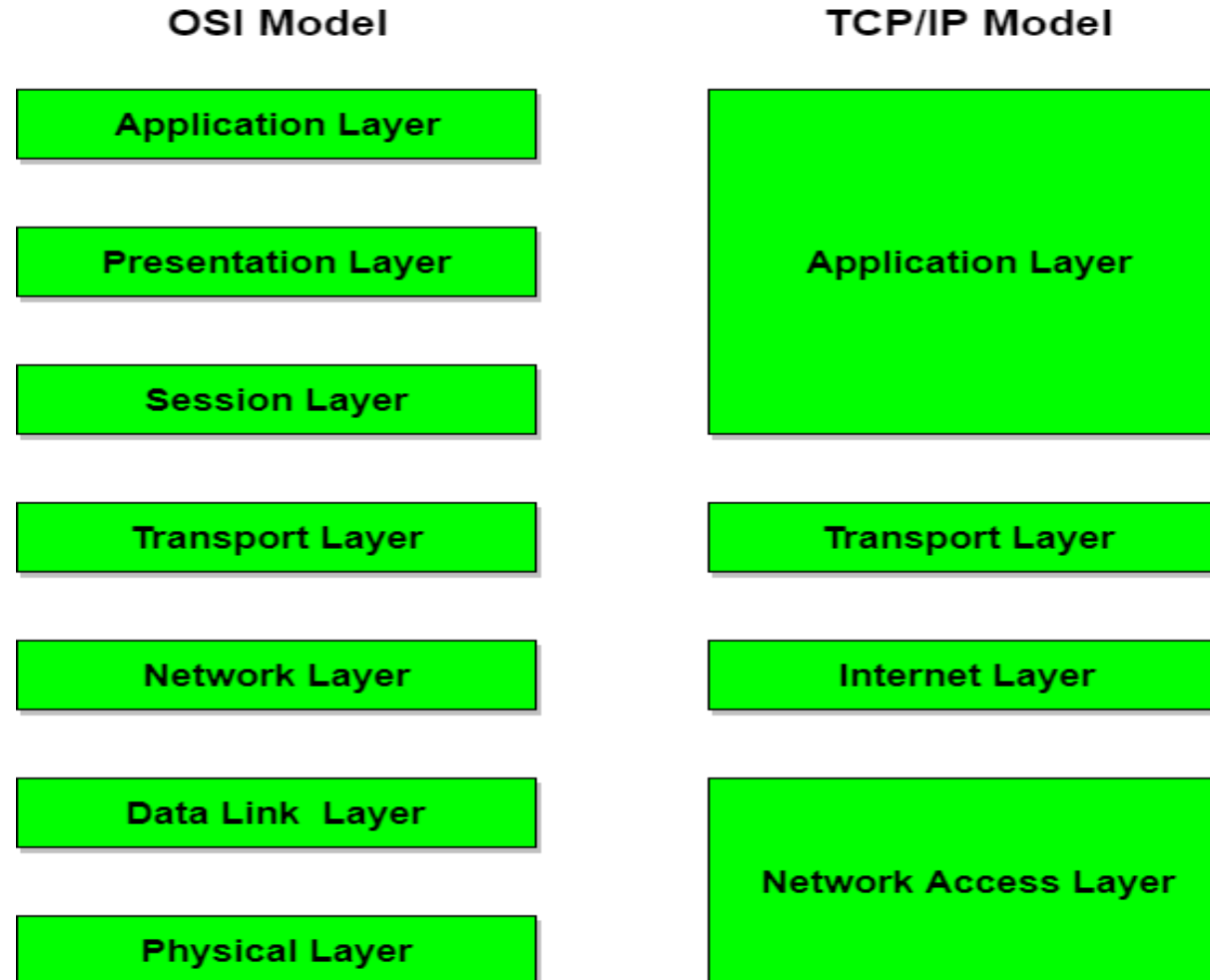# TCP/IP

The two most commonly used communication network models are TCP / IP and OSI. Many similarities and differences between them are here. The main differences is that conceptual model is OSI which is not practical for communication, while TCP / IP is used for connection establishment and network communication. Horizontal approach is followed by TCP / IP and the OSI model supports a vertical approach. For every network, including the Internet, TCP / IP is the standard protocol, whereas OSI is not a protocol, but a benchmark model for understanding and design.

- The TCP/IP protocols were initially developed as part of the research network developed by the United States Defense Advanced Research Projects Agency (DARPA or ARPA). Initially, this fledgling network, called the ARPAnet, was designed to use a number of protocols that had been adapted from existing technologies. However, they all had flaws or limitations, either in concept or in practical matters such as capacity, when used on the ARPAnet. The developers of the new network recognized that trying to use these existing protocols might eventually lead to problems as the ARPAnet scaled to a larger size and was adapted for newer uses and applications.

In 1973, development of a full-fledged system of internetworking protocols for the ARPAnet began. What many people don't realize is that in early versions of this technology, there was only one core protocol: TCP. And in fact, these letters didn't even stand for what they do today; they were for the Transmission Control Program. The first version of this predecessor of modern TCP was written in 1973

Diagrammatic Comparison between OSI Reference Model and TCP/IP Reference Model

OSI Model

| Application Layer |
| Presentation Layer |
| Session Layer |
| Transport Layer |
| Network Layer |
| Data Link Layer |
| Physical Layer |

TCP/IP Model

| Application Layer |
| Transport Layer |
| Internet Layer |
| Network Access Layer |

Network Access Layer:

- Network Access Layer is the combination of Data Link Layer and Physical Layer available in the OSI model.

- Physical Addressing is done in this layer i.e. MAC Address of source and destination is assigned to the data packets.

- Hence this layer is responsible for the physical transmission of data.

Internet Layer:

• The Internet layer is used to send an independent packet to a network to the destination.

• All the machines, Web servers, nodes that are attached to the TCP/IP network are assigned in this layer.

• It includes the IP (Internet Protocol), ICMP (Internet Control Message Protocol) and ARP (Address Resolution Protocol) as the standard packet format for the layer.

Transport Layer:

- It enables a fault-free end-to-end delivery of the data between the source and destination hosts in the form of datagrams.

- The protocols defined by this layer are TCP (Transmission Control Protocol) and UDP (User Datagram Protocol).

Application Layer:

- This layer permits users to access the services of global or private internet.

- The various protocols described in this layer are virtual terminal (TELNET), electronic mail (SMTP) and file transfer (FTP).

- Some additional protocols like DNS (Domain Name System), HTTP (Hypertext Transfer Protocol) and RTP (Real-time Transport Protocol). The working of this layer is a combination of application, presentation and session layer of the OSI model.

OSI Model and TCP/IP Comparison Table

OSI Model	TCP/IP Model
It stands for Open Systems Interconnection	It stands for Transmission Control and Internet Protocol.
It is a theoretical framework for the computer environment.	It is a customer service model that is used for data information transmission.
In the OSI model, there are 7 Layers	4 Layers are present in the TCP/IP model
Low in use	TCP/IP model is mostly used
This model is an approach in Vertical	This model is an approach in horizontal
In this model delivery of package is a guarantee	In this model delivery of package is not assured