

## TCP/IP PROTOCOL MODEL

The TCP/IP protocol suite was developed prior to the OSI model. Therefore, the layers in the TCP/IP protocol suite do not exactly match those in the OSI model.

The Original TCP/IP protocol suite was defined as having four layers: host-to-network, internet, transport, and application.

However, when TCP/IP is compared to OSI, we can say that the host-to-network layer is equivalent to the combination of the physical and data link layers. The internet layer is equivalent to the network layer, and the application layer is roughly doing the job of the session, presentation, and application layers with the transport layer in TCP/IP taking care of part of the duties of the session layer.

TCP/IP is a hierarchical protocol made up of interactive modules, each of which provides a specific functionality; however, the modules are not necessarily interdependent.

The layers of the TCP/IP protocol suite contain relatively independent protocols

that can be mixed and matched depending on the needs of the system. The term hierarchical means that each upper-level protocol is supported by one or more lower-level protocols.

The four layers of TCP/IP model are :-

- Host-to-Network Layer :- This layer is also known as network interface layer. This layer normally consists of device drivers in the OS and the network interface card attached to the system. Both the device drivers and the network interface card take care of the communication details with the media being used to transfer the data over the network.

In most of the cases, this media is in the form of cables, some of the famous protocols that are used at this layer include

ARP (Address resolution protocol), PPP (Point to point protocol) etc.

Internet Layer :- The main purpose of this layer is to organize or handle the movement of data on network. By movement of data, we generally means

transmitting of data over the network. The main protocol used at this layer is IP.

- Transport Layer :- This layer provides backbone to data flow between two hosts.

This layer receives data from the application layer above it. There are many protocols that work at this layer but the two most commonly used protocol at transport layer are TCP and UDP.

TCP is used where a reliable connection is required while UDP is used in case of unreliable connections.

TCP divides the data into proper sized chunks, and then passes these chunks onto the network.

It acknowledges received packets, waits for the acknowledgements of the packets it sent and sets timeout to resend the packets if acknowledgements are not received in time.

UDP provides a comparatively simpler but unreliable service by sending packets from one host to another. UDP does not take any extra measures to ensure that the data sent is received by the target host or not. The terms 'Unreliable Connection' are used where loss of some information does not hamper the task being fulfilled through this connection.

• Application Layer :- This is the top layer of TCP/IP protocol suite. This layer includes applications or processes that use transport layer protocols to deliver the data to destination computers.

Application layer also have various protocols that applications use to communicate with the ~~second~~ second layer, the transport layer. Some of the popular application layer protocols are :-

- HTTP (Hypertext transfer protocol)
- FTP (File transfer Protocol)
- SMTP (Simple mail transfer protocol)
- SNMP (Simple network management protocol) etc.

### Merits of TCP/IP model

- It is operated independently and it's scalable.
- Client/server architecture and supports a no. of protocols.
- Can be used to establish a connection between two computers.

### Demerits of TCP/IP

- In this, the transport layer does not guarantee delivery.
- The model cannot be used in any other application.
- Replacing protocol is not easy.