CECS 474 - HW 3

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Problem 2

a) 840 bytes = 6720 bits, 40 bytes = 320 bits

$T = d + 2P + a + p = d + 2P + a$ where d = datatrans transmission time

Throughput $= 1/T$ packets/s P = propagation time

Efficiency $= d/T$ a = ACK transmission time

C	d	a	P	T	Throughput	Efficiency
1 Kb_{ps}	6.72 s	320ms	8ms	7.056 s	0.142 pk/s	95%
100 $Kbps$	67.2ms	3.2 ms	8ms	86.4 ms	11.6 pk/s	77.8%
10 Mb_{ps}	.672ms	.032 ms	8 ms	16.7ms	59.9 pk/s	4.0%
1Gbps	6.72μs	3μs	8ms	16ms	62.5 pk/s	0.042%

b) Efficiency = $\min\left[\frac{\text{window size}}{T}, 1\right]$ 16 ms taken part a

Throughput = 1/T

C	Window size	T	Throughput	Efficiency
1 Gbps	10	16ms	625 pk/s	0.42%
1 Gbps	100	16ms	6.25 kpk/s	4.2%
1 Gbps	1,000	16ms	62.5 kpk/s	42%
1 Gbps	10,000	16ms	148.8 kpk/s	100%

ideal window = T/d = 2381 frames

Problem 5

a) True, if the sender's window size was 3 sending packets 1, 2, 3 at time = 0, then the receiver ACKS 1, 2, 3 at t = 1. When it reaches t = 4, the sender receives the ACKs the receiver sent at t = 1 and its window advances to 4, 5, 6. At t = 5, the sender receives ACKs 1, 2, 3 sent by receiver at t = 2 and are out of ACK window.

b) True, isn't this the same reason as part a?

c) True, w/ window size of 1, SR prevents out-of-order packets

d) True, cumulative ACK is a regular ACK, since only one packet can be referred into in a window of size = 1.

Problem 8

a) to increase CongWin to 6 MSS = 1 RTT, 7 MSS = 2 RTT,

so 12 MSS = 7 RTTs

b) 5 MSS was sent in 1 RTT, 6 MSS in 2 RTT, 7 MSS in 3 RTT

so by 6 RTT = 5 + 6 + 7 + 8 + 9 + 10 MSS = 45 MSS

so avg is 45 MSS / 6 RTT = 7.5 MSS / RTT