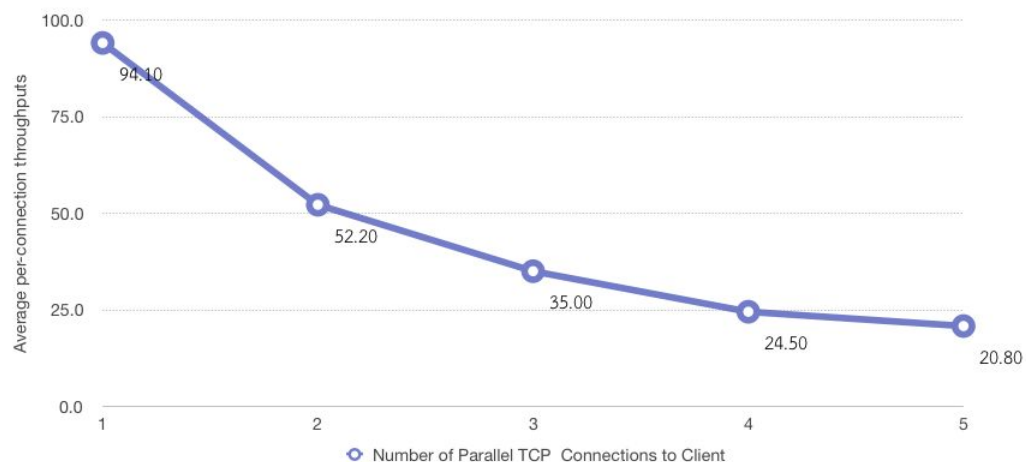


Lab Report 5

2.1 From data in Steps 3 and 4, plot the per-connection throughputs (x_i) and its average as a function of the number of parallel TCP connections (n).

| Number of Parallel TCP Connections to Client | Download throughputs (Mbps) | Average per-connection throughputs |
|--|-----------------------------|------------------------------------|
| 1 | 94.1 | 94.1 |
| 2 | 47.6,56.9 | 52.2 |
| 3 | 41.4,31.8,31.8 | 35.0 |
| 4 | 25.8,24.3,23.9,24.1 | 24.5 |
| 5 | 23.4,23.2,19.0,19.1,19.4 | 20.8 |



(a) For the case of one session (Step 3), Is the throughput close to the middle link capacity ? What is the percentage of throughput to the link capacity?

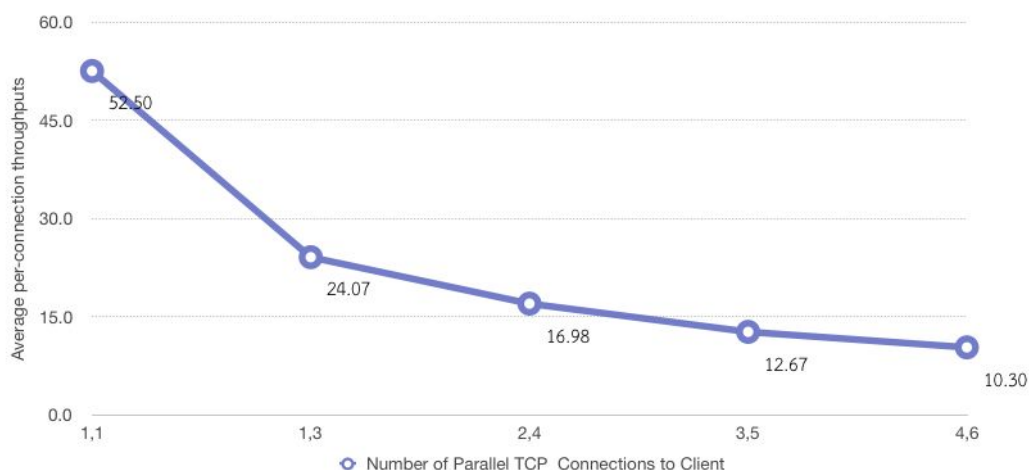
Ans Values are converge to the amount of 100 which is close to a middle link

(b) Explain how the per-connection throughputs you measured are related to the number of parallel TCP connections and the link capacity.

Ans Values will be decrease propotion to a number of TCP network connection

2.2 From data in Step 7, plot the per-connection throughputs (x and y) and its average as a function of the number of parallel TCP connections over the middle link (n).

| #TCP Connections to Client 1 | #TCP Connections to Client 2 | Number of TCP Connections over the middle link | Download throughputs (Mbps) | Average per-connection throughputs |
|------------------------------|------------------------------|--|---|------------------------------------|
| 1 | 1 | 2 | (55.0),(50.0) | 52.5 |
| 1 | 3 | 4 | (24.7), (23.9,23.8,23.9) | 24.1 |
| 2 | 4 | 6 | (18.0,18.1), (15.8,15.8,15.8,18.4) | 17.0 |
| 3 | 5 | 8 | (12.2,14.3,12.7),(12.0,11.8,11.8,11.8,14.8) | 12.7 |
| 4 | 6 | 10 | (10.1,10.4,10.0,10.4),(9.7,10.2,9.5,9.6,9.9,13.5) | 10.3 |



(a) Do you observe the same behavior of per-connection throughput over the middle link as in 2.1(b) ? Explain.

Ans Yes, as two clients are on the same network.

(b) Which client gets higher total download throughput? Do they get a fair share of the middle link capacity? If not, Do you think this result will be a problem in a real-world situation?

Ans Both clients receive a fair share. This will result in situation that although 1st client use only a small amount of network but will still receive only a fraction of overall network throughput.