

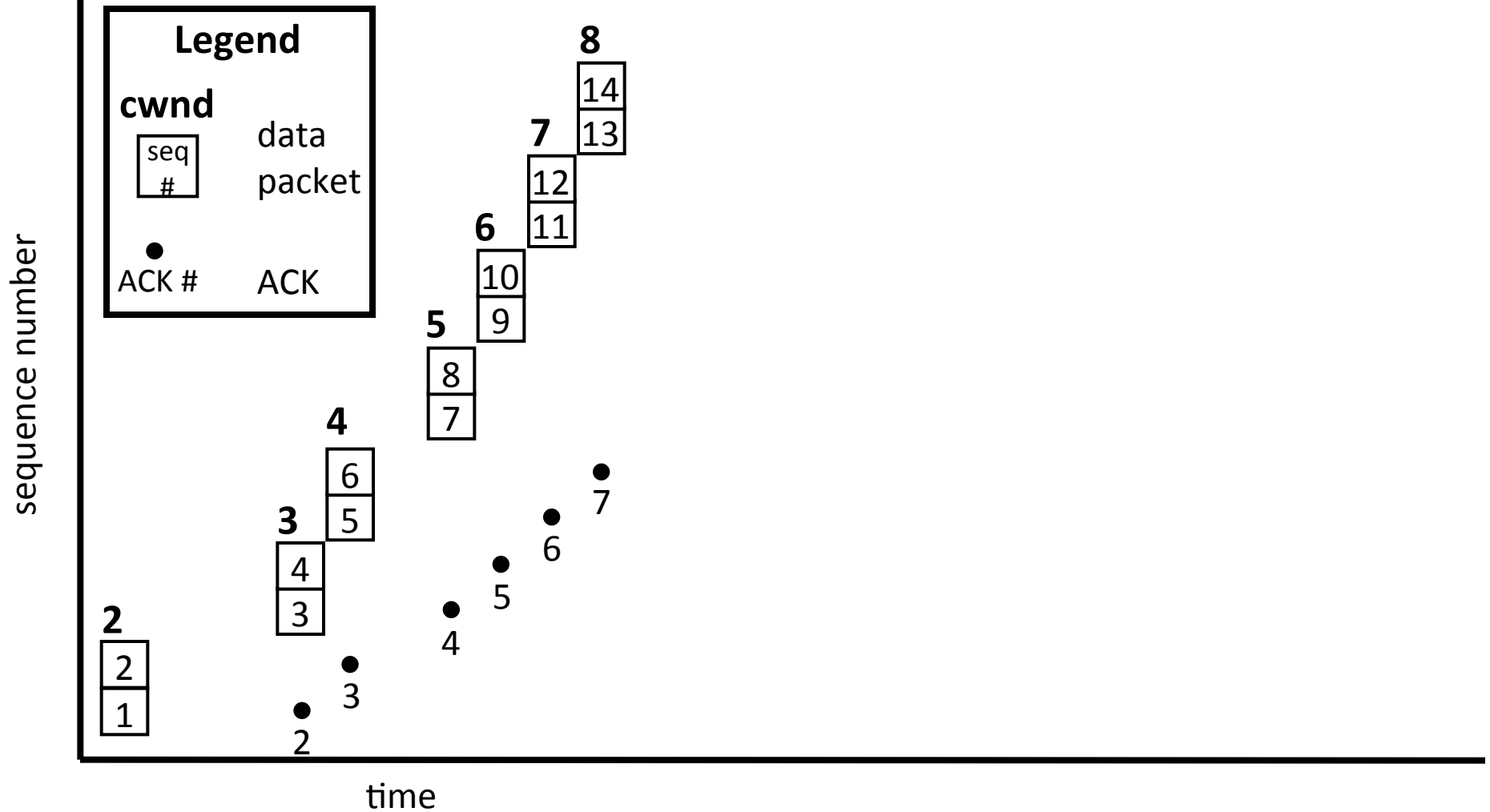
TCP Congestion Control Examples

CS 455/555

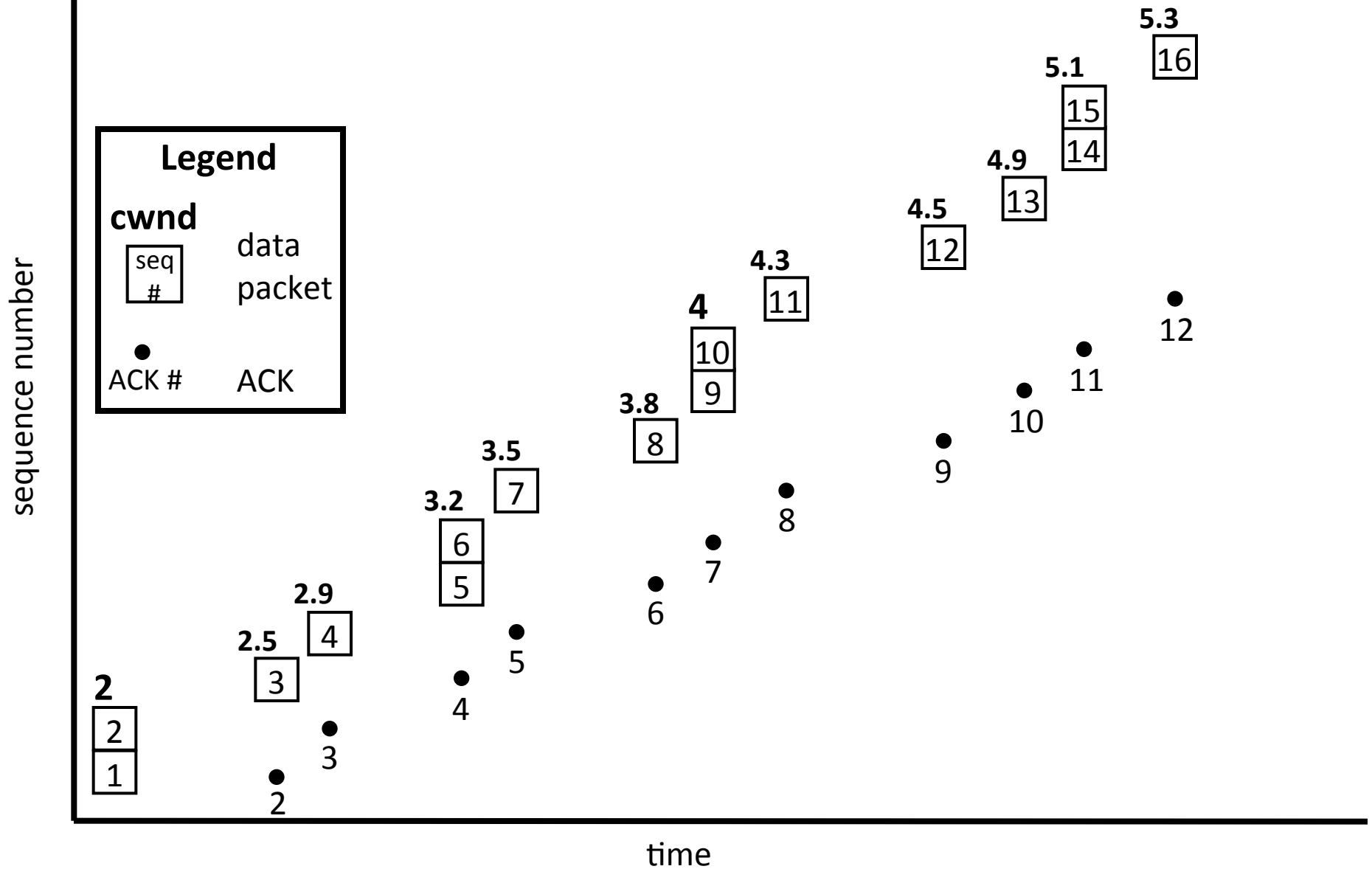
Fall 2009

Dr. Michele Weigle

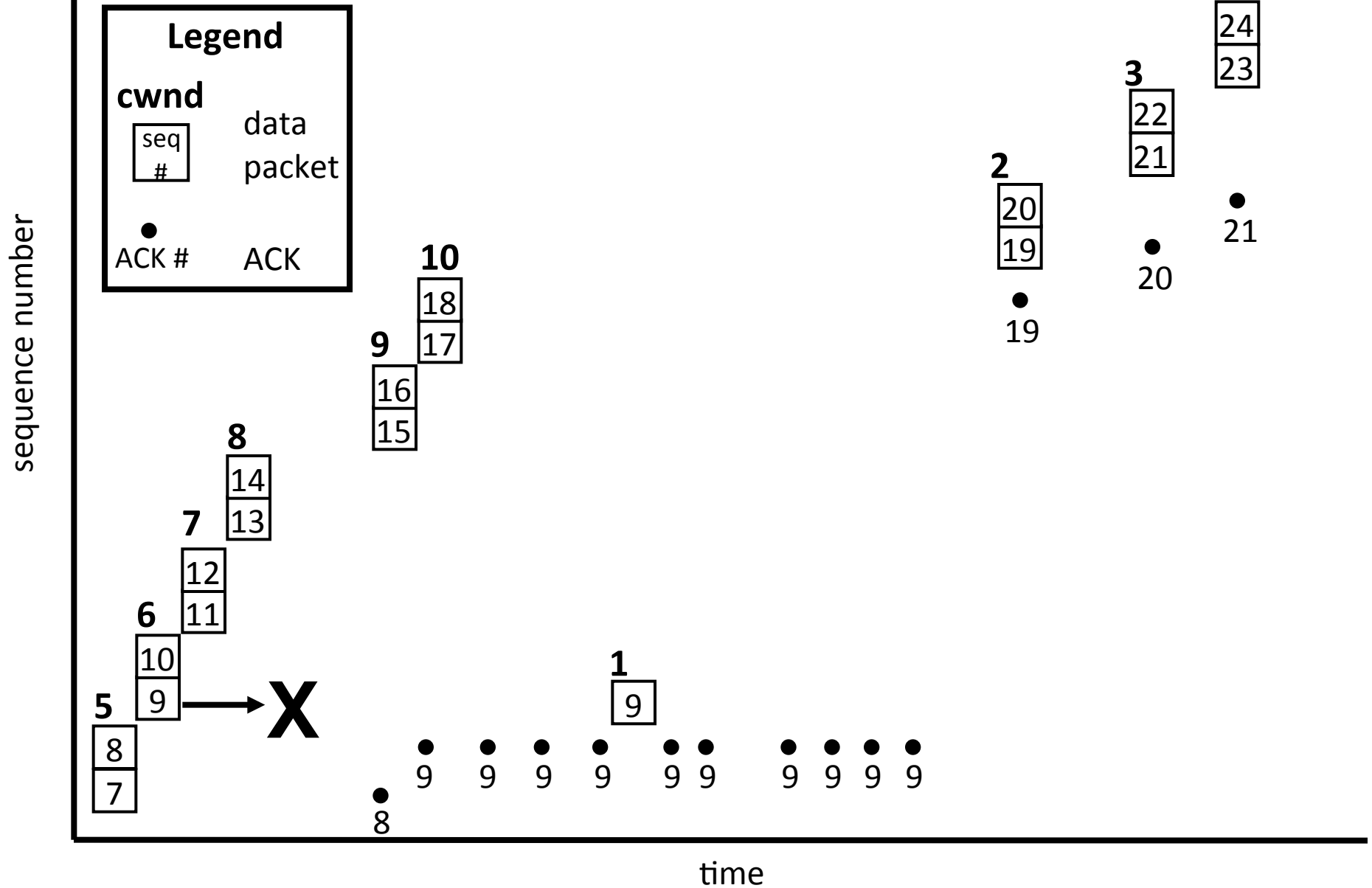
TCP Slow Start



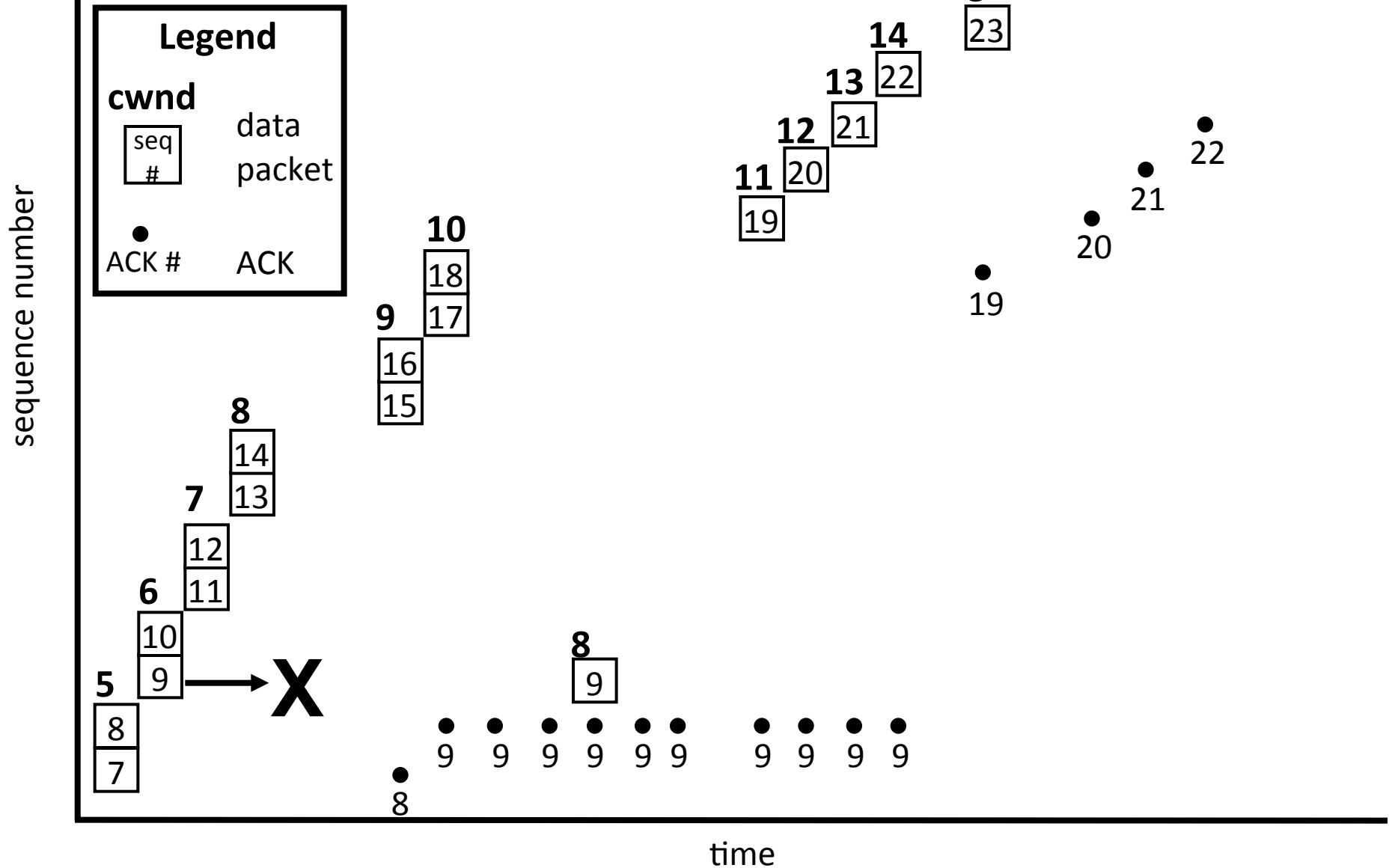
TCP Congestion Avoidance



TCP Tahoe Fast Retransmit



TCP Reno Fast Retransmit and Fast Recovery



Tahoe vs. Reno

One Lost Segment

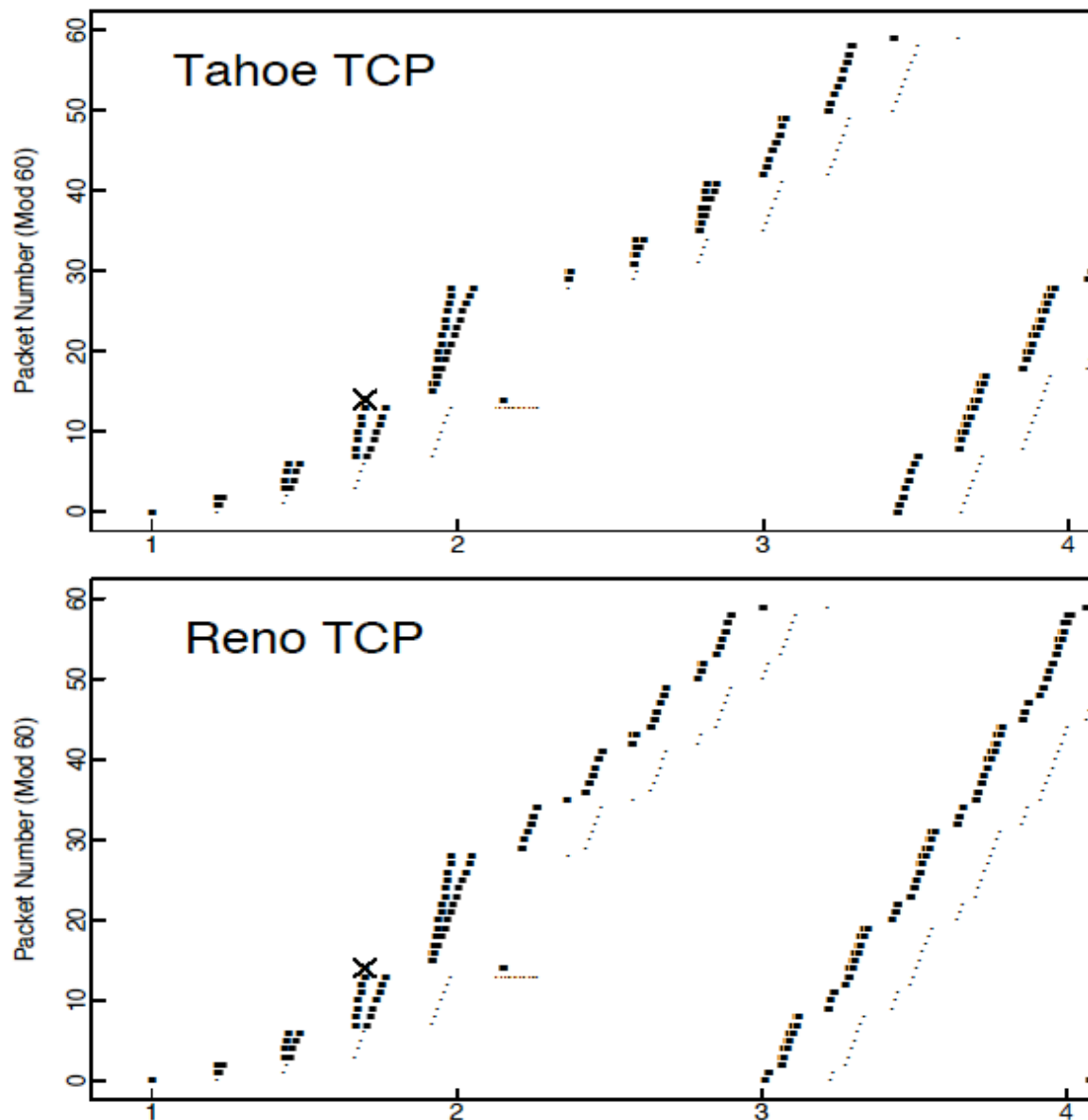


Figure 2 from “Simulation-based Comparison of Tahoe, Reno, and SACK TCP” by Fall and Floyd, SIGCOMM 1996.

Tahoe vs. Reno

Two Lost Segments

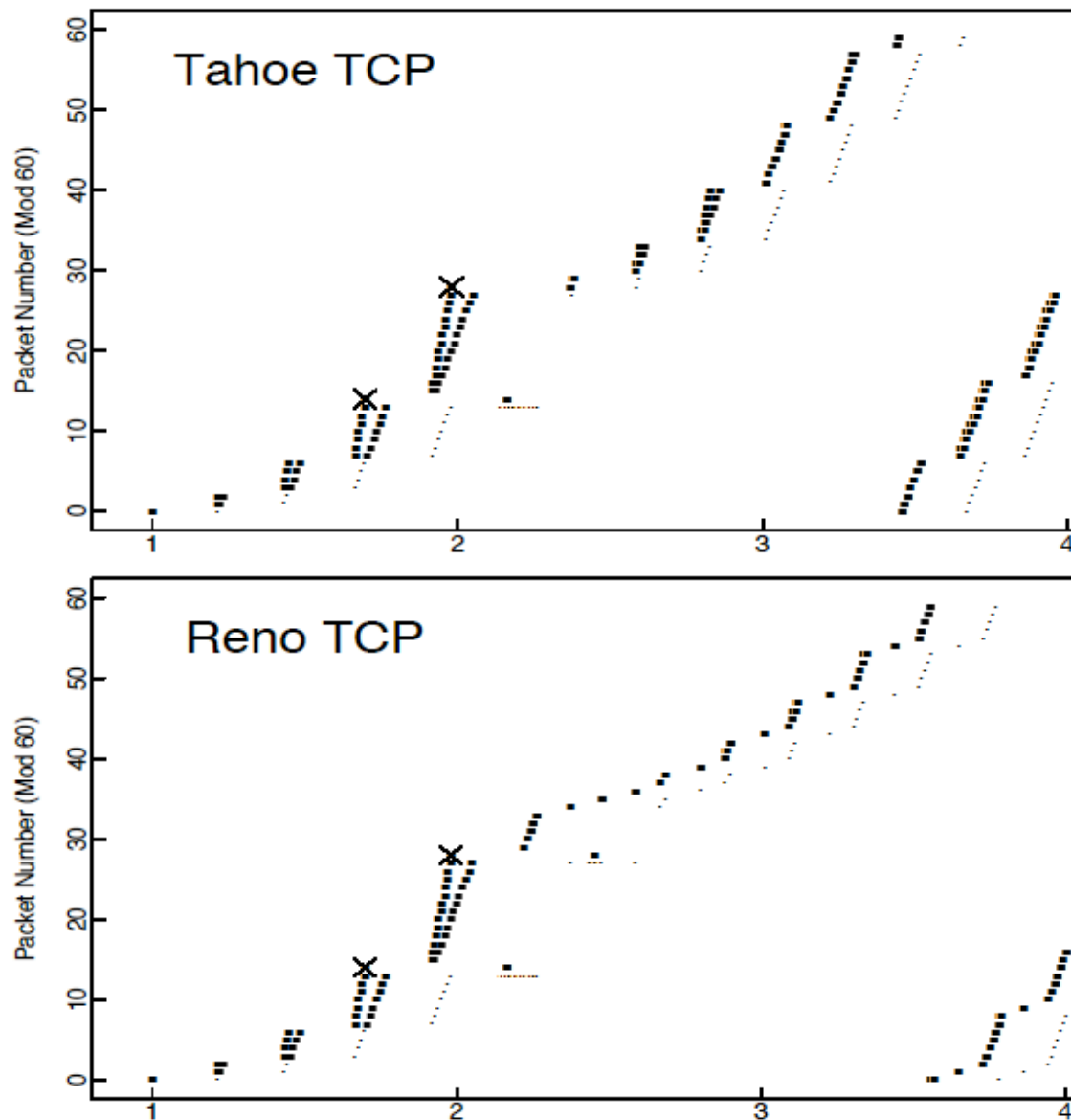


Figure 3 from “Simulation-based Comparison of Tahoe, Reno, and SACK TCP” by Fall and Floyd, SIGCOMM 1996.

Tahoe vs. Reno

Three Lost Segments

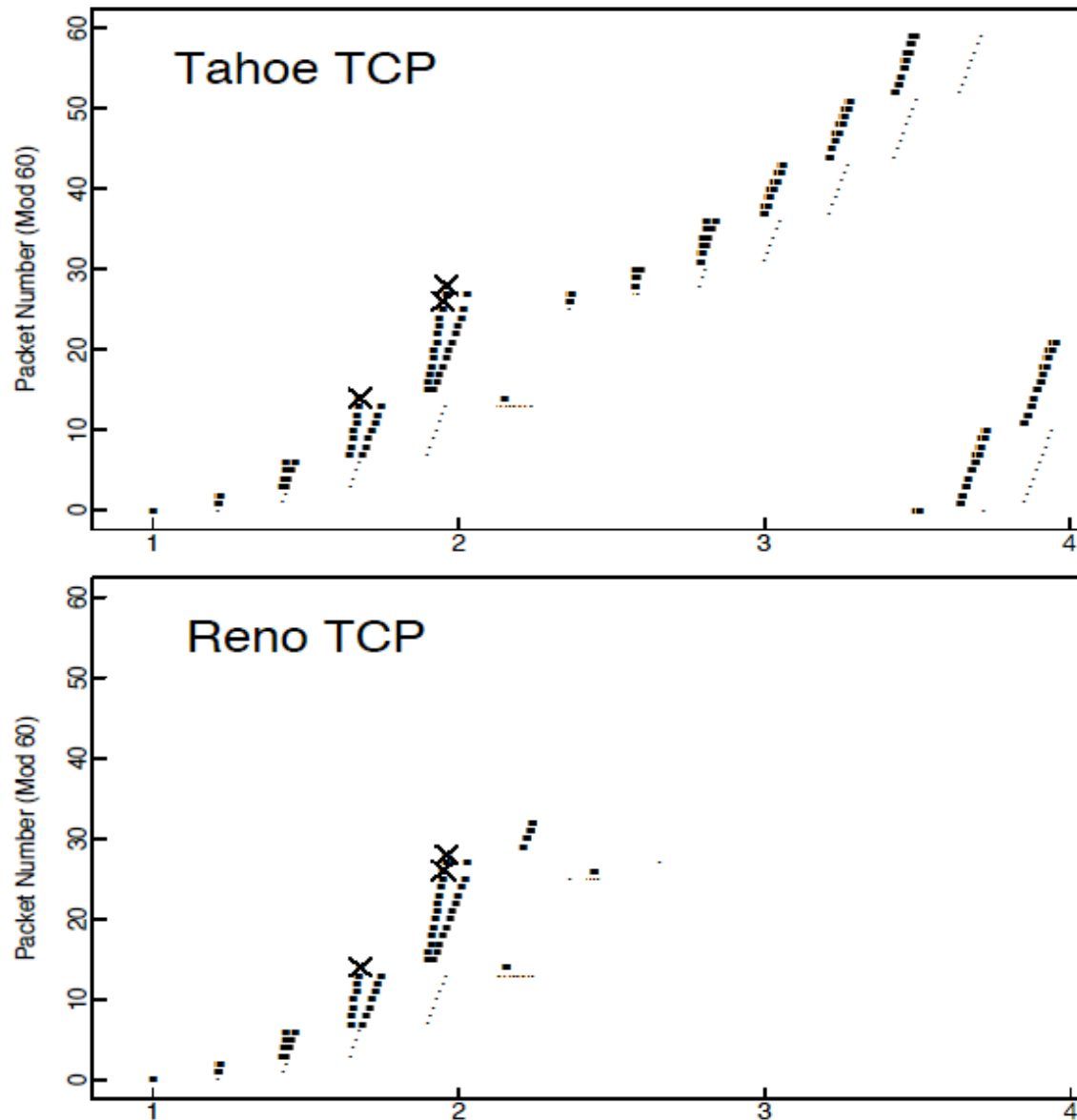


Figure 4 from “Simulation-based Comparison of Tahoe, Reno, and SACK TCP” by Fall and Floyd, SIGCOMM 1996.

NewReno

- TCP Reno
 - fast recovery ends as soon as an ACK for the lost segment is received
 - only one retransmission can be sent during each fast recovery period
- TCP NewReno
 - *partial ACK* - acknowledges some, but not all, of the data sent before the segment loss was detected
 - sender can infer that additional segments were lost
 - allows sender to retransmit more than one segment during a single fast recovery
 - only one lost segment may be retransmitted each RTT

Reno vs. NewReno

Two Lost Segments

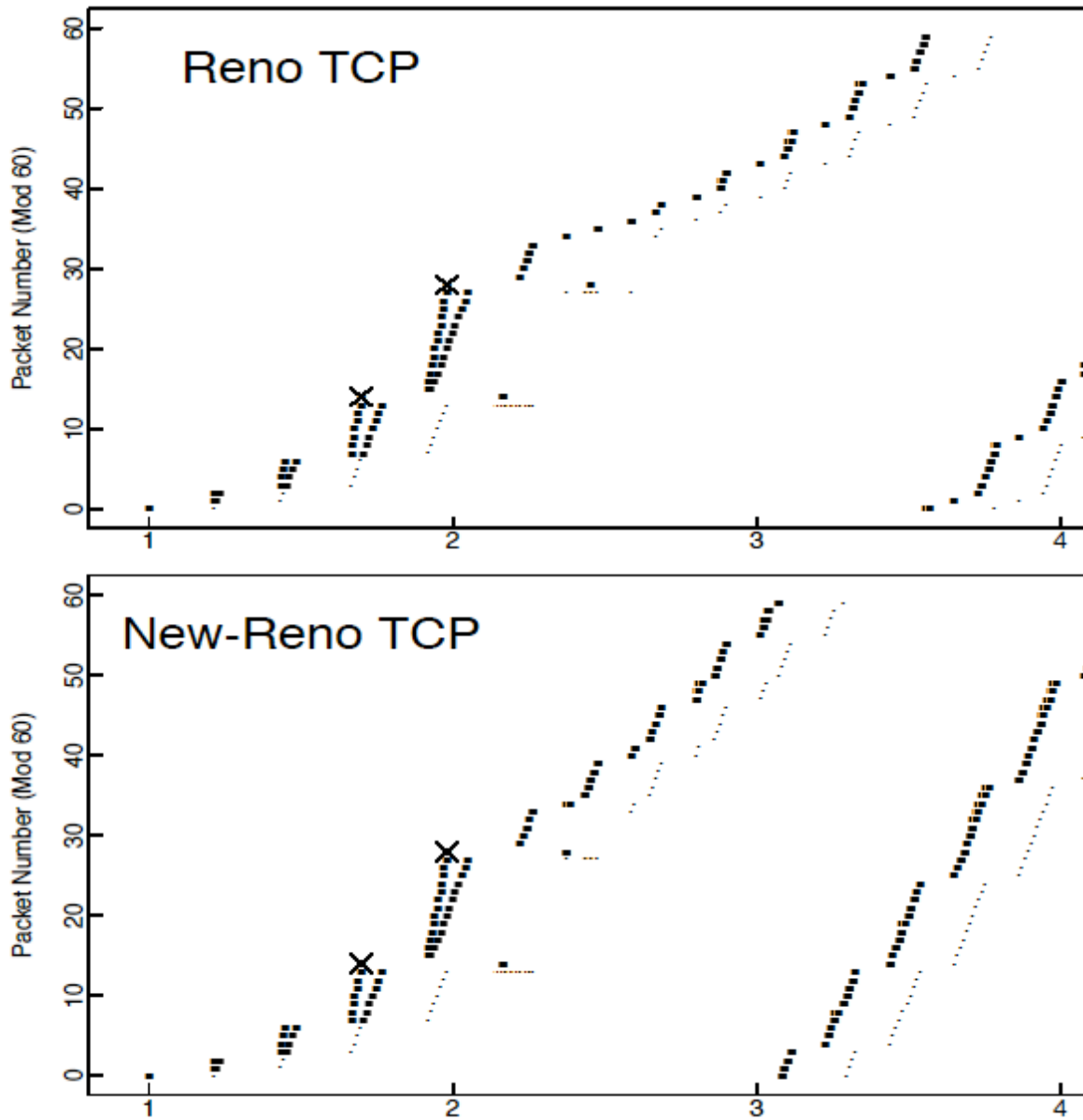


Figure 3 from “Simulation-based Comparison of Tahoe, Reno, and SACK TCP” by Fall and Floyd, SIGCOMM 1996.

Reno vs. NewReno

Three Lost Segments

