

## Lecture 7

01 September 2021 17:05

- Recap Basics of Transport layer
- UDP - detailed Structure
- Principles of Reliable Transport layer
  - ↳ based up to TCP standard.

### Transport layer

- 1 - Reliable connection ✓  $\leftrightarrow$  In-order  
No packet should get lost.
- 2 - Congestion control
- 3 - Managing processes/applications at same time
- 4 - Breaking down Big <sup>app layer</sup> packets into smaller packets

Expect

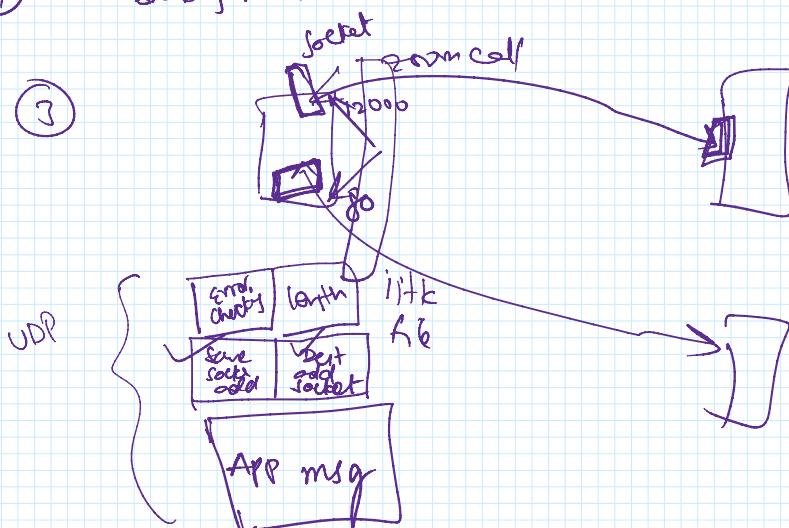
- Throughput guarantee ✗ }  $\rightarrow$  no existing
- Min. Delay guarantee ✗ } probably give bind guarantees.

Bare minimum req for Transport protocol:

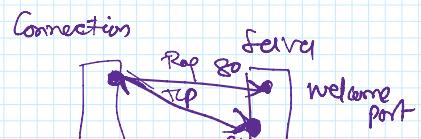
- ③ — Process Management
- ④ — Breaking packets

Two tuple

$$\text{UDP socket} = (\text{IP} + \text{Port})$$



SOCKET Add  
 $\downarrow$   
IP add + Port number

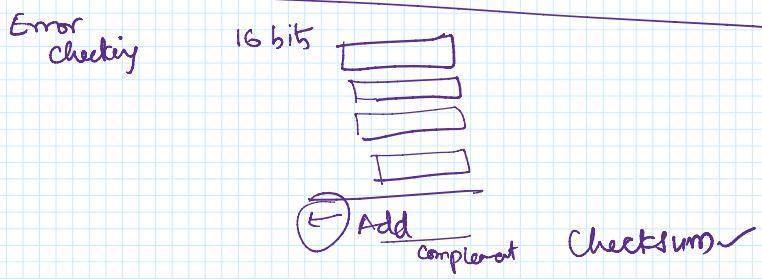


TCP Connec. socket  
 $\rightarrow$  (src\_ip, src\_port, dst\_ip, dst\_port)

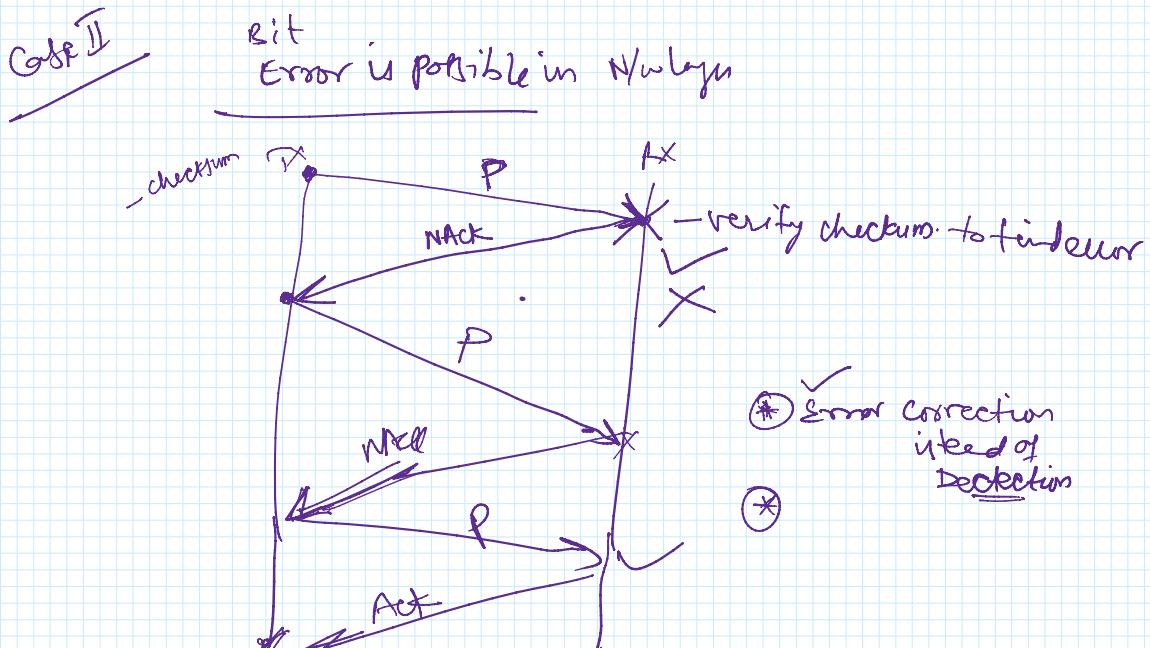
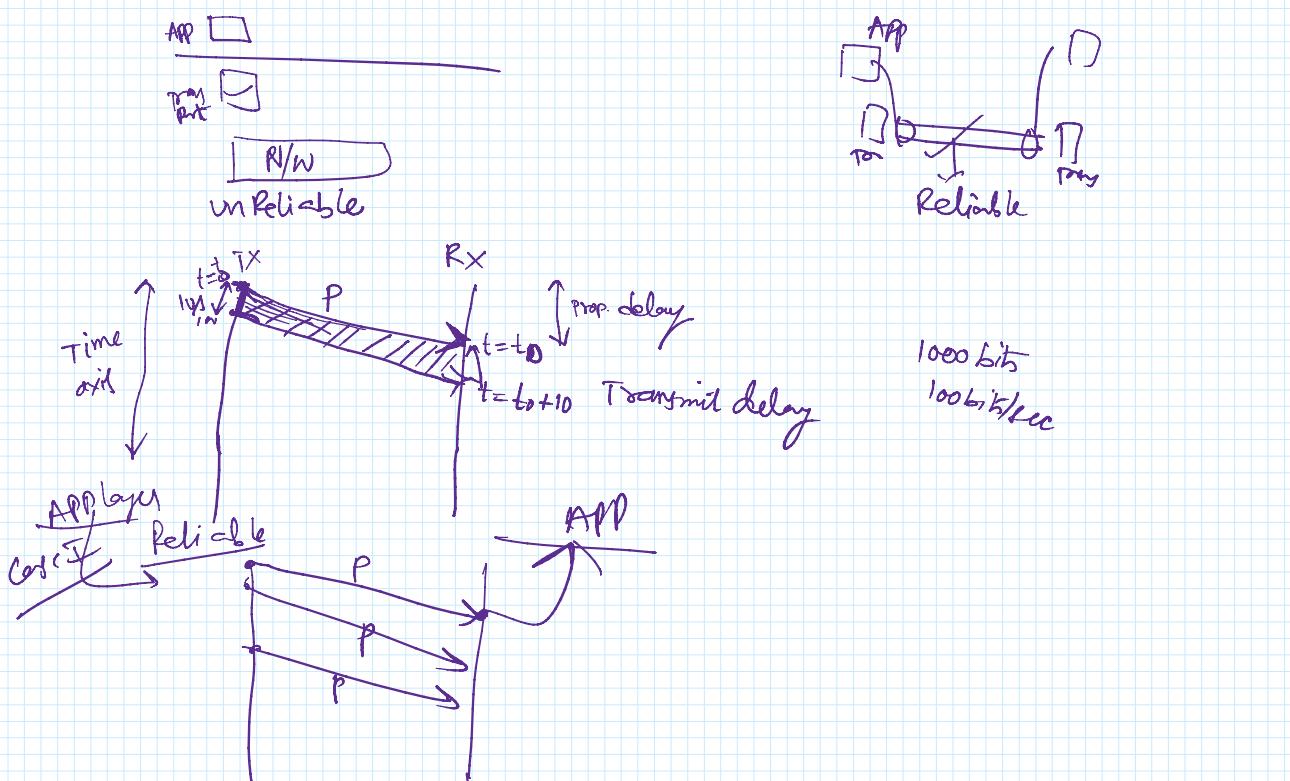
Error checking

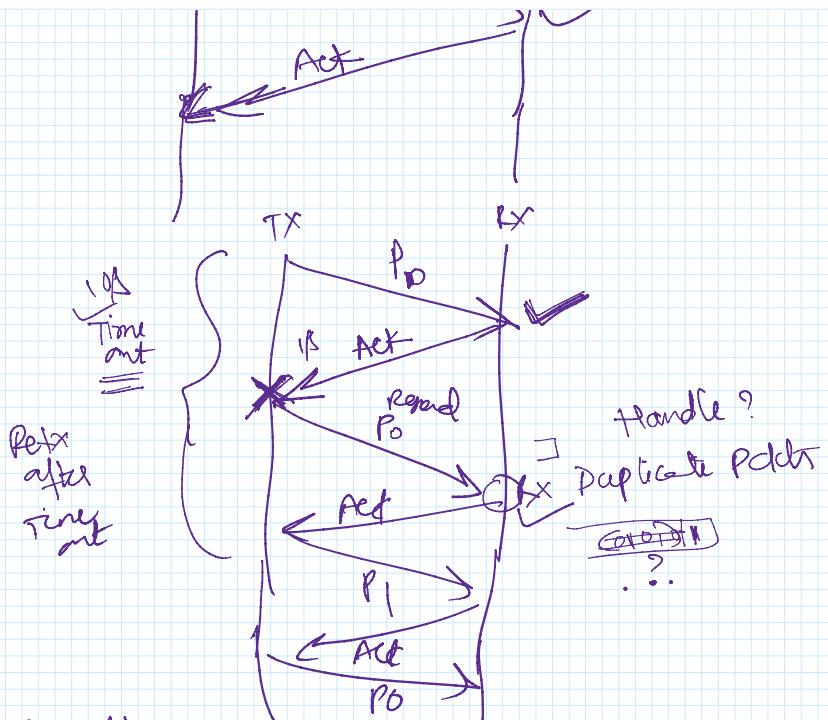
16 bits





- ✓ App layer will take care of losses of packets
- UDP - quickly without overheads



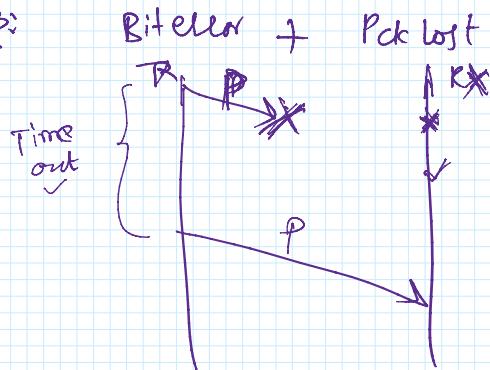


Suggestion: Add numbering for packets ✓

→ - 1 Bit  
 $\text{rx state}$

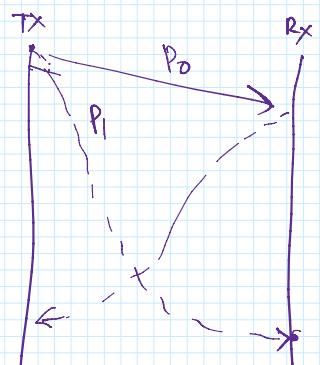
- 1 bit. is sufficient

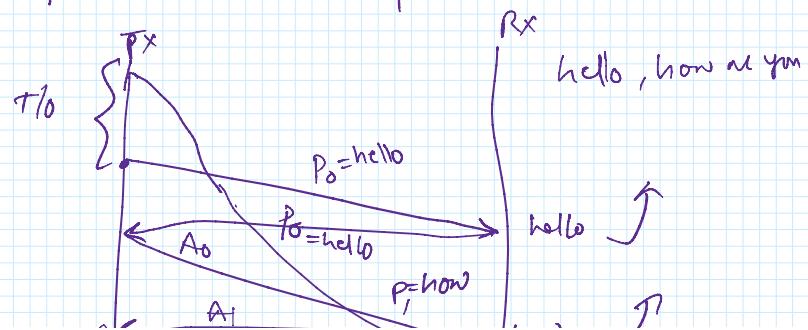
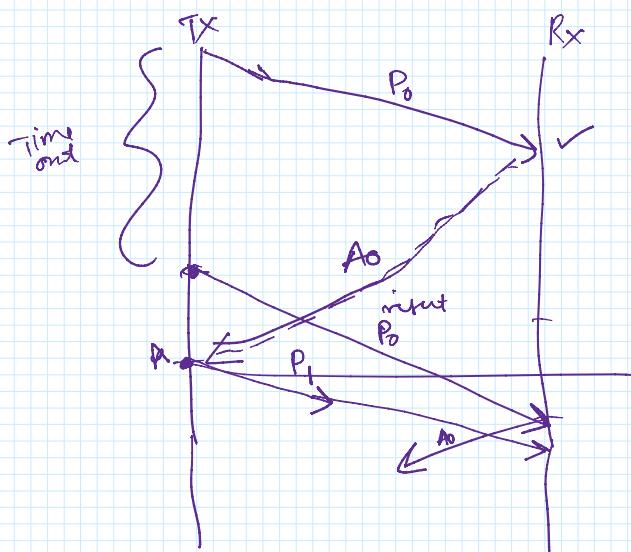
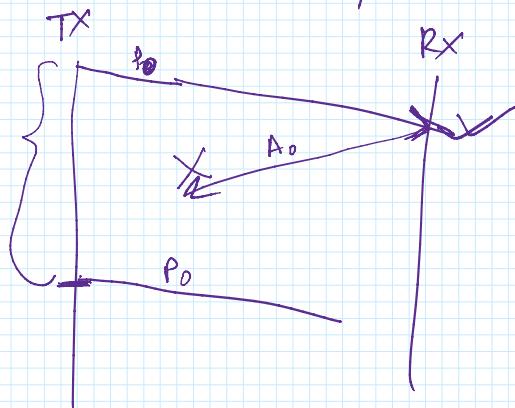
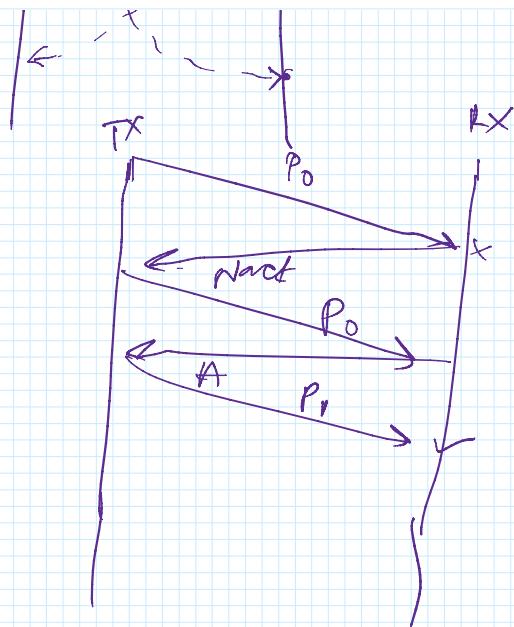
Case 3:

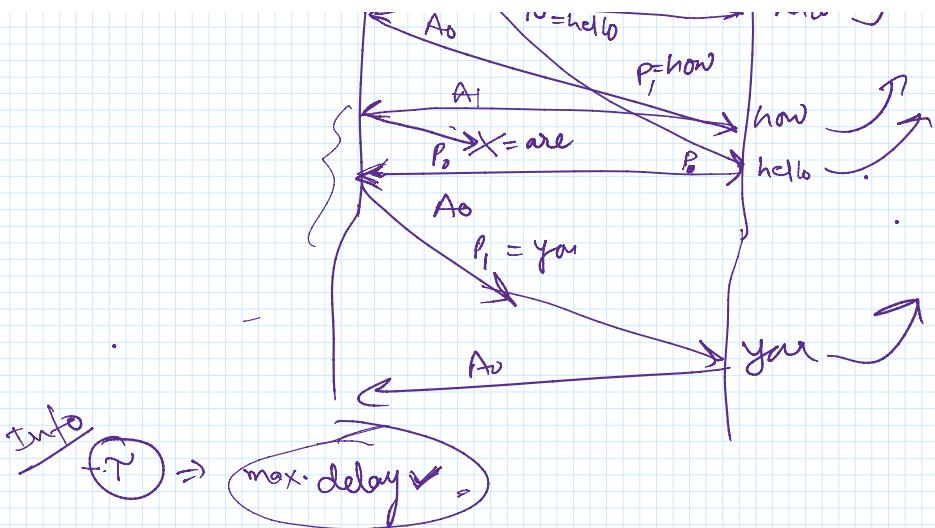


Case 4:

Bit error + Pck loss + variable delay ✓







→ Time stamp at Tx time sec num.

