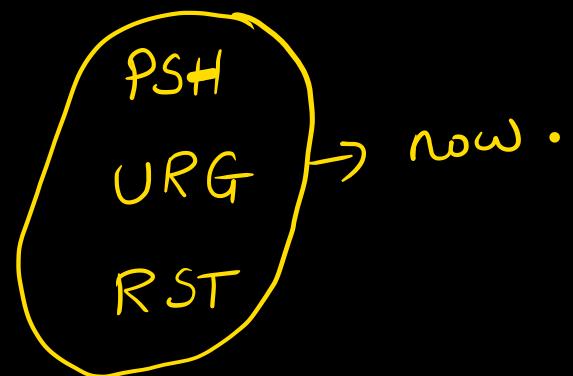


## Flags in TCP

SYN - Synchronization

ACK - indicates whether the segment contain acknowledgment.

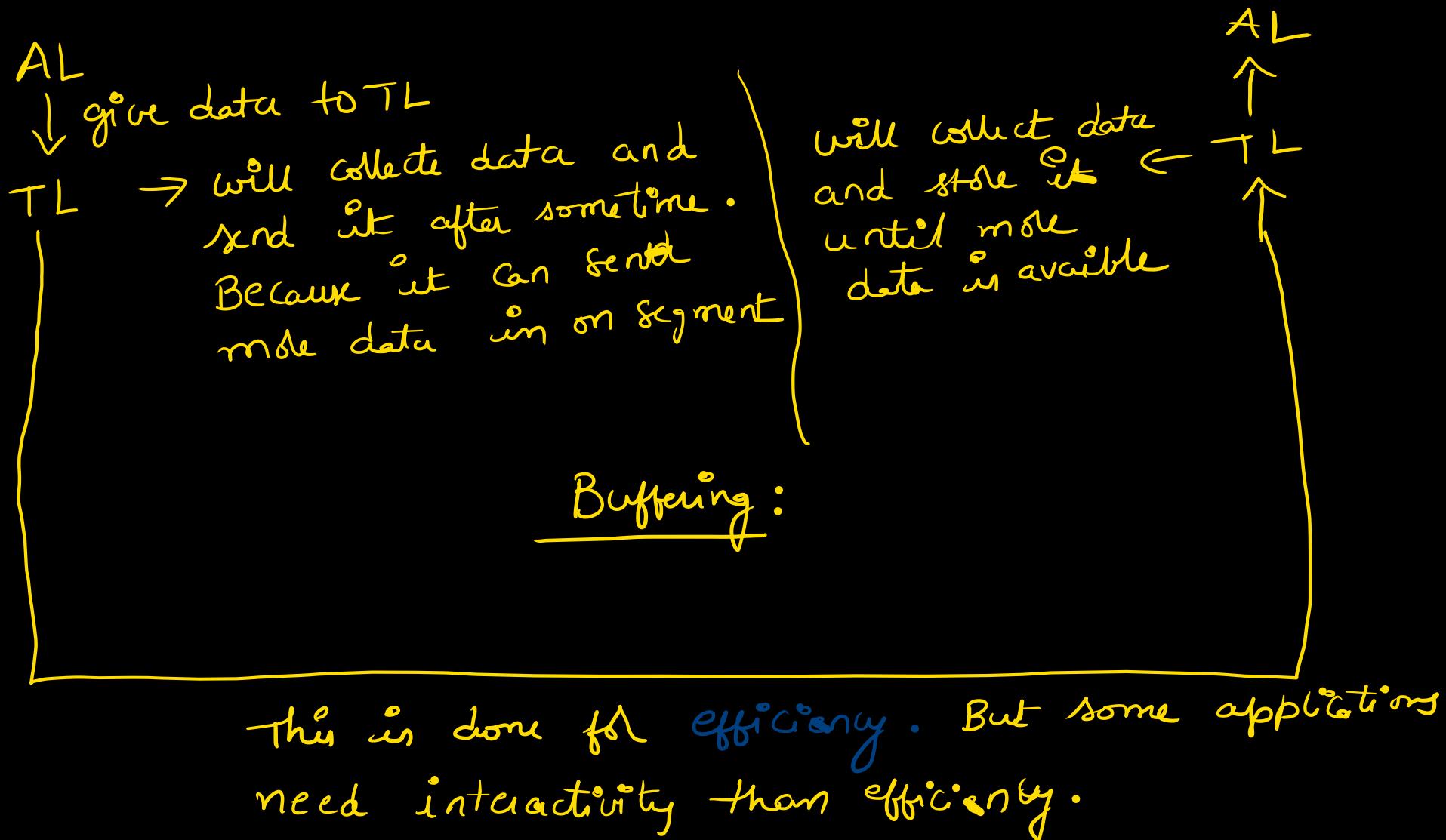
FIN - Terminate the Connection.



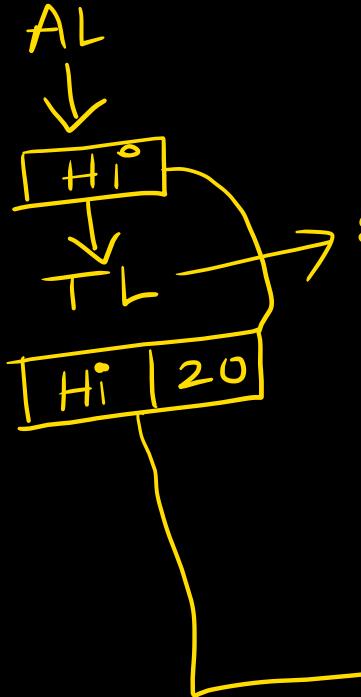
now.

PSH flag:





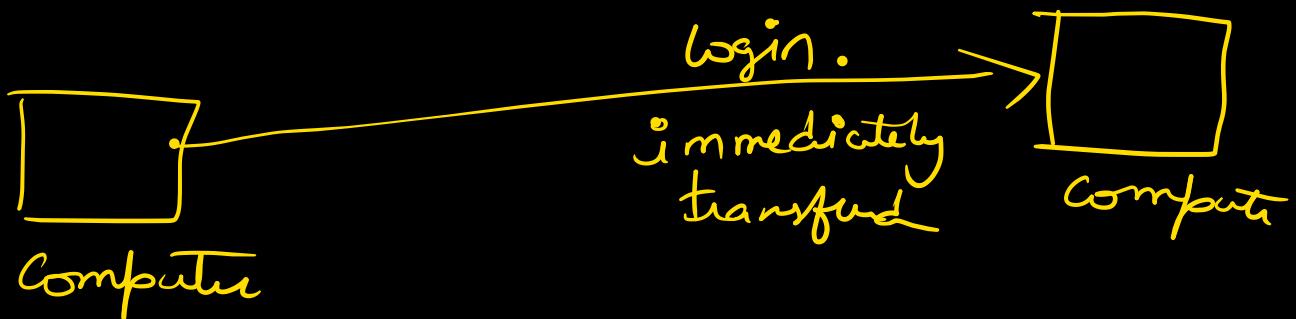
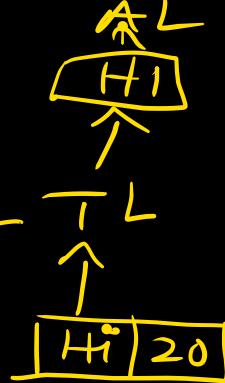
Enc Chat :



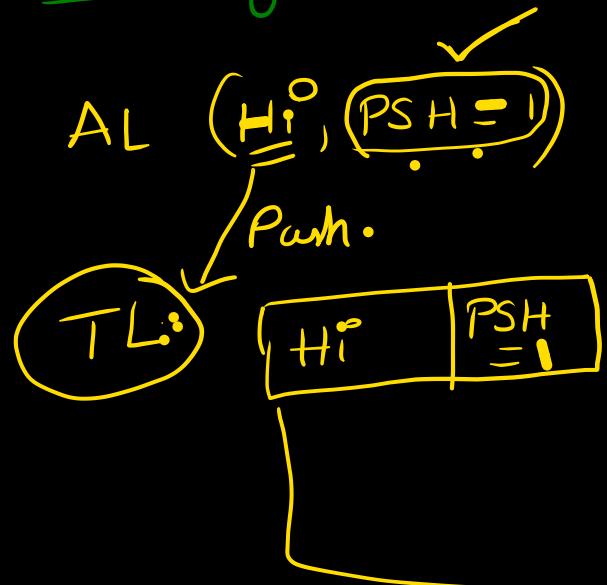
Should not wait  
even if data is  
small.

app like chatting  
Remote login

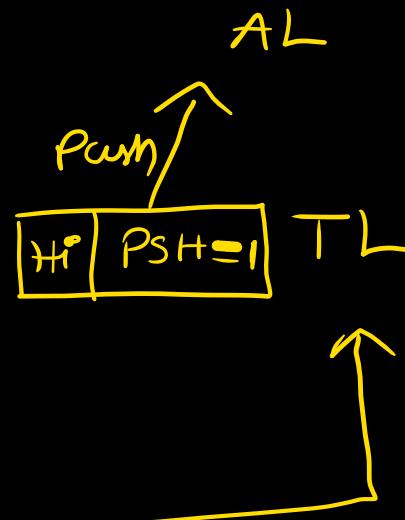
TL should not  
wait



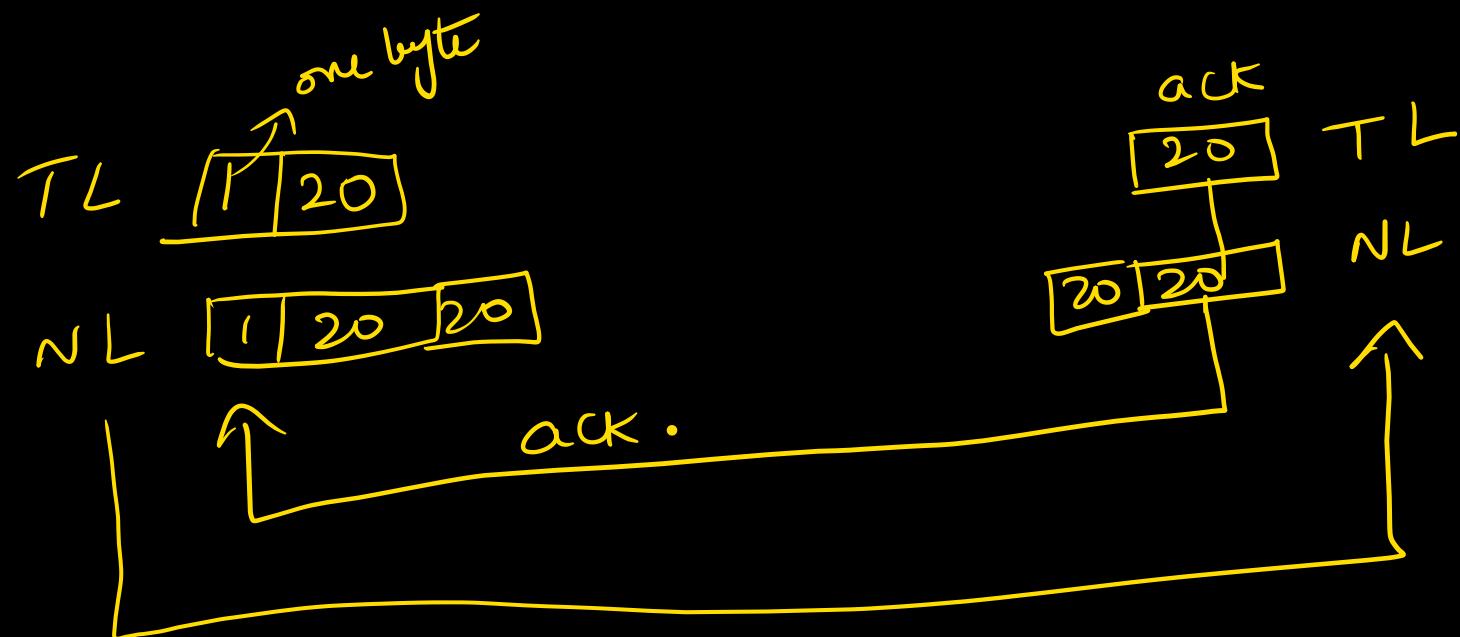
PSH flag:  $\rightarrow$  Tells TL to push the data immediately.



Email.  $\rightarrow$  X PSH  
char X  
videos  $\rightarrow$  PSH X

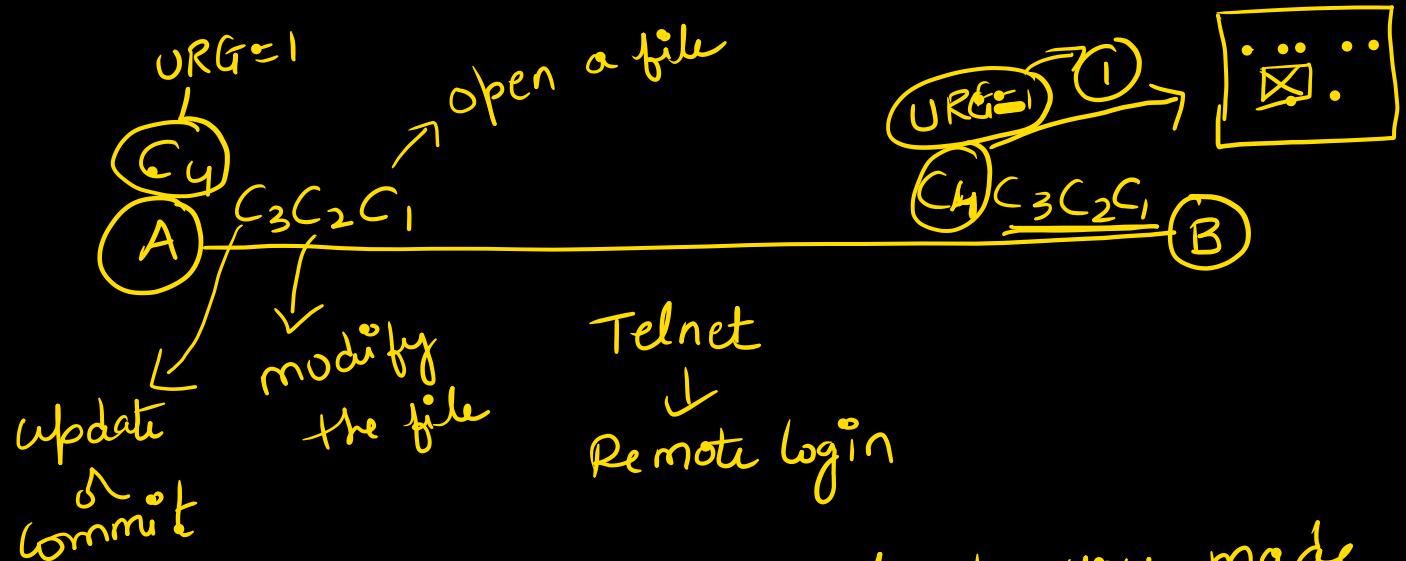


## Disadvantage of PSH:



PSH is inefficient.  
But it is needed  
in some applications

URG Flag: let us say we logged into remote system.



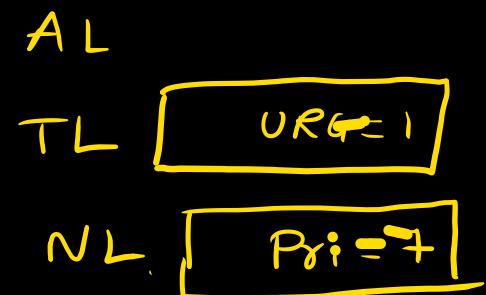
after  $C_1, C_2, C_3 \rightarrow$  you realised you made some mistake and you want to logout ( $(\text{ctr} + c)$ )  $\rightarrow C_4$ . So  $C_4$  has to processed first.



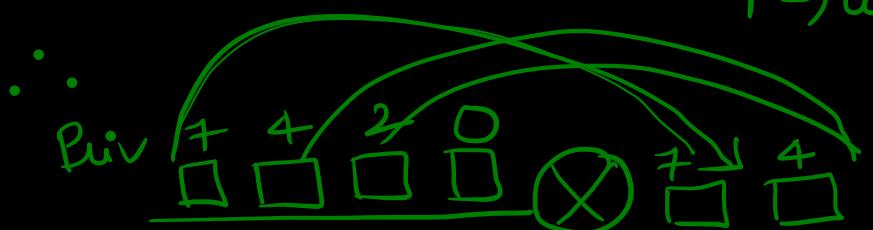
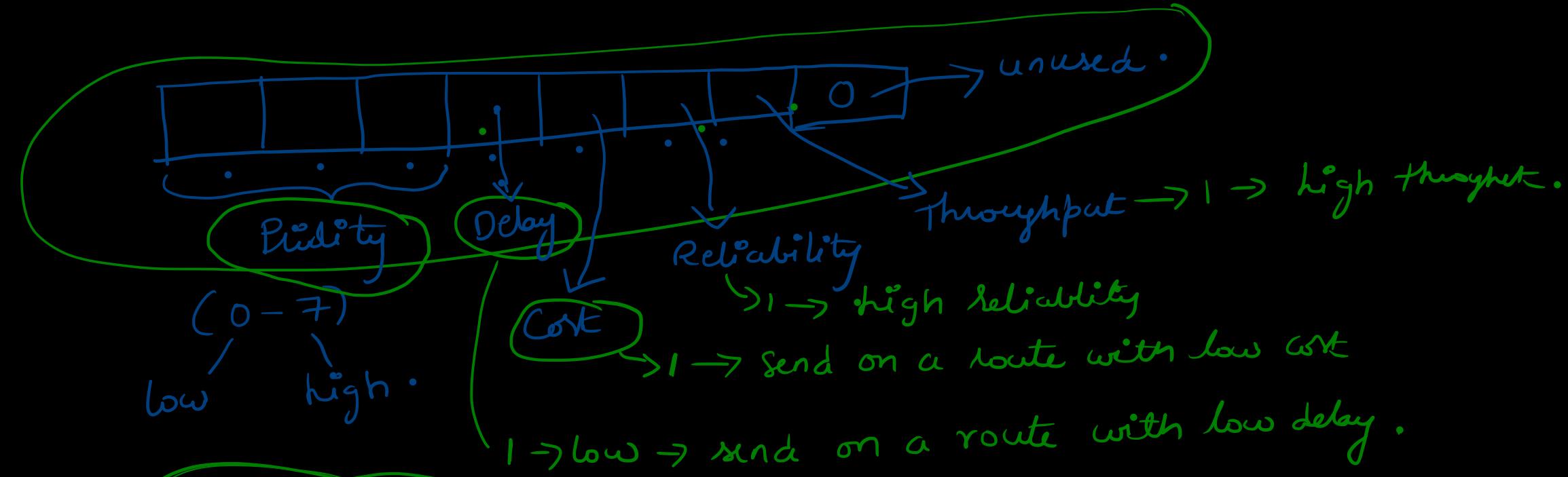


At the sender, in  
the IP header, priority  
is set to '7' → high  
in the **type of service**  
field.

A field available in IP header.



## Type of service in IP header: (8 bits)

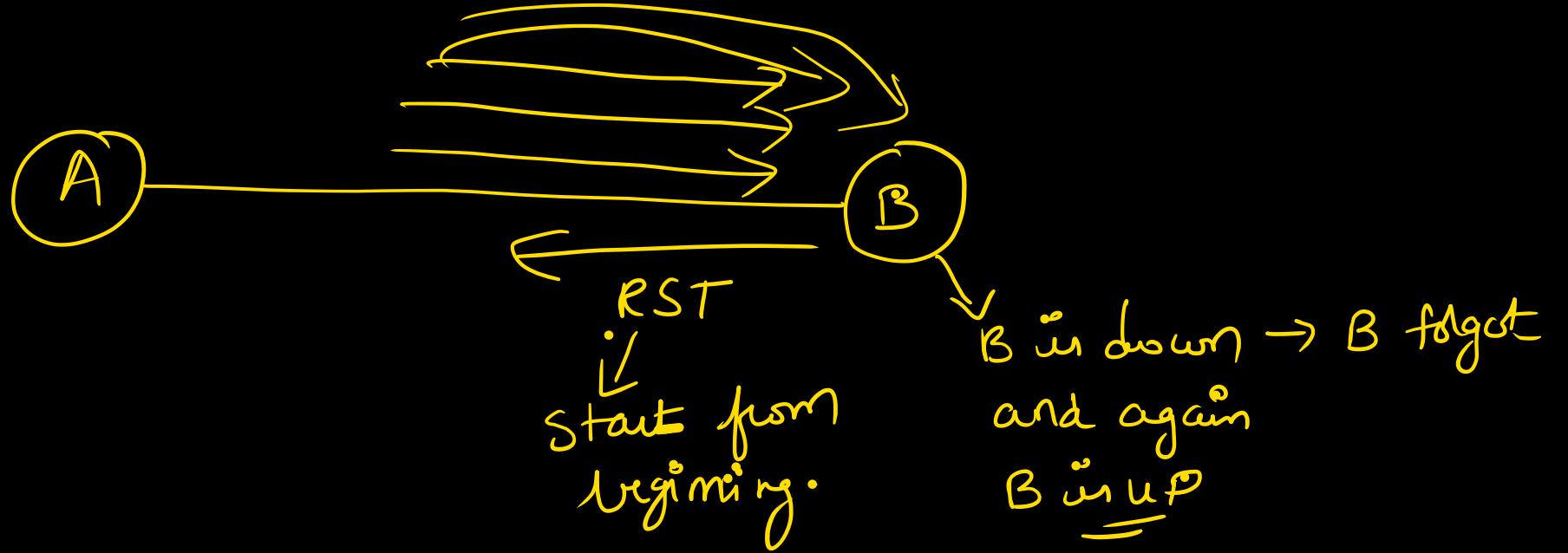


Everyone will put all 1's on this field  
so it is not allowed by  
default gateway.





RST flag: Reset the connection.



some time Rec is very slow.

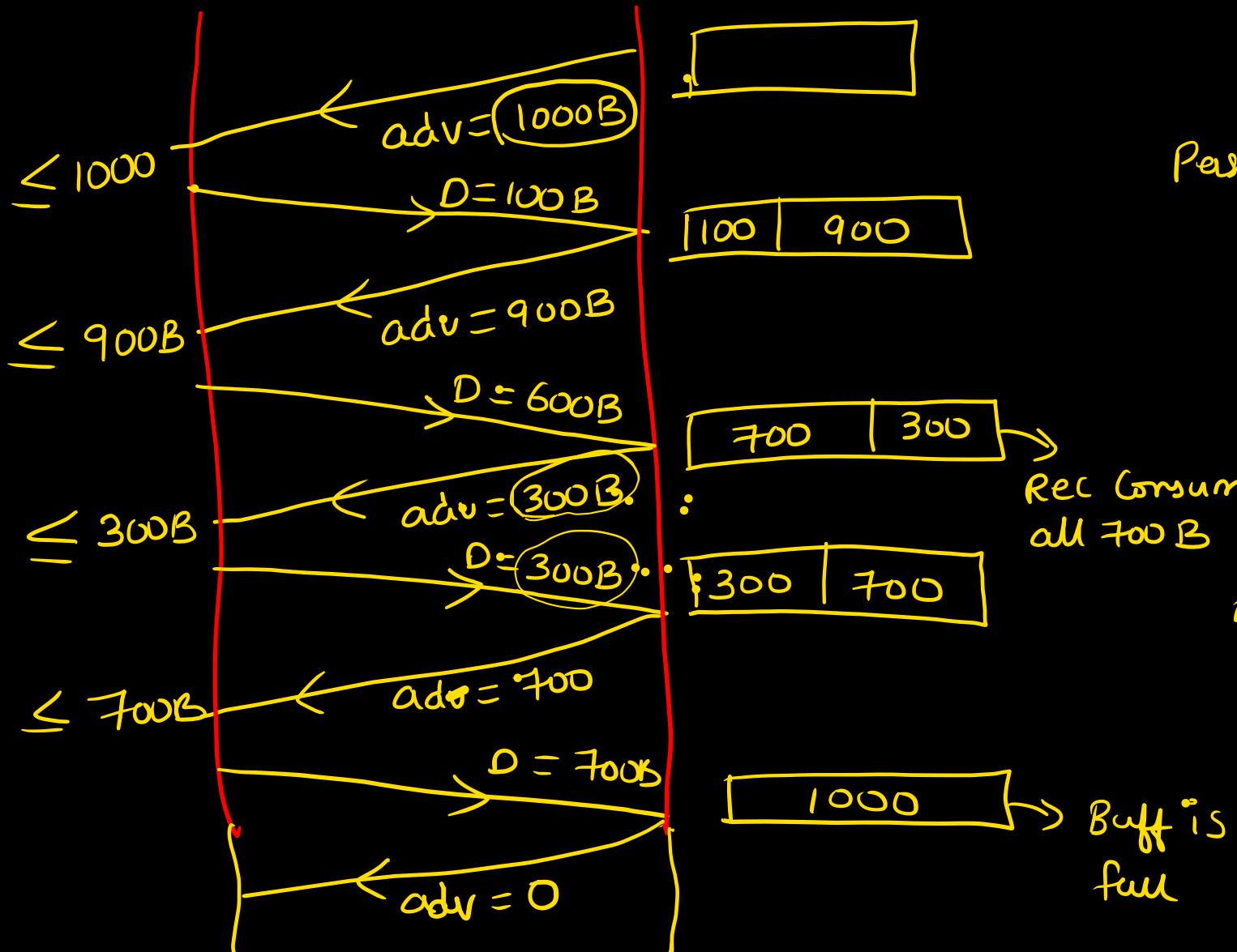
Then RST is used to  
clear the buffers.

TCP  $\rightarrow$  State diagram  $\rightarrow$  Tomorrow  $\rightarrow$  I will get diagram PDF.

Advertisement window:  $\rightarrow$  flow control:  $\rightarrow$  this is present in TCP header

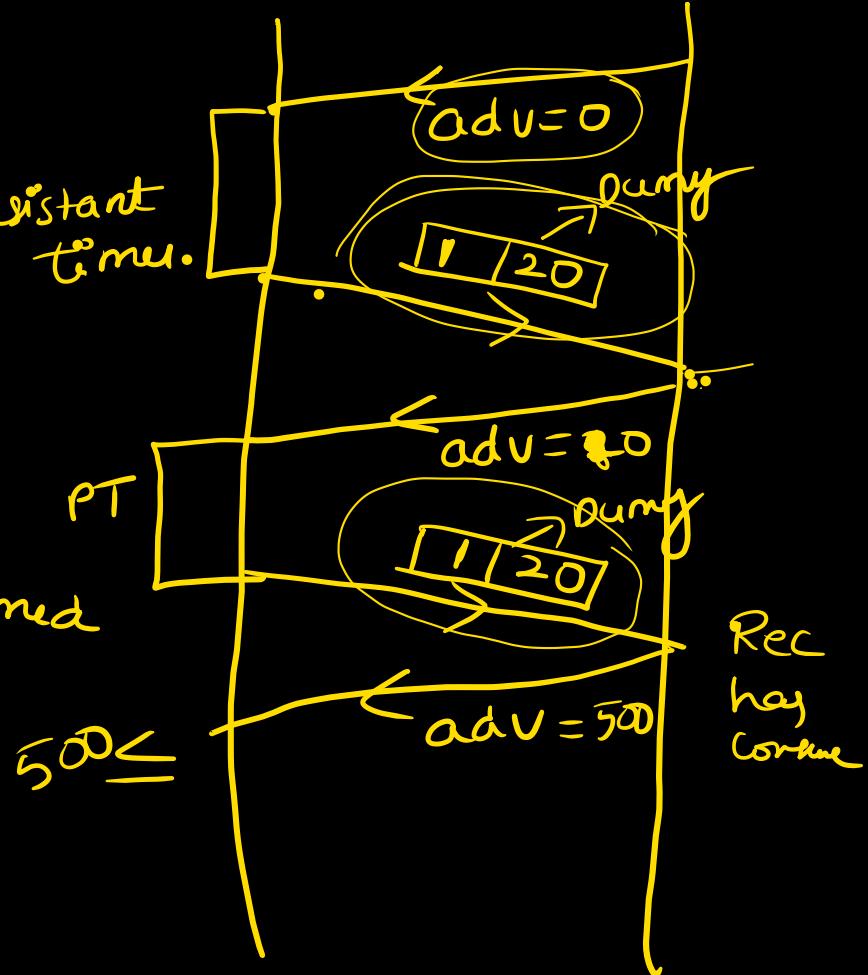


lets do again



Persistent timer.  
PT

Rec Consumed  
all 700 B



window size of adv window (16 bits)

$\therefore$  max num =  $2^{16} - 1 = 65535 \rightarrow$  Too small.

$16 \text{ bits} + 14 \text{ bits} = 30 \text{ bits}$ .

↓                          ↓  
adv window            options

$\therefore$  now we can advertise as big as

$$2^{30} = \boxed{1 G} \checkmark 2^{30}$$

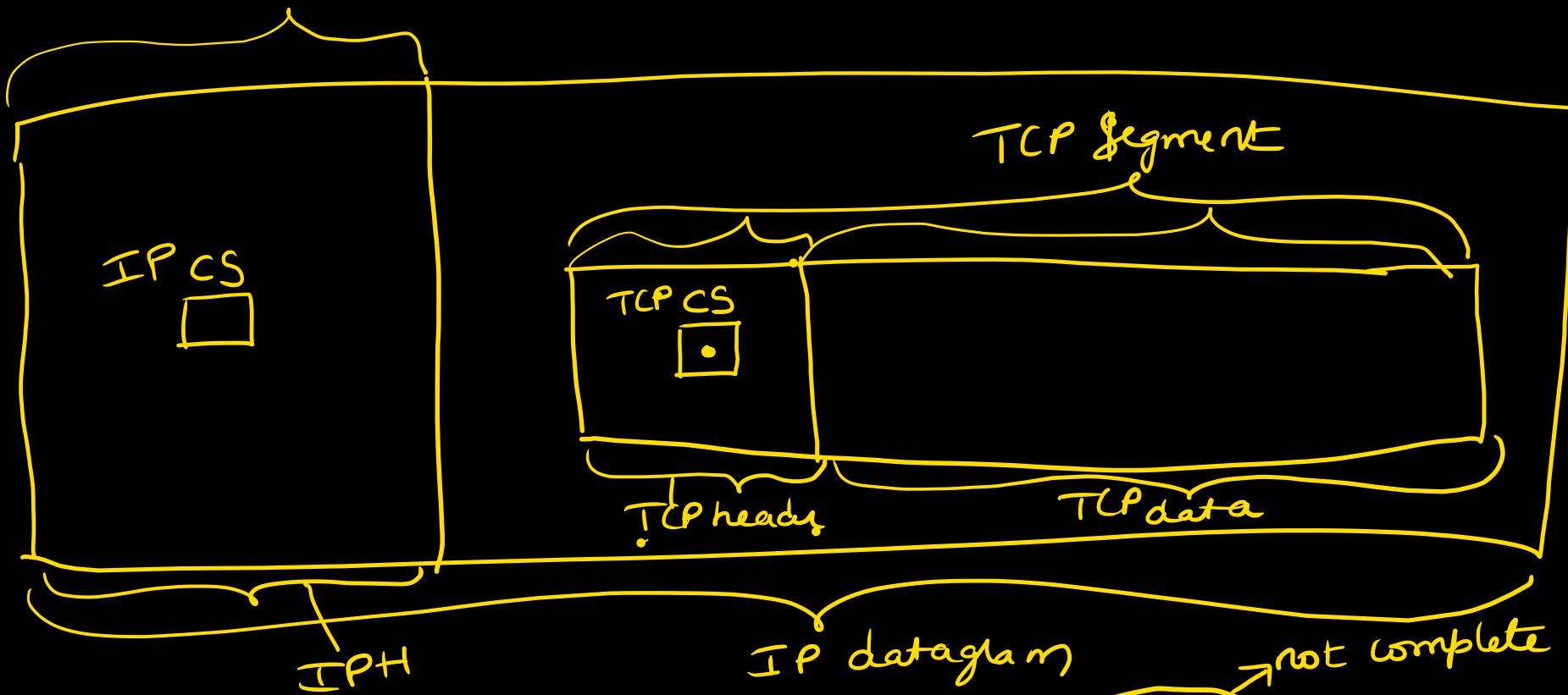
$$\frac{\text{Data}}{\text{BW}} - \frac{2^{30}}{10^9} - \underline{G}.$$

check sum :

At TCP checksum is calculated on



At  $\rightarrow$  IP  $\rightarrow$   $\downarrow$   $\rightarrow$  only on header.



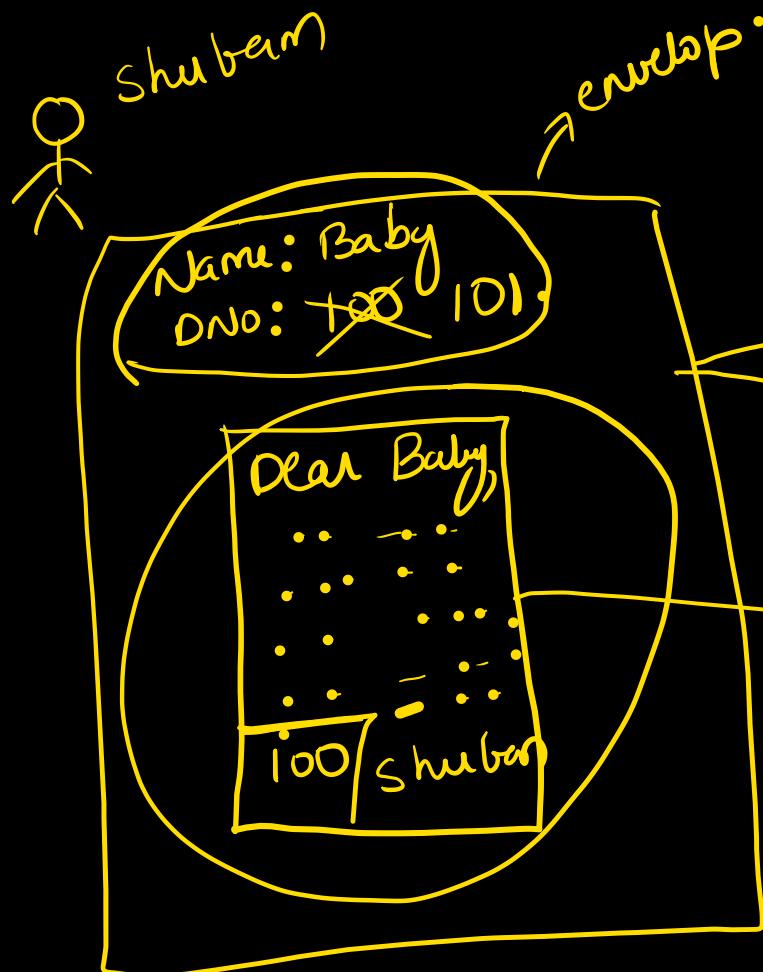
IPCS → only on IPTH

TCP CS → (Pseudo) IP header  
 +  
 TCP header  
 +  
 TCP data

not complete

why is CS calculated two times on IP header

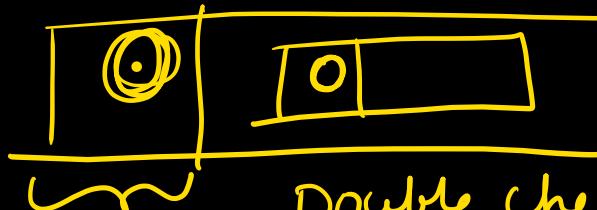
Shubham is writing a love letter to girl friend.



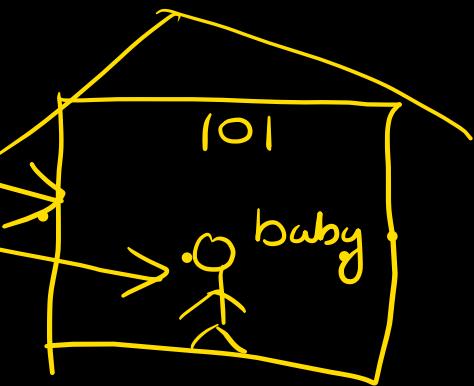
end.



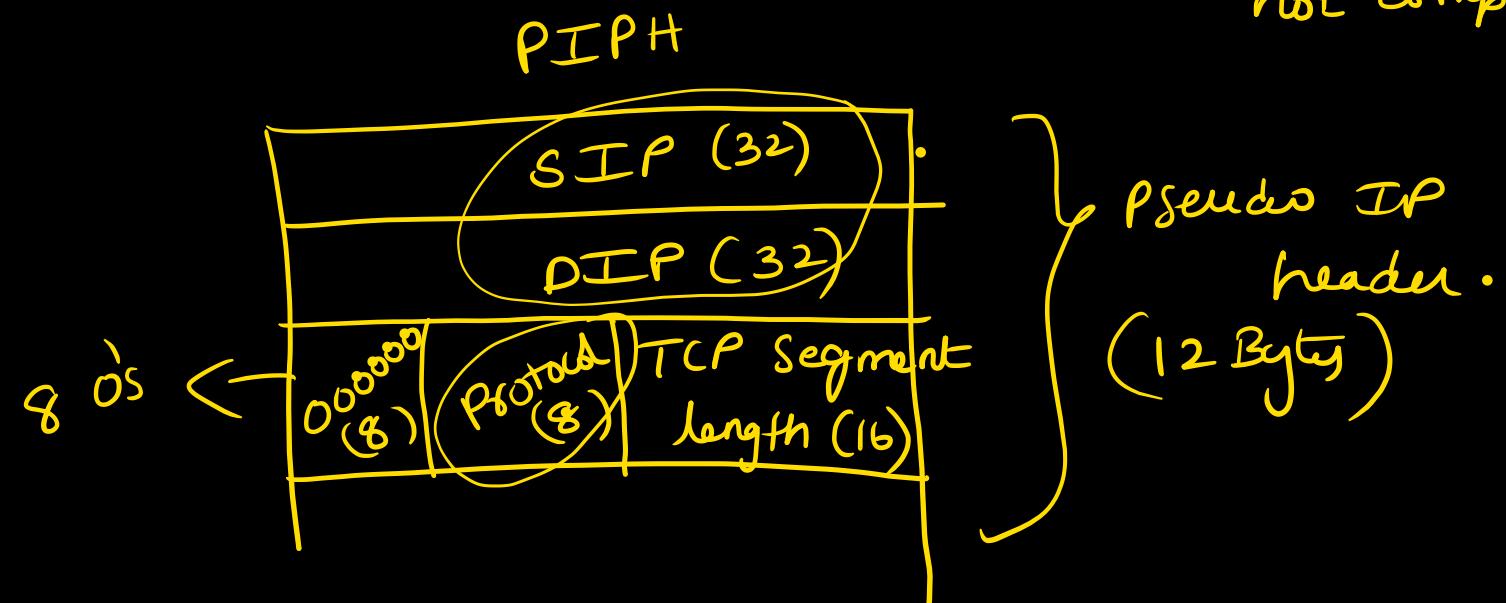
avoid.



Double checking  
Two ties.



TCP CS  $\rightarrow$  (TCPH) + (TCPD) + Pseudo IP header  
not complete.



options :

- (i) Time stamp ( when  $WAT < LT$ )
- (ii) window size & adv window extension (14 bits)
- (iii) Parameter negotiation (mss) ✓
- (iv) Padding  $\rightarrow$  TCPH  $\rightarrow$  multiple of '4'.

TCP header is completed

Returns missing in TCP:

TCP uses  $\text{SR} + \text{GBN}$  for flow control  
↓  
Combination

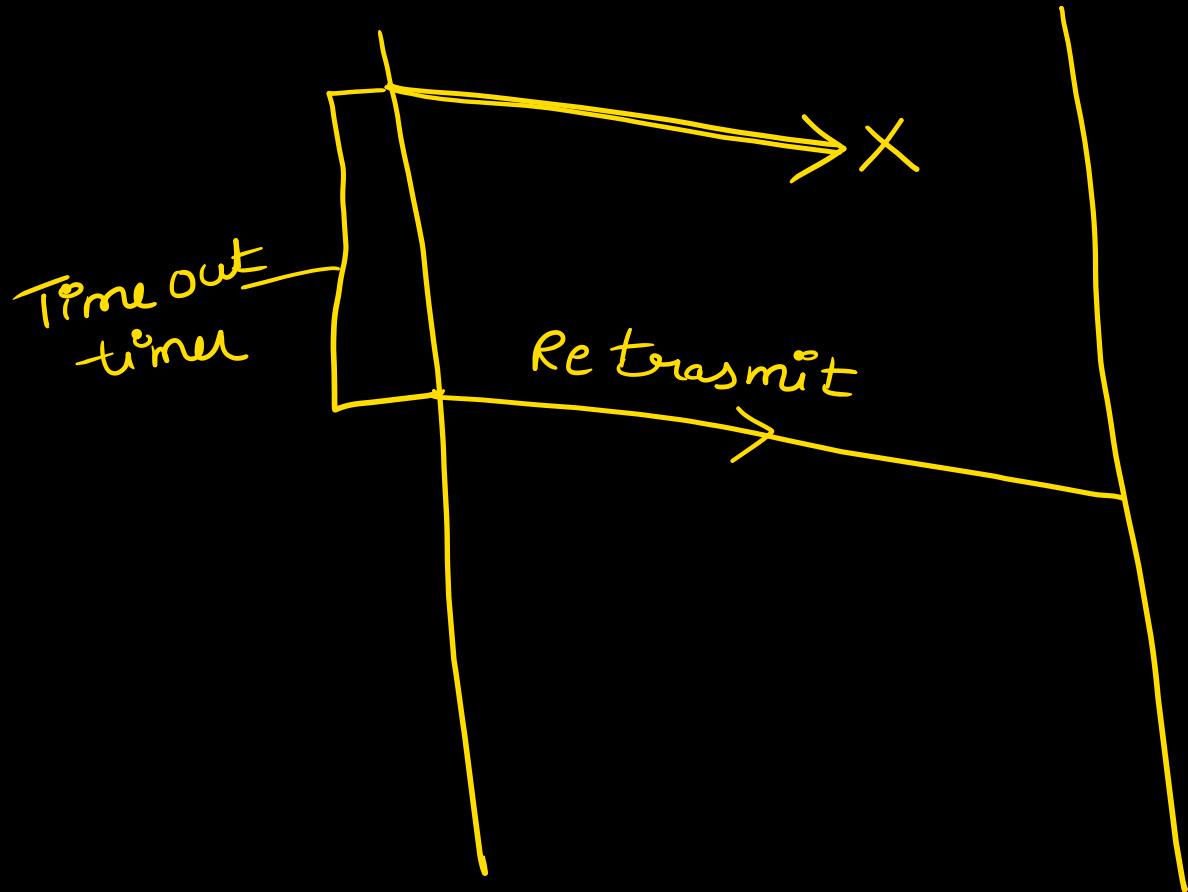
Why SR:

$w_S = w_R$   
out of  $n$  packets are accepted

Why GBN:

ACK are cumulative.

## Retransmissions.



TO timer  $\rightarrow$  too long  
 $\rightarrow$  unnecessary time wait.

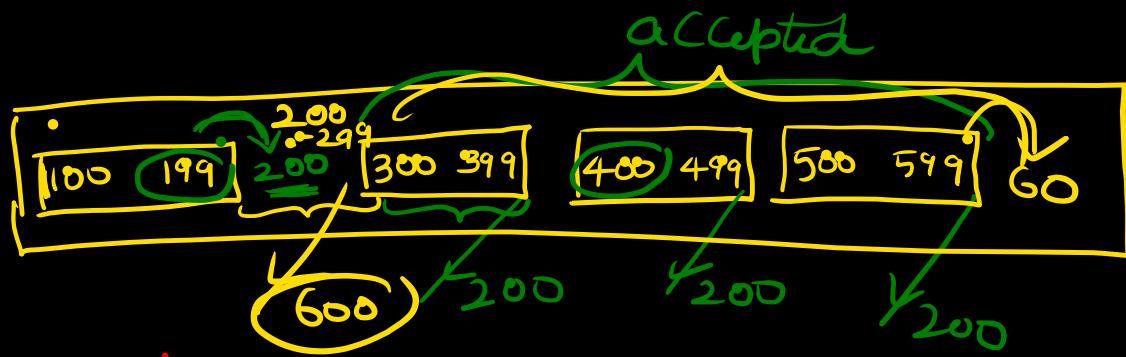
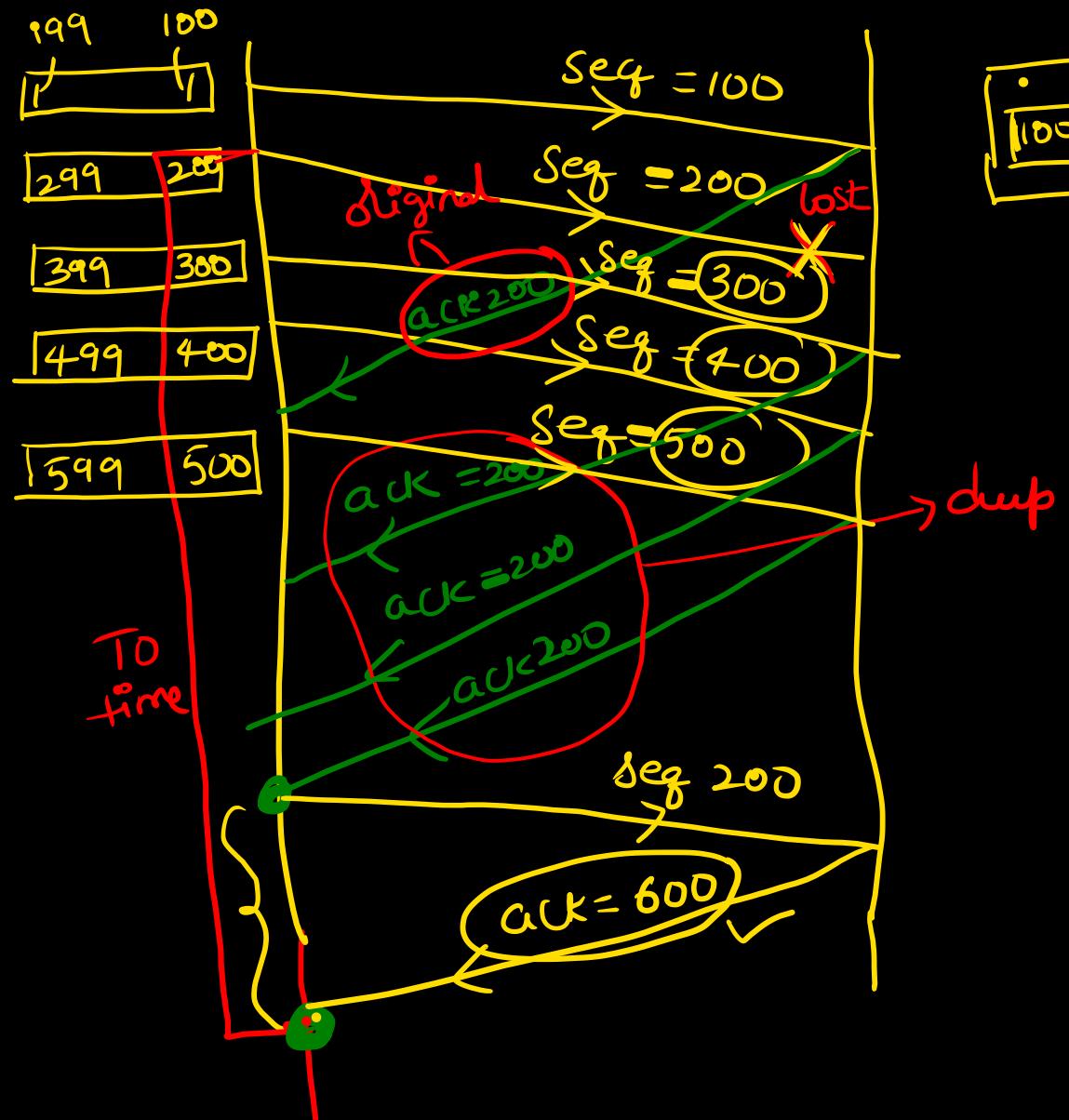


TO time is too short  $\rightarrow$  unnecessary Retransmision

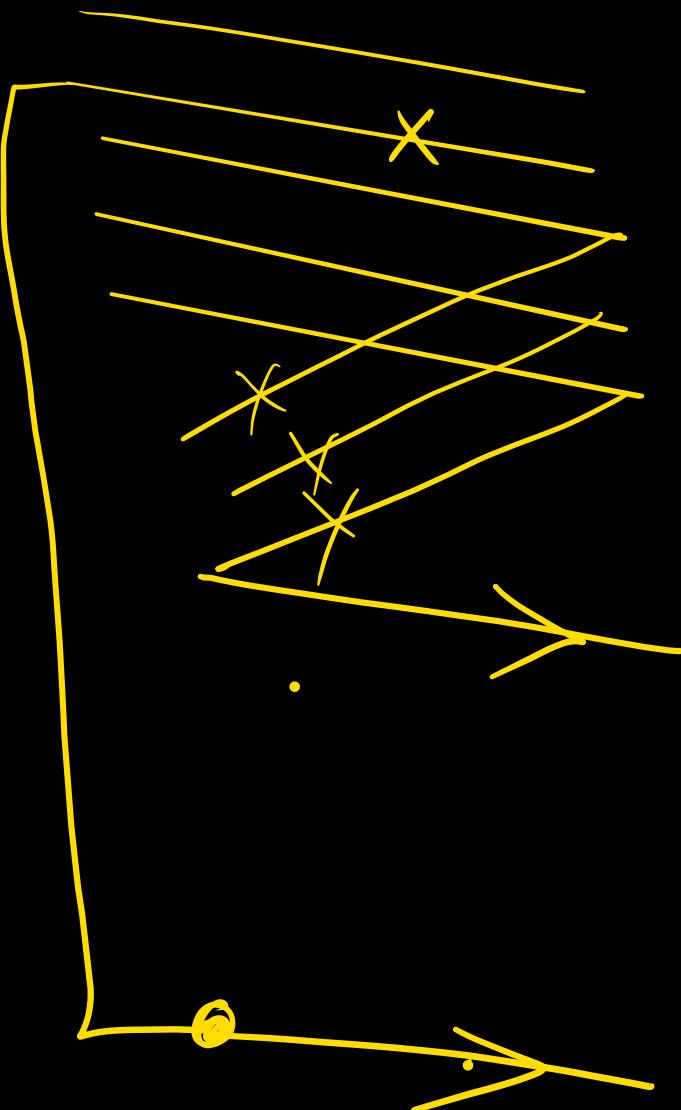


So TO time should  
be not too long &  
too short

Can we detect a packet loss earlier than 'TO'



when you get 3 dup ACKs,  
retransmit immediately.  
early retransmission or  
retransmission after 3 dup ACKs.



To time is anyway  
available. If possible  
we use early retirement