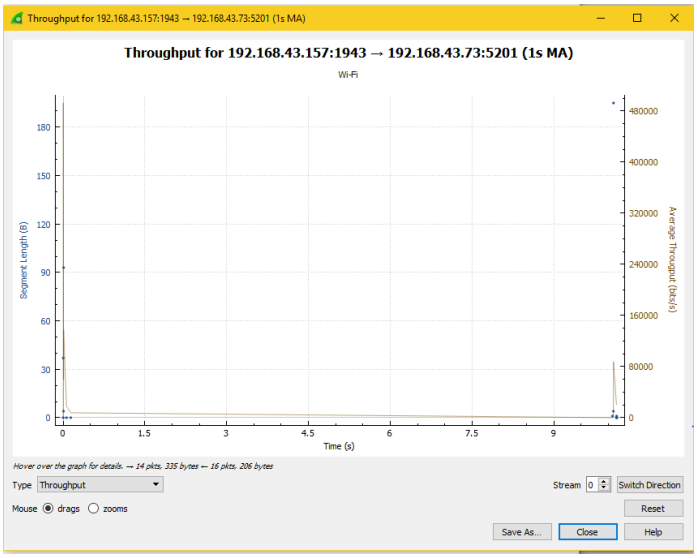


Figure 12

**J)**

Maximum Transfer Unit is the maximum bits in a particular data communication link. Therefore when the MTU increases , the throughput also increase.