

# TCP/IP

Transmission Control Protocol / Internet Protocol describes the standardization of packet construction and routing between software and network destinations, respectively. This means that TCP/IP allows software to be created without the overhead of determining how communication packets should be constructed for each individual piece of software. This abstraction simplifies the development process by providing a well-defined process for all software that intends to communicate between devices within the network. This simplification is also seen on the receiving end, since we know how the packets were constructed before being broken down into bits and sent over the wire, we can also reconstruct them in a similar manner on the receiving end of the transmission.

The term TCP/IP describes the connectivity between the TCP and IP protocols. The TCP protocol describes how packets should be constructed and maintains the reliable connection for the data to be sent. The IP protocol describes where to deliver the data, and handles routing to the appropriate destination. When used together, we have a reliable connection between two machines across the network.

The joining of the two individual protocols gives us TCP/IP which contains the following layers, in this order. Note that this order represents the sending device, and receiving devices will actually traverse these layers backwards while reconstructing the data to the same format in which it was originally sent.

4. Application
3. Transport
2. Internet
1. Host-to-Network

These two protocols are used together so often that the term TCP/IP is commonly used in place of referring to TCP or IP individually.

## Application

Describes the application or interface that the user interacts with, such as a web browser, chat service, or email application.

This layer depends upon the subsequent layers to handle packet construction, routing, and delivery via physical infrastructure.

Protocols in this layer are HTTP, HTTPS, DNS, FTP, and Telnet

## Transport

The Transport layer is responsible for providing a reliable connection between two devices on a network. With a reliable connection the data is broken down into smaller packets which can then be sent over the wire and reconstructed on the receiving end.

Upon receiving the packets, the recipient sends an ACK (acknowledgement) of the packet having been received, and then the sender replies with an additional ACK to indicate that it is aware the packet reached its destination.

This layer depends on subsequent layers to route the packet to the correct destination, and to provide the physical infrastructure which connects the devices within the same network.

Protocols for this layer are TCP and UDP, or Transmission Control Protocol and User Datagram Protocol.

## Internet

The Internet layer is sometimes referred to as the Network layer due to it being renamed within the OSI model, which we will talk about later on this page. This layer is responsible for routing the packets to the correct destination, and handles efficiently delivering the packets by finding the shortest or least-used path available between the two devices on the network.

This layer depends on the Datalink layer to provide the physical infrastructure that allows connectivity between the two devices on the network.

The IP protocol is used in this layer, along with ARP and ICMP

## Host-to-Network

The Host-to-Network layer is sometimes referred to as the Data Link layer, Network Access layer, or the Physical layer. This layer is responsible for facilitating the physical connections and infrastructure between two devices within the same network. Examples of this

Protocols for this layer are DSL, LAN, SATNET, SONET, WiFi (802.11), and Ethernet (802.3)

# Resources and Links

[TechTarget - TCP/IP](#)

[Avast - TCP/IP](#)

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