# Networks Assignment 4
# Computer Networks Lab

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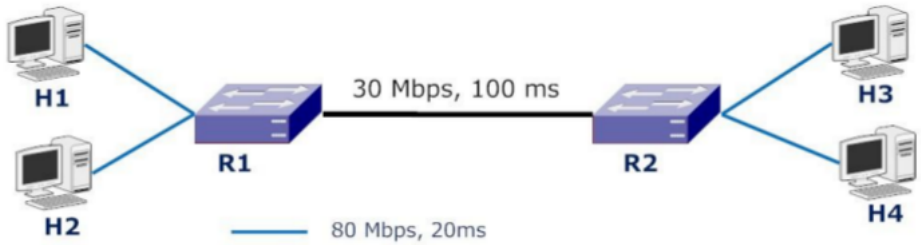
## Application 4

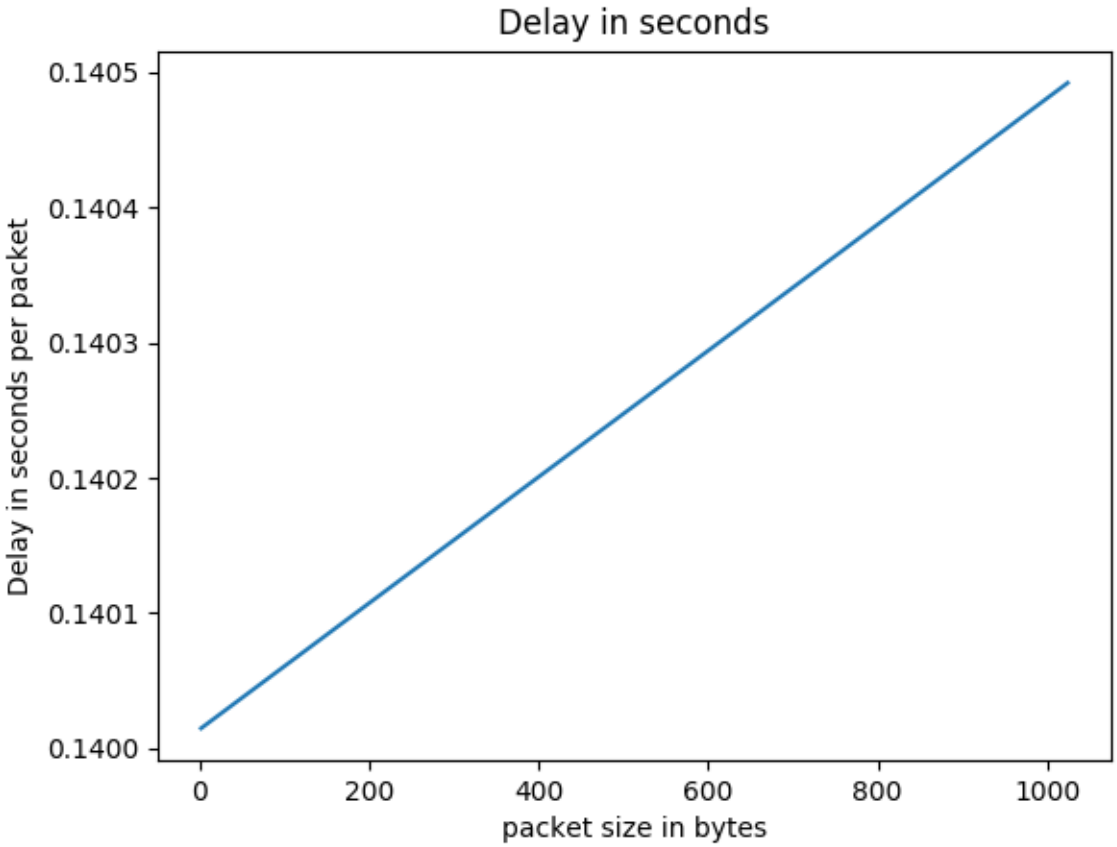
**Application #4:**
The objective is to compare the effect of CBR traffic over UDP agent and FTP traffic over TCP agent. Consider a TCP agent from TCP HighSpeed, TCP Vegas and TCP Scalable for the FTP traffic. Consider a Dumbbell topology with two routers R1 and R2 connected by a wired link (30 Mbps, 100 ms) and use drop-tail queues with queue size set according to bandwidth-delay product of the link. Each of the routers is connected to 2 hosts i.e., H1 and H2 are connected to R1 and H3 and H4 are connected to R2. The hosts are attached to the routers with (80 Mbps, 20ms) links. The CBR traffic over UDP agent and FTP traffic over TCP agent are attached to H1 and H2, respectively. Choose appropriate packet size for your experiments and perform the following:

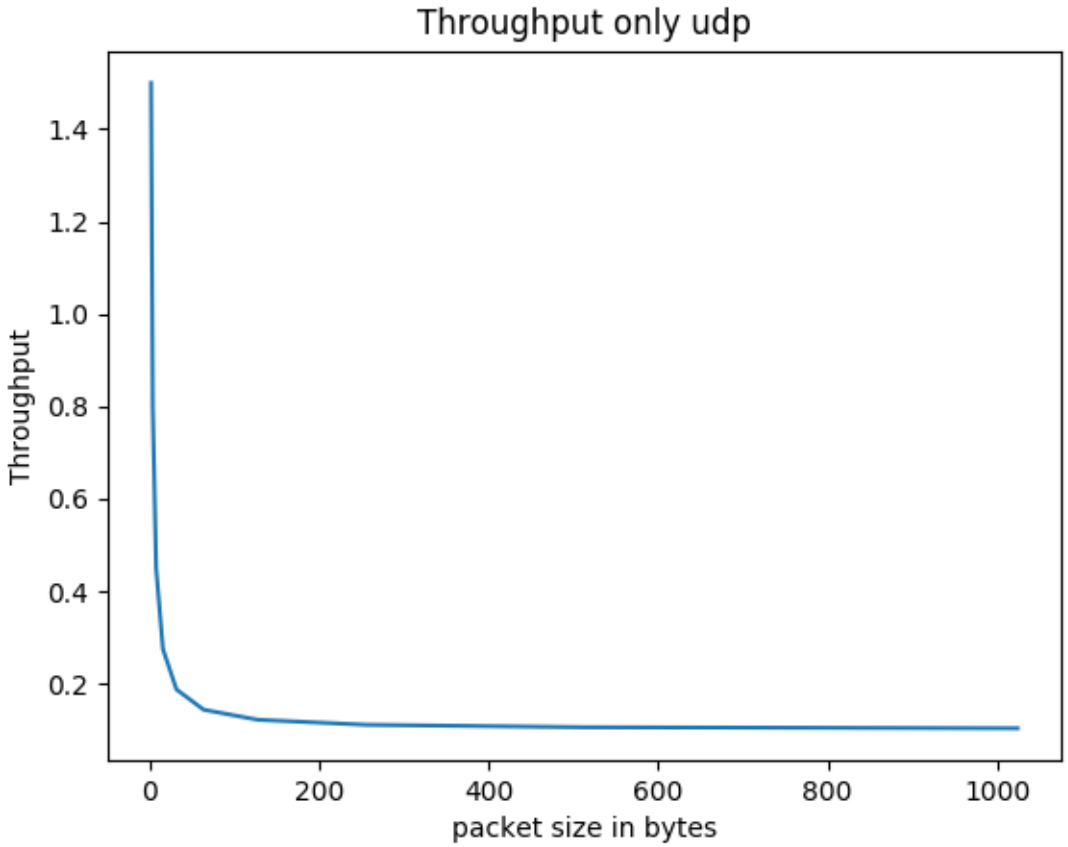
1. Compare the delay (in ms) and throughput (in Kbps) of CBR and FTP traffic streams, when only one of them is present in the network. Plot the graphs for the delay (in ms) and throughput (in Kbps) observed with different packet sizes.
2. Start both the flows at the same time and at different time. Also, compare the delay (in ms) and throughput (in Kbps) of CBR and FTP traffic streams. Plot the graphs for the delay (in ms) and throughput (in Kbps) observed with different packet sizes.

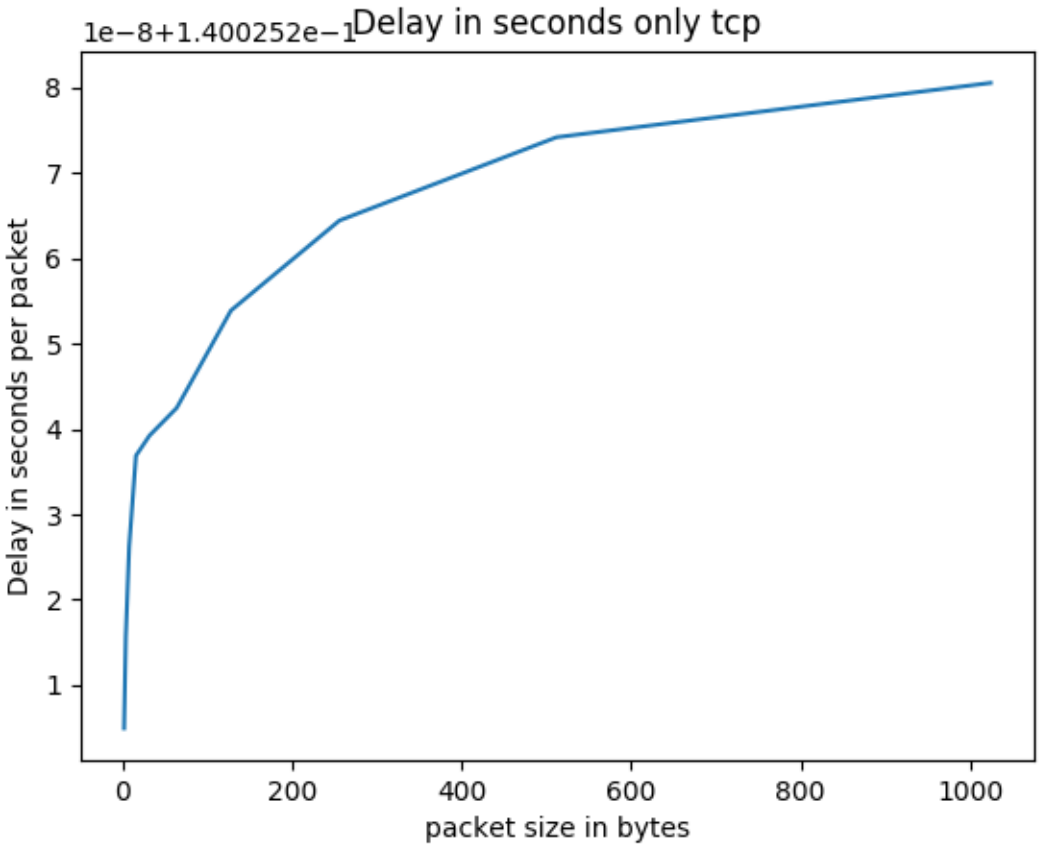


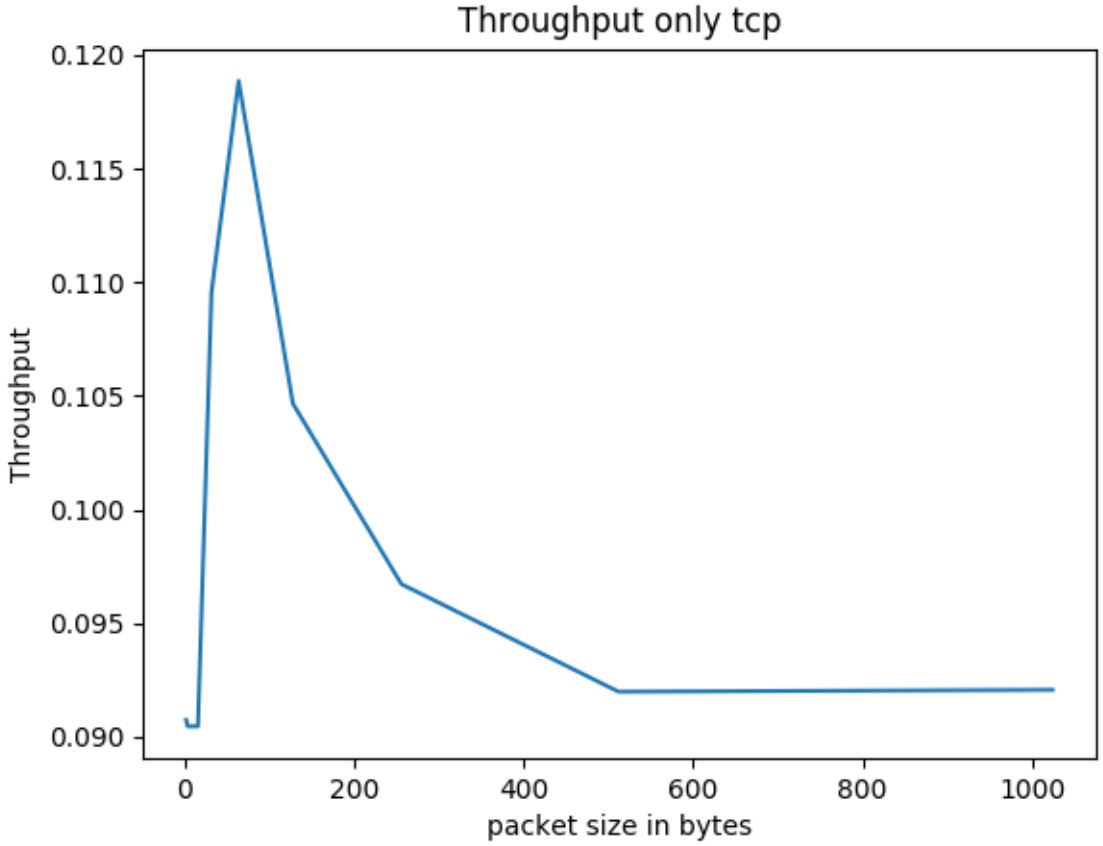

Make appropriate assumptions wherever necessary.

Qa.
For UDP packet

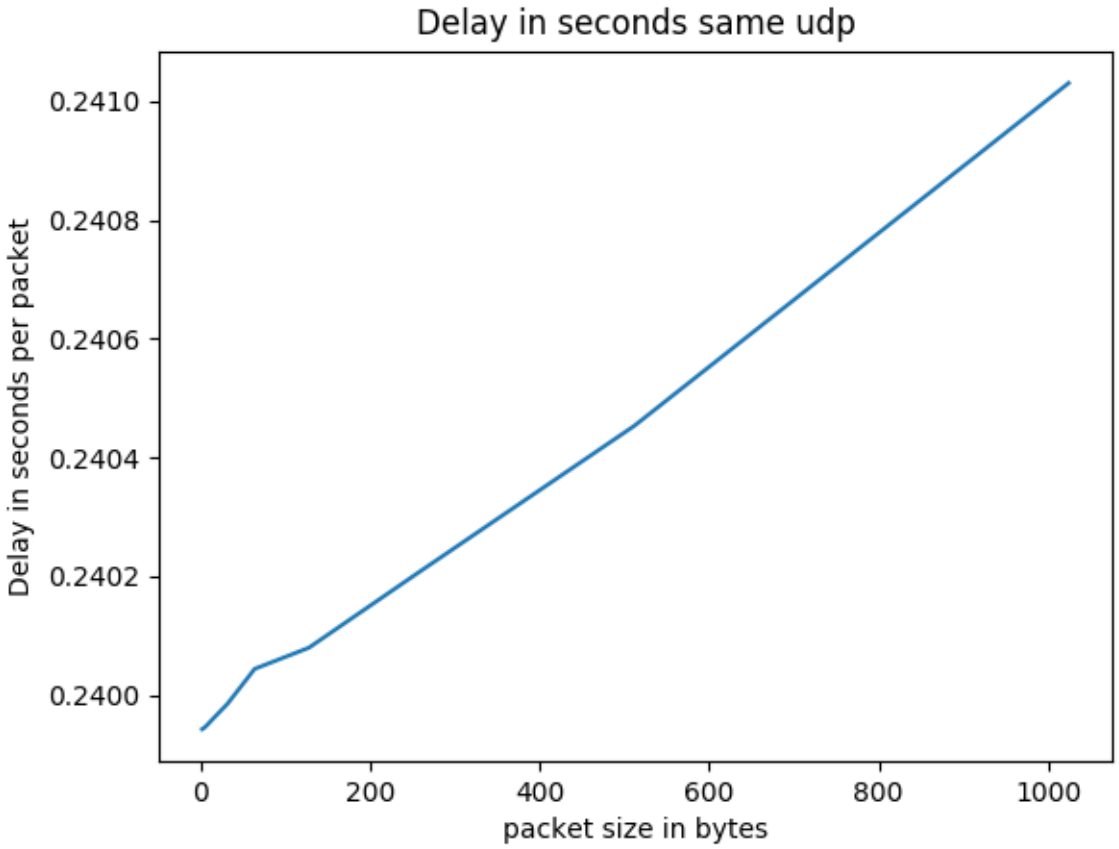


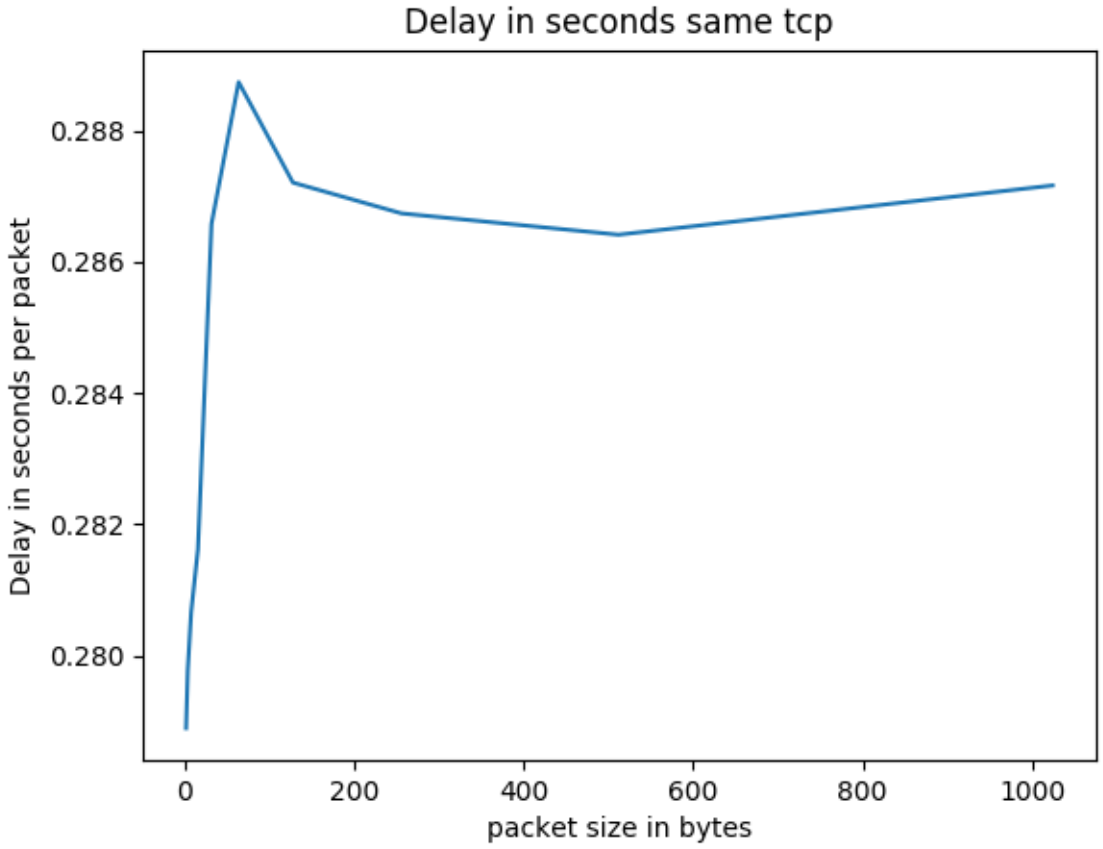

Throughput only udp
Throughput
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
200
400
600
800
1000
packet size in bytes

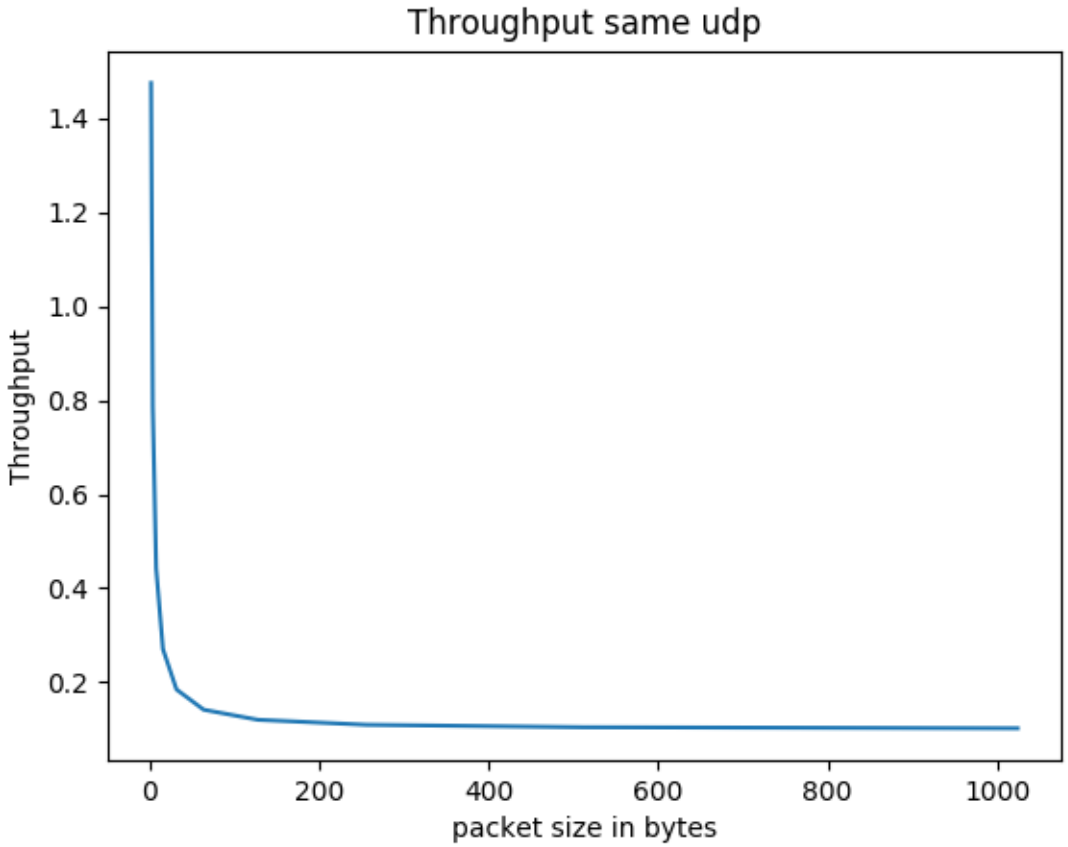

Delay in seconds only tcp
1e−8+1.400252e−1
Delay in seconds per packet
packet size in bytes
1
2
3
4
5
6
7
8
0
200
400
600
800
1000

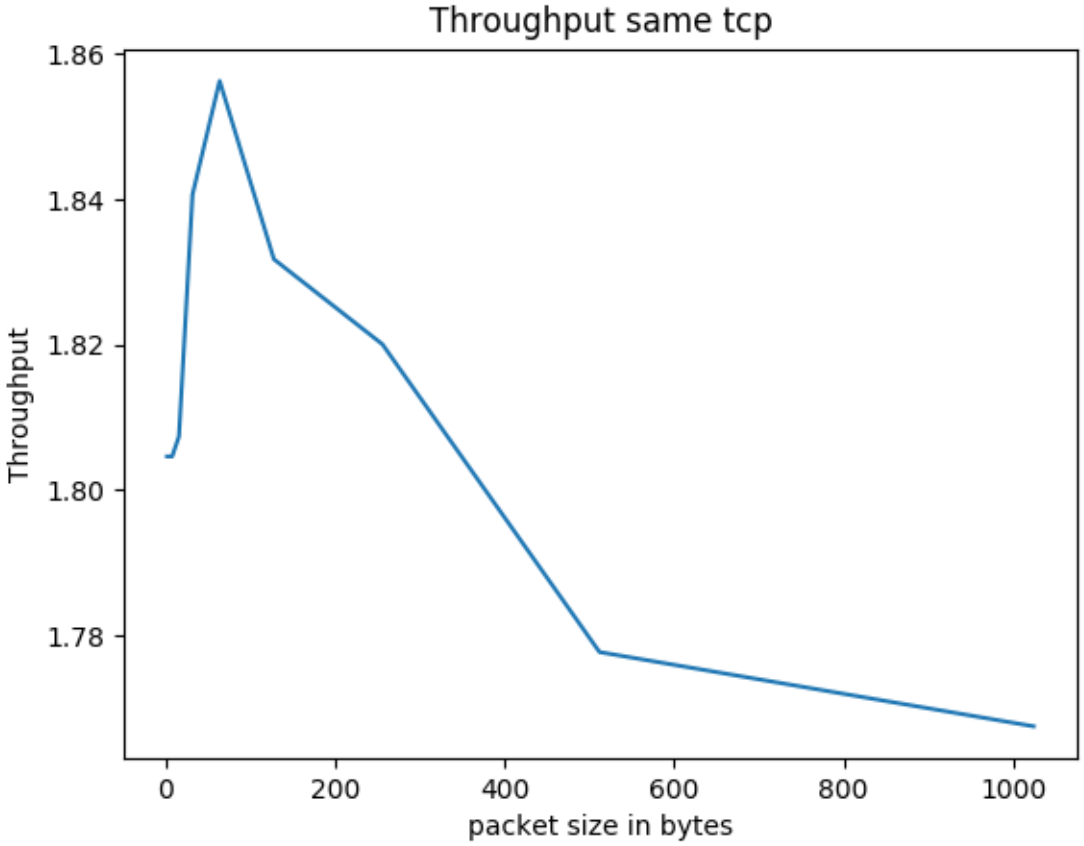

Throughput only tcp
Throughput
packet size in bytes
0.090
0.095
0.100
0.105
0.110
0.115
0.120
0
200
400
600
800
1000

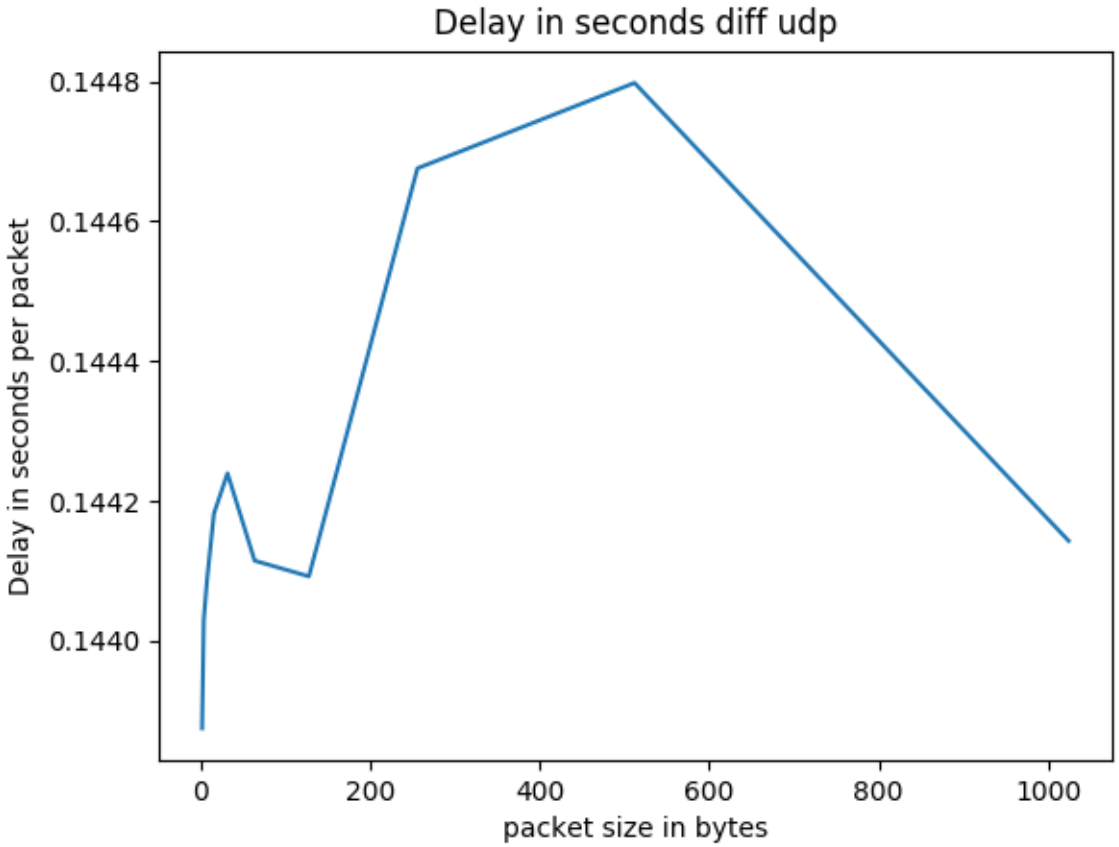
Qb.

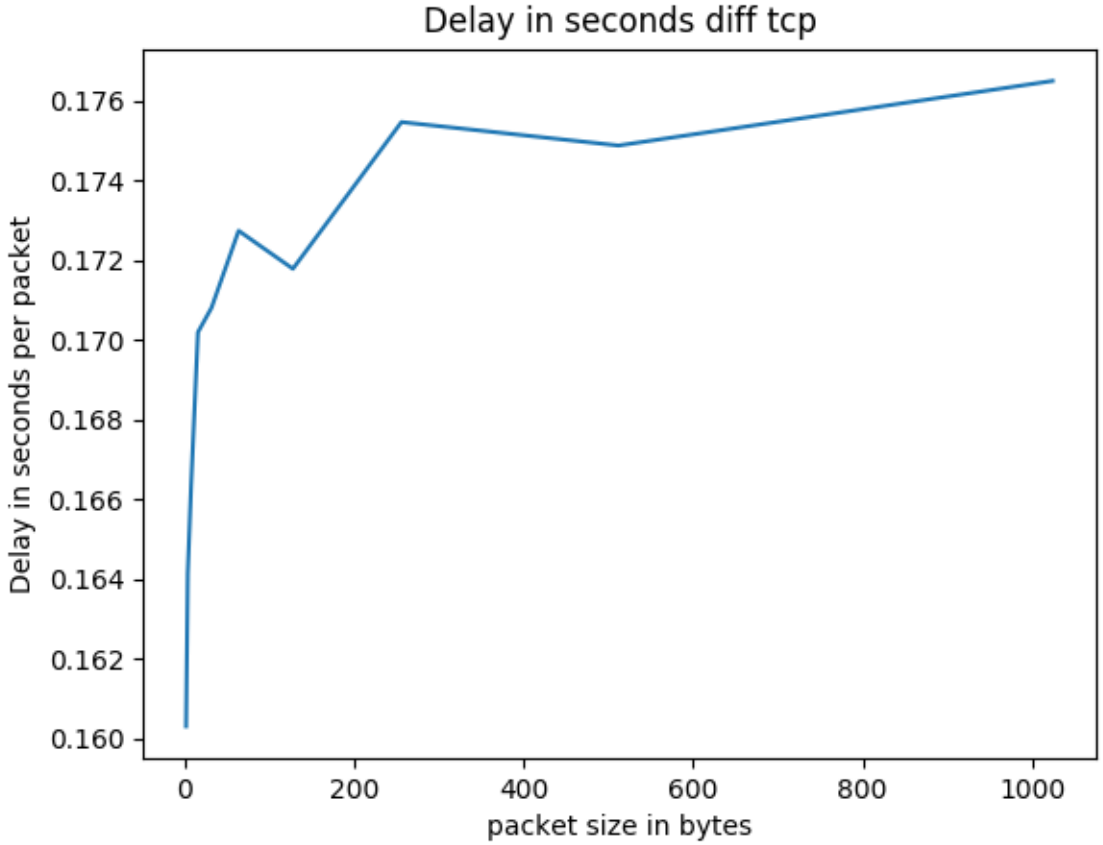

Delay in seconds same udp
Delay in seconds per packet
0.2410
0.2408
0.2406
0.2404
0.2402
0.2400
0
200
400
600
800
1000
packet size in bytes

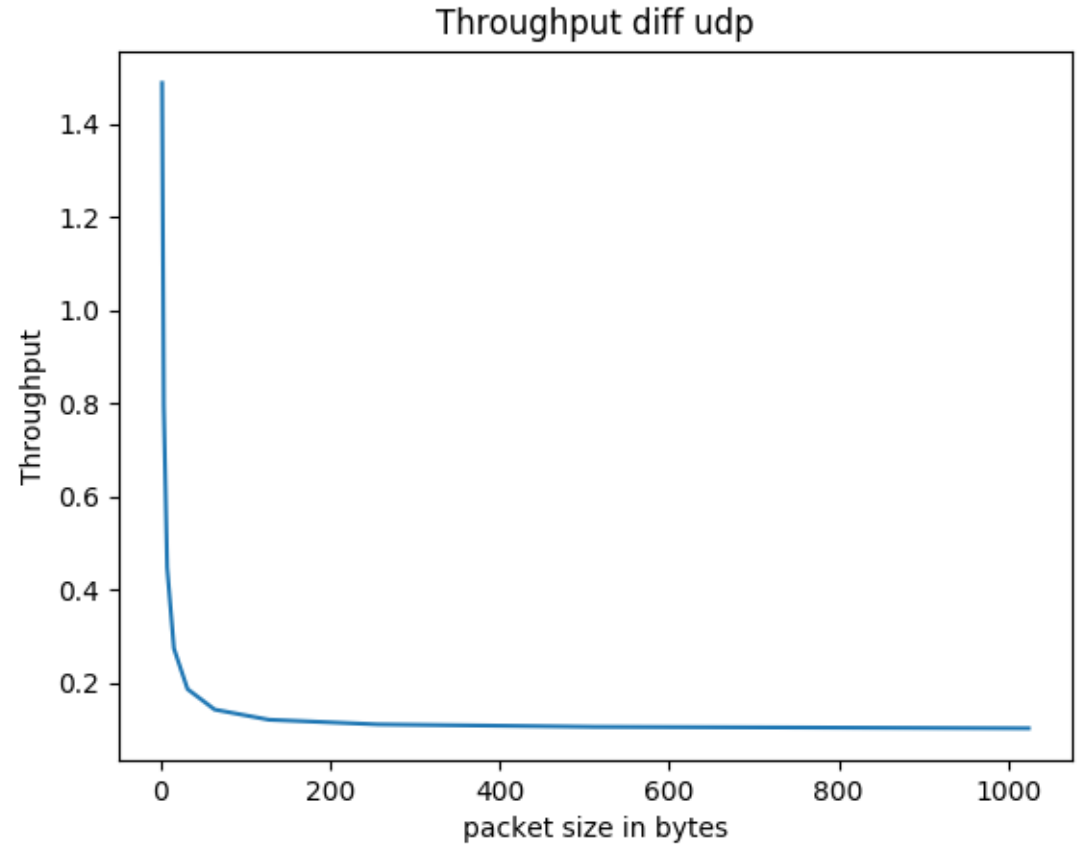

Delay in seconds same tcp
Delay in seconds per packet
0.288
0.286
0.284
0.282
0.280
0
200
400
600
800
1000
packet size in bytes

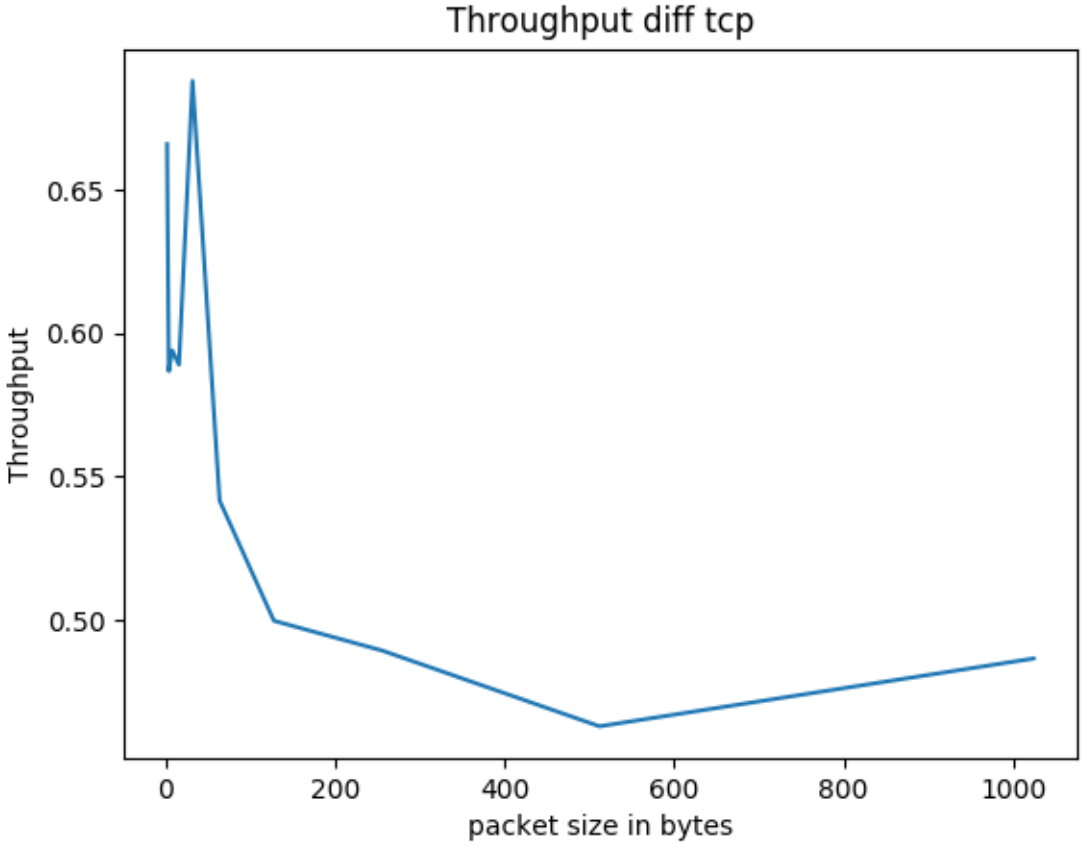

Throughput same udp
Throughput
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
200
400
600
800
1000
packet size in bytes


Throughput same tcp
Throughput
1.86
1.84
1.82
1.80
1.78
0
200
400
600
800
1000
packet size in bytes


Delay in seconds diff udp
Delay in seconds per packet
0.1448
0.1446
0.1444
0.1442
0.1440
0
200
400
600
800
1000
packet size in bytes


Delay in seconds diff tcp
Delay in seconds per packet
0.176
0.174
0.172
0.170
0.168
0.166
0.164
0.162
0.160
0
200
400
600
800
1000
packet size in bytes


Throughput diff udp
Throughput
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
200
400
600
800
1000
packet size in bytes


Throughput diff tcp
Throughput
0.65
0.60
0.55
0.50
0
200
400
600
800
1000
packet size in bytes