COL 334 Assignment 4

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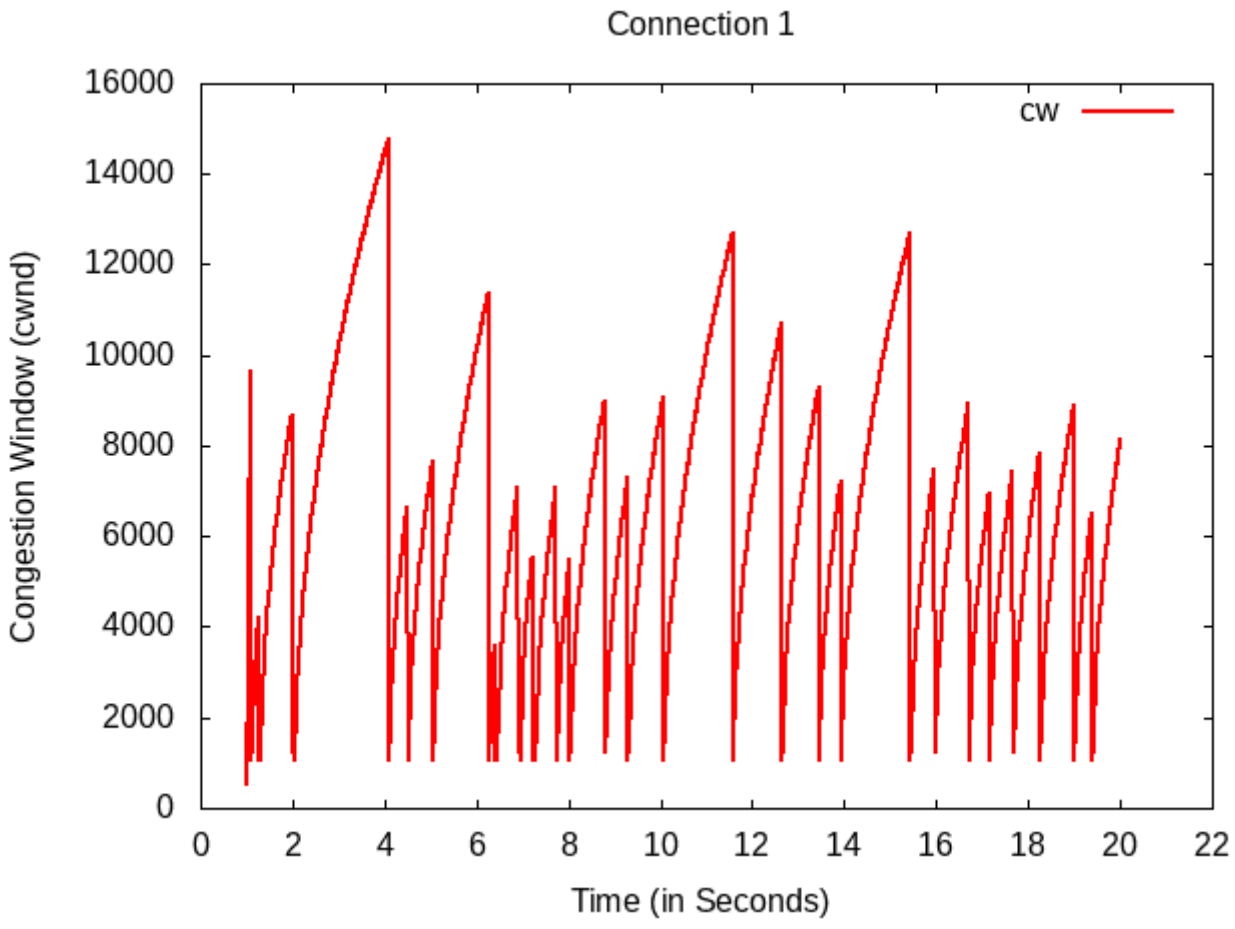
Entry Number - 2020CS50436

Part A Transport Layer

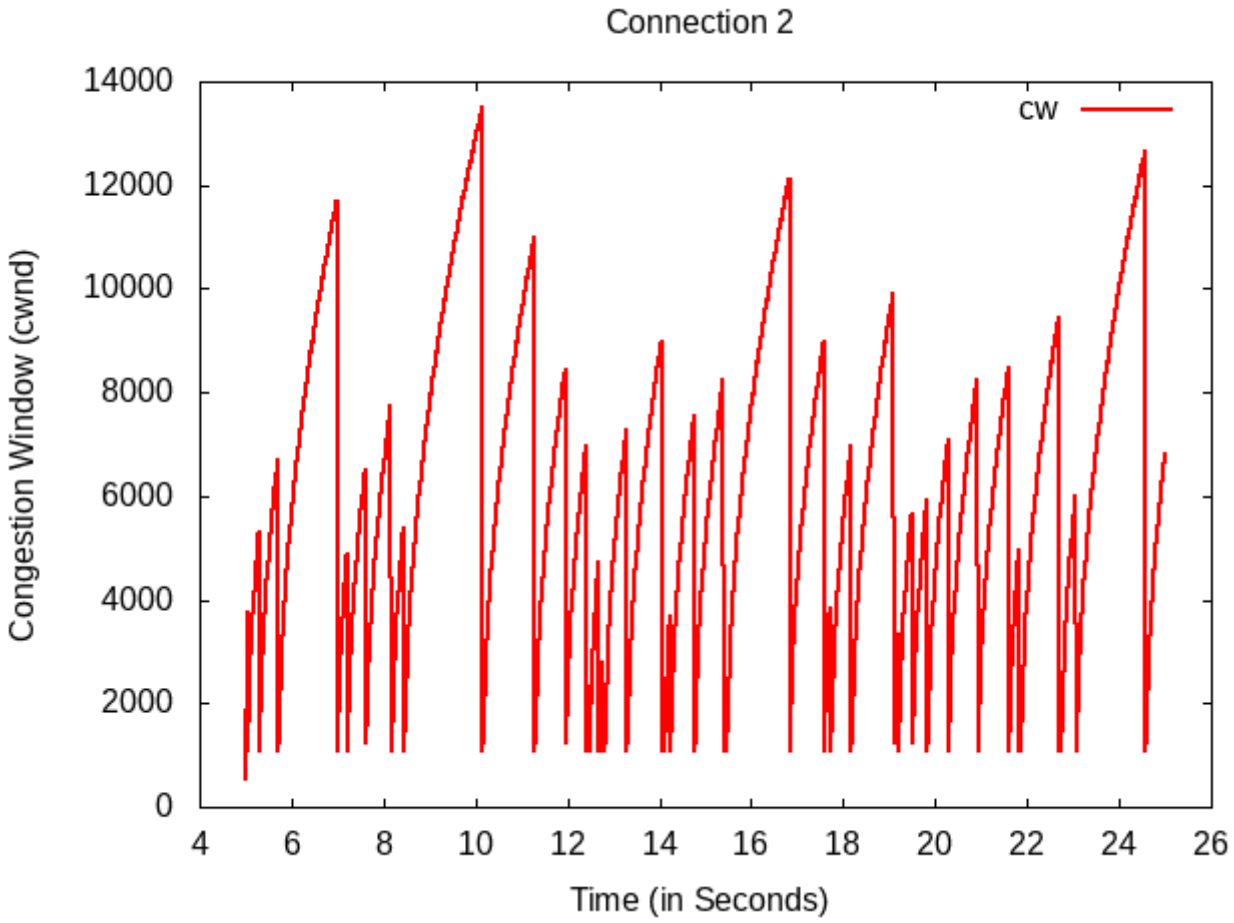
Plots

Configuration 1 : All senders use TCPNewReno

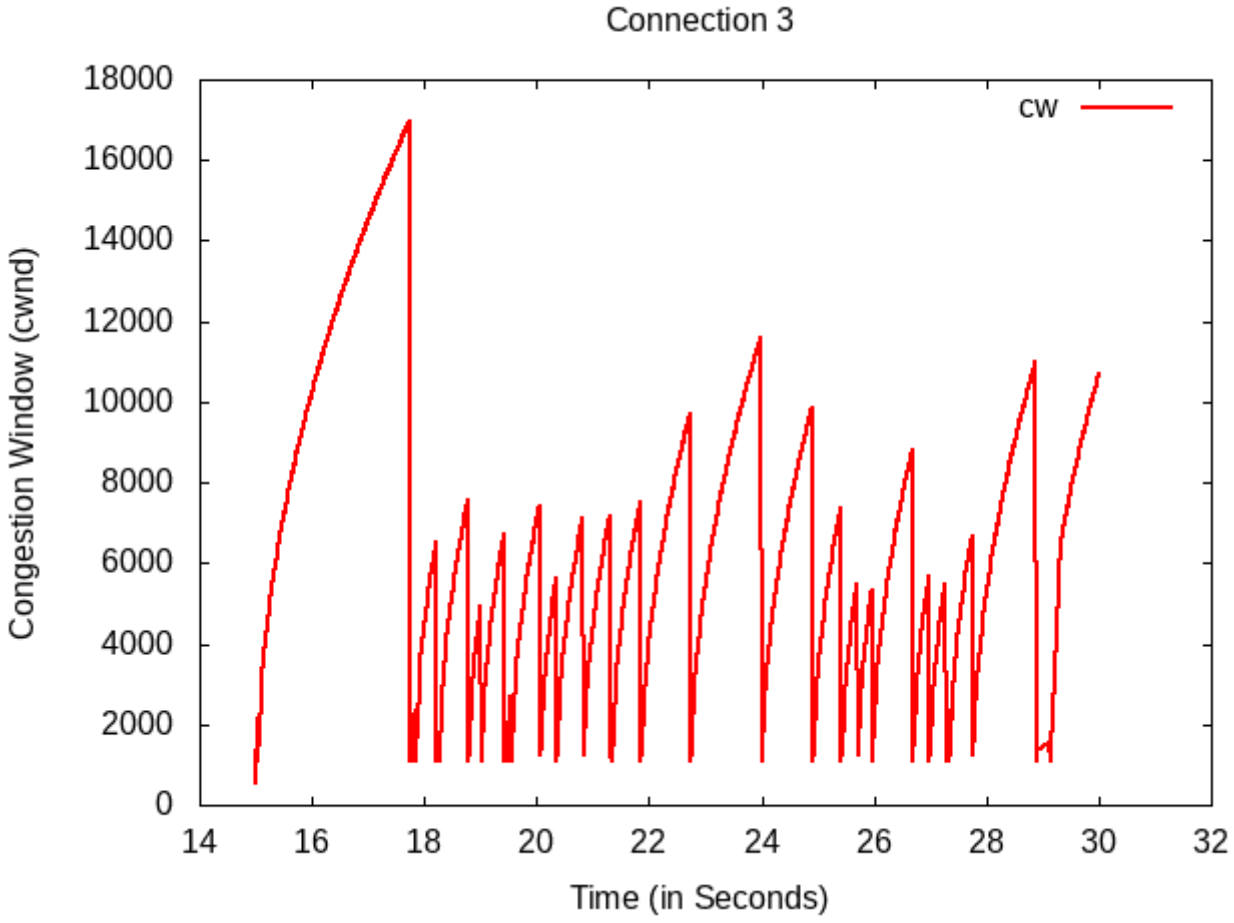
Connection 1



Connection 2

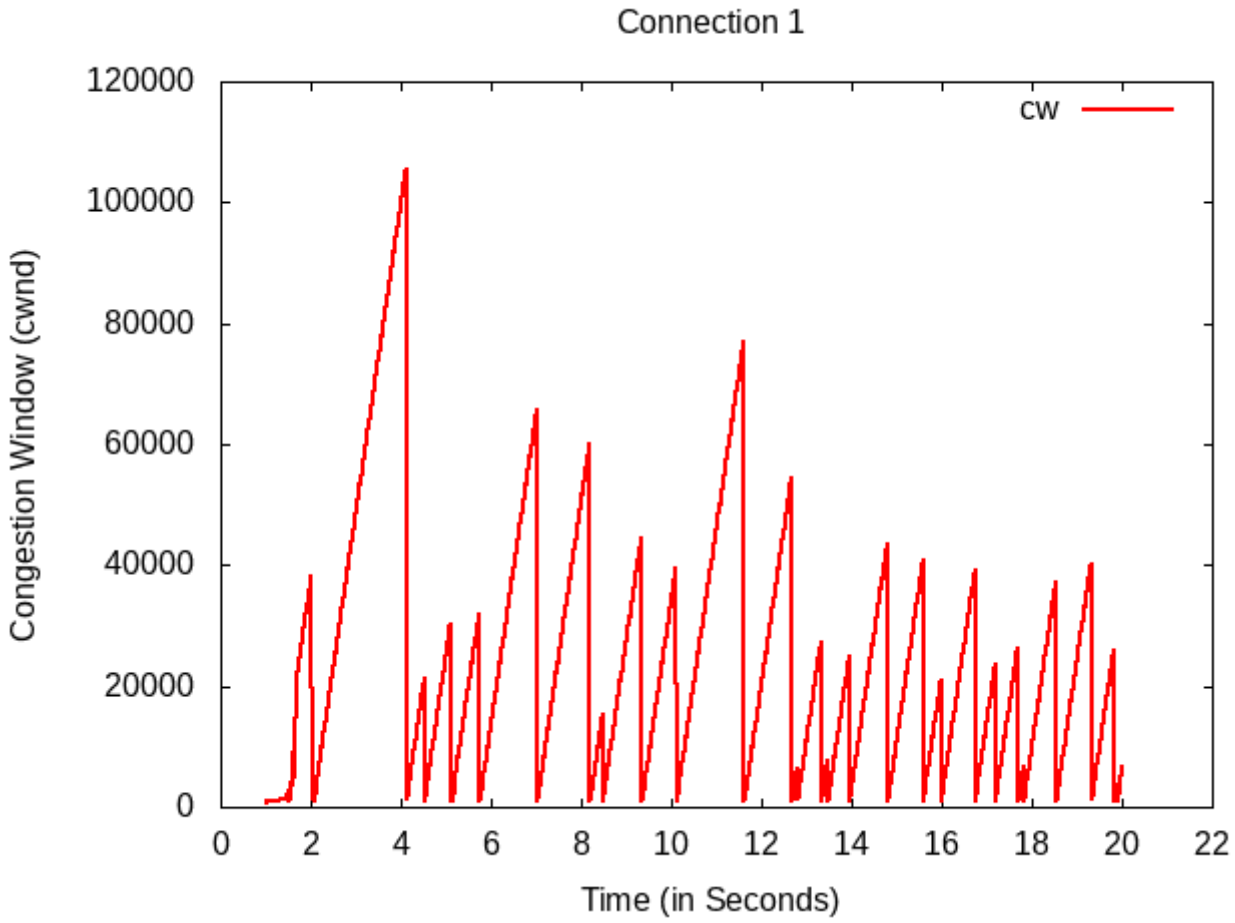


Connection 3

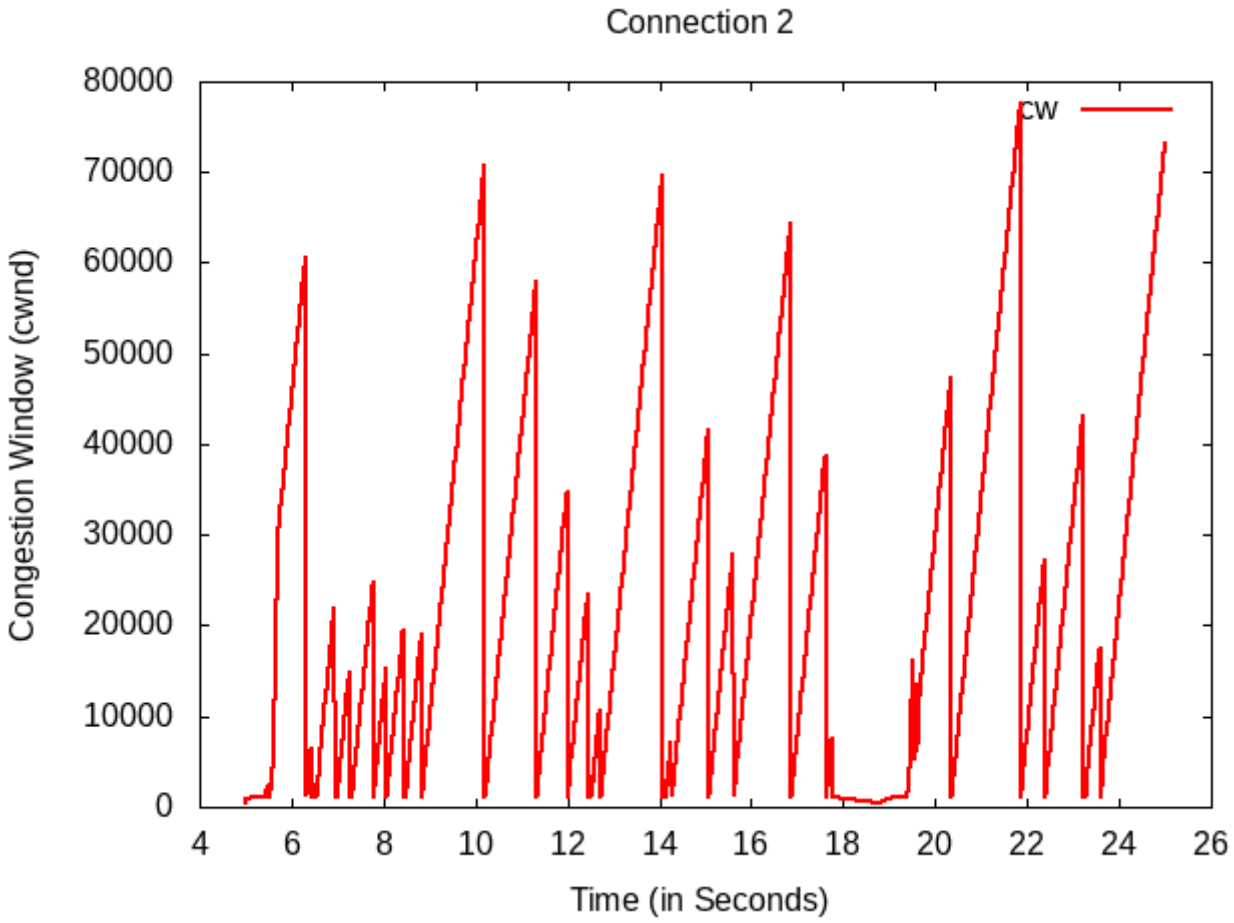


Configuration 2 :All senders use TCPNewRenoPlus

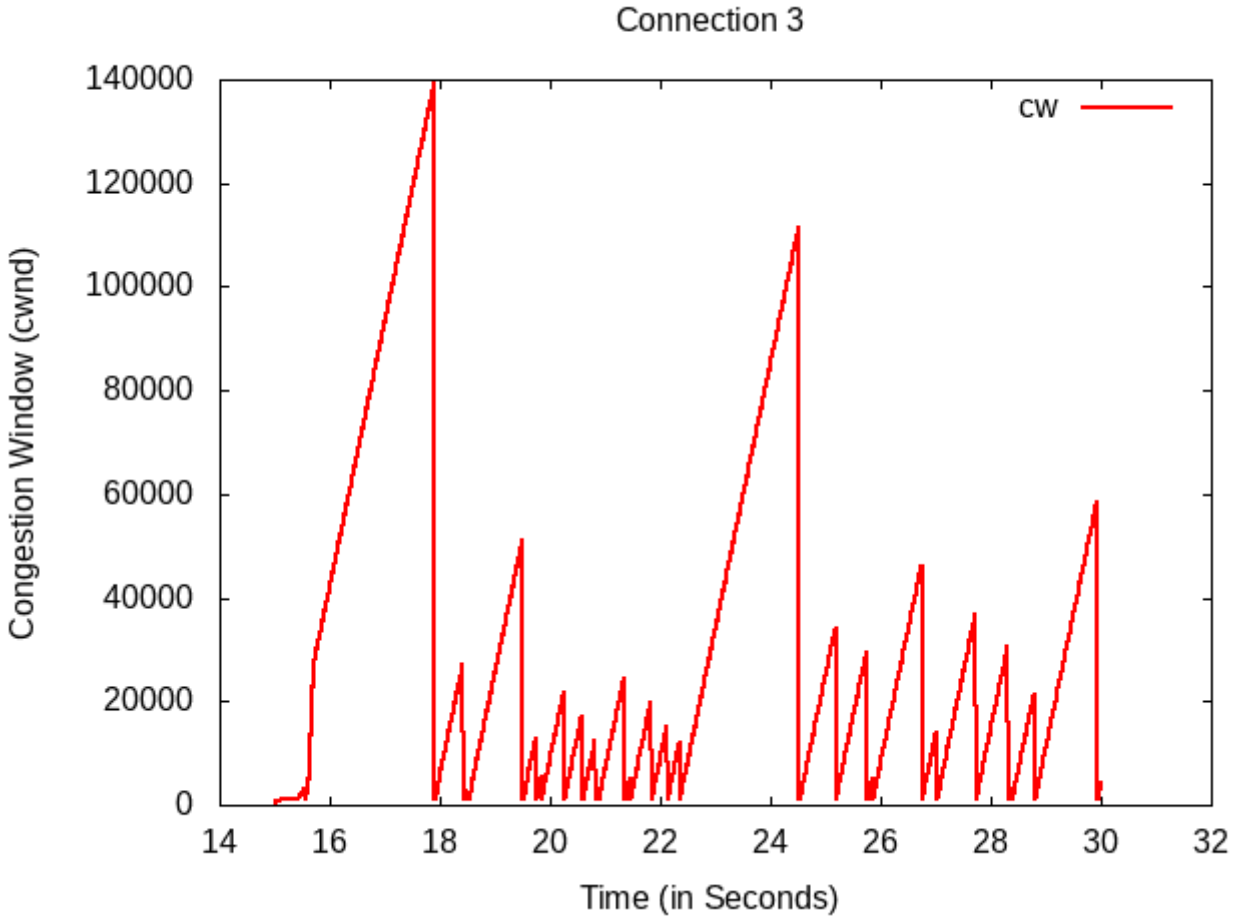
Connection 1



Connection 2



Connection 3



Explanation

The main difference we can see from the treands is the linear increase in case of NewRenoPlus.
Because in case of NewReno the congestion avoidance is set to

$$cwnd+ = \frac{(segmentsize)^2}{cwnd}$$

As we can see the increase is non linear and as the cwnd increase, the increase in the cwnd also decrease as the value of the denominator will increase and segement size remains constant.

Where as in case of NewRenoPlus the cwnd is set as follows

$$cwnd+ = 0.51 * segmentsize$$

Thus the increase is always linear as we can also see from the graph. Also since the segment size remains constant(except the first slope in the start), we can see that the slopes on the left side of the peak are same. This explains the congestion avoidance trend in the graph.

Now for the slow start phase we can see that in the TcpNewReno, there is a linear increase in the cwnd size because the cwnd is linearly increase in the starting.

$$cwnd+ = segmentsize$$

Thus we can see that the cwnd is linearly increased untill a threashold

It is not clearly visible in the graph but the cwnd will increase non linearly in the TcpNewRenoPlus as

$$cwnd+ = \frac{(segmentsize)^{1.91}}{cwnd}$$

In case of TcpNewReno, the entire network is impacted as follows.
We can see that the thickness of the curvers in case of connection1 and connection2(for tcpnewreno) is almost same. Thus the network is shared almost equally, where as in case of TcpNewRenoPlus we can observe that that connection1 have shorter peaks and lesser area for connection1 than connection2. Thus there is somewhat non equal sharing.
Also if we look at the graphs we can see that the thickness in case of TcpNewReno is more than TcpNewRenoPlus. Due to non linear increase in the congestion avoidance phase, the graph covers more area. Thus there will be a better transfer of data in case of TcpNewReno.

Files explanation

1. First.cc - This file contains the code for
2. wscript - This file contains the wscript. I have added dependency for netanim
3. TcpNewRenoPlus.h - This is the header file for the new protocol that I created (TcpNewRenoPlus)
4. TcpNewRenoPlus.cc - This is the main file for the new protocol that I created (TcpNewRenoPlus)
5. connection1.plt - GNUPlot script for connection 1
6. connection2.plt - GNUPlot script for connection 2
7. connection3.plt - GNUPlot script for connection 3
8. task1plot.sh - bash script to run connection1.plt, connection2.plt, connection3.plt