Cynthia Chan

CS 455

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Summary of Results - PA1

In this experiment, I utilized my echo server to test how packet size (payload) and server delay affect TCP's round trip time (RTT) and throughput. I first tested my programs on the a total of three servers: the csa2.bu.edu server, my local machine and then on the pcvm2-1.genirack.nyu.edu NYU server machine. For the csa2.bu.edu server, I used a port of 58000, and for my local machine i used a port of 11112 and I used 2000 as the port for NYU. The results of the three tests were then averaged and plotted on the graphs below. I used two CS machines to perform this experiment: my own (IP address 174.62.238.169) to run the server end, and Tara IP address to run the client.

First, I tested the effects how packet size and payload affect TCP's round trip time through the csa2.bu.edu server. The first part of this experiment finds TCP's average round trip time for packets ranging from 1 byte to 1000 bytes. With no server delay, the average RTT of packets was around .25ms, regardless of packet size. When server delay increases, the average RTT increased, but my data suggests that packet size made some sort of decreasing linear difference but not that much. The averages for RTT are roughly equivalent for any packet size, for both 5 delay and 10 delay. The differences can be attributed to the fact that each packet is delayed for a randomized length of time.

The second part of this experiment measures the throughput of the network connecting the client and host. With no server delay, throughput increases as message size increases. This

is exactly what I expected, since the RTT for messages do not differ enough to cause major

fluctuations in throughput. As the RTT for these messages increases, throughput will decrease.

This is slightly coherent with my data, as throughput decreases noticeably as server delay

increases. I did not graph this though, but I put the results below in a table.

RTT (ms) vs. Server Delay

TPUT (bps) vs. payload(Bytes)
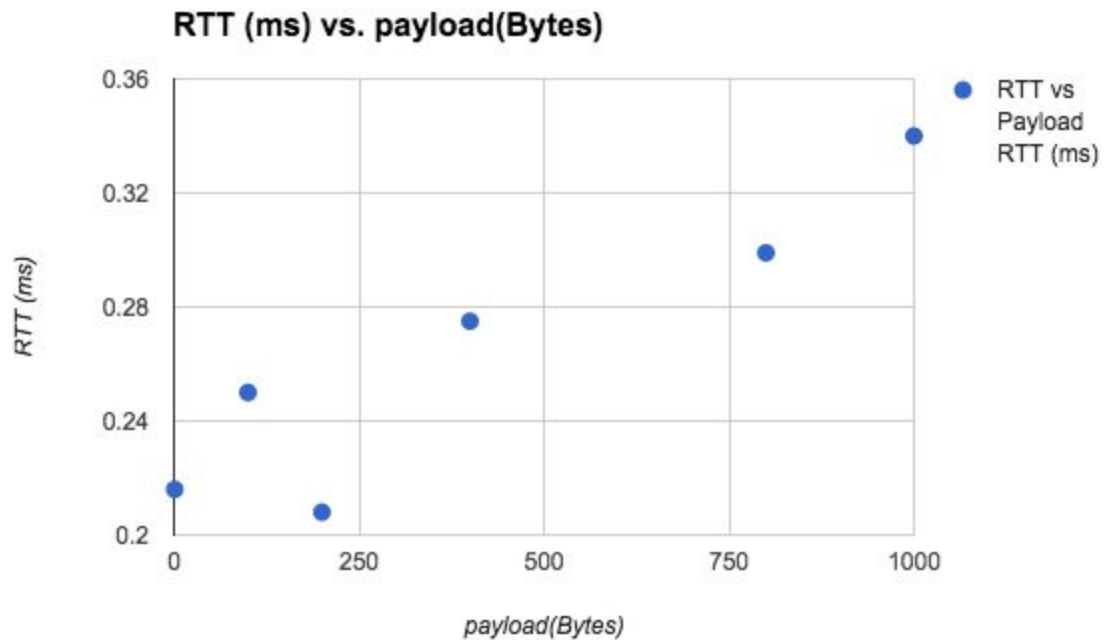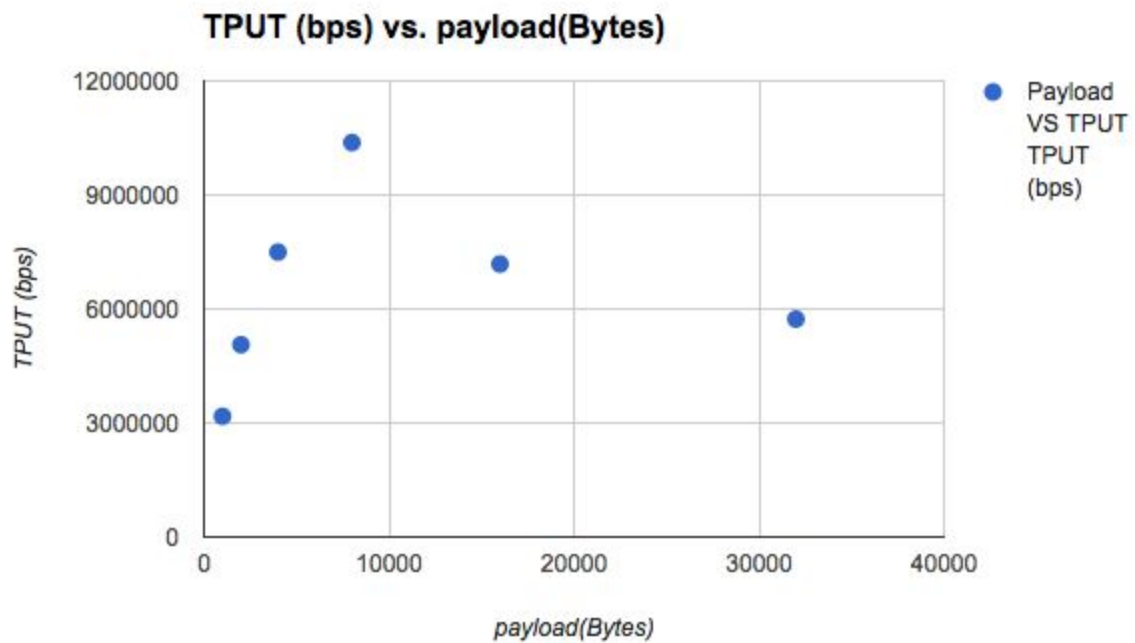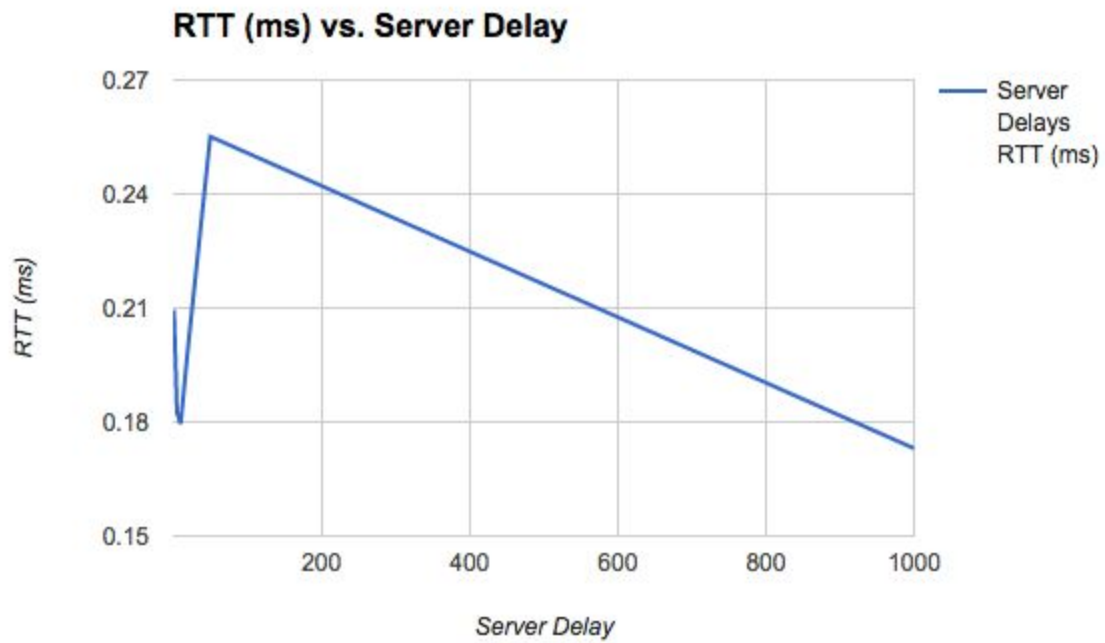
graphs:
port: 5800
csa2 rtt
payload vs ritt
s rtt 10 1 0: ('Average RTT in milliseconds: ', 0.2165079116821289)

s rtt 10 100 0 ('Average RTT in milliseconds: ', 0.2517223358154297)
s rtt 10 200 0 ('Average RTT in milliseconds: ', 0.20837783813476562)
s rtt 10 400 0 ('Average RTT in milliseconds: ', 0.2758979797363281)
s rtt 10 800 0 ('Average RTT in milliseconds: ', 0.2991914749145508)
s rtt 10 1000 0 ('Average RTT in milliseconds: ', 0.34155845642089844)

csa2 tput
payload vs throughput
s tput 10 1000 0 ('Average Throughput in bits per second: ', 3176373.2687171316)
s tput 10 2000 0 ('Average Throughput in bits per second: ', 5060234.07262364)
s tput 10 4000 0 ('Average Throughput in bits per second: ', 7497093.419008036)
s tput 10 8000 0 ('Average Throughput in bits per second: ', 10379133.420515595)
s tput 10 16000 0 ('Average Throughput in bits per second: ', 7183000.6055158125)
s tput 10 32000 0 ('Average Throughput in bits per second: ', 5734506.14429675)

Csa server delays:
RTT:
s rtt 10 100 1 ('Average RTT in milliseconds: ', 0.20949840545654297)
s rtt 10 100 5 ('Average RTT in milliseconds: ', 0.18260478973388672)
s rtt 10 100 10 ('Average RTT in milliseconds: ', 0.1795053482055664)
s rtt 10 100 20 ('Average RTT in milliseconds: ', 0.19969940185546875)
s rtt 10 100 50 ('Average RTT in milliseconds: ', 0.2551078796386719)
s rtt 10 100 100 ('Average RTT in milliseconds: ', 0.17306804656982422)

TPUT:
server delay vs tput
s tput 10 1000 1 ('Average Throughput in bits per second: ', 3153219.0157630197)
s tput 10 1000 20 ('Average Throughput in bits per second: ', 3333858.05800604)
s tput 10 1000 50 ('Average Throughput in bits per second: ', 3196838.1430419884)
s tput 10 1000 80 ('Average Throughput in bits per second: ', 3146243.31172796)
s tput 10 1000 100 ('Average Throughput in bits per second: ', 3133782.816492177)
s tput 10 1000 200 ('Average Throughput in bits per second: ', 2642613.432217612)