COMP2322 Homework 3

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(1) (a) TCP sequence number field = 4 bytes = 32 bits

Every sequence number corresponds to 1 byte of segment data

The file maximum size $L = 2^{32}$ bytes

(b) MSS = 880 bytes

Number of segment = $\frac{2^{32}\text{ bytes}}{880\text{ bytes}} \approx 4880645$

Total transmitted data = $56\text{ bytes} \times 4880645 + 2^{32}\text{ bytes}$

$= 4568283416\text{ bytes}$

Transmission time = $\frac{4568283416\text{ bytes} \times 8\text{ bits}}{200 \times 10^6\text{ bps}} \approx 182.735$

(2) Estimated $RTT_1 = \alpha \times SampleRTT_1 + (1-\alpha) \times EstimatedRTT_0$

$= 0.15 \times 108 + (1-0.15) \times 100 = 102.52\text{ms}$

$DevRTT_1 = \beta \times |SampleRTT_1 - EstimatedRTT_0| + (1-\beta) \times DevRTT_0$

$= 0.25 \times |108\text{ms} - 100\text{ms}| + 0.75 \times 6\text{ms} = 6.5\text{ms}$

$TimeoutInterval_1 = EstimatedRTT_1 + 4 \times DevRTT_1 = 101.2\text{ms} + 4 \times 6.5\text{ms} = 127.2\text{ms}$

Estimated $RTT_2 = \alpha \times SampleRTT_2 + (1-\alpha) \times EstimatedRTT_0$

$= 0.15 \times 110 + (1-0.15) \times 100.2 = 102.52\text{ms}$

$DevRTT_1 = \beta \times |SampleRTT_2 - EstimatedRTT_1| + (1-\beta) \times DevRTT_1$

$= 0.25 \times |110\text{ms} - 101.2\text{ms}| + 0.75 \times 6.5\text{ms} = 7.075\text{ms}$

$TimeoutInterval_2 = EstimatedRTT_2 + DevRTT_2 = 102.5\text{ms} + 4 \times 7.075\text{ms} = 130.82\text{ms}$