Modern Networking Concepts

CSE 589 spring 2014.

The document is report of the comparison of the Alternating bit, Go-Back-N and Selective repeat protocol. For a given set of inputs we run the simulation and record the outputs. Then we draw graph for each of them and compare their performance.

PA2

Performance comparision.

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In order to know the ideal protocol amongst the three under a given conditions and circumstances, we must have a method to compare the protocols. To do this we perform two experiments, one to compare the protocols on different loss probability and record the throughout for the given set of input. Two, we take different window size and different loss probability, and obtain the throughput for these conditions. Compare them based on the through put.

1. Experiment 1.

In this experiment we are comparing the through put for various loss probabilities. The main idea of the experiment is to compare the protocols for a given loss probability and measuring their performance based on the obtained throughput. We know that the throughput decreases when there is more loss. This is because the amount of data sent are more whenever there is loss, due to which we may have to send more packets or some of the packets may be lost. The experiment is done in order check which protocol performance better and sustains during the loss. We must also make sure that the packet sent are not lost and also the protocol must be durable for the given input.

For the following set of inputs are given

- Number of messages : 1000
- Corruption probability :0.2
- Average time of the arriving packet from layer 5(application) to layer 4 (transport) : 50.
- We vary the loss probability in the order of 0, 0.1, 0.2, 0.4, 0.6, 0.8

We obtain the throughput for all the runs and have recorded the results in a excel sheet "experiment2_data" which is attached with tar file.

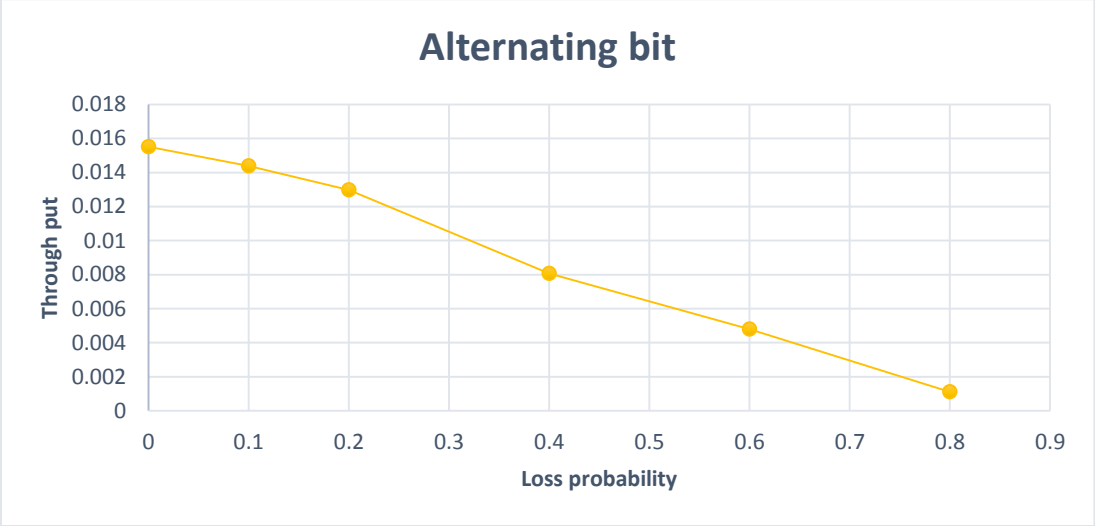
The results recorded are then used to make graphs, which is then made into a graph as show below. From the graph we can see that for the initial condition the Go-back_n and selective repeat protocol out performs the Alternating bit protocol. This is because when there is loss introduced during sending the alternating bit protocol waits until it gets the acknowledgement from the Receiving Host. During this time any packet that arrives from the application are lost. Whenever there is a loss there is a retransmission of the packets which will take more time. And since there is no buffer to accommodate packets from upper layer, these packets are lost. Therefore, Alternating bit protocol only send few numbers of messages.

However in comparison of the other two protocol for a small loss probability, we don't see comparable difference in them. Here our experiments contain two parts of window size 10 and 50.

Let us consider 10 first. In this case both the protocol are performing similar, however for high loss at 0.6 probability, the throughput is lesser for Selective. This is because the number of retransmission which becomes more for high loss.

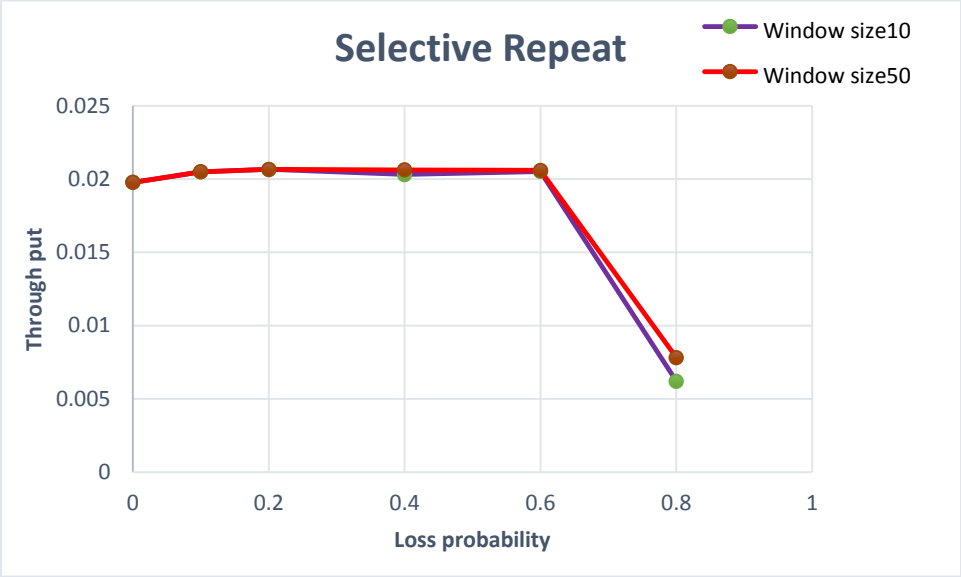
Let us also consider the 50 window size case. In this case the performance of the selective repeat is better than the Gobackn. As the number of window increases, it will accommodate more number of packets in the window. So whenever there is timeout the number of packets sent are the size of window filled. Because of this when the loss increase, the number of packets sent and retransmitted increase in a larger value. This causes the throughput to go done.

a. Alternating bit.



b. Go Back -n

c. Selective repeat protocol



2. Experiment 2.

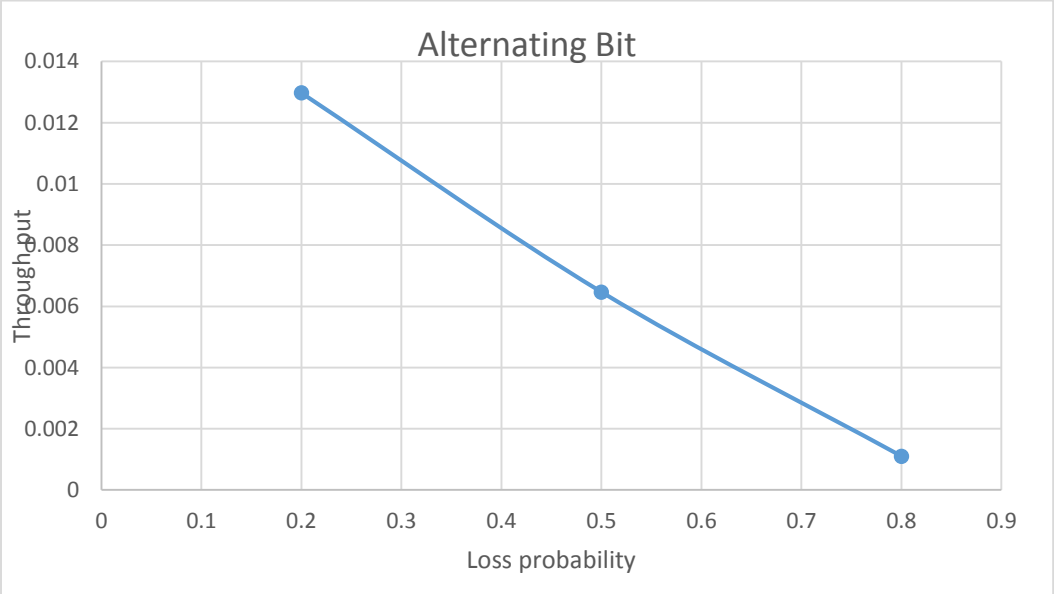
Aim: Comparison of the window size with the through put.

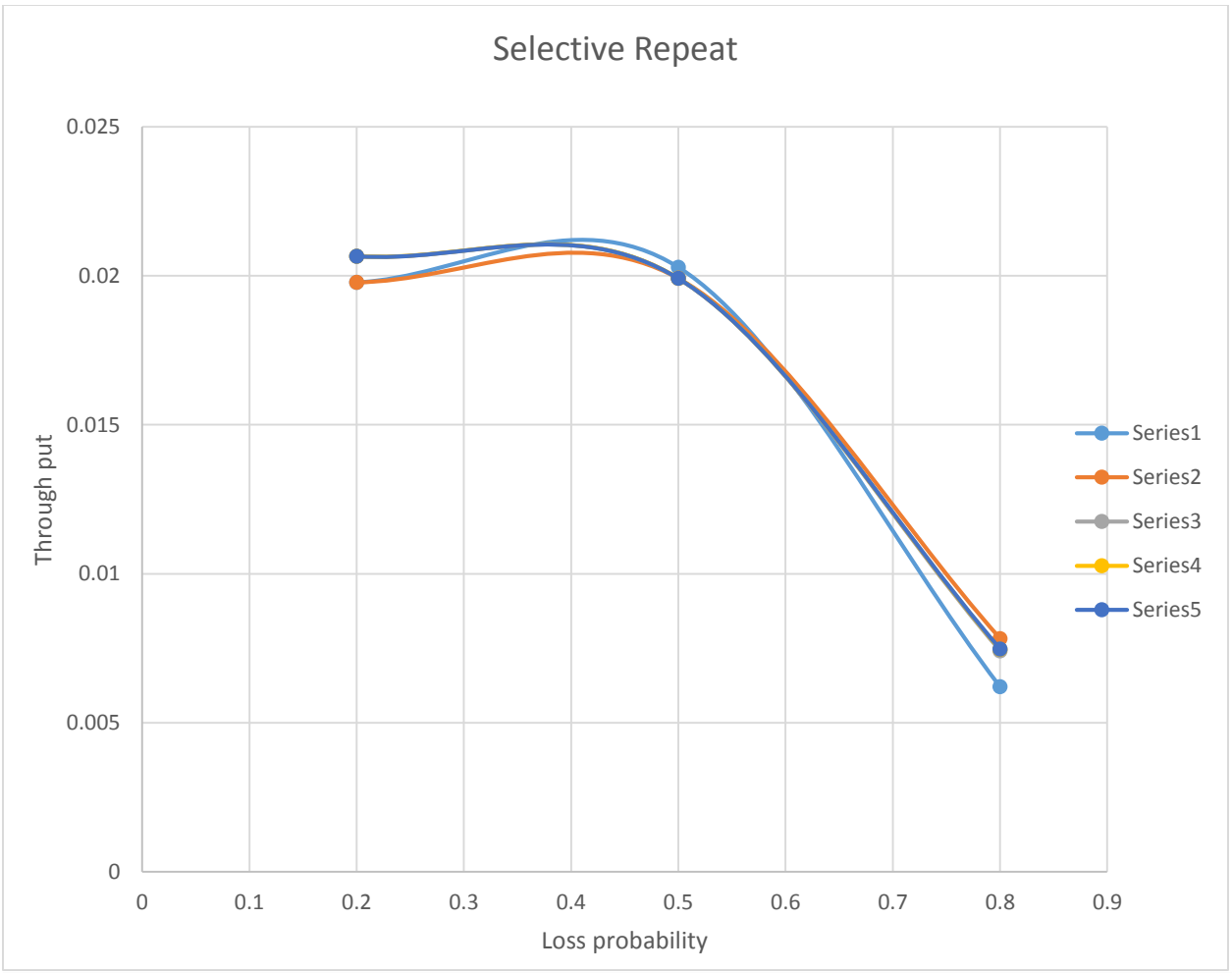
Observation: In this experiment we compare the performance of given input, with the through based on different window size. The window are set in the program every time, in the order 10, 50, 100, 200 and 500.

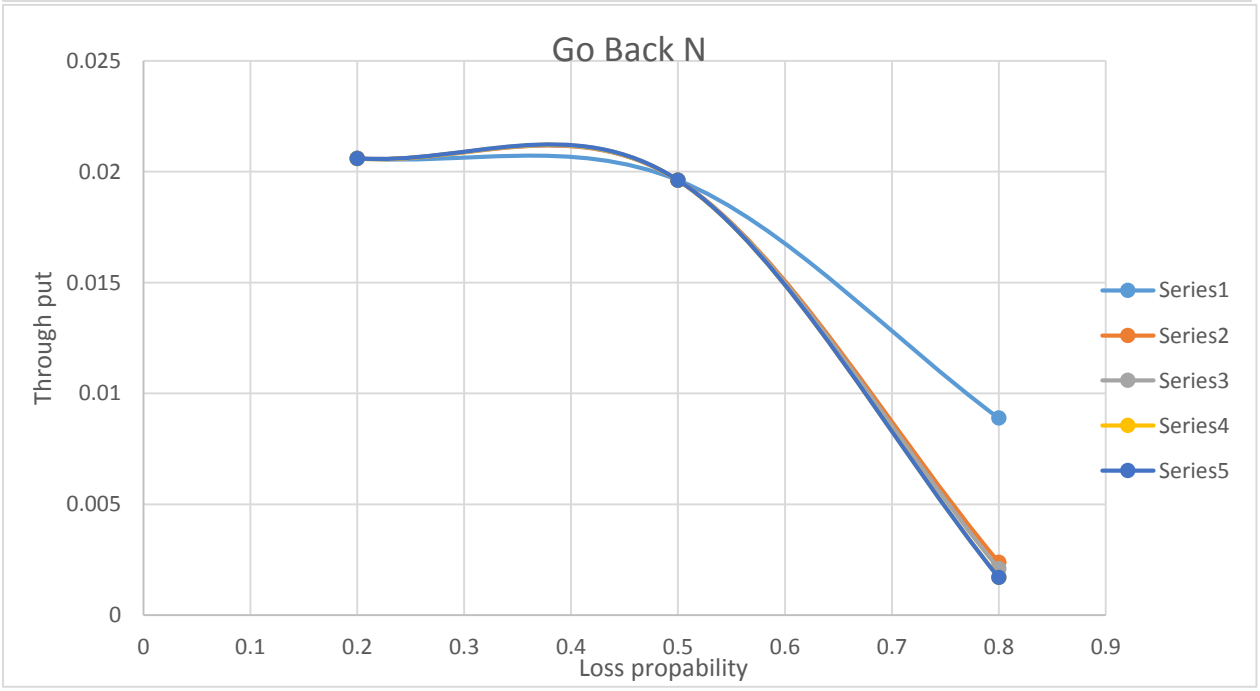
As the size of the window increase we find that the through put of the Go-BackN is dropped to very low value. This is due to fact that the number of retransmission which is induced whenever there is loss of packet or the packet gets corrupt. The simulation results are obtained for different window size and a graph for the given loss and throughput is made. For each window we get series in the graph namely:

- Series 1 – window size 10
- Series 2 – window size 50
- Series 3 – window size 100
- Series 4 – window size 200
- Series 5 – window size 500

The following are the observation obtained.




Selective Repeat
0.025
0.02
0.015
0.01
0.005
0
Through put
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
Loss probability
Series1
Series2
Series3
Series4
Series5


Go Back N
0.025
0.02
0.015
0.01
0.005
0
Through put
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
Loss propability
Series1
Series2
Series3
Series4
Series5

Result:

For the lower loss the throughput for GBn is similar to that of the SR, however the throughput drops for SR and for larger window size the throughput increase.

So using Selective repeat for a large window size is more efficient than the other protocols for high loss rate.