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# Lab8 Report

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## OVERVIEW

In this assignment we change various system network parameters and observe how the values of throughput and latency are affected when we send files of various sizes through the network..

## OBSERVATIONS

**FILE SIZE: 512KB**

Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
SACK	Window Size(B)	CCP	Link Delay(in s)	Link Drop %	Time Taken	Throughput
0	16	reno	2	0.5	1.06	446.62
0	16	reno	2	5	0.98	562.0
0	16	reno	50	0.5	1.36	397.2
0	16	reno	50	5	1.28	425.0
0	16	cubic	2	0.5	0.68	376.526
0	16	cubic	2	5	2.04	342.0
0	16	cubic	50	0.5	2.34	341.4
0	16	cubic	50	5	3.42	162.6
0	256	reno	2	0.5	2.32	279.6
0	256	reno	2	5	1.18	435.2
0	256	reno	50	0.5	1.74	230.84
0	256	reno	50	5	0.68	581.61
0	256	cubic	2	0.5	1.16	544.0
0	256	cubic	2	5	0.76	680.4
0	256	cubic	50	0.5	1.52	413.6
0	256	cubic	50	5	1.34	475.2
1	16	reno	2	0.5	1.4	396.6
1	16	reno	2	5	0.66	806.0
1	16	reno	50	0.5	0.94	624.6
1	16	reno	50	5	0.5	564.09
1	16	cubic	2	0.5	3.76	382.46
1	16	cubic	2	5	1.14	467.4
1	16	cubic	50	0.5	0.74	501.678
1	16	cubic	50	5	1.12	485.2
1	256	reno	2	0.5	0.7	760.2
1	256	reno	2	5	0.98	417.006
1	256	reno	50	0.5	0.96	570.0
1	256	reno	50	5	1.02	589.8
1	256	cubic	2	0.5	0.9	574.6
1	256	cubic	2	5	1.1	528.2
1	256	cubic	50	0.5	2.26	316.92
1	256	cubic	50	5	1.14	463.4

## FILE SIZE: 1MB

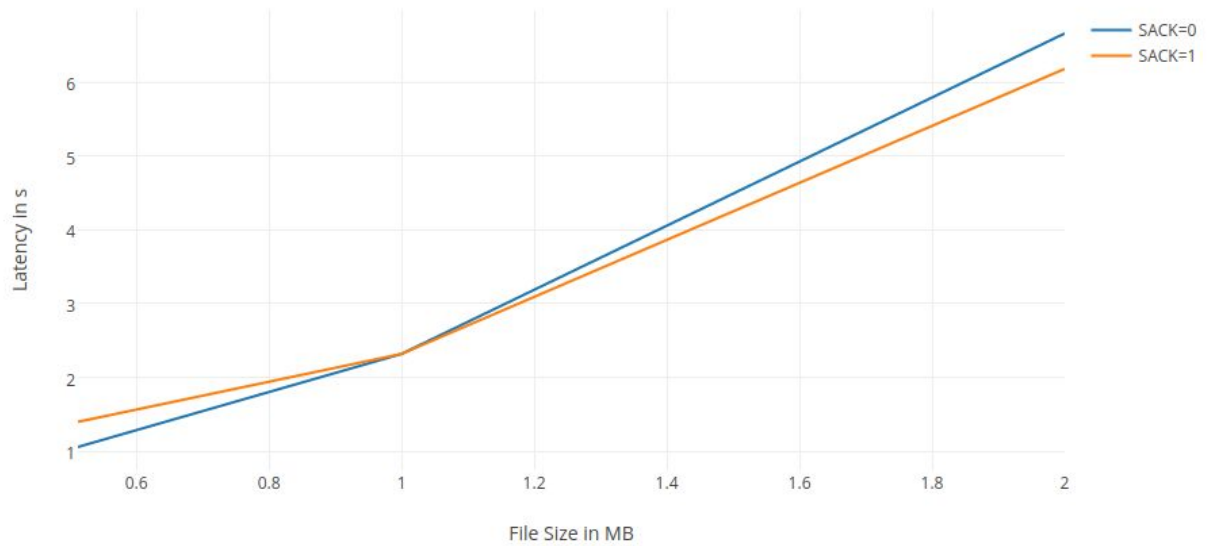
Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
SACK	Window Size	(CCP	Link Delay(in	Link Drop %	Time Taken	Throughput
0	16	reno	2	0.5	2.32	461.8
0	16	reno	2	5	2.08	505.8
0	16	reno	50	0.5	2.78	371.4
0	16	reno	50	5	1.8	576.0
0	16	cubic	2	0.5	2.58	394.066
0	16	cubic	2	5	3.74	270.4
0	16	cubic	50	0.5	5.58	203.2
0	16	cubic	50	5	10.38	322.64
0	256	reno	2	0.5	2.34	456.2
0	256	reno	2	5	5.88	245.4
0	256	reno	50	0.5	1.78	659.0
0	256	reno	50	5	2.06	580.8
0	256	cubic	2	0.5	2.14	507.4
0	256	cubic	2	5	2.08	562.8
0	256	cubic	50	0.5	2.26	472.0
0	256	cubic	50	5	1.52	727.8
1	16	reno	2	0.5	2.32	446.8
1	16	reno	2	5	1.68	613.0
1	16	reno	50	0.5	2.42	423.608
1	16	reno	50	5	2.06	278.112
1	16	cubic	2	0.5	2.76	398.8
1	16	cubic	2	5	3.86	281.6
1	16	cubic	50	0.5	1.68	622.8
1	16	cubic	50	5	2.38	470.0
1	256	reno	2	0.5	2.74	373.8
1	256	reno	2	5	2.12	595.8
1	256	reno	50	0.5	2.14	544.8
1	256	reno	50	5	1.62	454.432
1	256	cubic	2	0.5	1.72	603.4
1	256	cubic	2	5	2.12	590.6
1	256	cubic	50	0.5	2.54	407.2
1	256	cubic	50	5	2.56	419.8

## FILE SIZE: 2MB

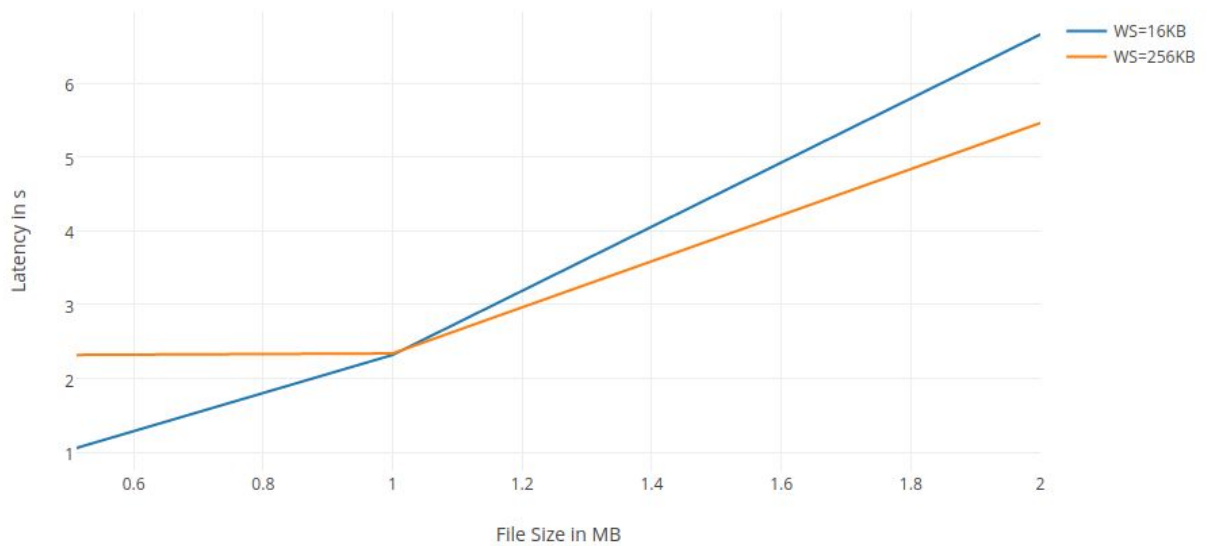
Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
SACK	Window Size	(iCCP	Link Delay(in	rLink Drop %	Time Taken	Throughput
0	16	reno	2	0.5	6.66	383.4
0	16	reno	2	5	4.9	434.2
0	16	reno	50	0.5	4.26	484.0
0	16	reno	50	5	5.78	353.0
0	16	cubic	2	0.5	7.72	339.6
0	16	cubic	2	5	13.42	177.24
0	16	cubic	50	0.5	17.26	131.9
0	16	cubic	50	5	9.3	260.4
0	256	reno	2	0.5	5.46	458.6
0	256	reno	2	5	7.2	333.8
0	256	reno	50	0.5	3.86	574.8
0	256	reno	50	5	4.48	518.4
0	256	cubic	2	0.5	7.6	333.0
0	256	cubic	2	5	5.4	399.4
0	256	cubic	50	0.5	4.22	579.4
0	256	cubic	50	5	3.28	627.6
1	16	reno	2	0.5	6.18	333.8
1	16	reno	2	5	4.76	430.8
1	16	reno	50	0.5	4.16	533.6
1	16	reno	50	5	3.54	432.616
1	16	cubic	2	0.5	5.3	411.6
1	16	cubic	2	5	3.98	588.8
1	16	cubic	50	0.5	5.52	391.2
1	16	cubic	50	5	3.84	555.4
1	256	reno	2	0.5	4.04	506.6
1	256	reno	2	5	3.52	571.8
1	256	reno	50	0.5	4.42	464.8
1	256	reno	50	5	3.02	690.8
1	256	cubic	2	0.5	4.24	499.2
1	256	cubic	2	5	7.16	289.8
1	256	cubic	50	0.5	5.1	398.6
1	256	cubic	50	5	5.18	398.0

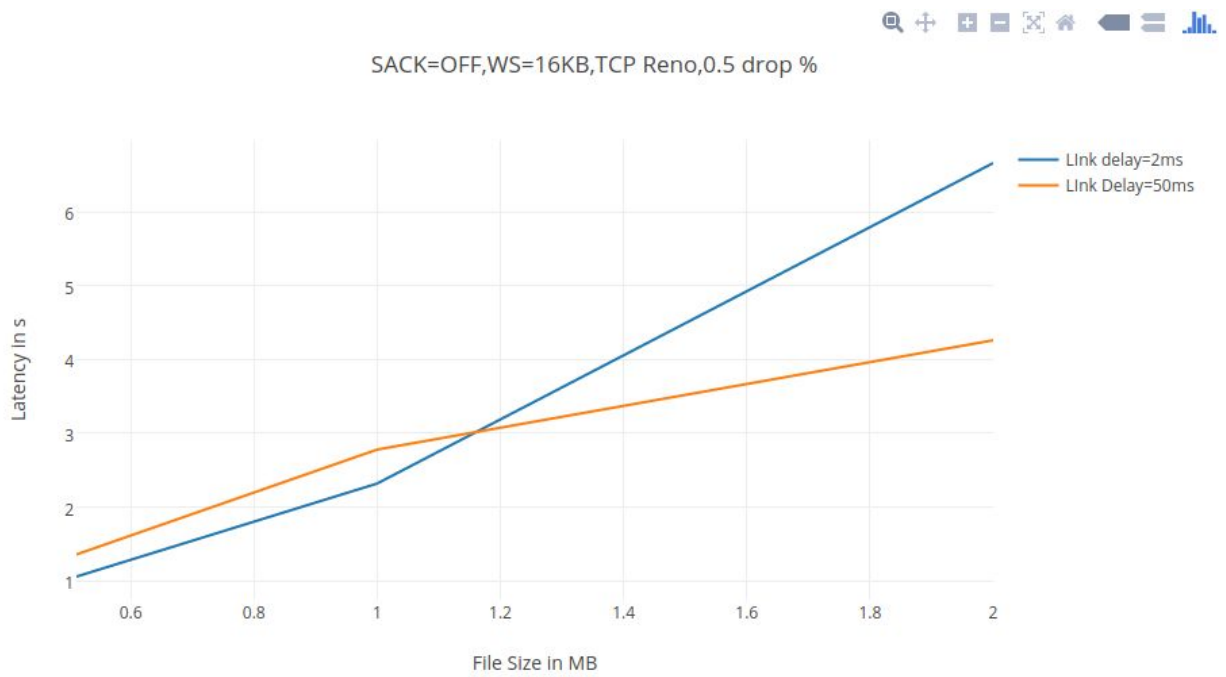
## GRAPHS

Window Size=16kb,TCP Reno,2ms Delay,0.5 drop %



SACK=OFF,TCP Reno,2ms Delay,0.5 drop %







## CONCLUSIONS

As file size increases ,the latency in general increases.

Also we notice that as file size increases Go Back N performs worse than Selective Acknowledgments.

If three duplicate ACKs are received, Reno will perform a fast retransmit and skip the slow start phase by instead halving the congestion window, setting the slow start threshold equal to the new congestion window, and enter a phase called Fast Recovery.

TCP Cubic is a less aggressive in which the window is a cubic function of time since the last congestion event, with the inflection point set to the window prior to the event. CUBIC is used by default in Linux kernels from version 2.6.19.

TCP Reno seems to be better performing for higher file sizes than TCP Cubic.

We see that higher link delay gives lower latency. This is because the link delay is added to tackle congestion in the network and higher delay reduces congestion in the link.

For similar reasons link drop percentage is added and hence higher link drop perce