

CN-3530/CS 301 Assignment 2

1. Stop and Wait Protocol

Question 1 – Number of retransmissions and throughput with different retransmission timeout values with stop-and-wait protocol. For each value of retransmission timeout, run the experiments for **5 times** and write down the average **number of retransmissions** and **average throughput**.

Retransmission timeout (ms)	Average number of re-transmissions	Average throughput (Kilobytes per second)
5	167.8	271.82693652
10	146.2	220.48064482
15	143.5	169.209417
20	145	142.3994688
25	156.4	116.9010026
30	137.8	115.2731724
40	141.6	94.4776804
50	143.4	74.5422948
75	140.8	59.2947902
100	139.6	49.723528

Question 2 – Discuss the impact of retransmission timeout value on number of retransmissions and throughput. Indicate the optimal timeout value from communication efficiency viewpoint (i.e., the timeout that minimizes the number of retransmissions and keeps the throughput as high as possible).

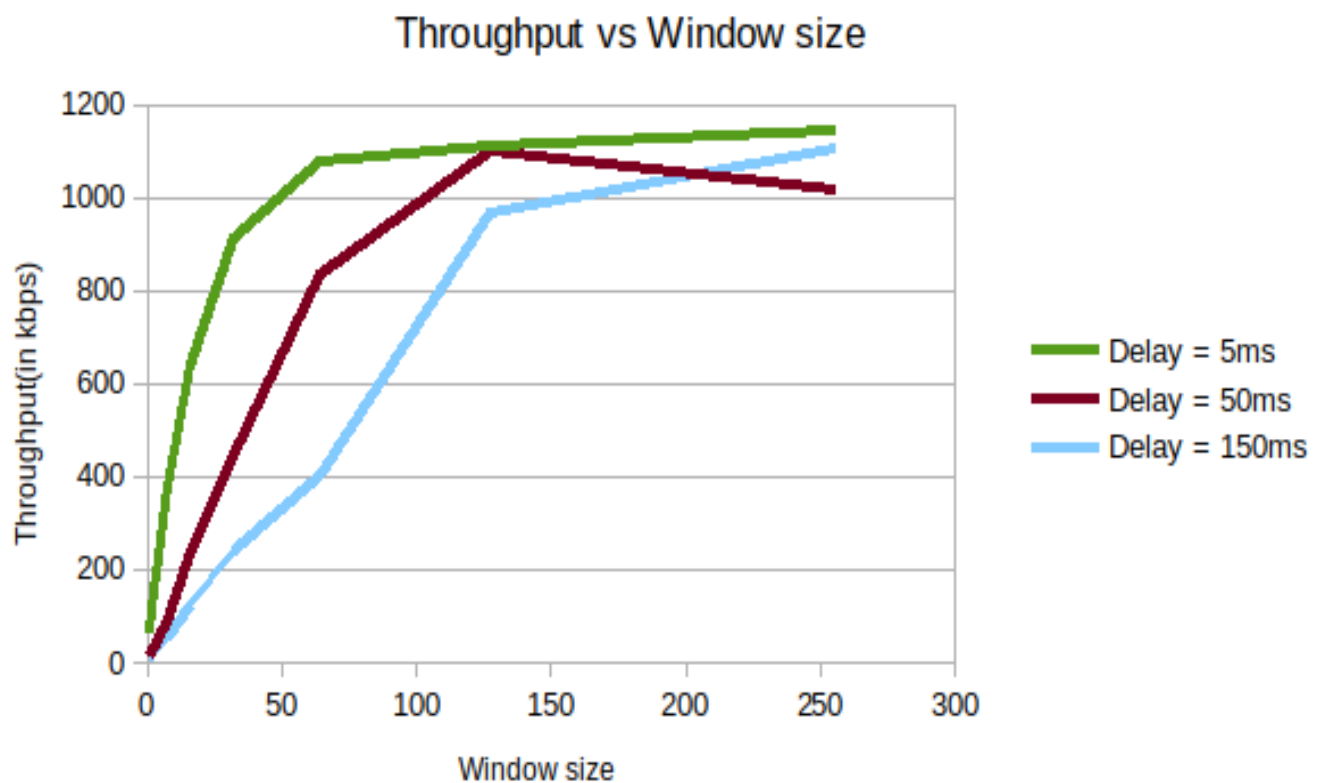
->as the timeout is increased throughput value is decreasing continuously because now sender is waiting more for the ack and hence sending less packets in i sec , due to which throughput decreases

->as timeout is increases , retransmitted packets are decreasing (approximately), yes because we are giving more time for ack to receive .

Optimal timeout observing this data is 30ms and this was used in subsequent question

2. Go back N Protocol

Create a graph similar to the one shown below using the results from the above table: (Edit: change delays to 5ms, 50ms and 150 ms as mentioned in the assignment statement)



Question 1 – Experimentation with Go-Back-N. For each value of window size, run the experiments **5 times** and write down the **average throughput**.

	Average throughput (Kilobytes per second)
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Window Size	Delay = 5ms	Delay = 50ms	Delay = 150ms
1	65.250507	11.378251	9.2161650
2	109.9994849	21.648629	7.69529367
4	169.859536	40.432333	19.8906360
8	394.6804078	87.128029	48.54078983
16	634.3484252	230.70043	119.31578242
32	923.080532	443.987340	236.39585815
64	1000.106719	833.456594	401.3256007
128	1161.681595	1098.0885353	967.4881781
256	1140.362075	1016.731692	1101.2902879

for delay 5ms - timeout value used is 30ms

for delay 50ms - timeout value used is 120ms

for delay 150ms -timeout value used is 320ms

Question 2 – Discuss your results from Question 1.

Here we can observe following things :

1->As the propagation delay increases , throughput decreases because of sending packets again and again (and since delay is high so we had to put high value as timeout also, so overall throughput decreases)

2->as the window size increases , throughput value are increasing and this should happen also because the formula for utilization is

$$U = n(L/R)/RTT + L/R$$

so if window size is increased then utilization will increase (keeping timeout value same for same delay)

PLAGIARISM STATEMENT <Include it in your report>

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