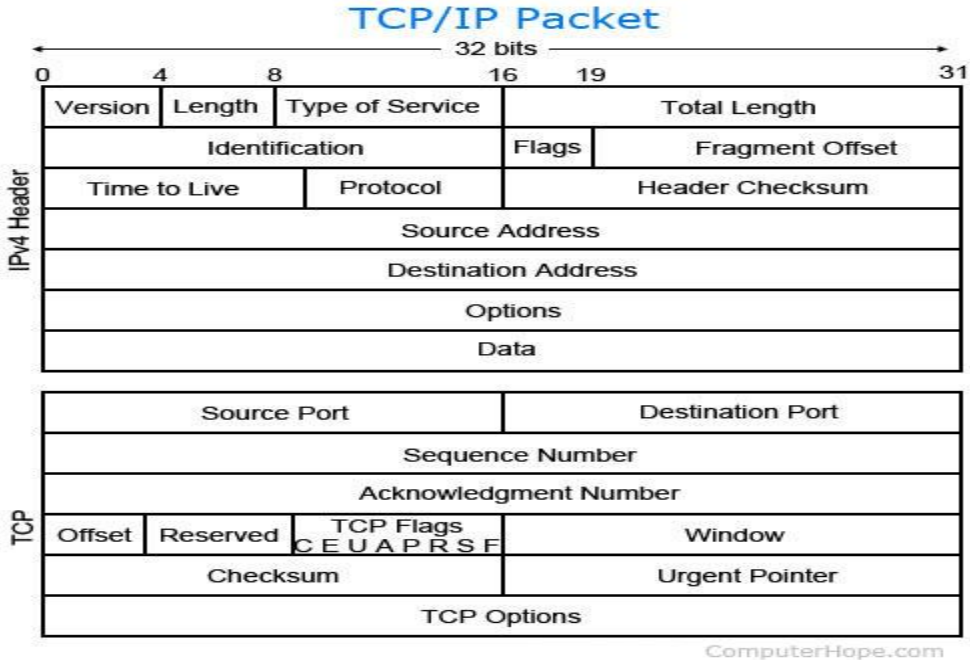


TCP/IP

Short for **Transmission Control Protocol/Internet Protocol**, **TCP/IP** is a set of rules (protocols) governing communications among all computers on the Internet. More specifically, TCP/IP dictates how information should be packaged (turned into bundles of information called packets), sent, and received, as well as how to get to its destination. TCP/IP was developed in 1978 and driven by Bob Kahn and Vint Cerf.



How does TCP/IP work?

As the name implies, TCP/IP is a combination of two separate protocols: Transmission Control Protocol (TCP) and Internet Protocol (IP). The Internet Protocol standard dictates the logistics of packets sent out over networks; it tells packets where to go and how to get there. IP has a method that lets any computer on the Internet forward a packet to another computer that is one or more intervals closer to the packet's recipient. You can think of it like workers in a line passing boulders from a quarry to a mining cart.

The Transmission Control Protocol is responsible for ensuring the reliable transmission of data across Internet-connected networks. TCP checks packets for errors and submits requests for re-transmissions if any are found.

Three of the most common TCP/IP protocols

- **HTTP** - Used between a web client and a web server, for *non-secure* data transmissions. A web client (i.e., Internet browser on a computer) sends a request to a web server to view a web page. The web server receives that request and sends the web page information back to the web client.
- **HTTPS** - Used between a web client and a web server, for *secure* data transmissions. Often used for sending credit card transaction data or other private data from a web client (i.e., Internet browser on a computer) to a web server.
- **FTP** - Used between two or more computers. One computer sends data to or receives data from another computer directly.

Domain names and TCP/IP addresses

The TCP/IP address for a website or web server is typically not easy to remember. To remedy this issue, a domain name is used instead. For example, **216.58.216.164** is one of the IP address for Google and **google.com** is the domain name. Using this method, instead of a set of numbers, makes it much easier for users to remember Computer Hope's web address.

What are the different layers of TCP/IP?

There are four total layers of TCP/IP protocol, each of which is listed below with a brief description.

- **Network Access Layer** - This layer is concerned with building packets.
- **Internet Layer** - This layer uses Internet Protocol (IP) to describe how packets are to be delivered.

- **Transport Layer** - This layer utilizes User Datagram Protocol (UDP) and Transmission Control Protocol (TCP) to ensure the proper transmission of data.
- **Application Layer** - This layer deals with application network processes. These processes include File Transfer Protocol (FTP), HyperText Transfer Protocol (HTTP), and Simple Mail Transfer Protocol (SMTP).

German Lorenz cipher machine, used in World War II to encrypt very-high-level general staff messages.