TCP vs UDP: What's the Difference and Which Protocol Is Better?

Differences between the protocols

The main difference between TCP (transmission control protocol) and UDP (user datagram protocol) is that TCP is a connection-based protocol and UDP is connectionless. While TCP is more reliable, it transfers data more slowly. UDP is less reliable but works more quickly. This makes each protocol suited to different types of data transfers.

Protocols are rules that govern how data is formatted and sent over a network. TCP and UDP are two different methods for doing the same job: transferring data via the internet. They enable servers and devices to communicate so you can send emails, watch Netflix, play games, and browse web pages.

TCP creates a secure communication line to ensure the reliable transmission of all data. Once a message is sent, the receipt is verified to make sure all the data was transferred.

UDP does not establish a connection when sending data. It sends data without confirming receipt or checking for errors. That means some or all of the data may be lost during transmission.

Factor	**TCP**	**UDP**
Connection type	Requires an established connection before transmitting data	No connection is needed to start and end a data transfer
Data sequence	Can sequence data (send in a specific order)	Cannot sequence or arrange data
Data retransmission	Can retransmit data if packets fail to arrive	No data retransmitting. Lost data can't be retrieved
Delivery	Delivery is guaranteed	Delivery is not guaranteed

Check for errors	Thorough error-checking guarantees data arrives in its intended state	Minimal error-checking covers the basics but may not prevent all errors
Broadcasting	Not supported	Supported
Speed	Slow, but complete data delivery	Fast, but at risk of incomplete data delivery

Which protocol is better: TCP or UDP?

It depends on what you're doing online and the type of data being transferred. UDP is better if you're gaming online, because its speedy data transfer allows for mostly lag-free gaming. TCP is better if you're transferring files, like family photos, because it ensures the data arrives exactly as it was sent.

Overall, TCP and UDP are both useful protocols, so to think in terms of TCP vs UDP is a bit misleading. But depending on the type of data transfer, TCP or UDP might be better for the job. Here are some examples:

TCP is best for:

- Email or texting
- File transfers
- Web browsing

UDP is best for:

- Live streaming

- Online gaming
- Video chat

Advantages of TCP

- It sets up and maintains a connection between sender and receiver.
- It operates independently of the operating system.
- It supports many routing protocols.

Disadvantages of TCP

- It uses more bandwidth and is slower than UDP.
- It’s especially slow at the beginning of a file transfer.
- It’s not suited for LAN and PAN networks.
- It can’t multicast or broadcast.

Advantages of UDP

- Smaller packet size and less overhead reduce end-to-end delay.
- Operates over a larger range of network conditions than TCP.
- UDP communication is more efficient.
- It can transmit live and real-time data.

Disadvantages of UDP

- It’s connectionless, which makes data transfer unreliable.
- There’s no system in place to acknowledge a successful data transfer.
- There’s no way to know if data is delivered in its original state, or at all.
- It has no error control, so it drops packets when errors are detected.

THANK YOU

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