CSC/ECE 573 Section 001
Fall 2019
PROJECT #2

Selective Repeat ARQ Protocol

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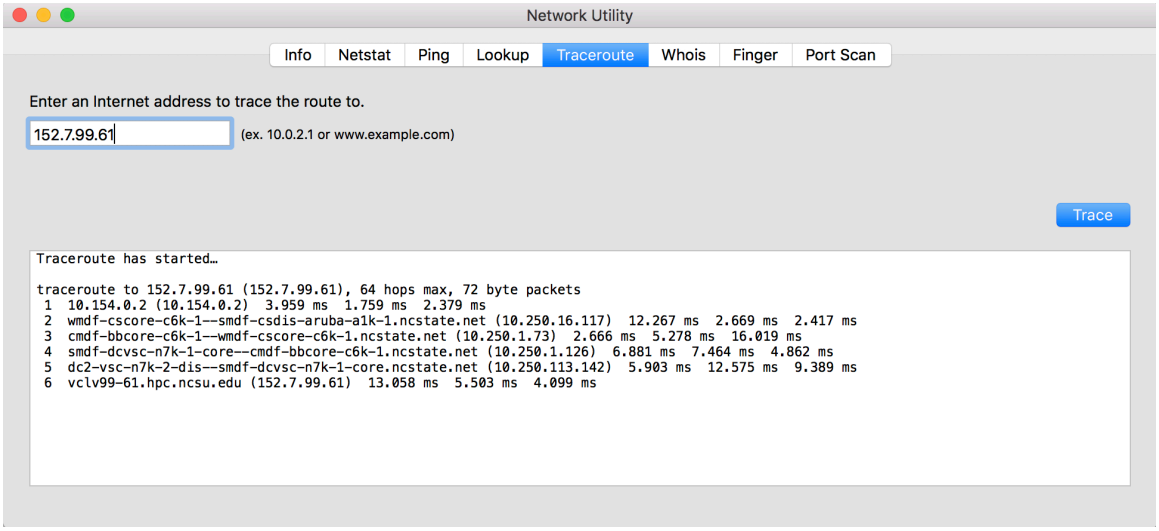
Task 1

Size of the file Transferred: 1054.08 KB ~ 1.1MB
Round Trip Time: 0.05 s
Transferred File: clientTest.txt

To maintain the host and server on two different hosts separated by router hops we configured server and client in PC and on VCL to carry out the mentioned tasks.

Traceroute (on MAC):
This can also be obtained by using traceroute 152.7.99.61 (ip address of the server) from the terminal on MAC (client machine).

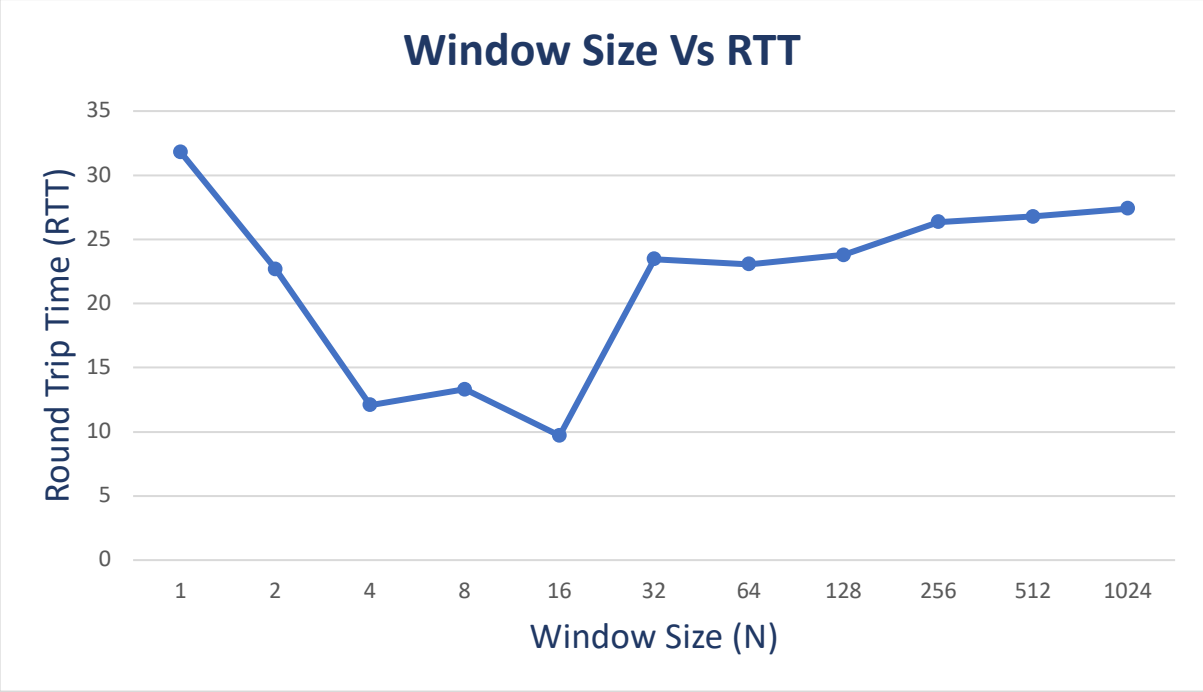


Effect of window size N

MSS (Maximum Segment Size) = 500
Packet Loss Probability = 0.05
Varying N (Window Size) from 1 to 1024

Window Size (N)	RTT 1	RTT 2	RTT 3	RTT 4	RTT 5	Average RTT
1	22.8476	24.6989	40.6935	35.5197	35.3081	31.8136
2	11.4954	29.6333	31.0795	24.2814	16.9599	22.6899
4	16.3647	8.6628	12.1782	10.9358	12.2662	12.0815
8	12.5979	15.8324	11.0788	13.1794	13.8653	13.3108
16	13.5802	12.0911	7.5276	9.8520	5.4486	9.6999
32	23.2697	26.6363	21.3393	22.6232	21.7614	23.4671
64	22.3765	24.8646	20.4877	21.4404	26.1050	23.0548

128	27.9271	22.8457	23.8685	21.4588	22.8786	23.7957
256	26.7656	26.8785	26.7328	25.8795	25.5476	26.3608
512	27.8654	26.4377	25.3465	27.7643	26.4659	26.7760
1024	26.3534	29.5434	27.4540	26.7639	26.8454	27.3920



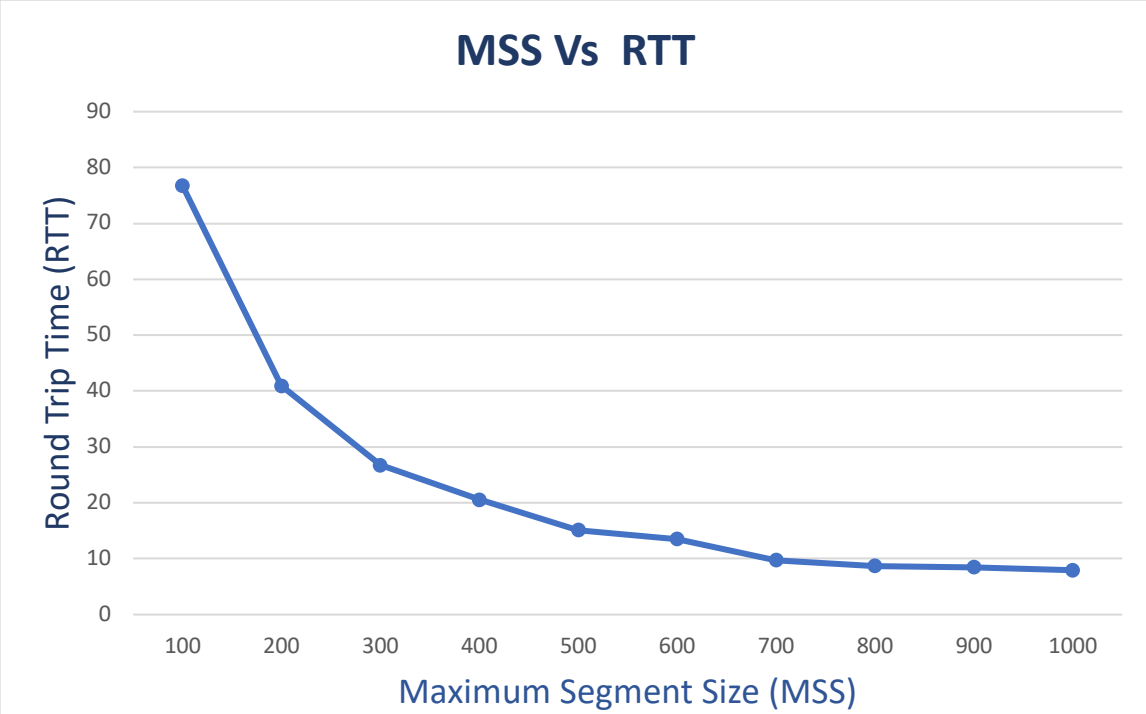
Results:
As the window size increases within a constrained set of values, a greater number of packets will be in the pipeline. This would eventually result in a reduced RTT as more number of packets are pipelined. The window size was gradually increased from 1 to 1024 bytes and the time delay corresponding to each of the transition has been observed and documented above. We can observe that, as the window size increases, the time delay decreases and gradually reaches a constant.

Task 2: Effect of MSS

N (Window size) = 64
Packet Loss Probability = 0.05
Varying MSS from 100 to 1000 in the increments of 100

MSS	RTT 1	RTT 2	RTT 3	RTT 4	RTT 5	Average RTT
100	75.2351	73.2312	82.5491	77.6296	74.9921	76.7274
200	42.6723	38.7690	45.6892	39.5624	37.8934	40.9173

300	30.5629	29.5893	24.5802	25.4539	23.5689	26.7511
400	19.4926	20.3274	21.7890	22.1245	18.8944	20.5256
500	16.2361	17.5678	13.7825	14.2985	13.7923	15.1354
600	10.5793	15.7659	16.6843	12.6874	11.9465	13.5327
700	10.5764	9.5647	8.6893	9.4563	10.2634	9.7100
800	8.7347	9.3257	7.6843	8.3474	9.3276	8.6840
900	8.5673	8.3276	9.8635	8.3256	7.3933	8.4955
1000	8.6843	7.4543	7.5734	8.7538	7.2134	7.9358



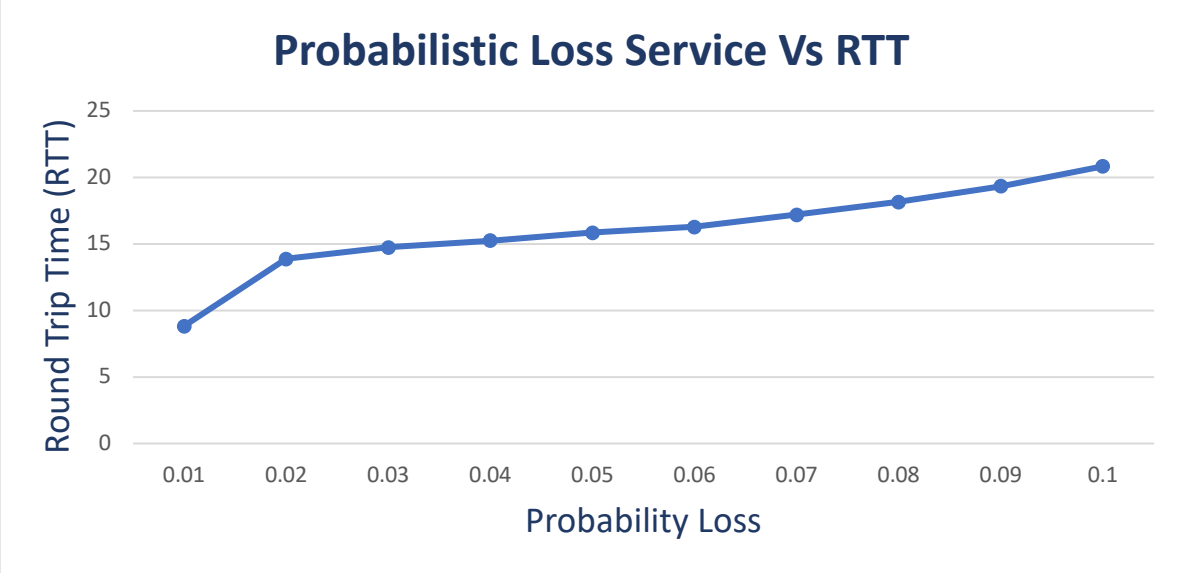
Results:

As the value of MSS increases, the average RTT decreases. This is because smaller MSS causes larger packet transfers, and hence there is a possibility of a greater number of packet losses and greater number of retransmissions. Larger MSS value leads to lesser number of retransmissions, hence the average delay decreases exponentially

Task 3: Effect of Loss Probability p

MSS = 500
N = 64
Varying P value from 0.01 to 0.10 in the increments of 0.1

Loss Probability (p)	RTT 1	RTT 2	RTT 3	RTT 4	RTT 5	Average RTT
0.01	9.6574	8.7643	9.6543	7.6740	8.4354	8.8371
0.02	13.6857	14.3278	12.8487	13.8640	14.6435	13.8739
0.03	13.8855	16.4540	14.6783	13.8684	14.8796	14.7532
0.04	15.7438	14.8643	15.4544	15.2567	14.8723	15.2383
0.05	15.7548	16.7483	14.7684	15.8725	16.1633	15.8615
0.06	16.3277	15.3476	15.6784	16.4376	17.5730	16.2729
0.07	17.2757	16.3265	17.7680	18.3286	16.3276	17.2053
0.08	18.4338	17.3287	17.3286	18.3290	19.3249	18.1490
0.09	18.3287	19.3287	18.8648	20.8363	19.3286	19.3374
0.1	21.8747	20.5835	21.5217	19.3427	20.8465	20.8338



Results:

We can say that as the probability loss increases the average RTT also increases which is the indication that as the probability increases there is a packet loss, retransmission takes place and hence the average delay increases.