# UDP

- **User Datagram Protocol (UDP)** is a Transport Layer protocol. UDP is a part of the Internet Protocol suite, referred to as UDP/IP suite. Unlike TCP, it is an **unreliable and connectionless protocol.**
- So, there is no need to establish a connection prior to data transfer. The UDP helps to establish low-latency and loss-tolerating connections establish over the network.
- The UDP enables process to process communication.

UDP Header –
- UDP header is an **8-bytes** fixed and simple header, while for TCP it may vary from 20 bytes to 60 bytes.
- The first 8 Bytes contains all necessary header information and the remaining part consist of data.
- UDP port number fields are each 16 bits long, therefore the range for port numbers is defined from 0 to 65535; port number 0 is reserved.
- Port numbers help to distinguish different user requests or processes.
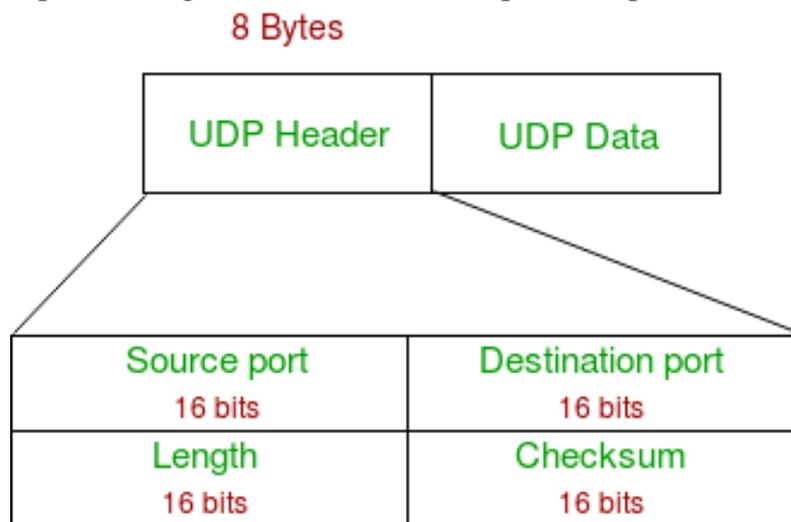
1. **Source Port:** Source Port is a 2 Byte long field used to identify the port number of the source.
2. **Destination Port:** It is a 2 Byte long field, used to identify the port of the destined packet.
3. **Length:** Length is the length of UDP including the header and the data. It is a 16-bits field.
4. **Checksum:** Checksum is 2 Bytes long field. It is the 16-bit one's complement of the one's complement sum of the UDP header, the pseudo-header of information from the IP header, and the data, padded with zero octets at the end (if necessary) to make a multiple of two octets.
- Unlike TCP, the Checksum calculation is not mandatory in UDP.
- No Error control or flow control is provided by UDP.
- Hence UDP depends on IP and ICMP for error reporting.

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- Also UDP provides port numbers so that is can differentiate between users requests.

Applications of UDP:

- Used for simple request-response communication when the size of data is less and hence there is lesser concern about flow and error control.
- It is a suitable protocol for multicasting as UDP supports packet switching.
- UDP is used for some routing update protocols like RIP(Routing Information Protocol).
- Normally used for real-time applications which can not tolerate uneven delays between sections of a received message.
- Following implementations uses UDP as a transport layer protocol:
  - NTP (Network Time Protocol)
  - DNS (Domain Name Service)
  - BOOTP, DHCP.
  - NNP (Network News Protocol)
  - Quote of the day protocol
  - TFTP, RTSP, RIP.
- The application layer can do some of the tasks through UDP-
  - Trace Route
  - Record Route
  - Timestamp
- UDP takes a datagram from Network Layer, attaches its header, and sends it to the user. So, it works fast.
- Actually, UDP is a null protocol if you remove the checksum field.
1. Reduce the requirement of computer resources.
2. When using the Multicast or Broadcast to transfer.
3. The transmission of Real-time packets, mainly in multimedia applications

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