

The TCP/IP Model

The TCP/IP model is a layered reference model, often referred to as the Internet Protocol Suite. The term **TCP/IP** stands for the two protocols:

- **Transmission Control Protocol (TCP)** – Layer 4 (Transport)
- **Internet Protocol (IP)** – Layer 3 (Network)

Layers of the TCP/IP Model

Layer	Function
4. Application	Allows applications to access the other layers' services and defines the protocols applications use to exchange data.
3. Transport	Responsible for providing (TCP) session and (UDP) datagram services for the Application Layer.
2. Internet	Responsible for host addressing, packaging, and routing functions.
1. Link	Responsible for placing the TCP/IP packets on the network medium and receiving corresponding packets from it. TCP/IP is designed to work independently of the network access method, frame format, and medium.

With TCP/IP, every application can transfer and exchange data over any network, regardless of the receiver's location. IP ensures data packet delivery, and TCP manages data transfer, ensuring a stable connection between data stream and application.

OSI vs. TCP/IP Model

- **OSI Model:** 7 Layers (Application, Presentation, Session, Transport, Network, Data-Link, Physical)
- **TCP/IP Model:** 4 Layers (Application, Transport, Internet, Link)

Key Tasks and Protocols of TCP/IP

Task	Protocol	Description
Logical Addressing	IP	Structures the network topology with logical addressing (e.g., subnetting, CIDR).
Routing	IP	Determines the next node for each packet from sender to receiver.
Error & Control Flow	TCP	Maintains virtual connections and sends control messages to verify connectivity.
Application Support	TCP	Uses TCP and UDP ports to differentiate application communication links.
Name Resolution	DNS	Resolves Fully Qualified Domain Names (FQDNs) to IP addresses.