



Parul Institute of Engineering And Technology

Topic: **Transport Layer Protocols(TCP & UDP)**

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Introduction

TCP- Transmission Control Protocol

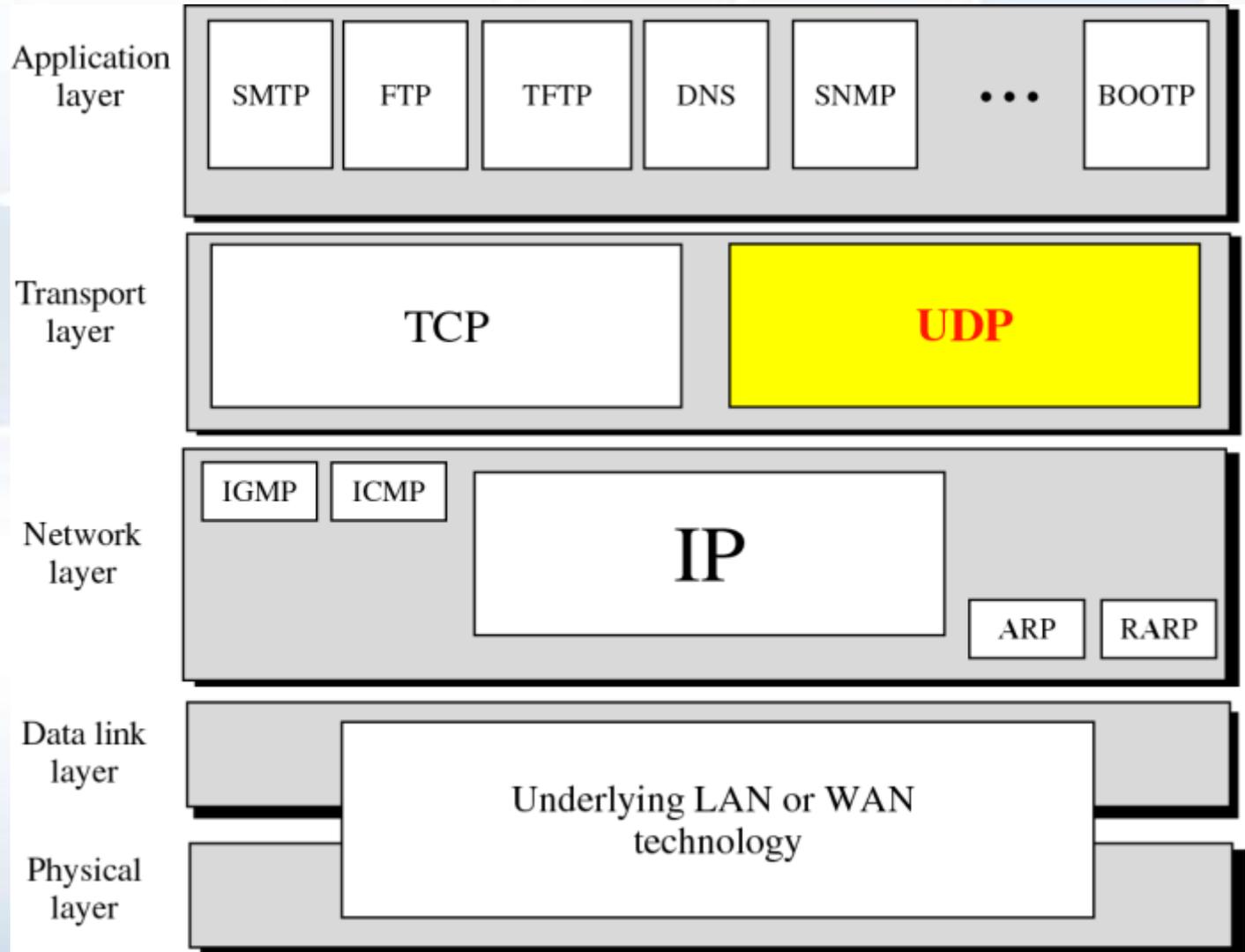
- TCP is a connection oriented services ,widely used transport layer protocol
- TCP provides process to process, full duplex .

UDP-User Datagram Protocol

- It is connectionless, unreliable transport protocol.
- process-to-process communication instead of host-to-host communication.



Position of TCP & UDP

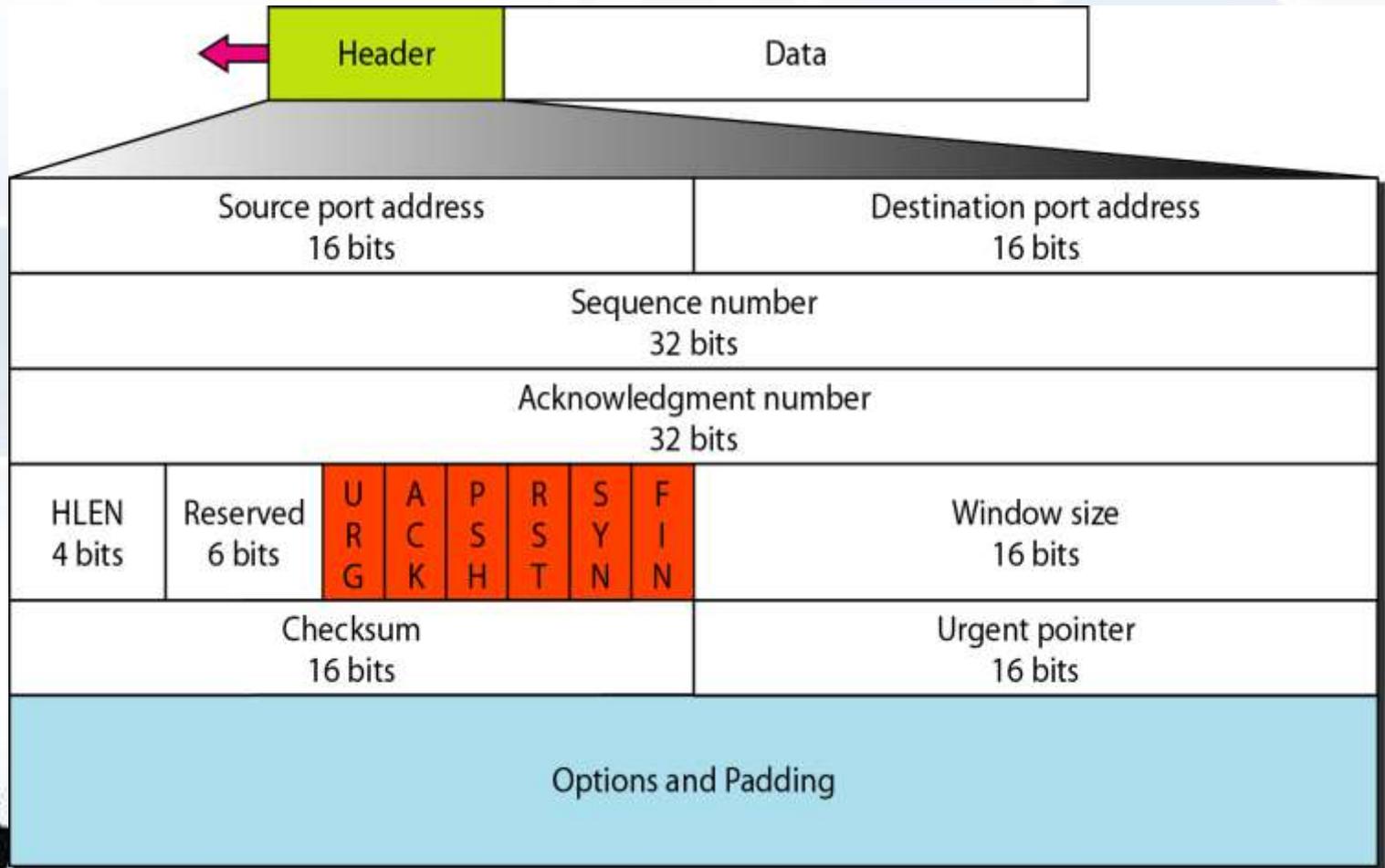


TCP Features

- Reliable transfer of data
- Flow Control
- Error Control
- Congestion Control



TCP header format



Description of field

1. **Source Port (16-bits)** - It identifies source port of the application process on the sending device.
2. **Destination Port (16-bits)** - It identifies destination port of the application process on the receiving device.
3. **Sequence Number (32-bits)** - Sequence number of data bytes of a segment in a session.
4. **Acknowledgement Number (32-bits)** - When ACK flag is set, this number contains the next sequence number of the data byte expected and works as acknowledgement of the previous data received.
5. **Data Offset (4-bits)** - This field implies both, the size of TCP header (32-bit words) and the offset of data in current packet in the whole TCP segment.
6. **Reserved (3-bits)** - Reserved for future use and all are set zero by default.



7. Flags(1-bit each)

- URG** - It indicates that Urgent Pointer field has significant data and should be processed.
- ACK** - It indicates that Acknowledgement field has significance. If ACK is cleared to 0, it indicates that packet does not contain acknowledgement.
- PSH** - When set, it is a request to the receiving station to PUSH data (as soon as it comes) to the receiving application without buffering it.
- RST** - It is used to restart a connection.
- SYN** - This flag is used to set up a connection between hosts.
- FIN** - This flag is used to release a connection and no more data is exchanged thereafter. Because packets with SYN and FIN flags have sequence numbers, they are processed in correct order.

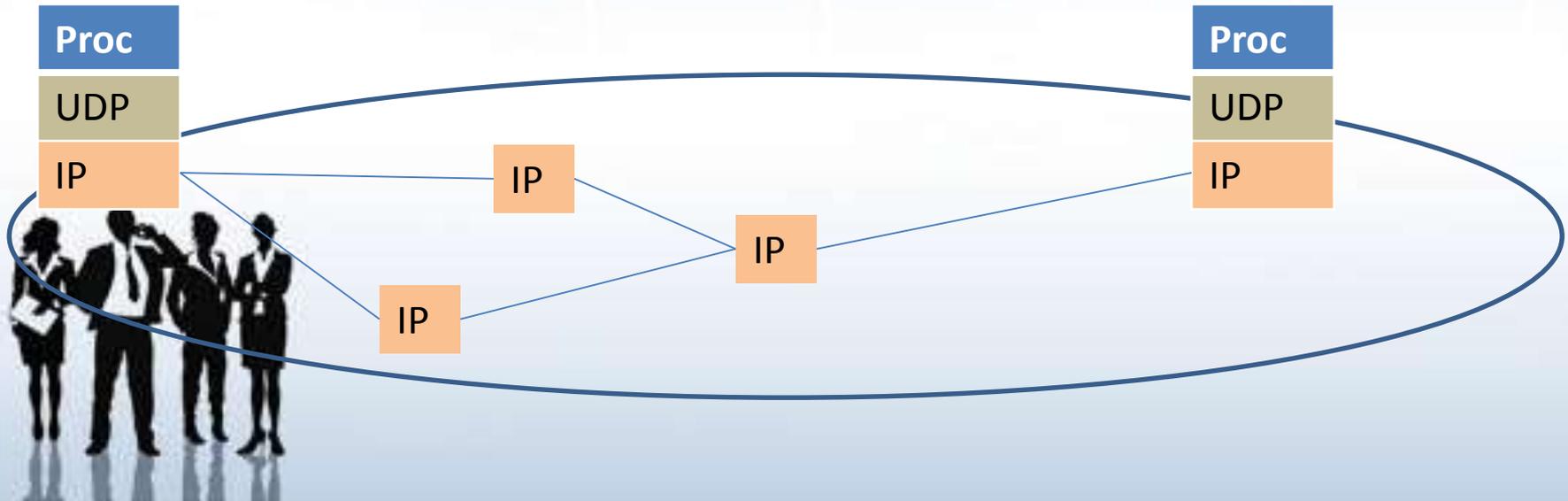


- 8. Windows Size** - This field is used for flow control between two stations and indicates the amount of buffer (in bytes) the receiver has allocated for a segment, i.e. how much data is the receiver expecting.
- 9. Checksum** - This field contains the checksum of Header, Data and Pseudo Headers.
- 10. Urgent Pointer** - It points to the urgent data byte if URG flag is set to 1.
- 11. Options** - It facilitates additional options which are not covered by the regular header. Option field is always described in 32-bit words. If this field contains data less than 32-bit, padding is used to cover the remaining bits to reach 32-bit boundary.

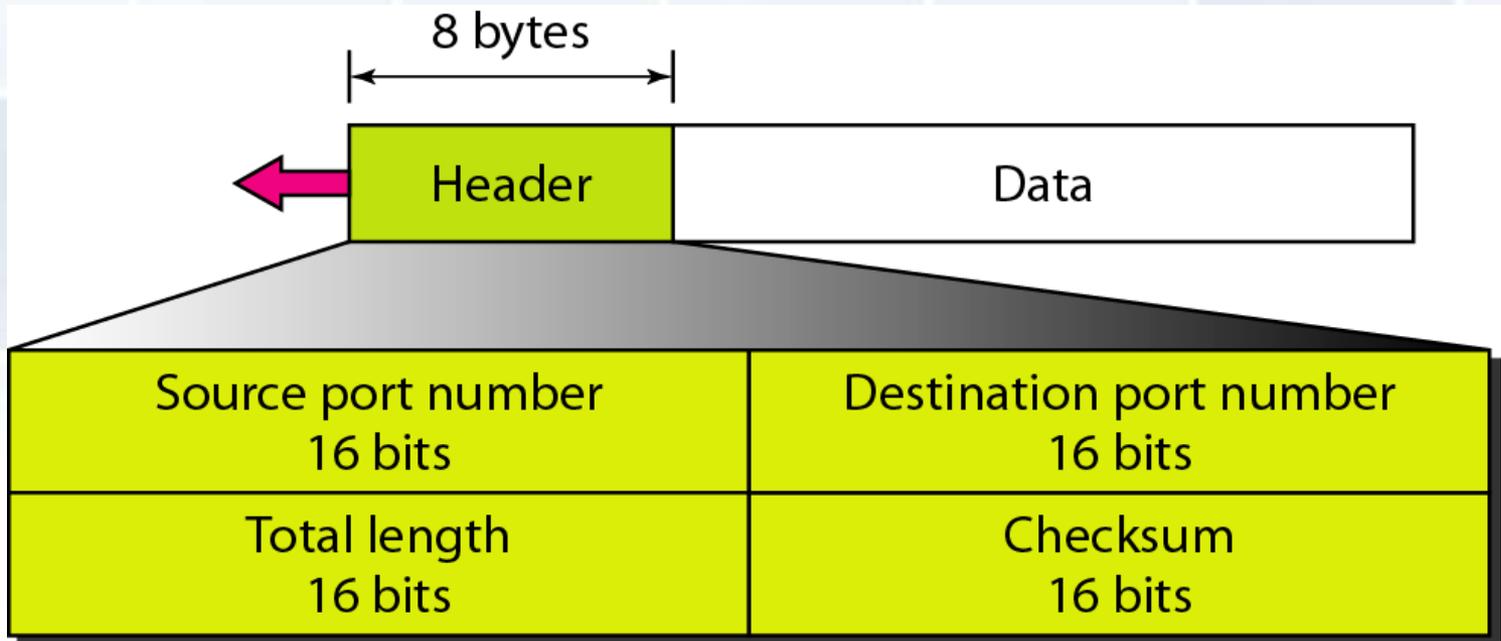


UDP-User Datagram Protocol

- Transport Layer protocol
- Connectionless
- Unreliable i.e. Best Effort service
- no handshaking between UDP sender, receiver
- each UDP segment handled independently of others
- UDP segments may be:
 - lost
 - delivered out of order



UDP Header format



Description of field

1. **Source Port** - This 16 bits information is used to identify the source port of the packet.
2. **Destination Port** - This 16 bits information, is used identify application level service on destination machine.
3. **Length** - Length field specifies the entire length of UDP packet (including header). It is 16-bits field and minimum value is 8-byte, i.e. the size of UDP header itself
4. **Checksum** - This field stores the checksum value generated by the sender before sending. IPv4 has this field as optional so when checksum field does not contain any value it is made 0 and all its bits are set to zero.



TCP Vs. UDP

No.	TCP	UDP
1.	Connection Oriented Protocol	Connection-less Protocol
2.	Connection in byte stream	Connection in message stream
3.	It does't support multicasting and broadcasting	It supports broadcasting
4.	It provides error control and flow control	Error Control and Flow control is not provided
5.	Supports full Duplex	Does not support full Duplex
6.	TCP packet is called as Segment	UDP packet is called as User Datagram



Thank You!

