Lab-6

22 April 2021

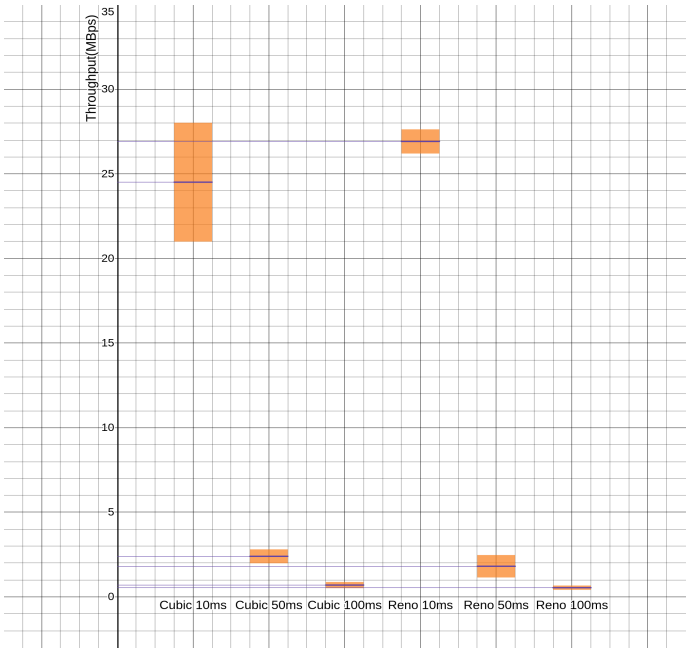
Results

congestion_control	loss	delay	avg_throughput	std_dev
cubic	0.1%	10ms	24.510761	9.547233
cubic	0.1%	50ms	2.399622	1.117692
cubic	0.1%	100ms	0.699589	0.496556
cubic	0.5%	10ms	16.843086	11.787019
cubic	0.5%	50ms	1.720822	1.499590
cubic	0.5%	100ms	0.415663	0.220715
cubic	1%	10ms	13.186048	11.621270
cubic	1%	50ms	0.734607	0.762752
cubic	1%	100ms	0.346694	0.409089
reno	0.1%	10ms	26.917971	1.941924
reno	0.1%	50ms	1.812260	1.802747
reno	0.1%	100ms	0.545986	0.344026
reno	0.5%	10ms	17.833457	10.405261
reno	0.5%	50ms	1.050079	1.411530
reno	0.5%	100ms	0.270657	0.213380
reno	1%	10ms	8.710652	11.178122
reno	1%	50ms	0.614076	0.901064
reno	1%	100ms	0.149757	0.045633

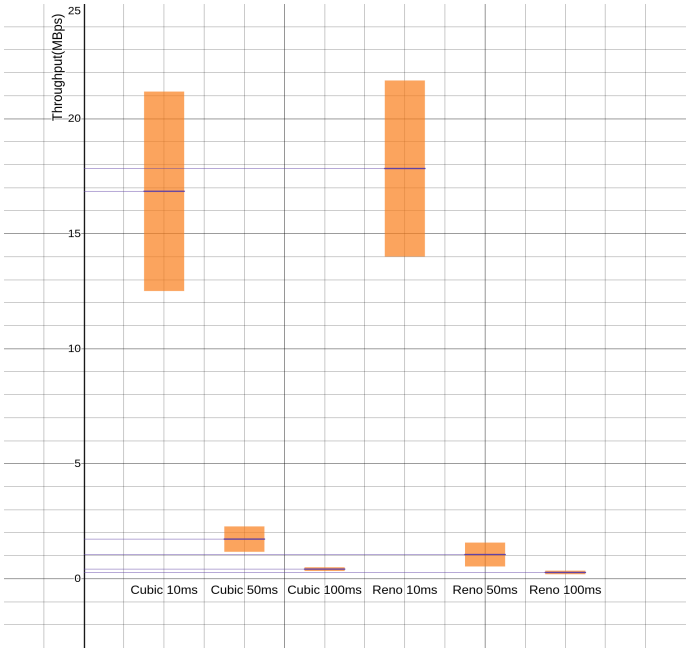
Values are in **MBps**

Plots

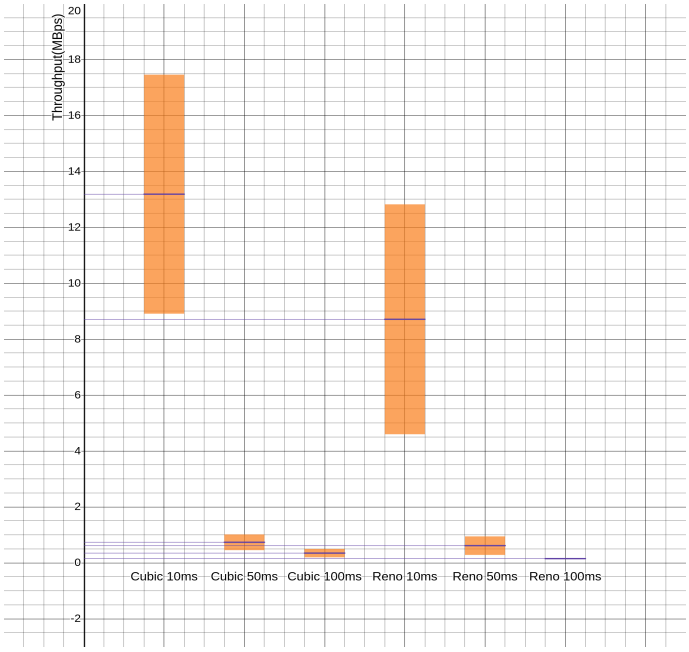
Throughput Vs Delay for Reno and Cubic: Loss = 0.1%



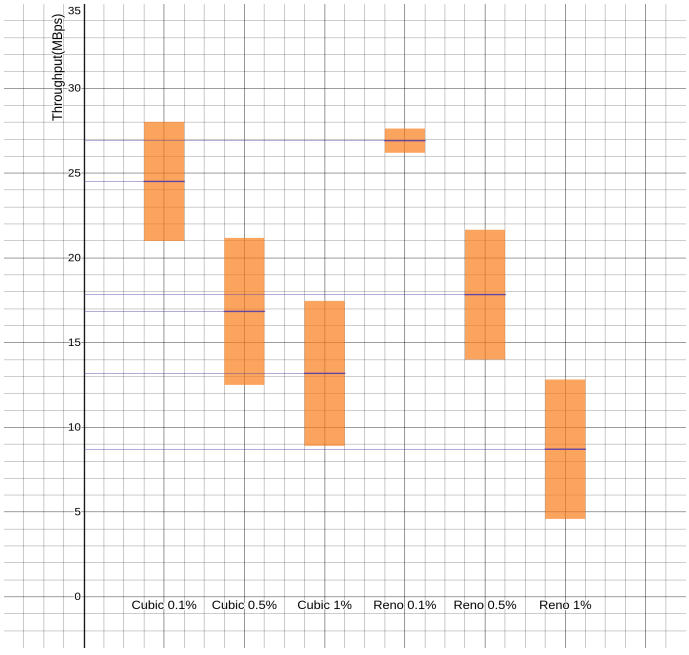
Throughput Vs Delay for Reno and Cubic: Loss = 0.5%



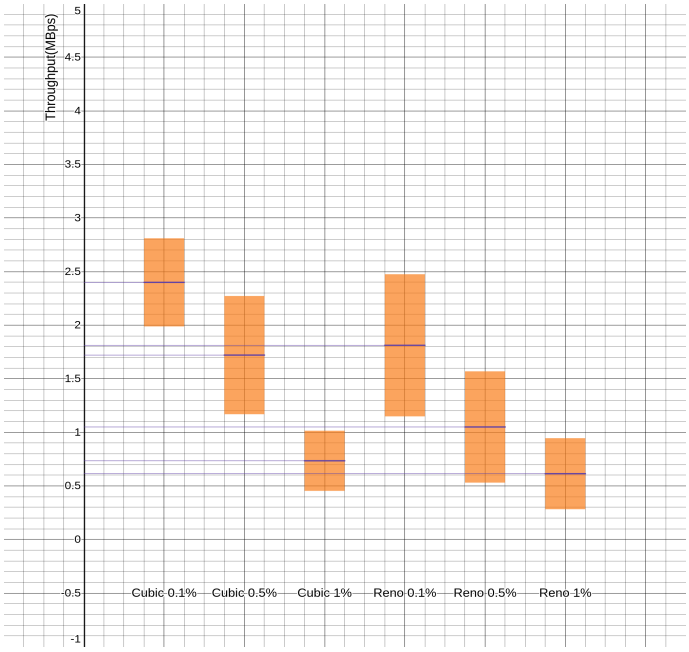
Throughput Vs Delay for Reno and Cubic: Loss = 1%



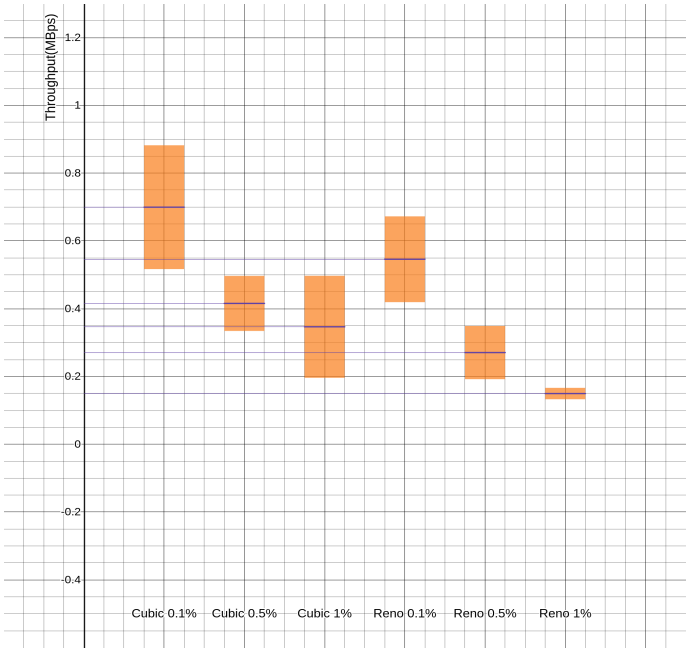
Throughput Vs Loss for Reno and Cubic: Delay = 10ms



Throughput Vs Loss for Reno and Cubic: Delay = 50ms

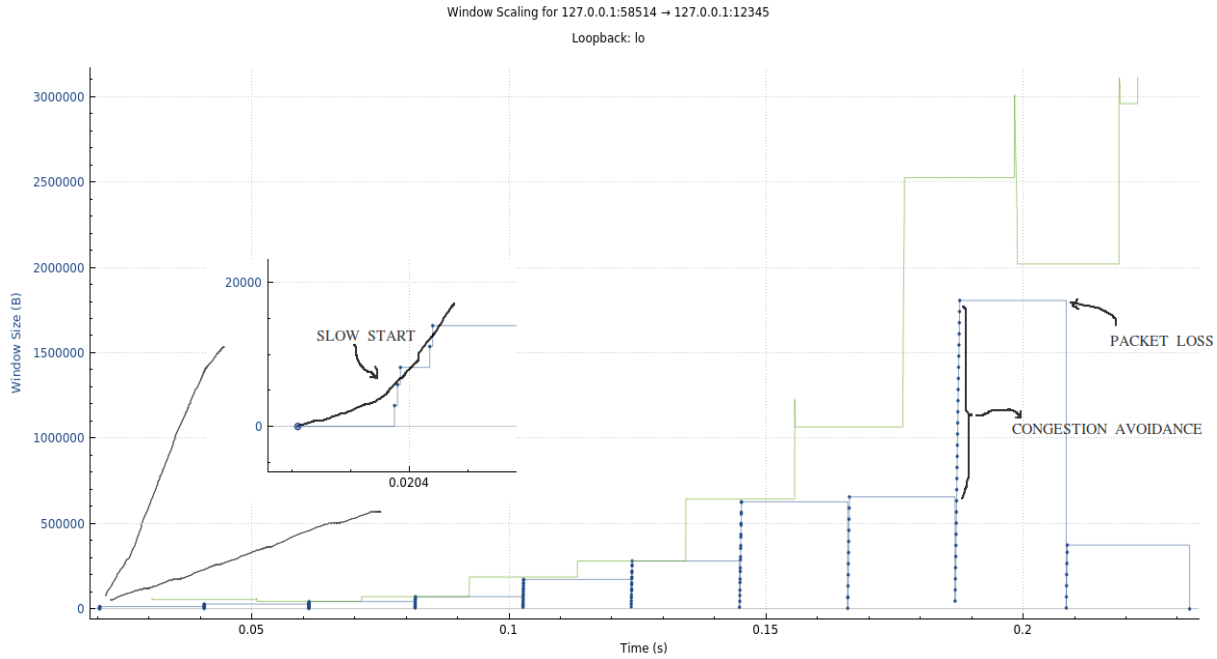


Throughput Vs Loss for Reno and Cubic: Delay = 100ms

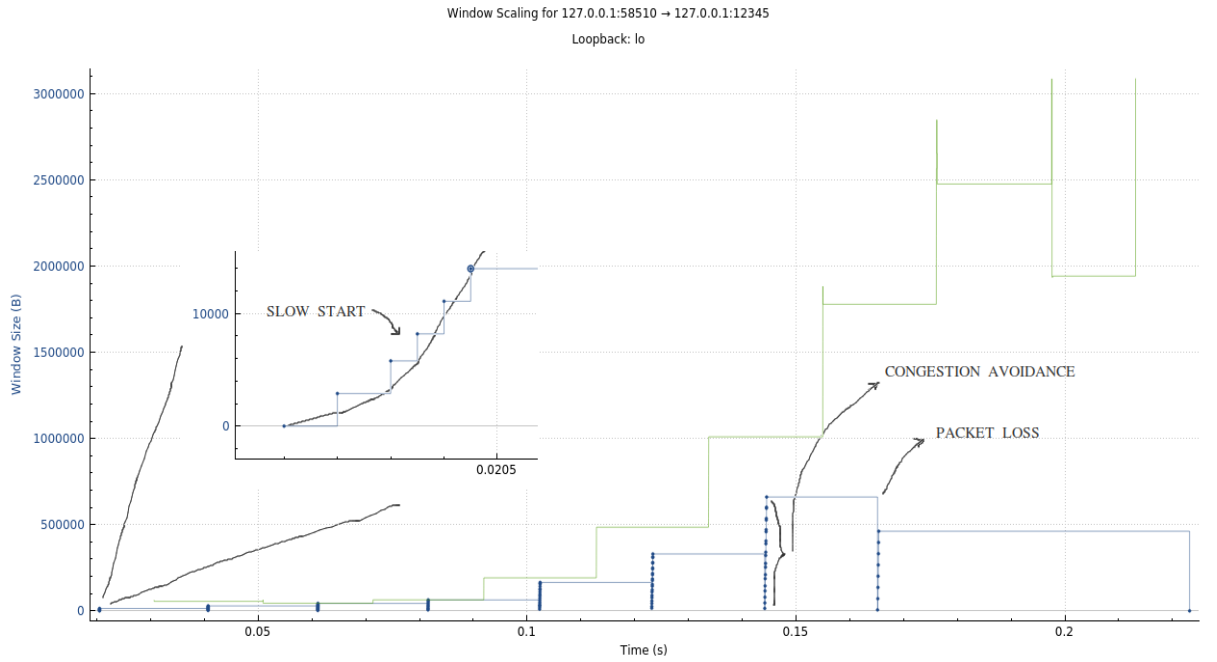


Window Scaling Graphs

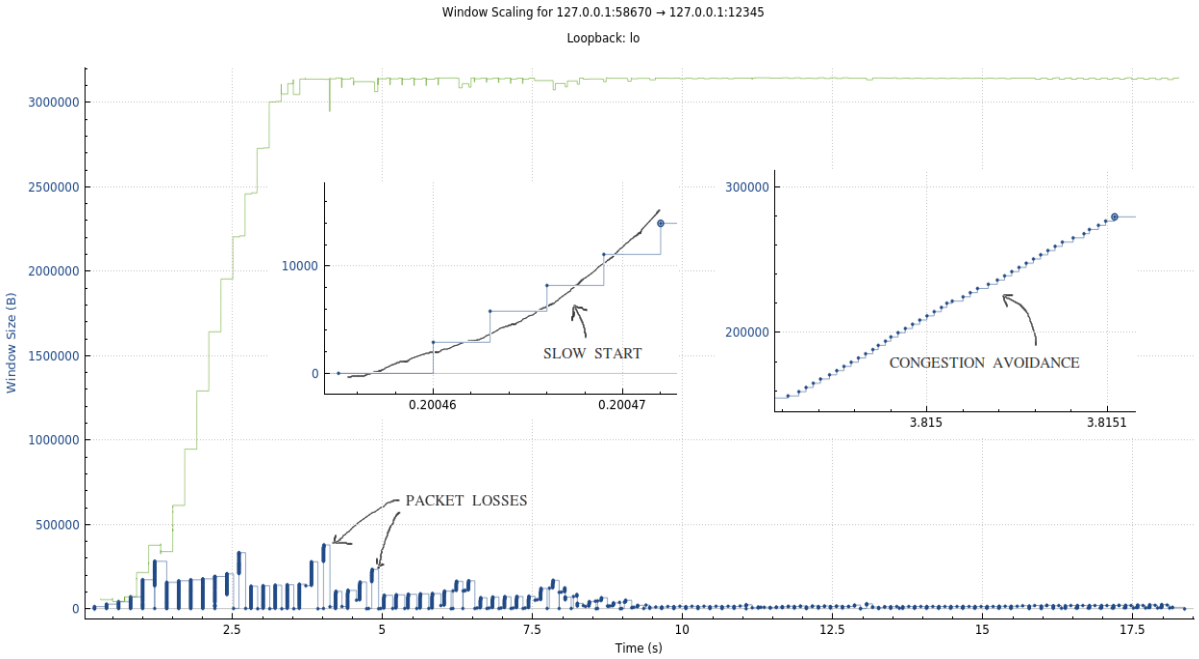
Cubic 0.1% Loss and 10ms Delay



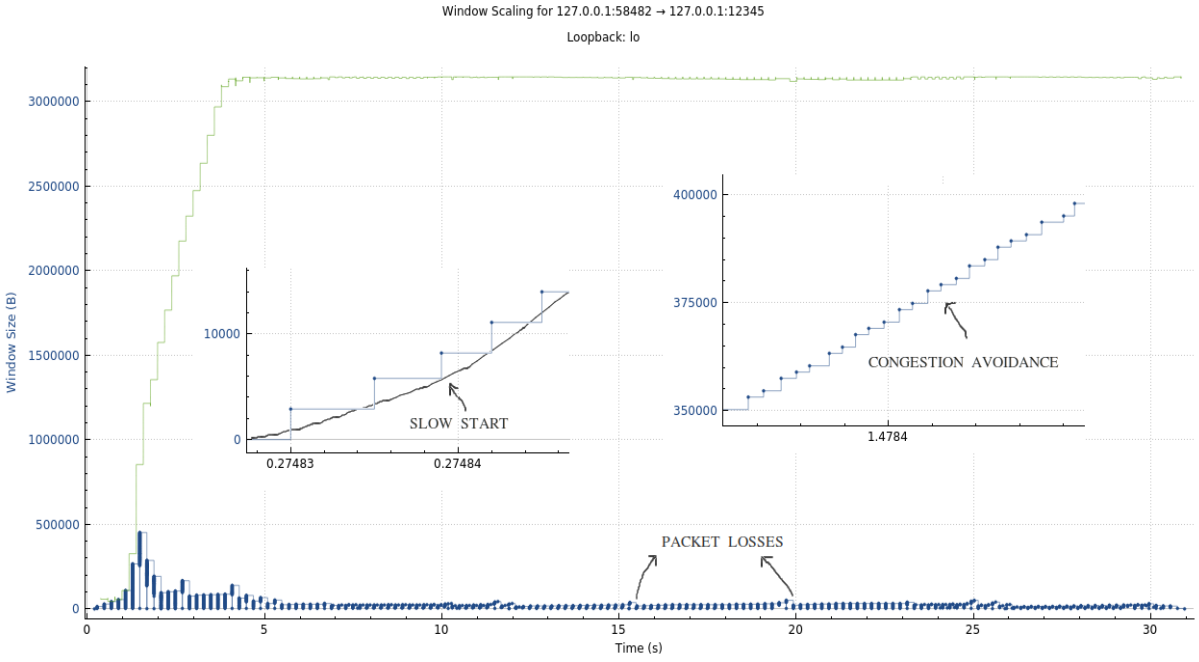
Reno 0.1% Loss and 10ms Delay



Cubic 1% Loss and 100ms Delay



Reno 1% Loss and 100ms Delay



Observations

The **throughput value decreases on increasing the delay** of the transmission which is pretty obvious to explain as the throughput is defined as data transferred divided by the time taken for transfer of the file, Hence on increasing the delay the throughput decreases.
The **throughput value decreases on increasing the loss** f the transmission which is pretty obvious to explain as the throughput is defined as data transferred divided by the time taken for transfer of the file, Hence as the loss increases the throughput value decreases.
It is very to clear from 10ms delay graph to see that the **throughput for reno is larger than the throughput for cubic** which is due to the aggressiveness of the cubic over reno which leads to lesser throughput when the loss value is lesser and as the loss value increase the relative performance of cubic over reno tends to increase slightly.
We can also note that the throughput of reno than cubic is lesser in the case of delay 100ms and loss 1% which is again due to more aggresiveness of cubic over reno.
The higher value of std_dev means that the data is very unreliable which is due to the fact that there doesnt exist a throughput guarantee in the present form of internet which makes the QoS bad, hence we have higher values of std_dev in the data.