COL334 Assignment 4 Part A

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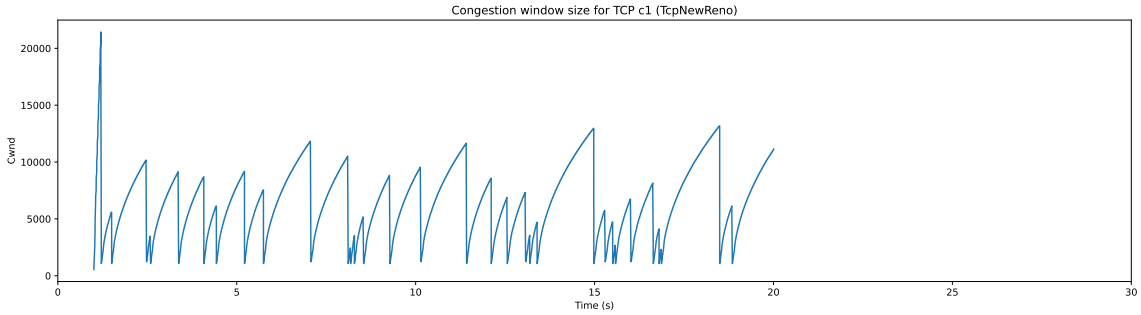
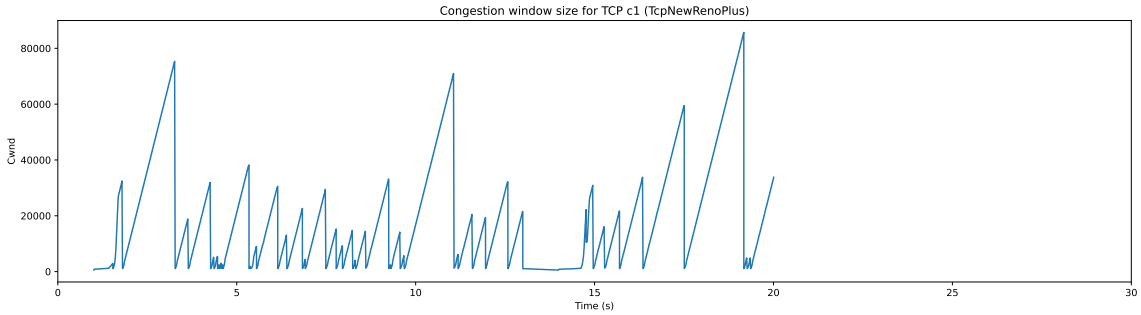
1. The plots for each source, with the new and old protocol are as follows:

   (i) For Connection 1 (from Node 1 to Node 3, starting at 1 s and ending at 20 s)

TcpNewReno

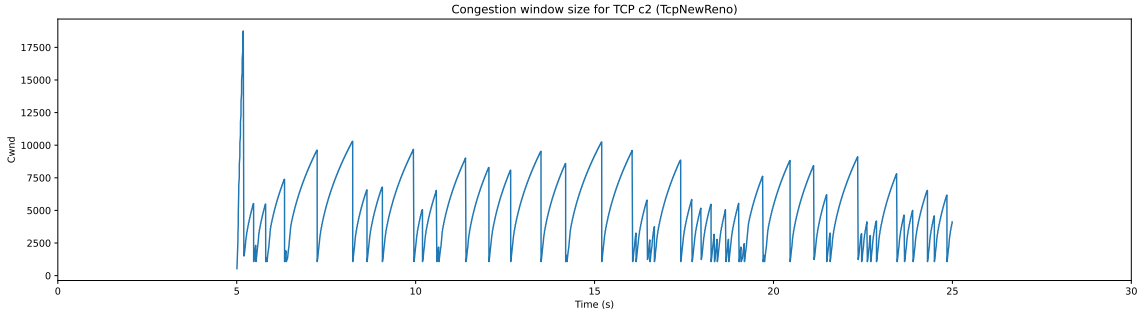


TcpNewRenoPlus

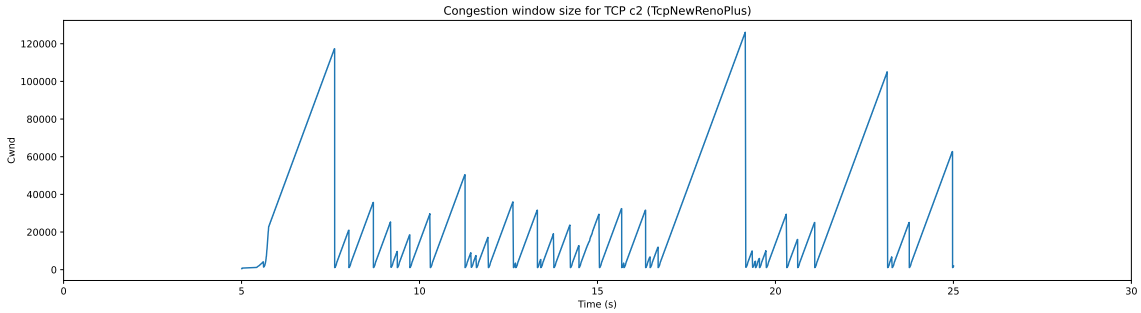


   (ii) For Connection 2 (from Node 1 to Node 3, starting at 5 s and ending at 25 s)

TcpNewReno

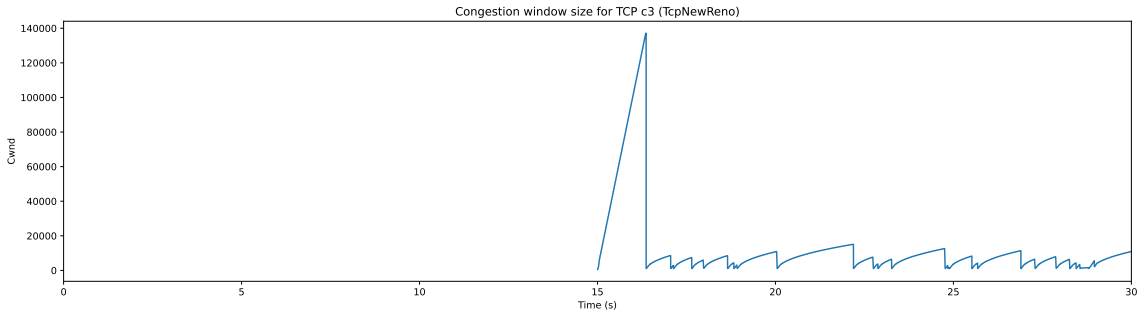


TcpNewRenoPlus

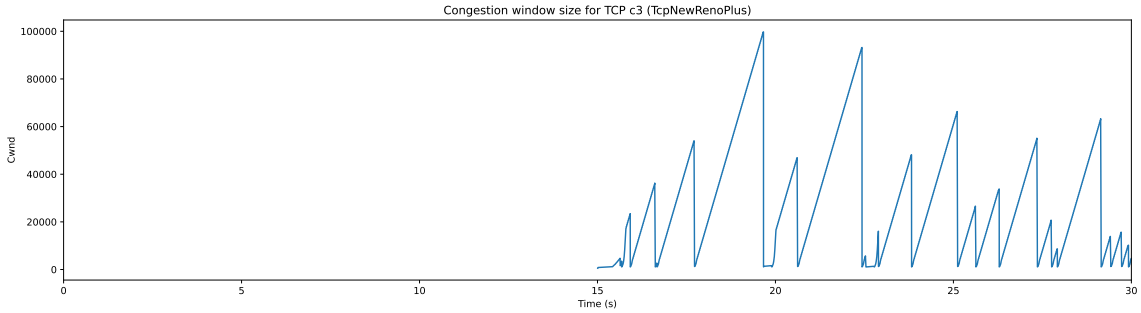


(iii) For Connection 3 (from Node 2 to Node 3, starting at 15 s and ending at 30 s)

TcpNewReno



TcpNewRenoPlus



2. We see that TcpNewRenoPlus uses a linear increase in the congestion control phase and reaches very high congestion window values, whereas TcpNewReno does not. Also, TcpNewRenoPlus uses a multiplicative increase in the slow start phase (seen at 20 seconds for connection 3), which allows it to get back to the old rate faster.

   As for the impact on the entire network, TcpNewRenoPlus clogs up the network for others. This can be seen in Connection 1 from 13 to 15 seconds, where almost no packets are transmitted and congestion window remains almost constant around 1 MSS. This is because Connection 2 takes up all the bandwidth on the link that they share, and none is left for Connection 1.

Appendix

All files are as specified in the submission instructions. The fifth.cc file was modified to create the connection and the simulation. The script saves the congestion windows to the respective files, and the plotting was done using a Jupyter notebook and matplotlib (which has been attached, both as a notebook and as a script). The data files generated after the run are in the data directory.