UNIT-5

TRANSPORT LAYER -

Transport layer offers peer-to-peer and end-to-end connection between two process on remote hosts.

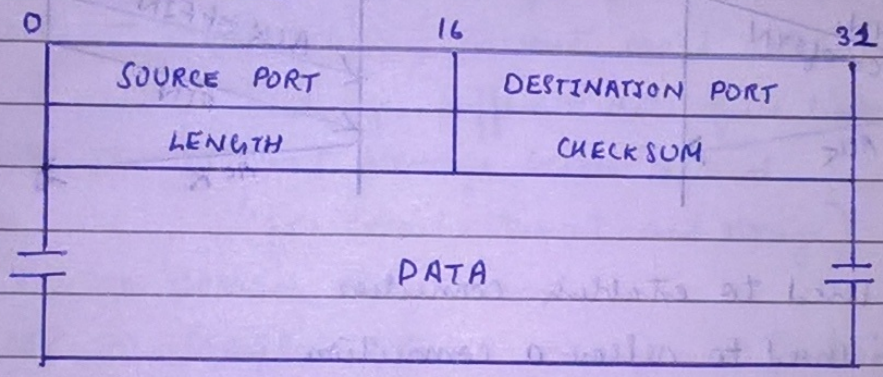
① Design Issues of transport layer -

(1) Addressing
(2) Error control
(3) Flow control
(4) Multiplexing
(5) Demultiplexing
(6) Routing

UDP (USER DATAGRAM PROTOCOL) - ~~Connection less protocol~~

~~It like~~ UDP is like a packet switching. It provides a way for applications to send encapsulated IP datagrams without having to establish a connection.

② UDP Header Format -

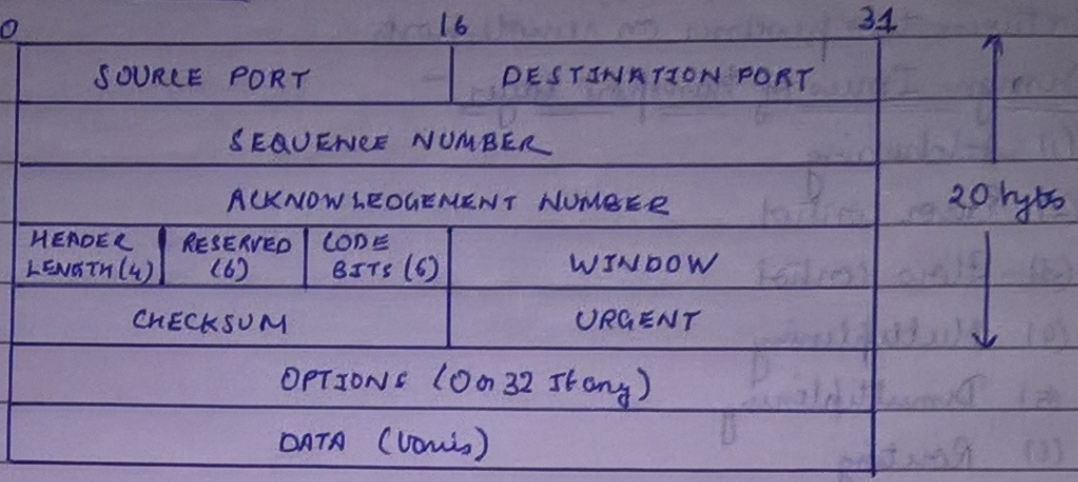


→ Pre-segment Checksum → Error checking
→ Carrying Unicast/Multicast Real Time traffic -
- Retransmission is meaningless: No per-flow integrity needed.
- Bit rate is determined by codec used: No flow control needed.

TCP (TRANFER CONTROL PROTOCOL) - Connection oriented protocol

It determines how to break application data into packets that networks can deliver, sends packets to and accepts packets from the network layer, manages flow control.

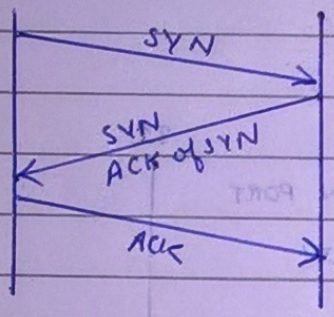
③ TCP Header Format -



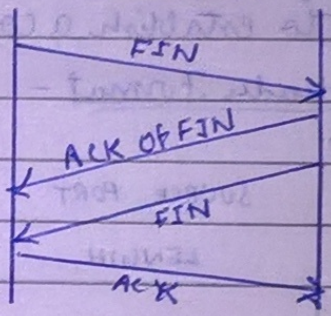
④ TCP Connection Management -

3-Way Handshake protocol -

Establishment -



Termination -



(bit) SYN is used to establish connection
(bit) FIN is used to release a connection.

⑤ Reliability of data transfer -

Data Reliability and Data Integrity

Per segment Integrity → Checksum

Per flow reliability → Sequence numbers & ACK.

⑥ TCP congestion control - Using AIMD (Additive increase multiplicative decrease)

Opening and shrinking of window size.

⑦ TCP flow control -

Senders won't overrun receivers buffer by transmitting too much, too fast

⑧ TCP Timer Management -

(1) Retransmit timer → to start retransmitting
(2) Persist timer → to prevent deadlocks
(3) Keepalive time → non-standard, to clean up redundant TCP states

~~SESSION LAYER :-~~

APPLICATION LAYER -

⑨ WWW → World wide web
HTTP → Hypertext Transfer protocol
SSH → Secure Shell (cryptographic, encrypted network protocol)
email { SMTP → Simple mail transfer protocol
MIME → Multipurpose Internet mail extensions (to exchange different data files like audio, video etc)
IMAP → Internet Message Access Protocol (for email retrieval and storage)
DNS → Domain Name Server.
SNMP → Simple Network management protocol (managing devices on IP networks like routers)

SESSION LAYER -

⑩ Servies → Authentication, Authorization (access rights)
Protocols → PAP (Password authentication Protocol)
SCP (Session Control Protocol)
H.245 (Call control protocol for multimedia communication)

PRESENTATION LAYER -

(11) Data Conversion
Character Code translation
Compression, Encryption and decryption } Services.

Protocols → LPP (lightweight Presentation protocols)
TELNET (remote Terminal access protocol)
X.25 packet assembler / ~~deassembler~~ disassembler (PAD)