CSC/ECE 573: Internet Protocols
Mini Projects Report

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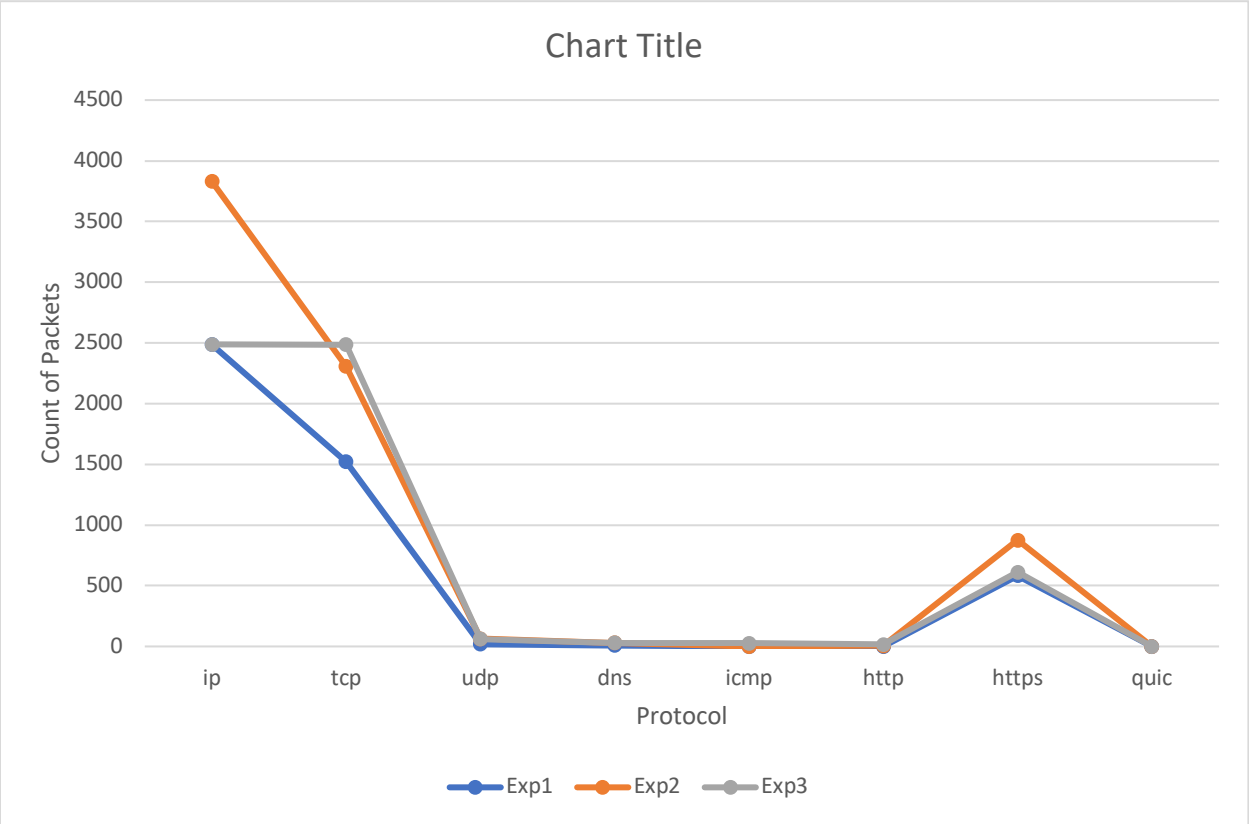
Project 1: Packet Sniffer

Plot of packet counts:

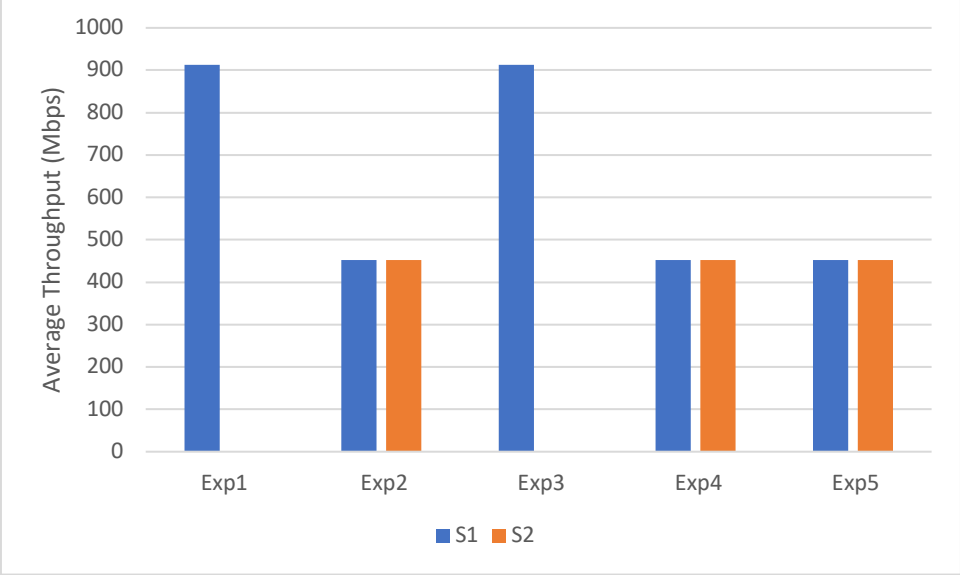


Analysis:

- Experiment 1 was to play a YouTube video in the browser and then start the sniffing tool, hence there are less TCP and UDP packets (since the connection was established beforehand). UDP, DNS, and HTTP packet numbers are also low.
- Experiment 2 ran the tool and then started playing a video, so there are more TCP and UCP packets than in Experiment 1. It also has more HTTPS packets. As we started the tool after playing the video, TCP packets are higher in number since YouTube uses TCP for transferring videos.
- Experiment 3 involved running the tool and then performing various browser searches. Unlike the first two experiments, this packet capture included ICMP packets. Ping sends ICMP echo request packets. (Since I wasn't able to capture ICMP packets otherwise, I used ping to specifically capture some ICMP packets since ping commands use ICMP protocol.)
- IP packets are the highest in number since all of the other protocols use IP protocol in the network layer.

Project 2: TCP analysis

Plot of average throughput:

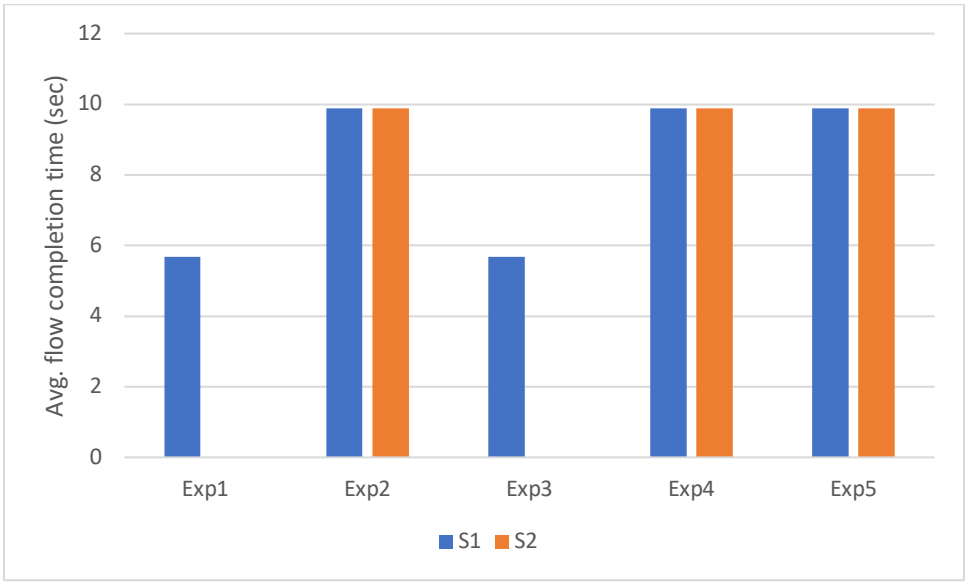


Analysis:

Exp1 and Exp3 have the highest values of average throughput at around 900 Mbps each. These are also the two experiments in which S2 and D2 nodes are not involved. Both involve S1 sending data to D1 via TCP cubic/DCTCP respectively. It seems likely that the high throughput for S1 in experiments 1 and 3

results from the fact that only one server is using the link to send data at one time. In experiments 2, 4 and 5 the throughput is lower but is equal for both S1 and S2, implying they share the link equally. This experiment showed that TCP Cubic and DCTCP seem to handle congestion in the network equally well, since in experiment 5 both S1 and S2 have equal throughput according to the results. There was also no problem faced when the two protocols had to "co-exist" in the 5th experiment – they both performed equally well.

Plot of average flow completion time:



Analysis:

Experiments 1 and 3 have the lowest average flow completion time, whereas they had the highest average throughput. This makes sense since average throughput varies with average flow completion time. Experiments 2, 4 and 5 have a higher average flow completion time and S1 and S2 have the same average flow completion time, again implying that they share the link equally.