CSC/ECE 573 Section 001
Fall 2019
PROJECT #2

Go Back N ARQ Protocol

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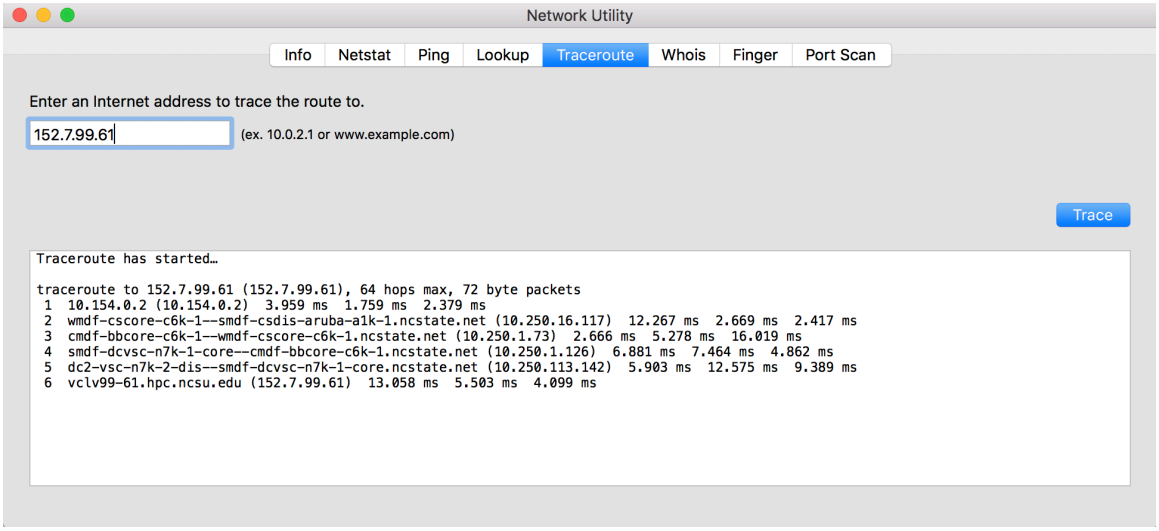
Task 1

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).

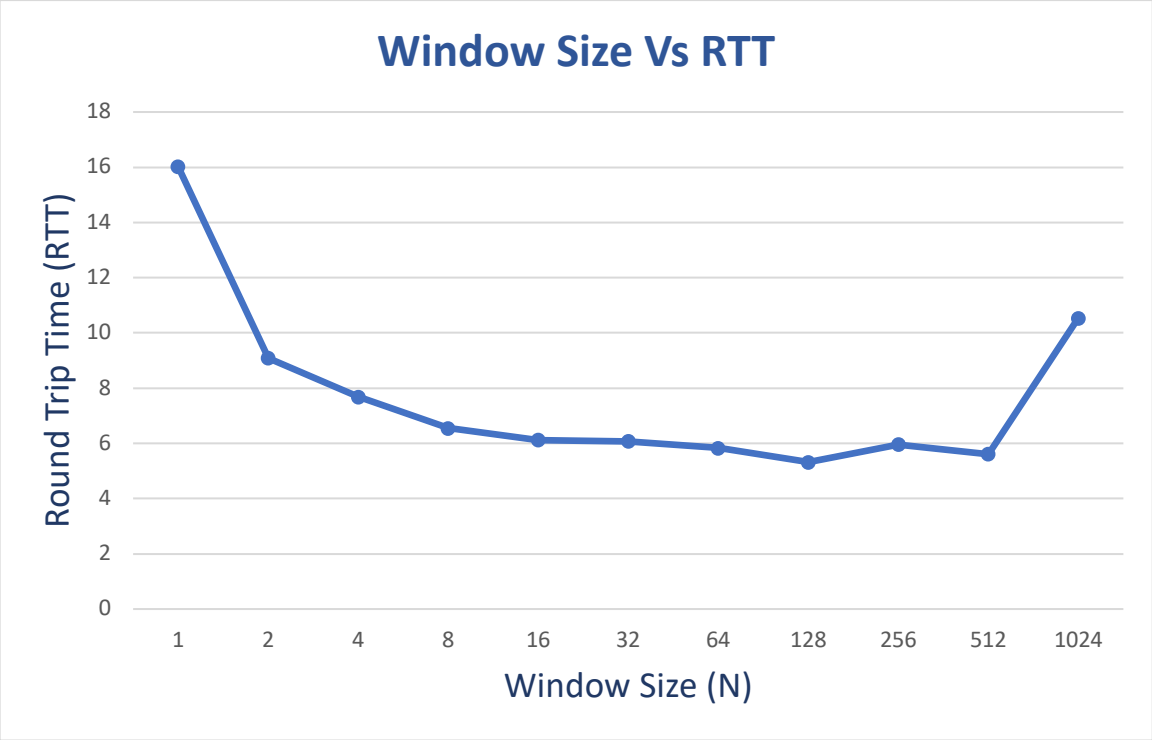


Effect of window size N

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	16.1842	15.6213	16.6412	15.6393	18.1255	16.0215
2	10.2640	8.8366	9.7181	8.4068	8.2452	9.0941
4	7.9443	6.9156	6.6709	9.0552	7.8711	7.6914
8	6.5370	6.0025	5.9674	7.4206	6.8049	6.5465
16	6.5468	6.2572	5.1899	6.4325	6.1910	6.1235
32	6.3078	5.6934	4.8855	7.1407	6.3558	6.0766
64	5.7477	5.3603	5.7850	6.4446	5.8316	5.8338

128	6.0071	5.3327	5.3571	4.6543	5.2621	5.3226
256	5.7693	5.9578	5.9647	6.2802	5.8554	5.9655
512	4.9588	6.4834	4.9181	5.7208	6.0050	5.6172
1024	9.2708	9.6882	10.9735	10.1095	12.6665	10.5417



Results:

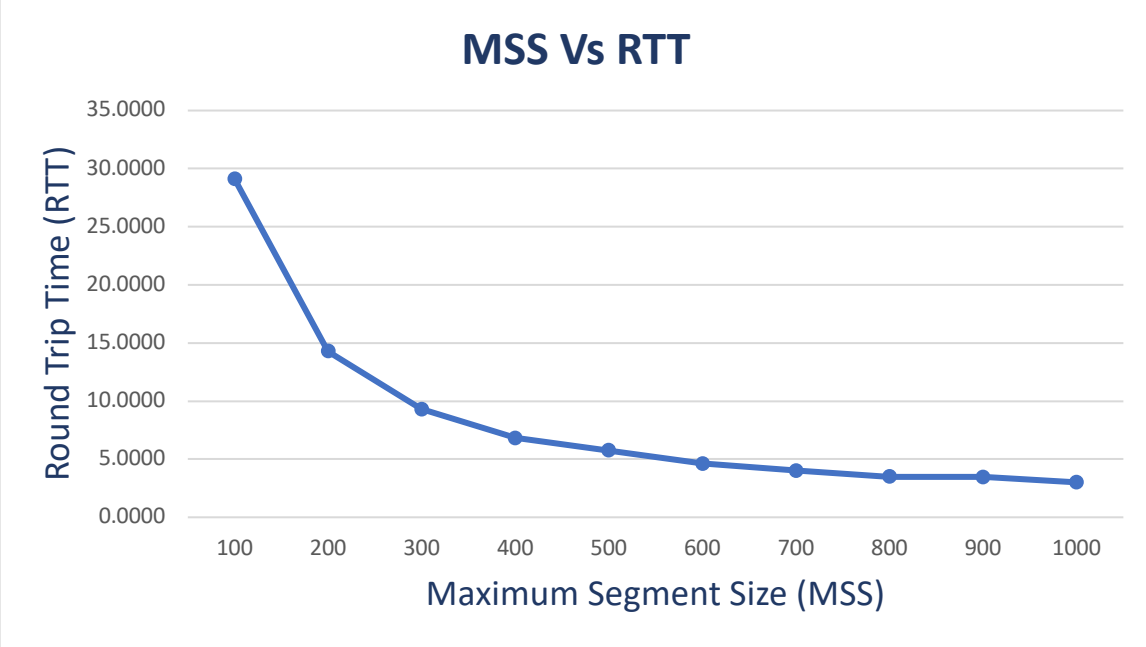
In the Go-back-N protocol, if the window size is small then the server receives packets slowly with multiple timeouts and thus clients end up in receiving the ACK's slowly. On the other hand, with large window size if packet is lost due to timeout or ACK loss then all the packets in the non-acknowledged packets in the window are sent leads to higher transfer time (We can observe that the delay is increased for 1024). Hence, best window size should be for values of N according to our results are from N = 16 to 512.

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	27.2136	31.9101	27.4469	29.0039	29.9596	29.1068
200	15.0255	14.1224	13.7415	13.9182	14.6347	14.2885

300	9.3257	9.7361	9.1526	8.8970	9.3955	9.3014
400	6.9043	7.3249	6.0396	6.7818	7.0701	6.8241
500	5.1940	5.5554	6.0796	5.7933	5.8851	5.7380
600	5.1368	4.1784	4.3738	4.6282	4.7946	4.6224
700	4.1615	3.9701	3.9065	4.0882	3.9691	4.0018
800	3.6402	3.5871	3.7690	3.2722	3.2670	3.4871
900	3.0069	3.5841	3.0610	3.3839	4.3114	3.4695
1000	3.0624	3.2977	2.9300	2.5808	2.7409	3.0078



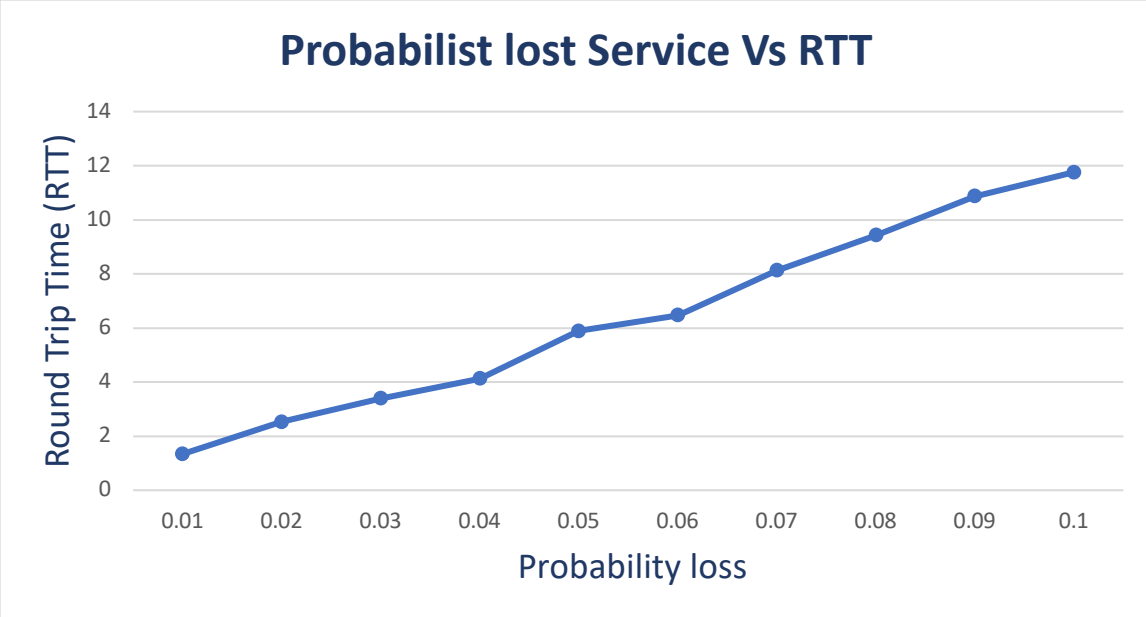
Results:
As the value of MSS increases, the average RTT decreases. This is because smaller MSS causes larger packet transfers, and hence there is a possibility of a greater number of packet losses and greater number of retransmissions. Larger MSS value leads to lesser number of retransmissions, hence 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	1.5184	1.2551	1.1660	1.4379	1.3211	1.3397
0.02	2.3925	2.0956	3.0150	2.4306	2.7236	2.5315
0.03	3.3558	3.2729	4.2375	3.3841	2.7388	3.3978

0.04	4.1847	3.8	3.9397	4.2106	4.5198	4.1241
0.05	5.7138	6.0327	5.5329	6.4402	5.7495	5.8938
0.06	5.9754	7.4925	6.0843	7.2817	5.4980	6.4664
0.07	8.5281	8.7687	7.8264	7.8949	7.6004	8.1237
0.08	10.2173	9.5208	8.5186	9.0326	9.8260	9.4231
0.09	11.2877	10.9182	11.2696	11.1203	9.7719	10.8735
0.1	12.0171	11.8726	12.2751	11.3312	11.2897	11.7571



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.