

Homework 5

*Assigned: October 8**Due: October 14*

1. Show the values of the RTT and deviation estimates after each step in the following sequence of events. Use $\alpha = \beta = 0.8$. Assume that the first sample is used as the initial RTT estimate.
 - Send packet at 0 msec, get ACK at 5 msec.
 - Send packet at 2 msec, get ACK at 10 msec.
 - Send packet at 4 msec. Timeout and resend. Get ACK at 20 msec.
 - Send packet at 22 msec, get ACK at 32 msec.
 - Send packet at 24 msec, get ACK at 36 msec.
2. Calculate the throughput of the Stop-and-Wait protocol, assuming no bit errors or lost packets, under the following two environments:
 - The link has one-way propagation delay equal to 1 msec and speed equal to 28.8 Kbps. The data packets are 10,000 bytes long and the acknowledgements are 20 bytes long.
 - The link has one-way propagation delay equal to 25 msec and speed equal to 155 Mbps. The data packets are 53 bytes long and the acknowledgements are 53 bytes long.
3. Suppose hosts A and B are communicating over a TCP connection. Assume that A selects initial sequence number 52 and B selects initial sequence number 107. Further, assume the MSS is 512 bytes. A has 700 bytes to send, and B has 1030 bytes to send. Using a diagram, show all of the segments exchanged between A and B, starting with the connection setup segments. Minimize the number of segments by including acknowledgements and data in the same segment whenever possible. For each segment, give the sequence number, ack number, size of the payload, and flags that are set.
4. Read the man page for the Unix utility `netstat`. Use `netstat` to see the state of the local TCP connections. Run `netstat` during (or shortly after) a web transfer. What do you see?