TCP Protocol

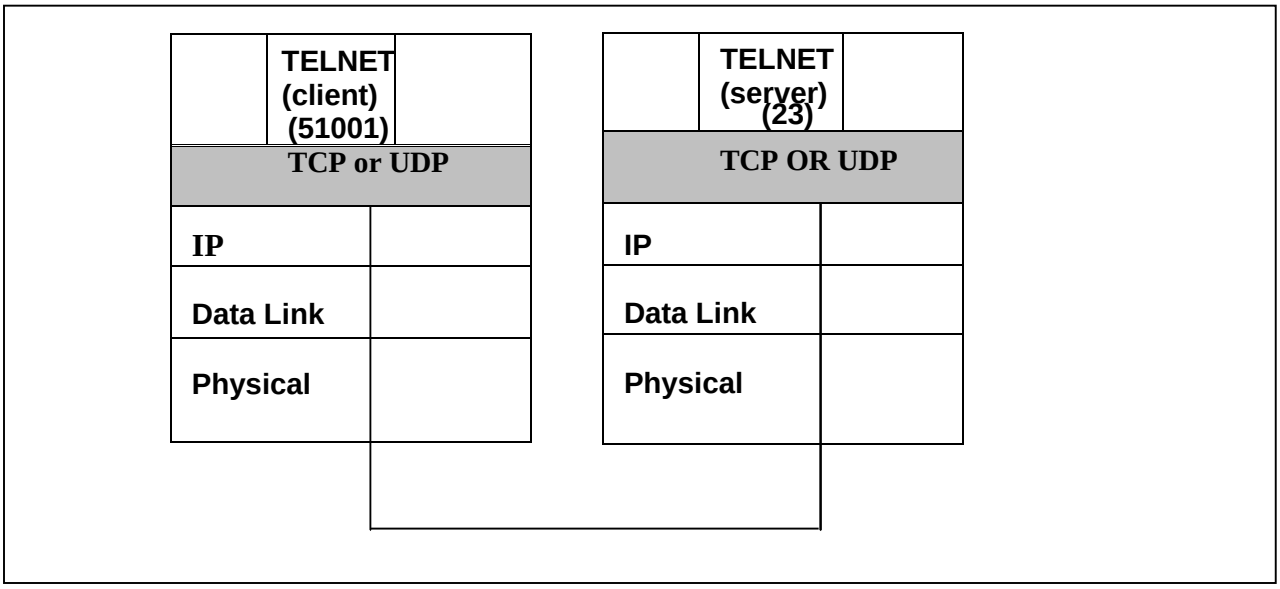
ARPA established a packet-switching network of computers linked by point-to-point leased lines called Advanced Research Project Agency Network(ARPANET) that provided a basics for early research into networking. The conventions developed by ARPA to specify how individual computers could communicate across that network became TCP/IP.

The transport layer is represented in TCP/IP by two protocols:TCP and UDP. Of these, UDP is similar; it provides nonsequenced transport functionality when reliability and security are less important than size and speed.

The transport protocols of the TCP/IP suite define a set of conceptual connections to individual process called protocol ports or, more simply, ports. A protocol port is a destination point (usually a buffer) for storing data for use by a particular process.

The IP is a host-to-host protocol, meaning that it can deliver a packet from one physical device to another. TCP/IP's transport level protocols are port-to-port protocols that work on top of the IP protocols to deliver the packet from the originating port to the IP services at the start of a transmission, and from the IP services to the destination port at the start end.

Figure Port addresses



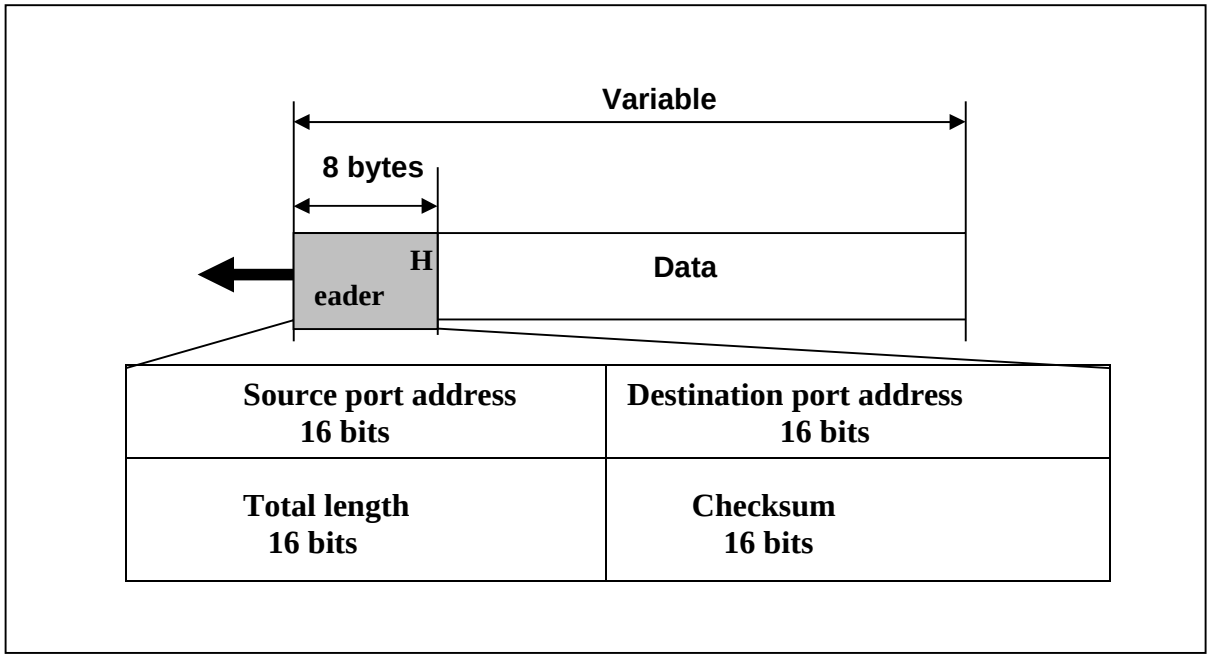
Each port is defined by a positive integer address carried in the header of a transport layer packet. An IP datagram uses the host's 32-bit Internet address. A frame at the transport level uses the process port address of 16 bits, enough to allow the support of up to 65,536(0 to 65535) ports.

USER DATAGRM PROTOCOL(UDP)

The user datagram protocol (UDP) is the simpler of the two standard TCP/IP transport protocols. It is an end-to-end transport level protocol that adds only port addresses, check sum error control, and length information to the data from the upper layer. The packet produced by the UDP is called a user datagram .

- **Source port address.** The source port address is the address of the application program that has created the message.
- **Destination port address.** The destination port address is the address of the application program that will receive the message.
- **Total length.** The total length field defines the total length of the user datagram in bytes.
- **Check sum.** The check sum is a 16-bit field used in error detection.

Figure UDP datagram format



UDP provides only the basic functions needed for end-to-end delivery of a transmission. It does not provide any sequencing or recording functions and cannot specify the damaged packet when reporting an error (for which it must be paired with ICMP). UDP can discover that an error has occurred; ICMP can then inform the sender that a user datagram has been damaged and discarded. Neither, however, has the ability to specify which packet has been lost. UDP contains only a checksum; it does not contain an ID or sequencing number for a particular data segment.

Transmission Control Protocol(TCP)

The Transmission Control Protocol (TCP) provides full transport layer services to applications. TCP is a reliable stream transport port-to-port protocol. The term stream, in this context, means connection-oriented: a connection must be established between both ends of a transmission before either may transmit data. By creating this connection, TCP generates a virtual circuit between sender and receiver that is active for the duration of a transmission.(connections for the duration of an entire exchange are different, and are handled by session functions in individual applications.) TCP begins each transmission by altering the receiver that datagrams are on their way (connection establishment) and ends each transmission with a connection termination. In this way, the receiver knows to expect the entire transmission rather than a single packet.