What is a protocol? |

Network protocol definition

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In networking, a protocol is a set of rules for formatting and processing data. Network protocols are like a common language for computers. The computers within a network may use vastly different software and hardware; however, protocols enable them to communicate with each other regardless.

Standardized protocols are like a common language that computers can use, similar to how two people from different parts of the world may not understand each other's native languages, but they can communicate using a shared third language. If one computer uses the Internet Protocol (IP) and a second computer does as well, they will be able to communicate — just as the United Nations relies on its 6 official languages to communicate amongst representatives from all over the globe. But if one computer uses IP and the other does not know this protocol, they will be unable to communicate.

On the Internet, there are different protocols for different types of processes. Protocols are often discussed in terms of which OSI model layer they belong to.

What are the layers of the OSI model?

The Open Systems Interconnection (OSI) model is an abstract representation of how the Internet works. It contains 7 layers, with each layer representing a different category of networking functions.

layer-1

physical layer: Transmits raw bit stream over the physical medium.

layer-2

Datalink layer: defines the format of data on the network.

layer-3

network layer: decides which physical path the data will take.

layer-4

transport layer: transmits data using transmission protocols including TCP and UDP.

Layar-5

session Layar: maintains connection and is responsible for controlling ports and sessions.

layer-6

presentation layer: ensures that data is in a usable format and is where data encryption occurs.

layer-7

Application layer: human-computer interaction Layar, where applications can access the network services.

Protocols make these networking functions possible. For instance, the Internet Protocol (IP) is responsible for routing data by indicating where data packets\* come from and what their destination is. IP makes network-to-network communications possible. Hence, IP is considered a network layer (layer 3) protocol.

As another example, the Transmission Control Protocol (TCP) ensures that the transportation of packets of data across networks goes smoothly. Therefore, TCP is considered a transport layer (layer 4) protocol.

\*A packet is a small segment of data; all data sent over a network is divided into packets.

What other protocols are used on the Internet?

Some of the most important protocols to know are:

TCP: As described above, TCP is a transport layer protocol that ensures reliable data delivery. TCP is meant to be used with IP, and the two protocols are often referenced together as TCP/IP.

HTTP: The Hypertext Transfer Protocol (HTTP) is the foundation of the World Wide Web, the Internet that most users interact with. It is used for transferring data between devices. HTTP belongs to the application layer (layer 7), because it puts data into a format that applications (e.g. a browser) can use directly, without further interpretation. The lower layers of the OSI model are handled by a computer's operating system, not applications.

HTTPS: The problem with HTTP is that it is not encrypted — any attacker who intercepts an HTTP message can read it. HTTPS (HTTP Secure) corrects this by encrypting HTTP messages.

TLS/SSL: Transport Layer Security (TLS) is the protocol HTTPS uses for encryption. TLS used to be called Secure Sockets Layer (SSL).

UDP: The User Datagram Protocol (UDP) is a faster but less reliable alternative to TCP at the transport layer. It is often used in services like video streaming and gaming, where fast data delivery is paramount.