

CSE 461 - Module 6: Sliding Window

Preamble: Stop and Wait

- Sender:
 - Sends message marked m
 - If timeout occurs, resend
 - If receive an ACK for m , move on to message $m+1$

Issue: Performance

- Example:
 - 1,000 bit messages sent on a line with bit rate 10,000,000 bits/sec. and propagation delay 20 msec.
 - What is the effective transmission rate?
- Bandwidth-delay product (BD)

- Idealization: try to be transmitting all the time

Sliding Window: Basic Scheme

- Sender maintains a send window of messages that it has sent but hasn't yet received ACKs for
 - Send buffer
- Receiver maintains a receive window
 - Buffer space for messages within the window
 - Must be able to identify an ordering of message → sequence numbers

Sliding Window: Issues

- Issues:
 - Naming
 - What kind of feedback does receiver provide?
 - ACK vs. NAK
 - Selective vs. cumulative

- When does it provide it?
 - Some regular rate
 - On each received message
 - Something else...

Sliding Window: Operation

- Assume positive, selective ACKs sent only when a message is received
 - Sender sends messages 1 through 6
 - Sender hears ACKs for 1, 3, and 5
 - What has happened?
 - What happens next?
- Assume positive, cumulative ACKs sent only when a message is received
 - Sender sends messages 1 through 6
 - Sender hears ACK for 1, 2, 3
 - What has happened?
 - What happens next?
- What else can we do?

Sequence Number Space Issue

- The sequence number is (usually) carried in some fixed-width field of the message header
 - There are only so many sequence numbers
 - They will eventually wrap
- Suppose there are N possible sequence numbers. How big can the send window be?
 - Obviously can't be bigger than N !
 - Must it be smaller?
- The overlapping windows problem

- The delayed message problem...