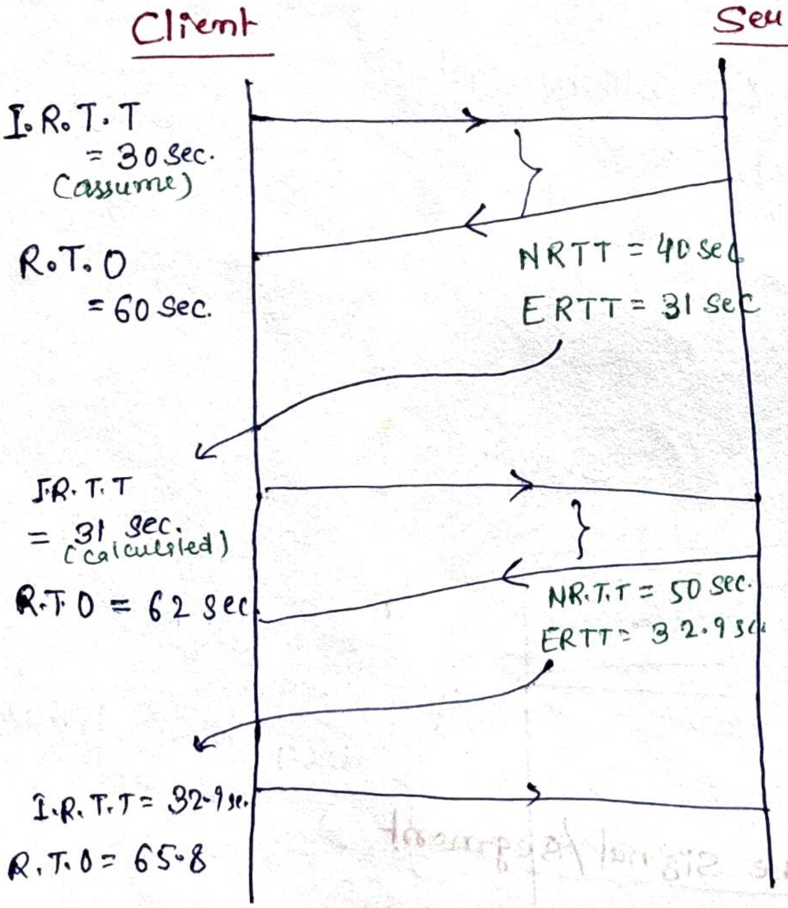
→ The client is transmitting the data & suddenly seem slient & then after some time server will start keep-alive time & a probe segment is transmitted.

→ If the response comes from the client then the server will stop the timer & continuing accepting the data.

→ If the response doesn't comes from the client then the timer will expires then the server will suddenly close the connection.

* RTO Timer (Re-transmission after Time-out timer)

General Timer



I.R.T.T = 30 sec

N.R.T.T = 40 sec.

$\alpha = 0.9$ (scaling factor)

$E.R.T.T = \alpha * I.R.T.T + (1-\alpha) * N.R.T.T$

$E.R.T.T = 0.9 * 30 + (0.1) * 40$ sec.,

$= 27 + 4$

$= 31$ sec.

Now,

I.R.T.T = 31 sec.

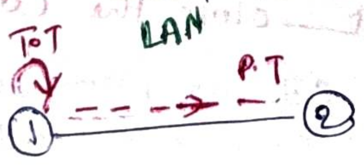
$E.R.T.T = 0.9 * 31 + (0.1) \times 50$

$= 27.9 + 5$

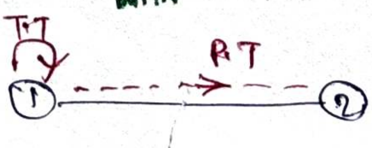
$= 32.9$ sec.

Dynamic timer → In Data link Layer, Generally static timers are used, Whereas in TCP Dynamic timers are used.

LAN



WAN



→ In a LAN network transmission time will be dominating propogation time because length is small.

→ In the WAN network or Internet, Propagation time will be dominating transmission time because length is large.

Que. for what value of 'α' E.R.T.T will be the avg of I.R.T.T & New R.T.T.

Sol^n. $\alpha = 0.5$

$$E.R.T.T = 0.5 * I.R.T.T + 0.5 * N.R.T.T$$

$$E.R.T.T = \frac{I.R.T.T + N.R.T.T}{2}$$

UDP Protocol

⇓

Datagrams

UDP Header	Data

← 8 bytes →

← 65535 bytes →

Source Port (16 bits)	Destination Port (16 bits)
Total length (16 bits	Checksum (16 bits)

① Total length bits in datagram

00000000 11111111

Size of Datagram = 255 Bytes

Header + Payload value = Datagram

$8 + x = 255 \Rightarrow x = 247$ Bytes An

→ If total length is given in a datagram, We can calculate both datagram as well as the payload value.

Let suppose,

(2) total length bit given as $(\underbrace{FFFE}\ \underbrace{0050}\ \underbrace{FFF0}_{\text{total length}}\underbrace{FFF0}_{\text{checksum}})_{16}$

Calculate

(i) Source Port

(ii) Dest. Port

(iii) Size of datagram

(iv) Size of payload value.

(v) Is the datagram travel from (Source to Dest.) client to server (OR) vice versa.

Soln,

$\underbrace{FFFE}_{\text{Source Port}}\ \underbrace{0050}_{\text{Destination Port}}\ FFF0FFF0$

(a) Source Port ⇒ FFFE → 1111 1111 1111 1110

= 65534 (Dynamic Port)

(b) Destina. Port ⇒ 0050 → 0000 0000 0101 0000

$= 2^6 + 2^4 = 80$ (http) fixed port

(c) Size of datagram = FFF0 = 1111 1111 1111 0000 = 65520

(FFFF − 000F) = 65535 − 15

$\boxed{0 - 65535}$

= 65520 Bytes

(d) Size of Payload value = 65520 − 8 = 65512 Bytes.

(e) Datagram is moving from client to server.

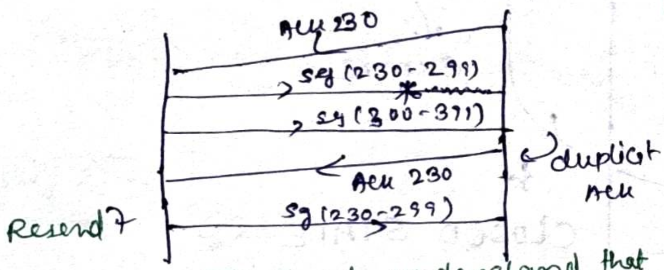
(bcz Source ⇒ Dynamic, Dest ⇒ fixed } client to server)

8 + x = 65520

x = 65520 − 8

= 65512 B

TCP	UDP
① (20-60) byte of Dynamic Header	① 8 bytes of Static Header
② Max segment (2^{30}) or size any size	② Datagram is 65535 Bytes
③ Provides flow control	③ has no flow control
④ ~~Error~~ Checksum is mandatory	④ Checksum is optional.
⑤ TCP has a Error control	⑤ It has no error control.
⑥ It doesn't depends on ICMP (bcz (It has its own error control mech & connection-oriented)	⑥ It depends on ICMP



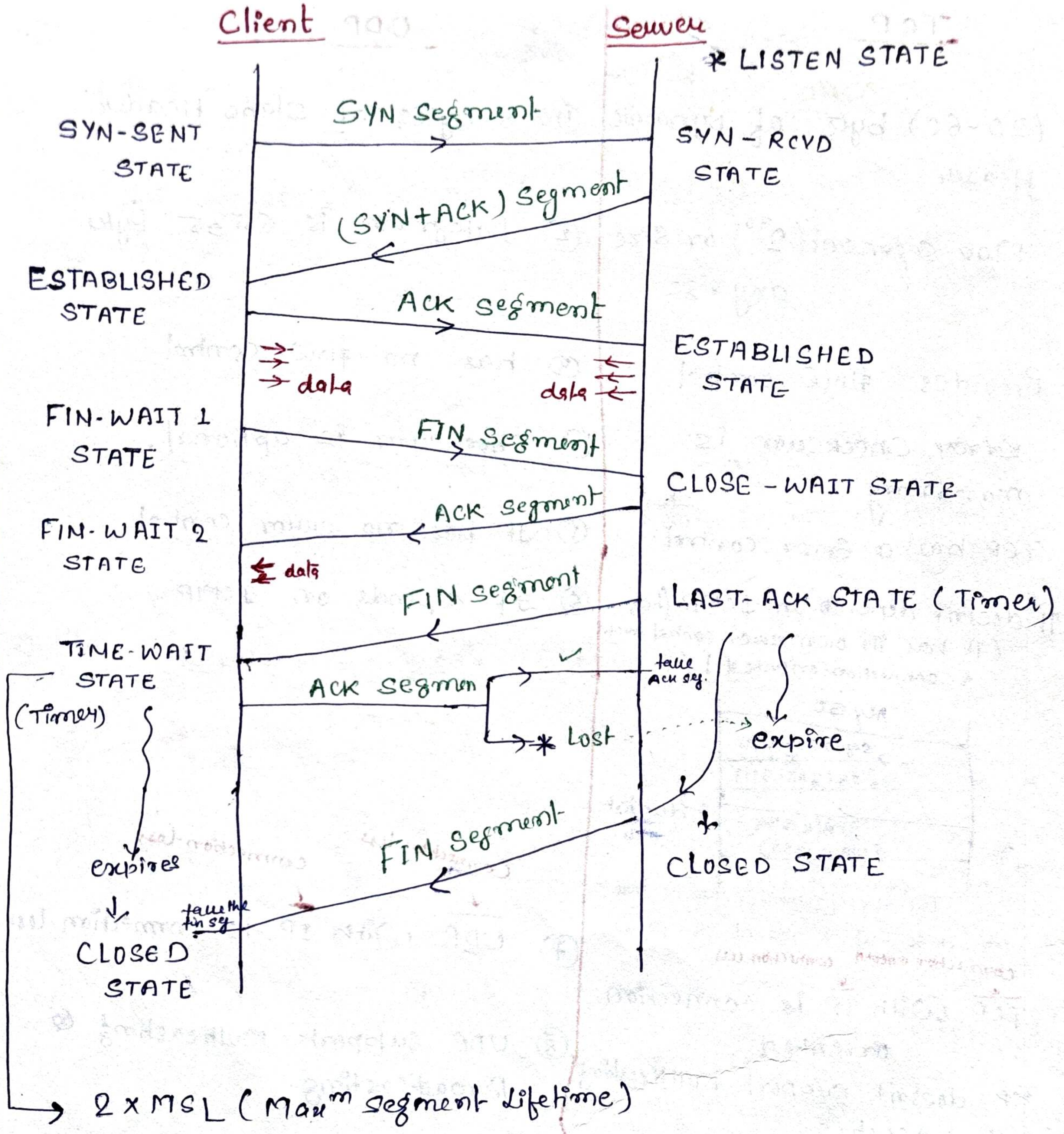
TCP itself understand that (segment) packet is lost & resent the packet.

TCP	UDP
⑦ TCP (connection-oriented) with IP (connection-less) is connection oriented	⑦ UDP (connection-less) with IP (connection-less) is connection-less.
⑧ TCP doesn't support Multicasting & broad-casting.	⑧ UDP supports Multicasting & Broad-casting.
⑨ Http, SMTP, FTP, Telnet	⑨ TFTP, DNS, SNMP

* State Transition of TCP :-

→ In FYN-WAIT 1 & FYN-WAIT 2, client can't send any data but it receives data from server.

→ If server gets the fyn segment & server has still some data left over to send, then server will move from established state to close-wait state.



→ When server has transmitted FIN + ACK the client will move from FIN-WAIT 1 state to TIME-WAIT State.

→ Server will move from established state to Last-Ack state when it transmits FIN + ACK signals.