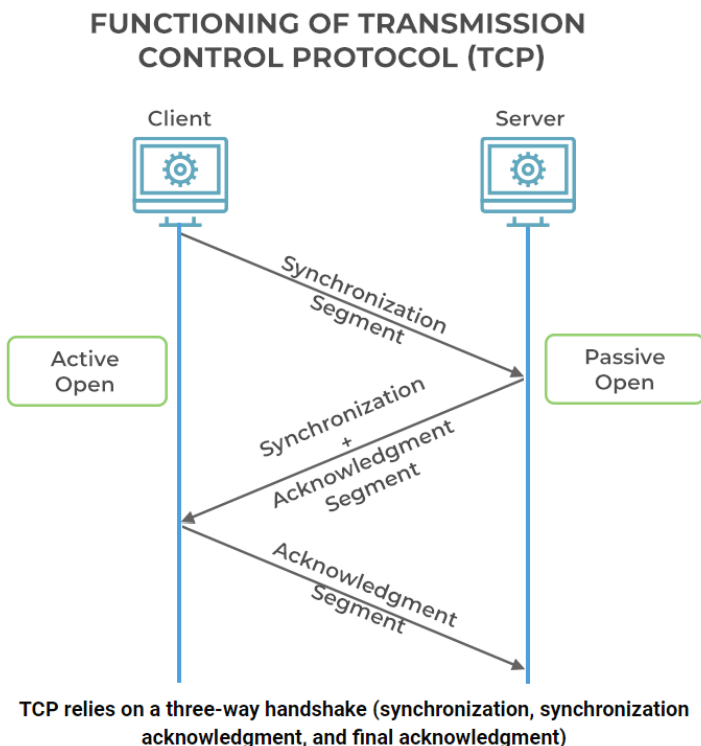


TCP/UDP

Overview

What is the TCP?

The TCP stands for Transmission Control Protocol. If we want communication between two computers and communication should be good and reliable. For example, we want to view a web page, then we expect that nothing should be missing on the page, or we want to download a file, then we require a complete file, i.e., nothing should be missing either it could be a text or an image. This can only be possible due to the TCP. It is one of the most widely used protocols over the TCP/IP network.



Features of TCP

- **Data delivery**

TCP protocol ensures that the data is received correctly, no data is missing and in order. If TCP protocol is not used, then the incorrect data can be received or out of order. For example, if we try to view the web page or download a file without using TCP, then some data or images could be missing.

- **Protocol**

TCP is a connection-oriented protocol. Through the word connection-oriented, we understand that computers first establish a connection and then do the communication. This is done by using a three-way handshake. In a three-way handshake, the first sender sends the SYN message to the receiver then the receiver sends back the SYN ACK message to confirm that the message has been received. After receiving the SYN ACK message, the sender sends the acknowledgment message to the receiver. In this way, the connection is established between the computers. Once the connection is established, the data will be delivered. This protocol guarantees the data delivery means that if the data is not received then the TCP will resend the data.

What is UDP?

The UDP stands for User Datagram Protocol. Its working is similar to the TCP as it is also used for sending and receiving the message. The main difference is that UDP is a connectionless protocol. Here, connectionless means that no connection establishes prior to communication. It also does not guarantee the delivery of data packets. It does not even care whether the data has been received on the receiver's end or not, so it is also known as the "fire-and-forget" protocol. It is also known as the "fire-and-forget" protocol as it sends the data and does not care whether the data is received or not. UDP is faster than TCP as it does not provide the assurance for the delivery of the packets.

Features 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.

Basis	Transmission Control Protocol (TCP)	User Datagram Protocol (UDP)
Type of Service	<p>TCP is a connection-oriented protocol. Connection orientation means that the communicating devices should establish a connection before transmitting data and should close the connection after transmitting the data.</p>	<p>UDP is the Datagram-oriented protocol. This is because there is no overhead for opening a connection, maintaining a connection, or terminating a connection. UDP is efficient for broadcast and multicast types of network transmission.</p>
Reliability	<p>TCP is reliable as it guarantees the delivery of data to the destination router.</p>	<p>The delivery of data to the destination cannot be guaranteed in UDP.</p>
Error checking mechanism	<p>TCP provides extensive error-checking mechanisms.</p> <p>It is because it provides flow control and acknowledgment of data.</p>	<p>UDP has only the basic error-checking mechanism using checksums.</p>
Acknowledgment	<p>An acknowledgment segment is present.</p>	<p>No acknowledgment segment.</p>
Sequence	<p>Sequencing of data is a feature of Transmission Control</p>	<p>There is no sequencing of data in UDP. If the order is required, it has to be</p>

Basis	Transmission Control Protocol (TCP)	User Datagram Protocol (UDP)
	Protocol (TCP). this means that packets arrive in order at the receiver.	managed by the application layer.
Speed	TCP is comparatively slower than UDP.	UDP is faster, simpler, and more efficient than TCP.
Retransmission	Retransmission of lost packets is possible in TCP, but not in UDP.	There is no retransmission of lost packets in the User Datagram Protocol (UDP).
Header Length	TCP has a (20-60) bytes variable length header.	UDP has an 8 bytes fixed-length header.
Weight	TCP is heavy-weight.	UDP is lightweight.
Handshaking Techniques	Uses handshakes such as SYN, ACK, SYN-ACK	It's a connectionless protocol i.e. No handshake
Broadcasting	TCP doesn't support Broadcasting.	UDP supports Broadcasting.
Protocols	TCP is used by HTTP, HTTPs, FTP, SMTP and Telnet.	UDP is used by DNS, DHCP, TFTP, SNMP, RIP, and VoIP.
Stream Type	The TCP connection is a byte stream.	UDP connection is a message stream.

Basis	Transmission Control Protocol (TCP)	User Datagram Protocol (UDP)
Overhead	Low but higher than UDP.	Very low.
Applications	This protocol is primarily utilized in situations when a safe and trustworthy communication procedure is necessary, such as in email, on the web surfing, and in military services.	This protocol is used in situations where quick communication is necessary but where dependability is not a concern, such as VoIP, game streaming, video, and music streaming, etc.