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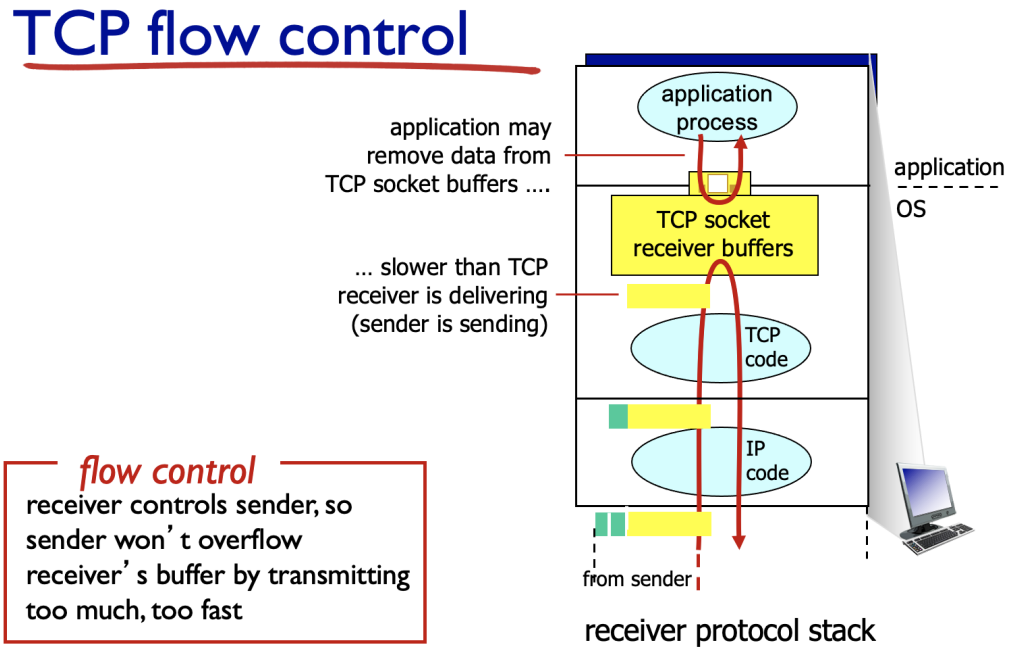
CSCI 379 Class Notes

TCP Transmission

Flow Control

- *Cumulative Acknowledgements* are used to pipeline packets and lessen the overhead of TCP connections by allowing for fewer transmissions to be sent back and forth
- *Flow Control* is a way for a receiver to tell a sender that its buffer is close to filling up
    - This happens to prevent the buffer filling up and causing packet loss
- This is achieved using the *receive window* field in the TCP segment header



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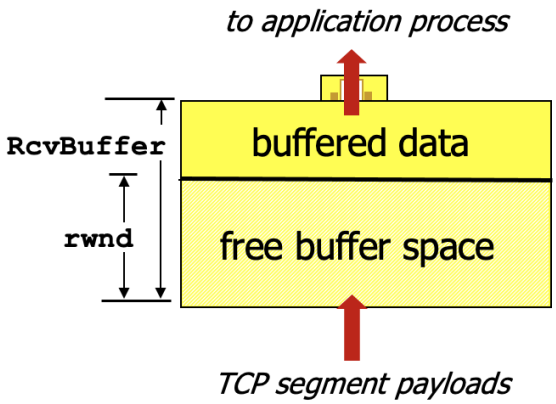

receiver-side buffering

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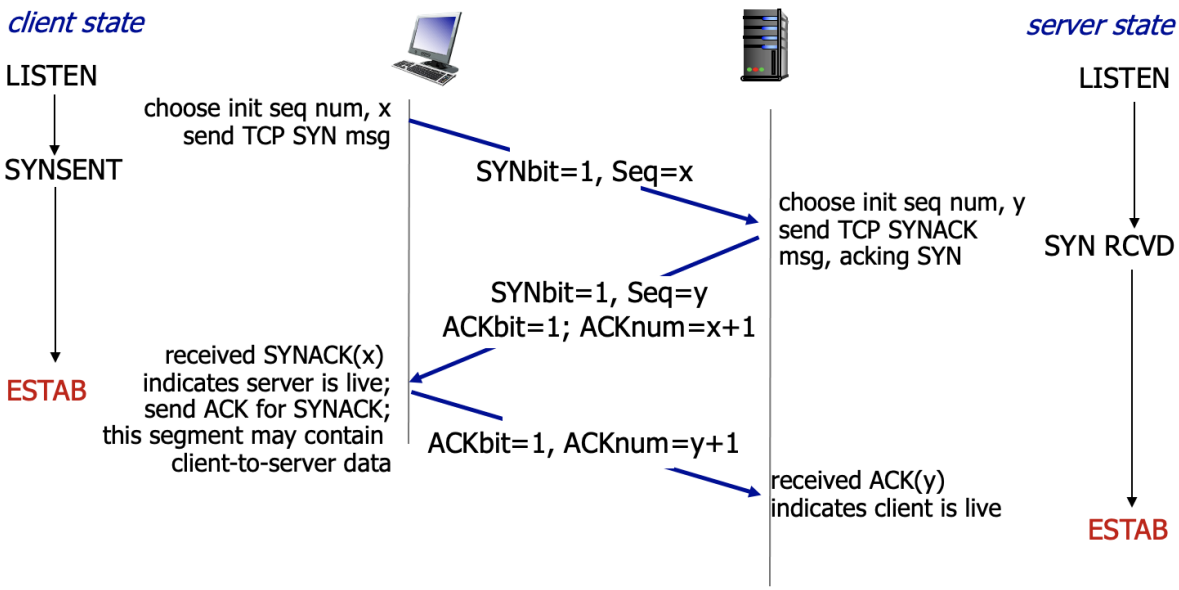
- The receiver informs sender of free space using the `rwnd` value in the TCP header
  - `RcvBuffer` size is set via socket options (typical default is 4096 bytes)
  - Many OSes auto-adjust `RcvBuffer`
- Sender limits size of sent data to the value oof the receivers `rwnd` variable
- Prevents buffer overflow

Connection Management

- **The TCP Three-Way Handshake**



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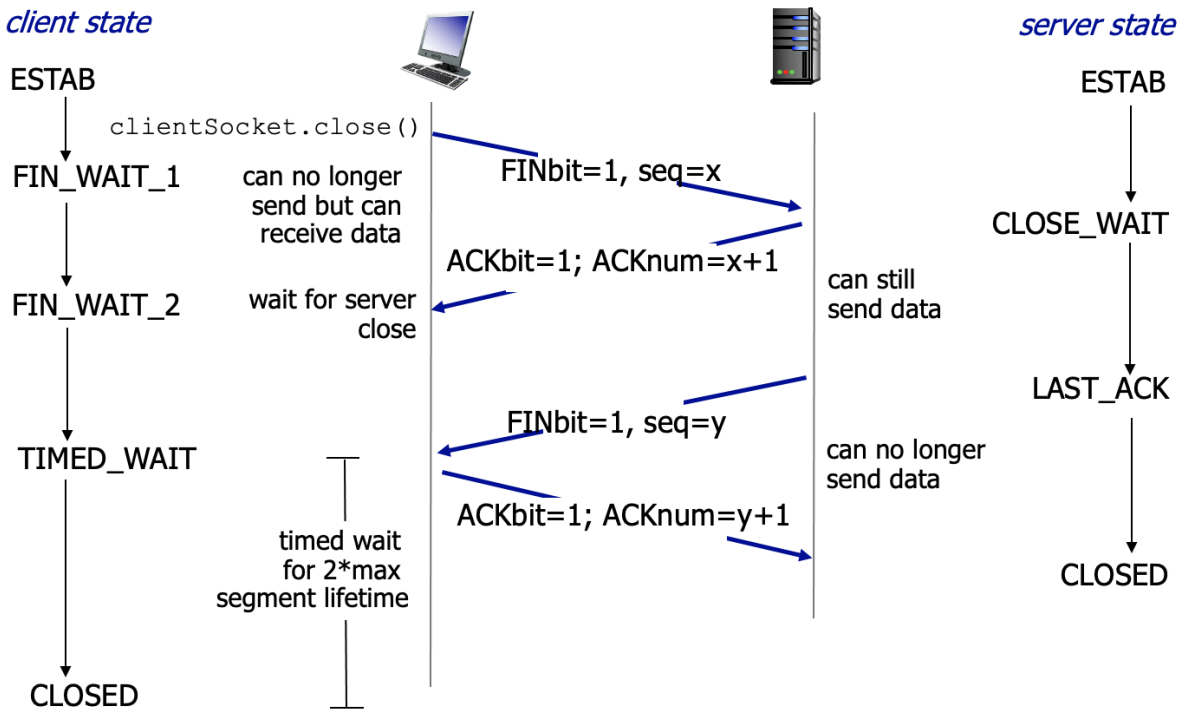
- **Closing a connection**
  - A TCP connection is closed using the `FIN` flag in the TCP header and setting it to 1

- When receiver receives a FIN flag, it will acknowledge it, and then after some time it will send its own `FIN` flag
  - During this time, the receiver is still capable of transmitting data over the connection



Congestion Control

- In a connection, lost packets and long delays are often the result of *congestion* in the network
- This is a very important issue in the realm of networking, given that most networks are susceptible to congestion at times