Computer Networks Assignment - 3

<u>Performance of the Reliable - UDP</u>

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We used **netem** tool to emulate various network conditions to see the resilience of our protocol [networking:netem].
We tweak certain parameters to see the effect of it on our protocol, ceteris paribus. The file size we have used is 32316 bytes. The window size is 4 packets. The maximum segment size is 1024 bytes. The throughput values are given after varying each of the parameters.

<u>Packet Loss</u>

| Rate	0%	3%	5%	7%	10%
Time taken (in seconds)	0.27802348136901855	16.58825922012329	33.4226610660553	45.484636068344116	54.628926277160645
Throughput (Bytes/sec)	116234.787	1948.125	966.8889	710.4817	591.5547

Packet loss vs Throughput
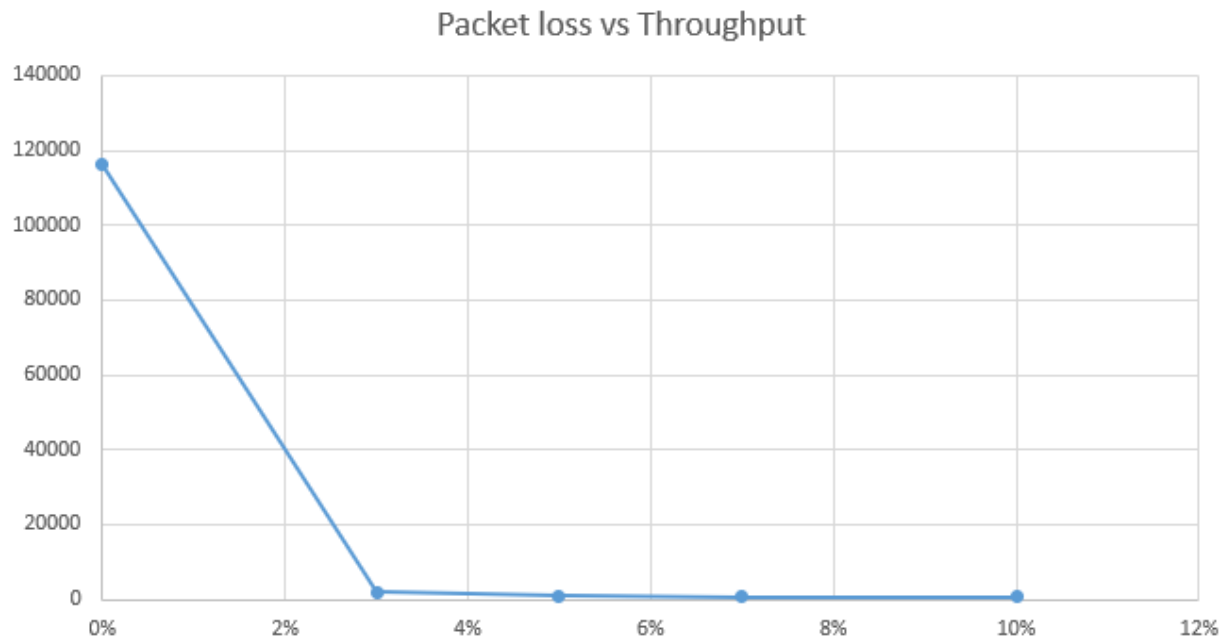
Delay

Delay	0ms	25ms	50ms	75ms	100ms
Time taken (in seconds)	0.278023481 36901855	7.073549032 211304	13.41797995 5673218	19.78634834 2895508	26.13292264 9383545
Throughput (Bytes/sec)	116234.787	4568.569	2408.41	1633.247	1236.601

Packet Delay vs Throughput
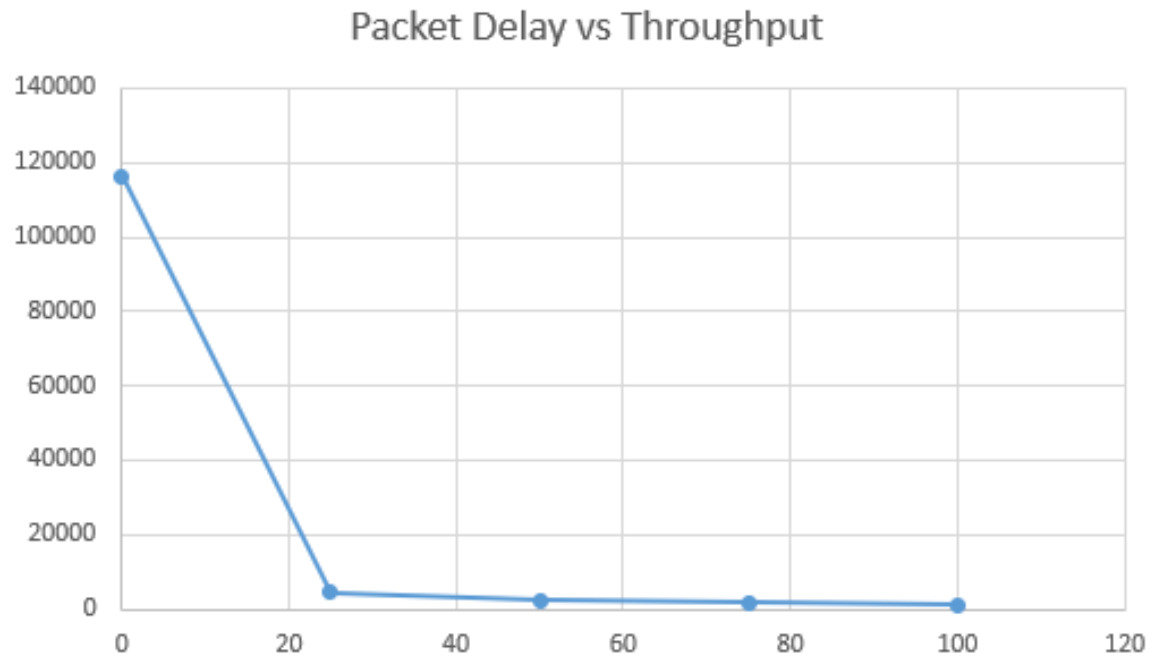
Packet Corruption

Rate	1%	3%	5%	10%	20%
Time taken (in seconds)	9.221344233	20.9524	32.91916	49.65391	109.745
Throughput (Bytes/sec)	3504.47821760052	1542.35288233202	981.677628388795	650.824821303877	294.464550631917

Packet Corruption vs Throughput
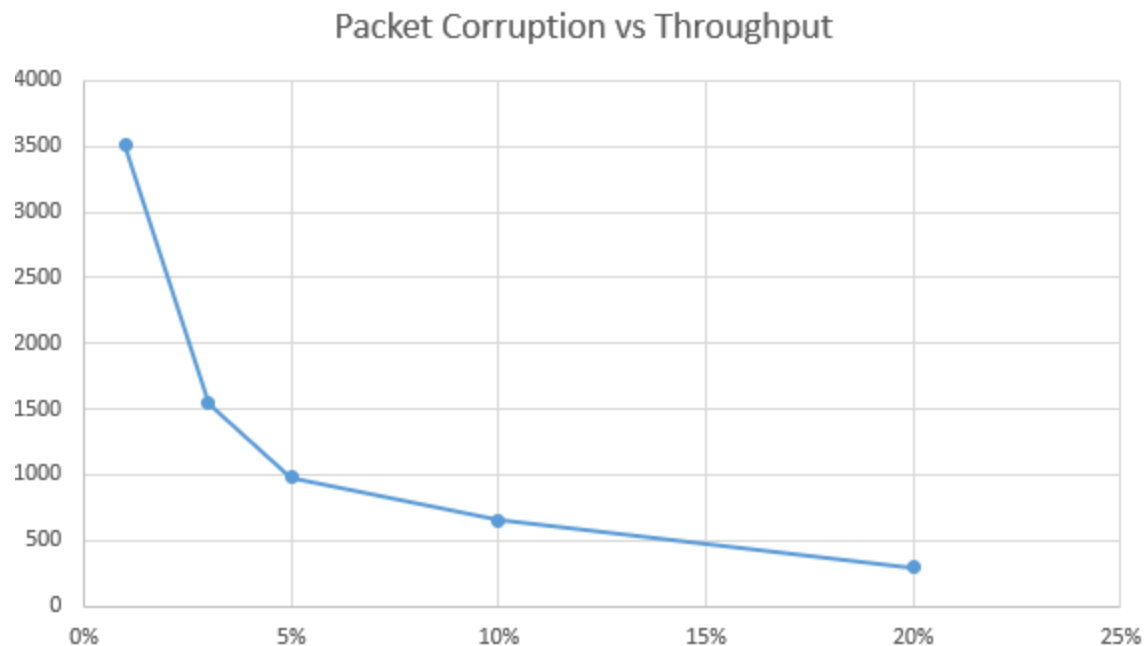
Packet Reordering (10 ms delay)

Rate (% of packets, % of corr)	1%,50%	15%,50%	30%,50%	50%,50%	75%,50%
Time taken (in seconds)	3.3208065033	3.3219654561	3.2591035366	2.7910878658	2.1480147839
Throughput (Bytes/sec)	9731.3709691	9727.9759311	9915.6101170	11578.281141	15044.589191

Packet Reordering vs Throughput
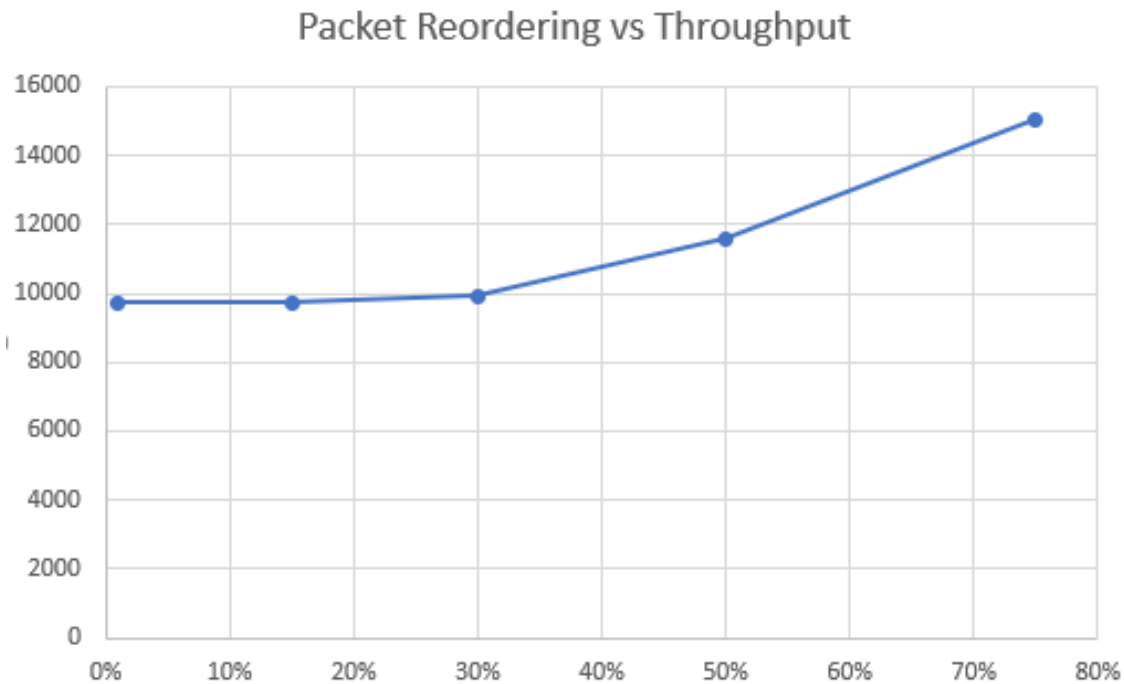
Some commands in netem:

- sudo tc qdisc show dev lo - shows all active rules
- sudo tc qdisc del dev lo root - deletes all active rules
- sudo tc qdisc add dev lo root netem loss x% - adds x% packet loss
- sudo tc qdisc add dev lo netem delay xms - adds x ms delay
- sudo tc qdisc add dev lo root netem corrupt x% - adds x% corrupted packets