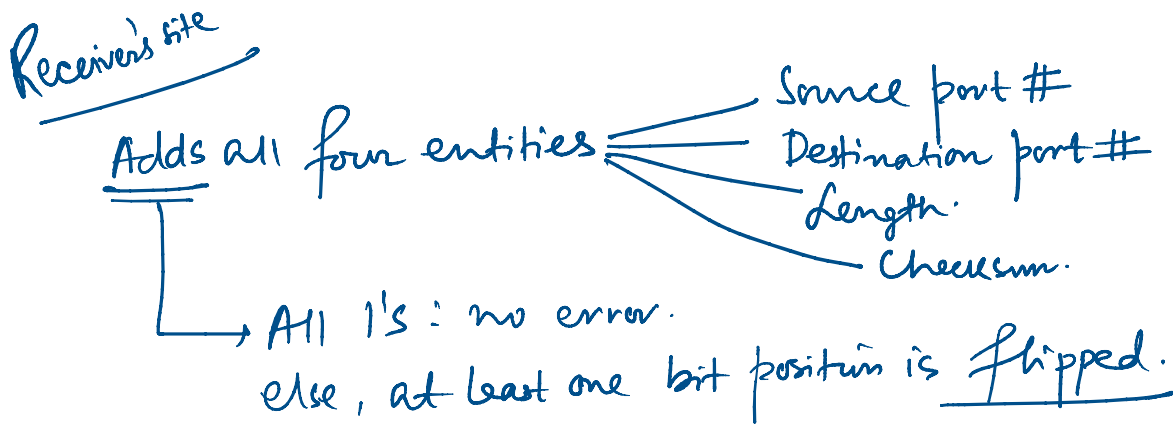
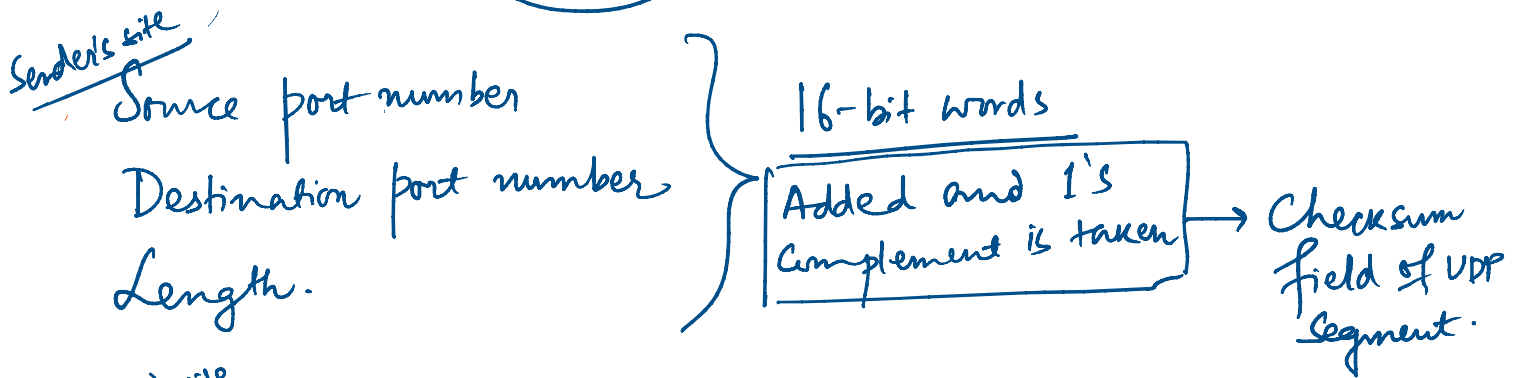


Module 3: Transport Layer - 2

Friday, February 11, 2022 10:53 AM

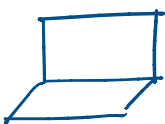
- UDP header - 8 bytes (64 bits)



Limitations of UDP

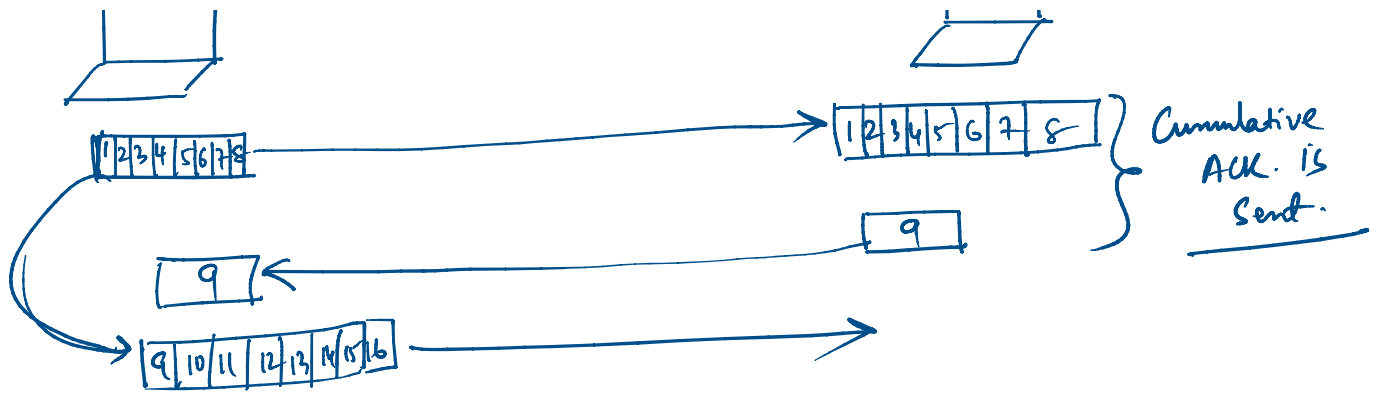
- Packet loss. (no connection establishment prior to data delivery)
- Out-of-order delivery (since the segments follow different paths to the destination)
- Error detection is unreliable to some extent and no error recovery is supported.
- No congestion control - creates a cascading effect on network performance.

Sender.



Receiver.



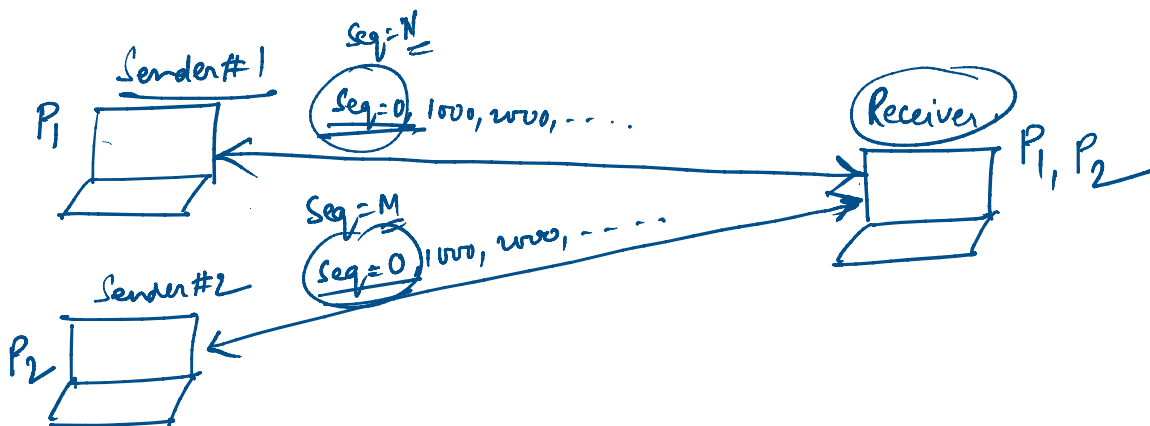


Connection-oriented.

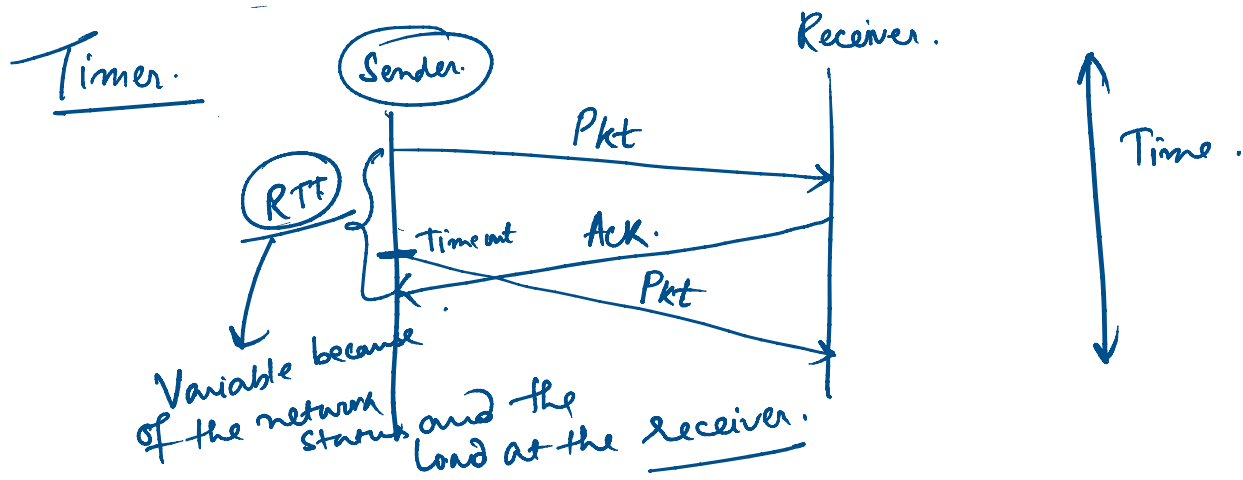
- two processes must first "handshake" with each other.
- they must send some preliminary segments to each other to establish the parameters of the ensuing data transfer.
- initialize TCP state variables associated with the TCP connection.

✓ TCP header - 20 bytes (minimum)
 ↳ increases the segment overhead.

✓ TCP sequence number - it is used to give number to the stream of bytes rather than the segments.



- TCP connections randomly choose the initial sequence number:
 - ✓ Minimizes the possibility that a segment still present in the network from another connection between two hosts is mistaken.



Trade-off

Which is an optimal timeout?

- Shorter timeout: more number of retransmissions.
- Longer timeout: more delay at the sender site.

$$DevRTT_t = (1 - \beta) \cdot DevRTT_{t-1} + \beta \cdot |SampleRTT_t - EstimatedRTT_{t-1}|$$

$\beta = 0.125$
To give less weightage to previous RTTs.