

Course ISE 327, EEE 051: Introduction to Computer Networks

Recitation 3 Exercise

Michael J. May

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1 Exercise 1

Draw a timeline diagram for the sliding window algorithm with $SWS = RWS = 3$ frames for the following two situations. Use a timeout interval of about $2 \times RTT$.

- (a) Frame 4 is lost.
- (b) Frames 4-6 are lost.

2 Exercise 2

Draw a timeline diagram for the sliding window algorithm with $SWS = RWS = 4$ frames for the following two situations. Assume the receiver sends a duplicate acknowledgement if it does not receive the expected frame. For example, it sends `DUPACK[2]` when it expects to see `FRAME[2]` but receives `FRAME[3]` instead. Also, the receiver sends a cumulative acknowledgment after it receives all the outstanding frames. For example, it sends `ACK[5]` when it receives the lost frame `FRAME[2]` after it already received `FRAME[3]`, `FRAME[4]`, and `FRAME[5]`. Use a timeout interval of about $2 \times RTT$.

- (a) Frame 2 is lost. Retransmission takes place upon timeout (as usual).
- (b) Frame 2 is lost. Retransmission takes place either upon receipt of the first `DUPACK` or upon timeout. Does this scheme reduce the transaction time? Note that some end-to-end protocols (e.g., variants of TCP) use a similar scheme for fast retransmission.

2.1 Answer

The following gives the timeline for the first case. The second case reduces the total transaction time by roughly 1 RTT.

