Transport Layer

Allow traffic to be directed to specific Network Application. It Ensures integrity through error checking and data verification (Multiplexing & Demultiplexing)

Data in this layer is called Segment

Ports are 16 bits they are used to direct traffic to specific services run on network computer

Protocols used in This layer

TCP	UDP
Transmission Control Protocol	User Datagram Protocol
Connection Oriented : as it establish a connection between Transmitter an receiver Before it begins to send the data 3-Way Handshakes Establish 4-way Handshakes Fin	Connectionless : it sends data directly without any establishment of a connection so it is faster that TCP and safe more bandwidth No Handshakes
Reliable : as it establish a connection and ensure that the data is received well and if not it tell the transmitter to send it again	Unreliable : as it is doesn't guarantee that the data received correctly as there is no

TCP Segment

16 Bits Source Port Number
16 Bits Destination Port Number
32 Bits Sequence Number: it is used to keep track of where in sequences of TCP Segment this one Expected to be when we split the data
32 Bits Acknowledgement Number : number of the next expected segment
4 Bits Data offset field : how long TCP header for this segment is
6 Bits Control Flags
16 Bits Window : Range of Sequence number might be Sent Before Acknowledgement required
16 Bits Checksum
16 Bits Urgent Pointer : points that this segment is more important than others
16 Bits Optional & Padding before Pay load

Flags

URG

Urgent When it is equal 1 means segment is urgent & urgent pointer has more data about that

ACK

Acknowledge When it is equal 1 means Acknowledge field should be Examined

PSH

Push When it is equal 1 means transmitter want the receiver to push buffered data to application on receiver end as soon as possible

RST

Reset When it is equal 1 means one side of connection can't recover from series of missing data

SYN

Synchronize it is used in first establish TCP connection and ensure that receiver end knows to examine sequence Number Field

FIN

Finish Transmitter doesn't have any more data to send and connection can be closed

Socket State

Listen

Socket ready and listen for incoming connection (for servers only)

SYN-SENT

Syn request Sent but Connection Doesn't established Yet

SYN-Received

Socket was listening and received syn-request and sent syn/Ack

Established

TCP Connection is open and both sides send data (client and server)

FIN-Wait

The FIN is sent but the ACK isn't Received

Close-Wait

The Connection in TCP is closed but in the Application layer is open

Closed

The connection Terminated