

Lab 9 - Cpre 489

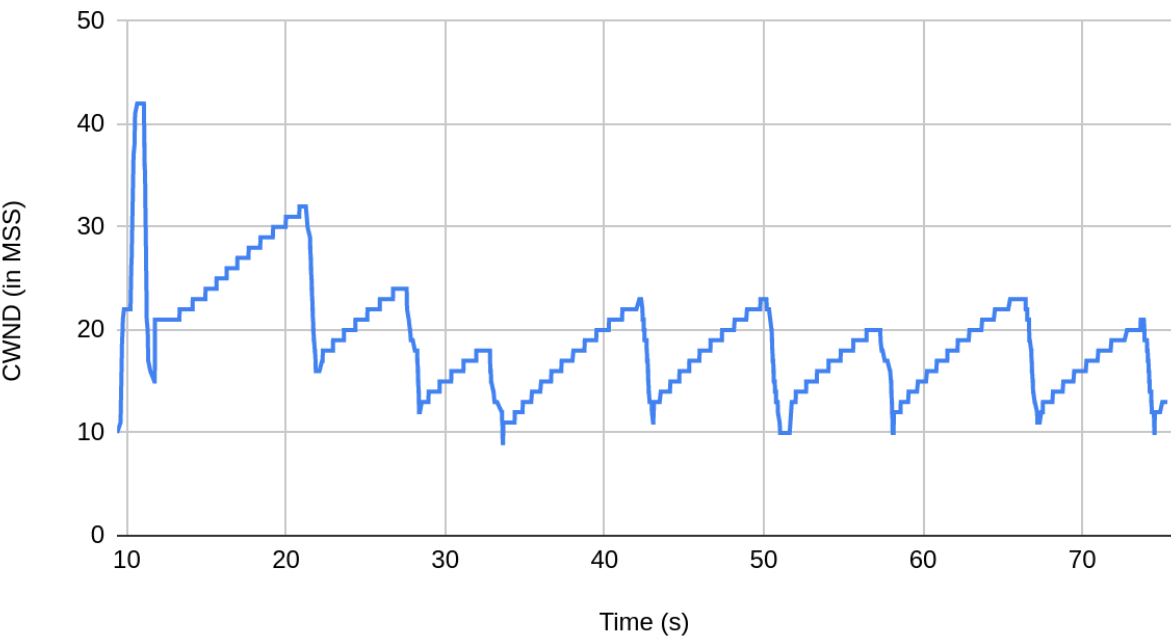
Joseph Schmidt

```
2 569950 29312
76.648684691 10.10.1.2:42916 10.10.2.1:5001 32 0xbdbad670 0xbdba7bf0 16 12 20595
2 568348 29312
76.684837410 10.10.1.2:42916 10.10.2.1:5001 32 0xbdbadc18 0xbdba8198 16 12 20595
2 568459 29312
76.697109808 10.10.1.2:42916 10.10.2.1:5001 32 0xbdbae1c0 0xbdba8740 16 12 20595
2 570047 29312
76.709210514 10.10.1.2:42916 10.10.2.1:5001 32 0xbdbae768 0xbdba8ce8 16 12 20595
2 572971 29312
76.721265975 10.10.1.2:42916 10.10.2.1:5001 32 0xbdbaf2b8 0xbdba9290 17 12 20595
2 577040 29312
76.781895381 10.10.1.2:42916 10.10.2.1:5001 32 0xbdbaf860 0xbdba9838 17 12 20595
2 582107 29312
76.793950708 10.10.1.2:42916 10.10.2.1:5001 32 0xbdbafe08 0xbdba9de0 17 12 20595
2 582035 29312
77.048307088 10.10.1.2:42916 10.10.2.1:5001 32 0xbdbb03b0 0xbdbaa388 17 12 20595
2 583480 29312
77.060503935 10.10.1.2:42916 10.10.2.1:5001 32 0xbdbb0958 0xbdbaa930 17 12 20595
2 590801 29312
77.120978759 10.10.1.2:42916 10.10.2.1:5001 32 0xbdbb0f00 0xbdbaaed8 17 12 20595
2 597199 29312
77.133177626 10.10.1.2:42916 10.10.2.1:5001 32 0xbdbb14a8 0xbdbab480 17 12 20595
2 602776 29312
77.193596326 10.10.1.2:42916 10.10.2.1:5001 32 0xbdbb1a50 0xbdbaba28 17 1
```

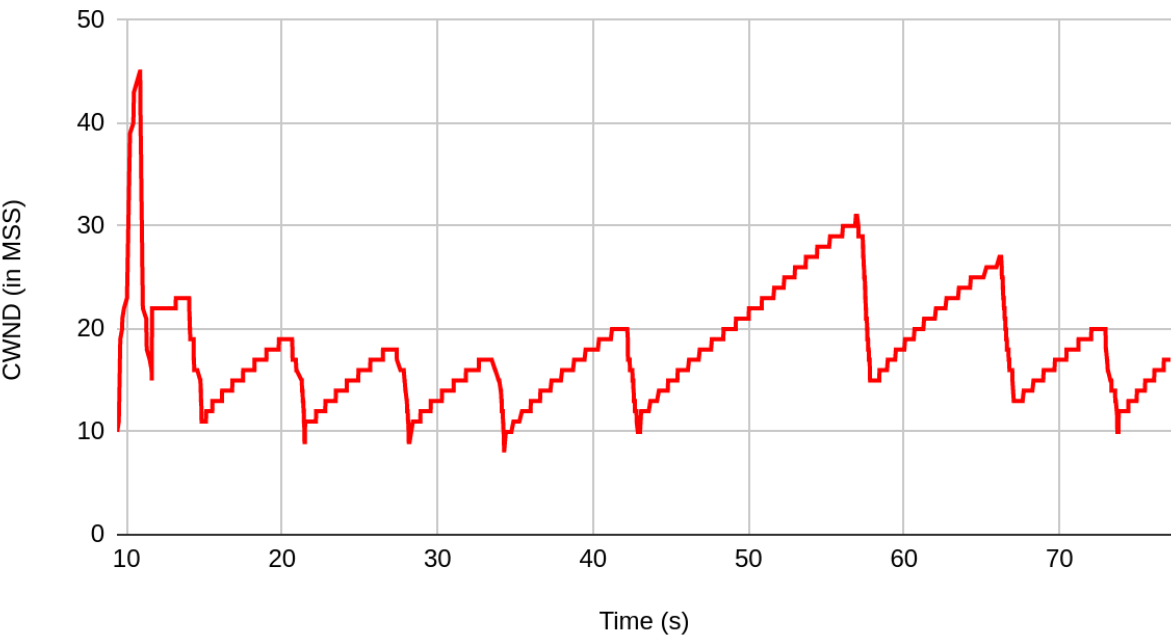
```
^Cjschm333@server:~$ iperf -s
-----
Server listening on TCP port 5001
TCP window size: 85.3 KByte (default)
-----
[ 6] local 10.10.2.1 port 5001 connected with 10.10.1.2 port 42918
[ 5] local 10.10.2.1 port 5001 connected with 10.10.1.2 port 42916
[ 4] local 10.10.2.1 port 5001 connected with 10.10.1.2 port 42914
[ ID] Interval          Transfer      Bandwidth
[ 6] 0.0-70.6 sec      3.25 MBytes   386 Kbits/sec
[ 5] 0.0-72.7 sec      2.50 MBytes   288 Kbits/sec
[ 4] 0.0-73.2 sec      2.62 MBytes   301 Kbits/sec
[SUM] 0.0-73.2 sec    8.38 MBytes   959 Kbits/sec
```

```
jschm333@client:~$ sudo modprobe tcp_probe port=5001 full=1
jschm333@client:~$ sudo chmod 444 /proc/net/tcpprobe
jschm333@client:~$ dd if=/proc/net/tcpprobe ibs=128 obs=128 | tee /tmp/tcpprobe.dat
```

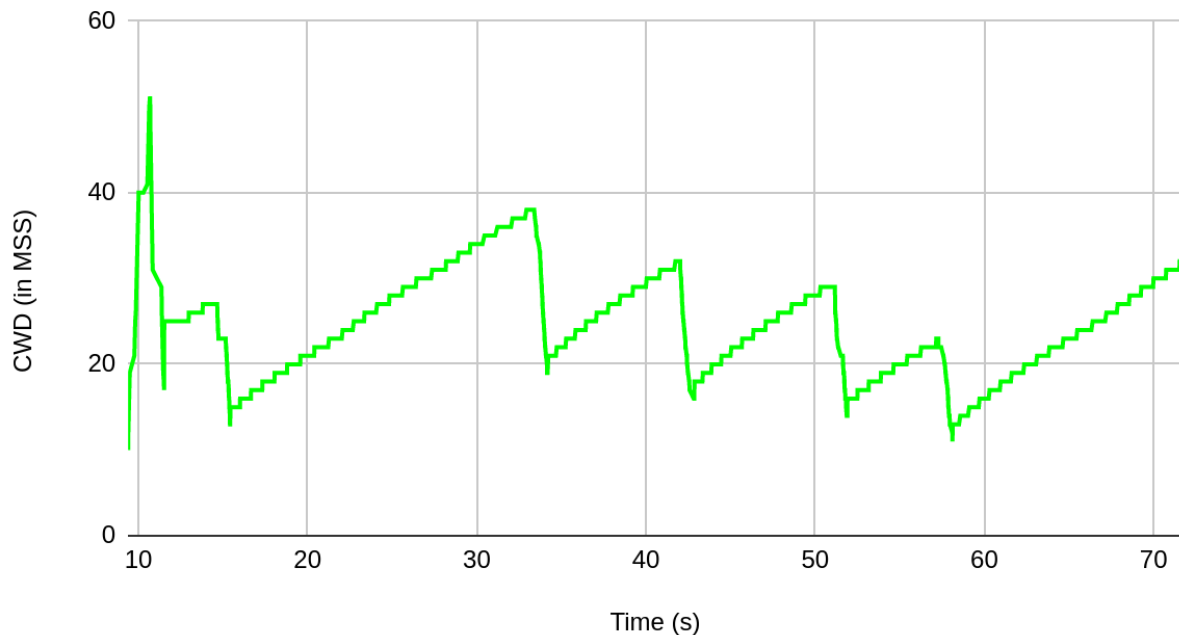
Port 42914



Port 42916




Port 42918



The periods of slow start are from 10 to 15. You can see the exponential growth right off the back on all of the graphs. Once it hits the ssthresh value though it switches into congestion avoidance and grows linearly. For all of the graphs it remains in congestion avoidance for the rest of the time period. This is because there appears to be no timeouts but only 3rd dup ACKs happening which will keep it in congestion avoidance mode after halving the cwnd.

TCP in slow start makes the cwnd grow at an exponential rate. Once it enters congestion avoidance phase it will grow linearly.

When 3 ACKS are received it halves the cwnd and resumes CA. This is shown on the graph as we can see at times 15, 35, 43, 52, and 58 (for graph Port 42918). The slow start window will equal half of the cwnd.

 Experiments ▾ Storage ▾ **News!** Docs ▾

The UMass cluster will be offline for maintenance 5/22 through 5/28 ×

Current Usage: 0 Node Hours, **Prev Week: 1.67**, **Prev Month: 1.67** (30 day rank: 1645 of 1708 users) ●

Experiments Profiles Project Profiles Datasets Reservations Membership Usage Account

You do not have any active experiments. Click [here](#) to create one.

Summary:

In this lab helped reinforce my knowledge of TCP control and how it works. We were able to see in a real world example of how TCP control takes place on our routers. I feel more comfortable with TCP control after this after having to analyze our graphs and understand why the graph

looked the way it did. I also learned a lot more about graphing. I spent most of this lab in Google sheets trying to plot the graph and I learned a lot about separating data and making queries. I also learned what iperf did as it is a tool to check network performance. Overall, I learned a lot from this lab and feel more comfortable gathering and plotting data.