BRYANT CCNA ICDN1 SEC 8. TCP and UDP

SEC 8.1 TCP Good, UDP Bad?

TCP

- guarantees delivery of segments
- performs error detection and recovery
- performs "windowing"
- "connection-oriented", meaning there is a two-way connection between sender/sendee before data is actually sent

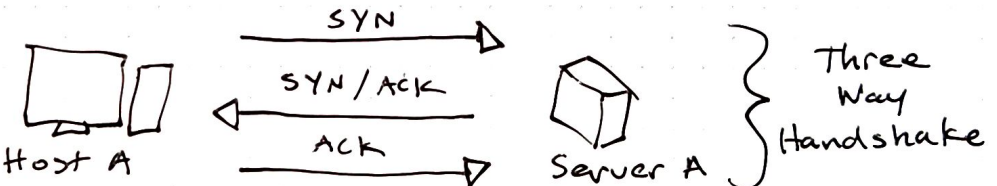
UPP

- "best effort" delivery
- no error detection
- no windowing
- is "connectionless" meaning there is no communication before data is sent. It just gets sent!

TCP Three way Handshake

Before segment transmission via TCP, the devices involved must agree on basic parameters:

- The initiator sends a TCP segment with the synchronization (SYN) bit set. The TCP sequence number is the primary value synched here.



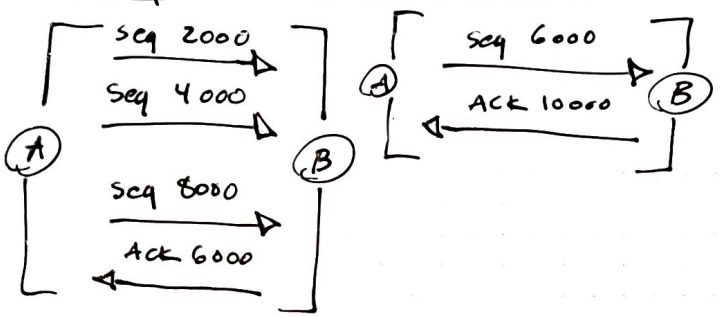
for example, the host will send four 2000-byte segments after the three-way handshake is complete. The sequence numbers are used by the recipient to determine the order of the segments and to anticipate the number of the next segment.

The recipient sends an ACK back, for two purposes:

- Obvious - confirm that the segments were recieved
- not-as-obvious - The acknowledgement number in the ACK allows the sender to determine if any segments were lost in transmission. If they were, the sender re-sends them.

The ACK number is not set to the number of the last segment recieved. Instead, it is set to the number of the next segment the recipient expects to see. This cumulative acknowledgement scheme allows the sender to identify segment loss.

SEC 8.2 The comparison continues



Flow control and Windowing

Window - the size of the window is negociated during the three way handshake, and specifies the number of bytes the sender can send without recieving an ACK.

- The window size is dynamic and can be changed later

TCP Header

SRC. PORT	DST. PORT
SEQ. NUM	
ACK NUM	
Doff. | RES. | FLG.	WINDOW
CHECKSUM	URGENT
OPTIONS + PADDING	
DATA...	

UDP HEADER

SRC. PORT	DST. PORT
LENGTH	CHECKSUM
DATA...	

All these TCP features have a cost which is much higher overhead. The header size difference really adds up, especially in delay-sensitive applications.

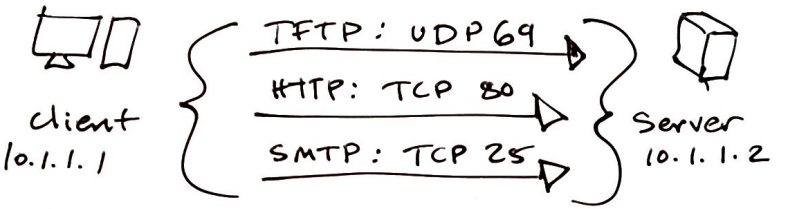
TCP's three-way handshake and forward acknowledgement schemes use bandwidth that UDP does not.

Similarities:

- Both run at Transport layer
- Both perform multiplexing.

SEC 8.3 Multiplexing and Intro to Port Numbers

How does a server handle multiple and simultaneous connections from a client?



Socket - combination of IP Address and port #.

I.E. 10.1.1.2:69 or (10.1.1.2, UDP, 69)

BONUS Four-way handshake - used in the termination of communication.