PROJECT 2 - REPORT

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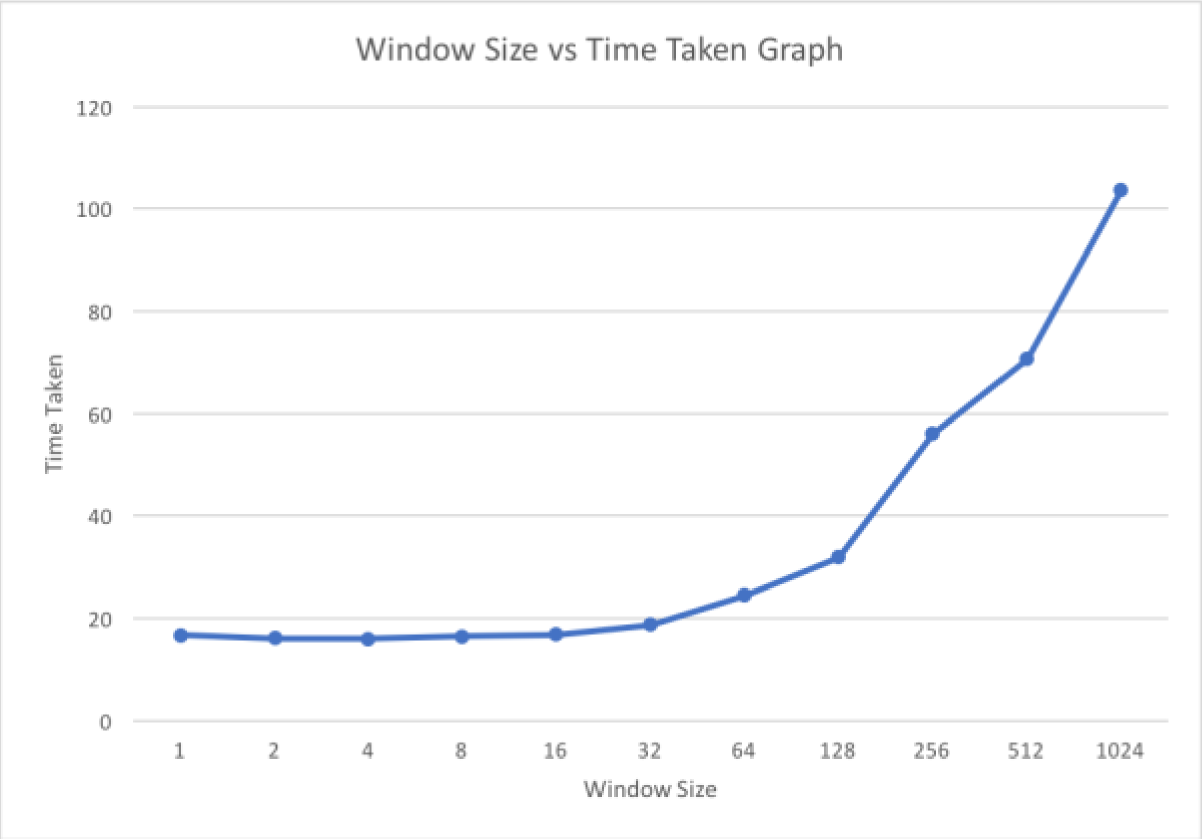
3 tasks were performed to test the average delay in transferring a file of size 1 MB.The client and server were run on 2 separate VCL remote machines and the Round Trip Time was observed to be about 6 ms. Transmission at each window size,probability value and MSS value was repeated 5 times to compute the average delay.

The results are as follows:

a) Task 1

The MSS in this case was set to 500 bytes and loss probability was set to 0.05. The window size was then varied as 1, 2, 4, 8, 16, 32, 64, 128, 256, 512 and 1024.

The resulting graph is as follows:

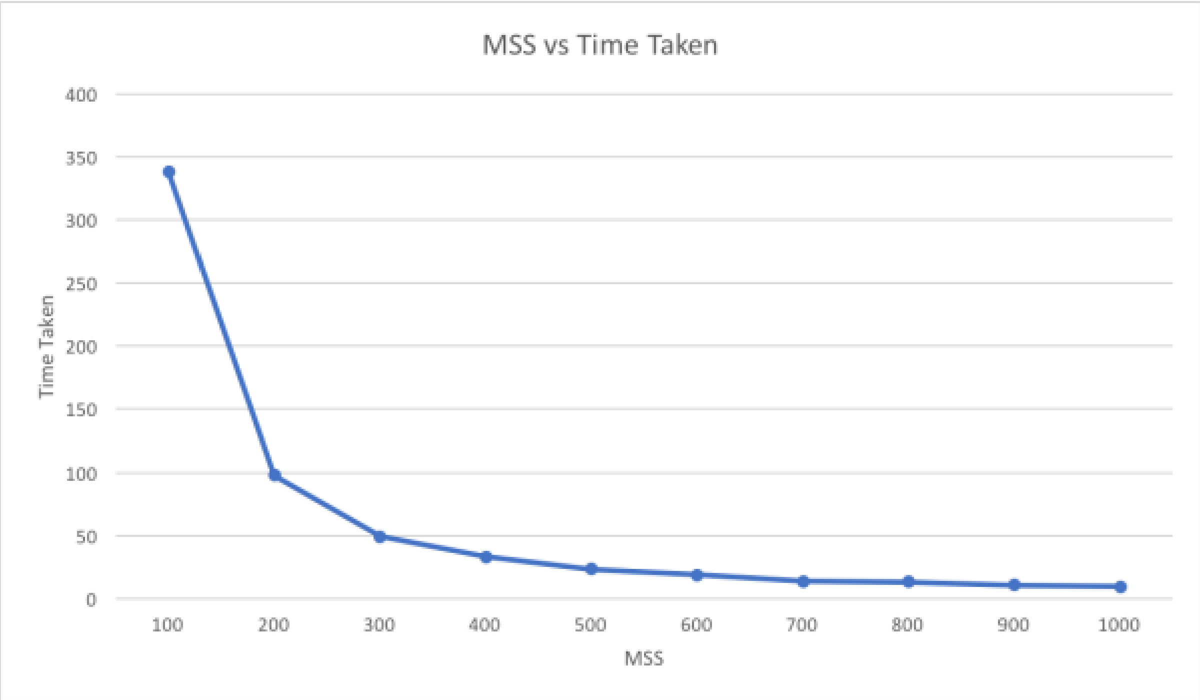


The graph does not show much variation for smaller window sizes but for larger window sizes the average delay increases with increase in window size. This is to be expected because for larger window sizes the client can send more packets without receiving an acknowledgement and thus when a packet is dropped,there will be a timeout at the client

and more packets have to be transmitted to the server again. Thus the average delay will be larger for larger window sizes. For smaller window sizes there is not much change in delay from one window size to another because transmitting a few extra packets due to a slightly bigger window size would not substantially affect the overall delay.
Overall we can say that the average delay increases with increase in window size due to more packets being retransmitted by the client in case of a packet drop.

b) Task 2

The window size in this case was set to 64 and the loss probability was fixed to 0.05. The MSS was then varied from 100 to 1000 in increments of 100. The graph obtained is as follows:

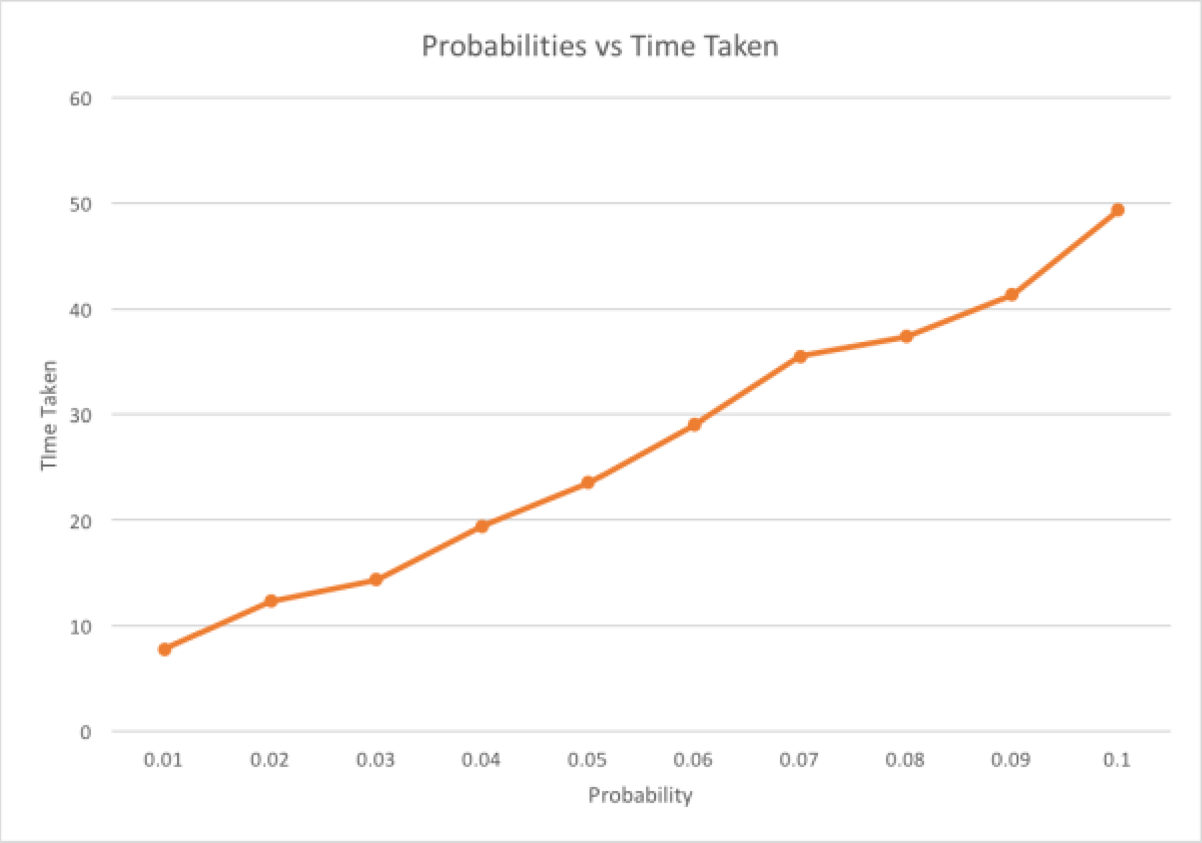


We can see from the above graph that the average delay decreases with increase in the MSS value. This is to be expected because higher value of MSS means that the file would be divided in lesser number of packets and thus the client would have fewer total packets to transmit overall. WIth window size remaining constant , the same number of packets would be transmitted for different MSS values without waiting for an acknowledgement but transmission of fewer packets overall would reduce the overall average delay. Also we can say that the higher transmission delay due to larger size of packets in case of higher MSS is compensated by decrease in overall propagation delay due to fewer packets propagating the network.

Thus overall the average delay decreases with increase in MSS.

c) Task 3

The MSS was set to 500 bytes and the window size to 64. The loss probability p was then varied from 0.01 to 0.10 in increments of 0.01. The graph obtained is as follows:



We can see from the above graph that the overall delay increases with increase in loss probability. This is because the random number r generated between 0 and 1 at the server would have higher probability of being less than or equal to p when the value of p increases. Thus it means that a packet received at the server would have a higher chance of getting dropped by the server. This would trigger a timeout at the client and lead to retransmissions and increase in delay. Therefore with increase in value of p more packets are dropped which leads to more timeouts and retransmissions from the client and thus the average delay increases. The shape of the graph is as expected.