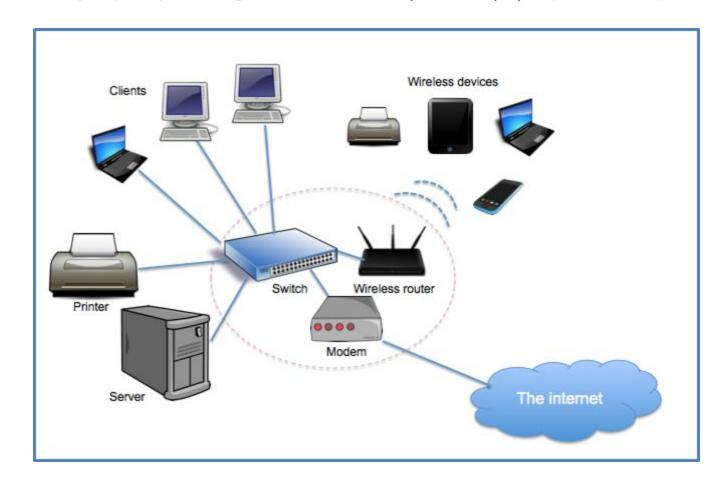


COMPUTER NETWORKS



Instructor: Mr. B. V. Sathish Kumar, Assistant Professor
Department of Electronics and Communication Engineering



UNIT - V

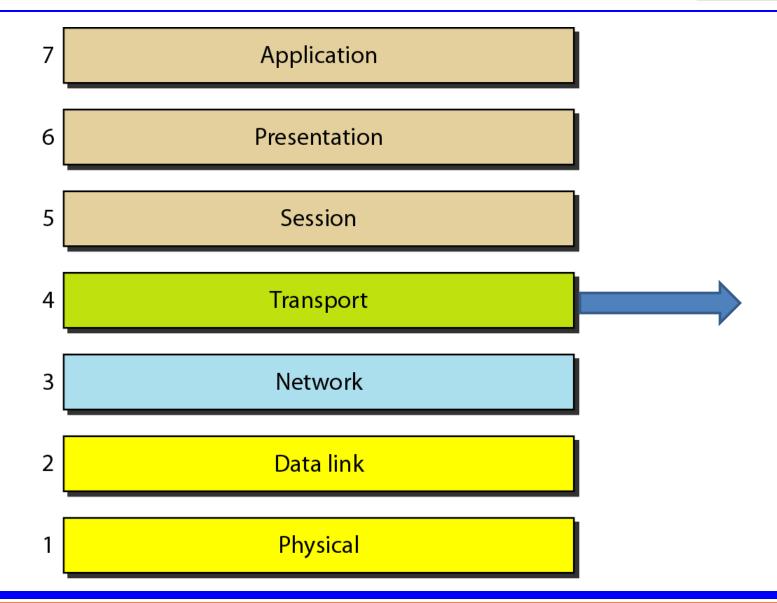
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Syllabus

- Transport Layer Design Issues, Connection Establishment, Connection Termination, Transport and User Datagram Protocols
- ❖ Application Layer –Design Issues, DNS, WWW, HTTP/HTTPS, E-mail



Figure: Seven layers of OSI Model





TRANSPORT LAYER



PROCESS-TO-PROCESS DELIVERY

The transport layer is responsible for process-to-process delivery the delivery of a packet, part of a message, from one process to another. Note

The transport layer is responsible for process-to-process delivery.



Figure: Types of data deliveries

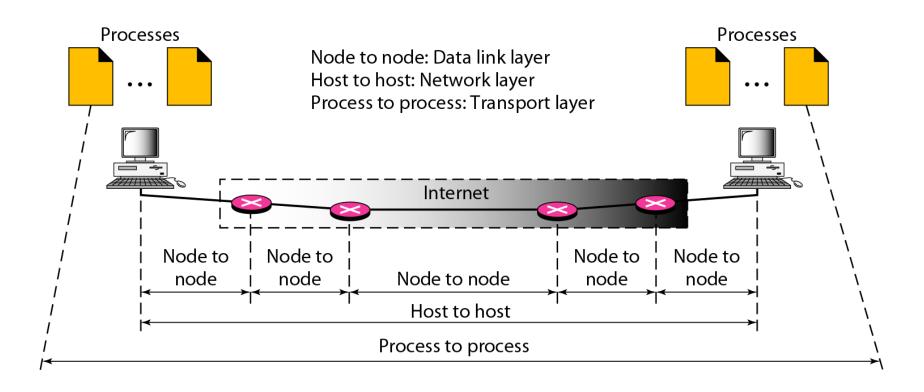




Figure: Port numbers

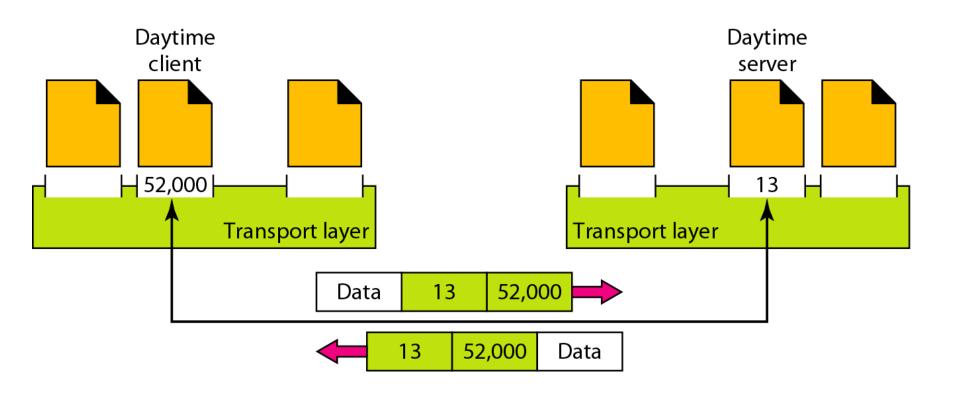




Figure: IP addresses versus port numbers

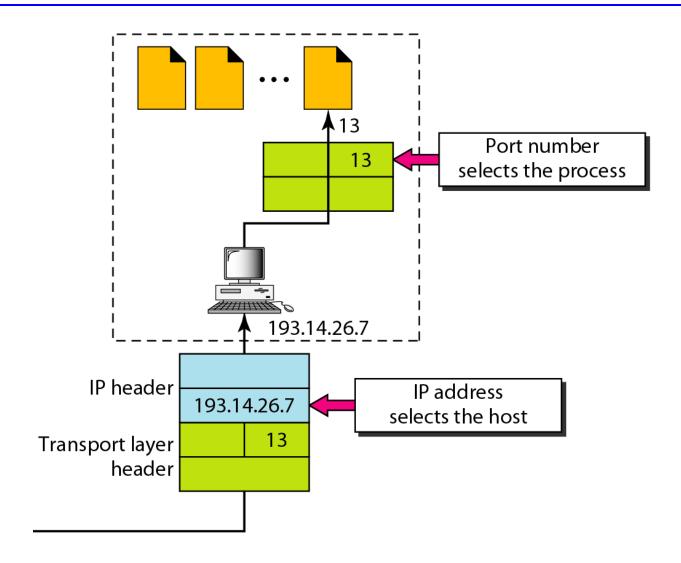
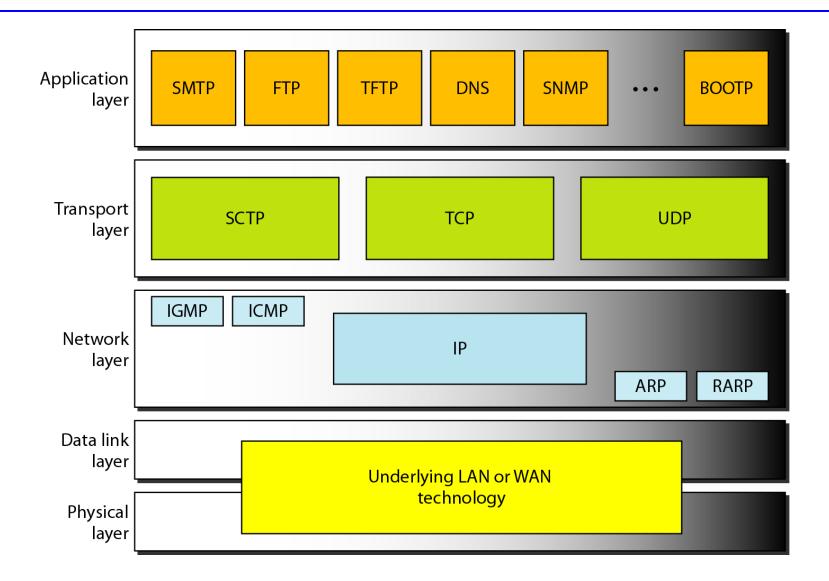




Figure: Position of UDP, TCP, and SCTP in TCP/IP suite





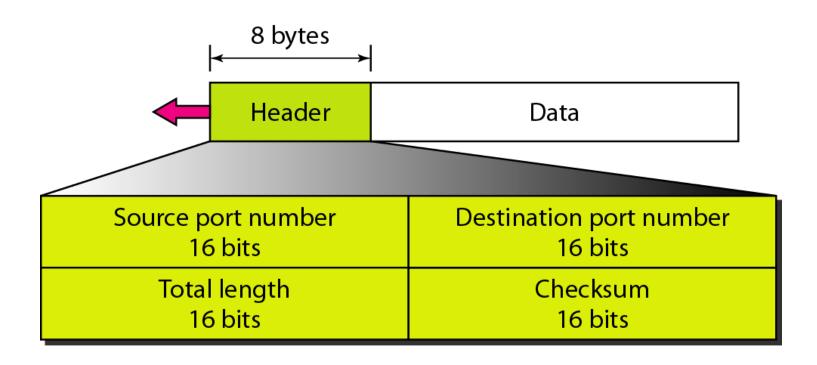
User Datagram Protocol

The User Datagram Protocol (UDP) is called a connectionless, unreliable transport protocol.

It does not add anything to the services of IP except to provide process-to-process communication instead of host-to-host communication.



Figure: User datagram format





UDP length

= IP length – IP header's length



Transmission Control Protocol

TCP is a connection-oriented protocol; it creates a virtual connection between two TCPs to send data.

In addition, TCP uses flow and error control mechanisms at the transport level.



Figure: Stream delivery

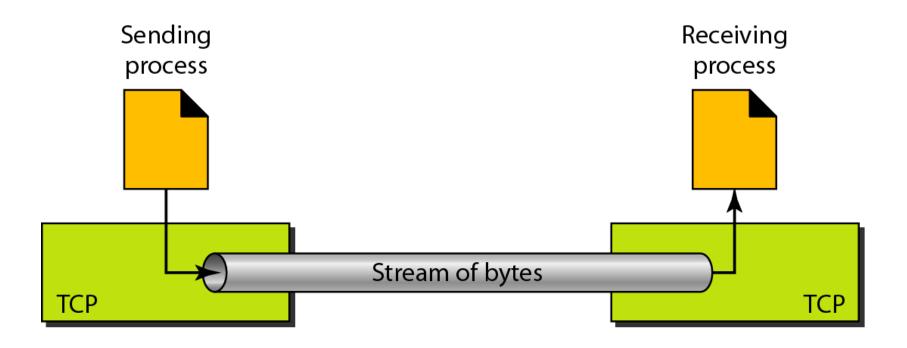




Figure: Sending and receiving buffers

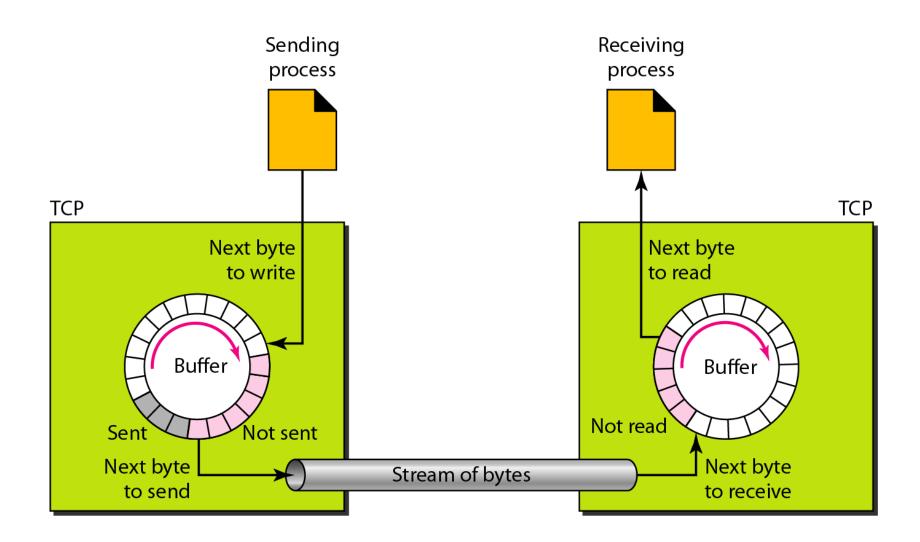
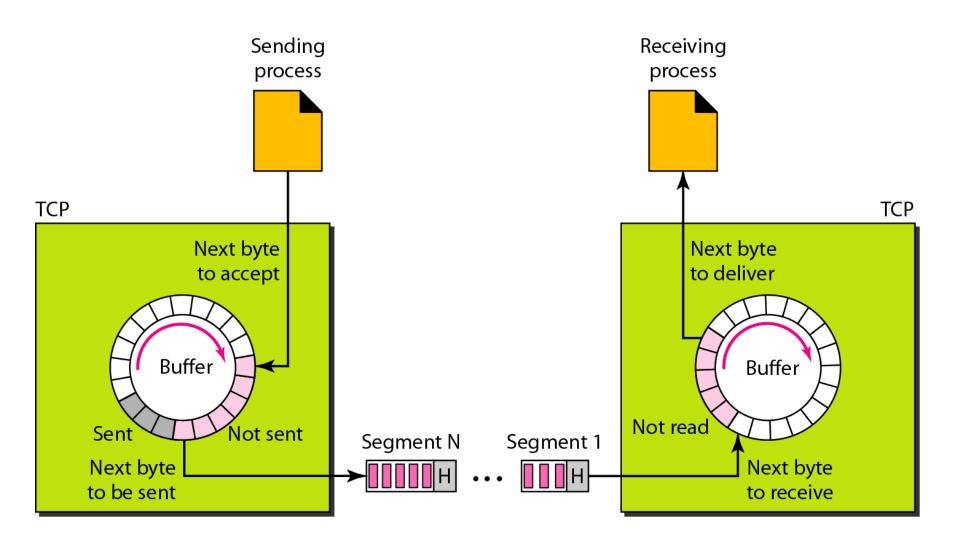




Figure: TCP segments



Note

The bytes of data being transferred in each connection are numbered by TCP. The numbering starts with a randomly generated number.



The value in the sequence number field of a segment defines the number of the first data byte contained in that segment.



The value of the acknowledgment field in a segment defines the number of the next byte a party expects to receive.

The acknowledgment number is cumulative.



Figure: TCP segment format

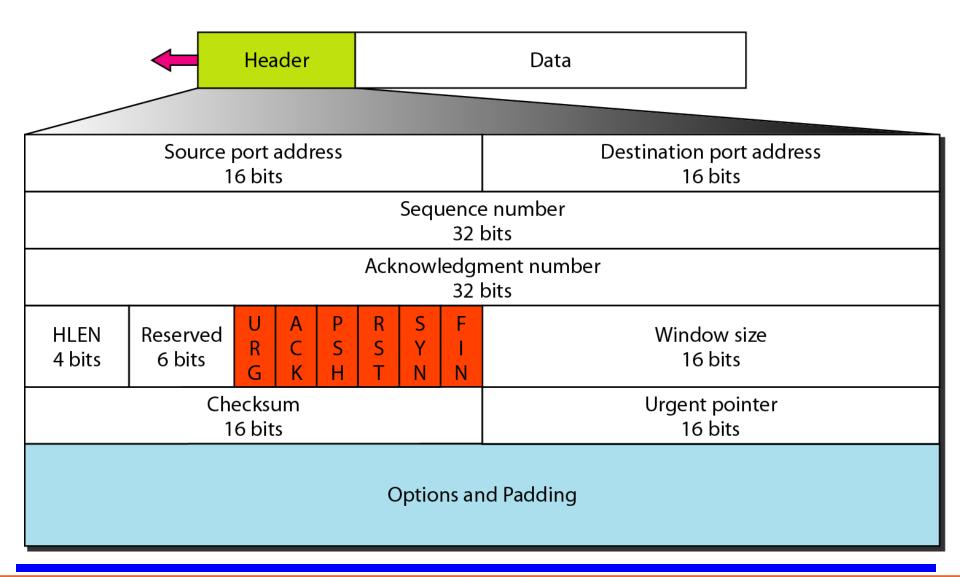




Figure: Control field

URG: Urgent pointer is valid

ACK: Acknowledgment is valid

PSH: Request for push

RST: Reset the connection

SYN: Synchronize sequence numbers

FIN: Terminate the connection

URG ACK PSH	RST	SYN	FIN
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Table: Description of flags in the control field

Flag	Description	
URG	The value of the urgent pointer field is valid.	
ACK	The value of the acknowledgment field is valid.	
PSH	Push the data.	
RST	Reset the connection.	
SYN	Synchronize sequence numbers during connection.	
FIN	Terminate the connection.	