

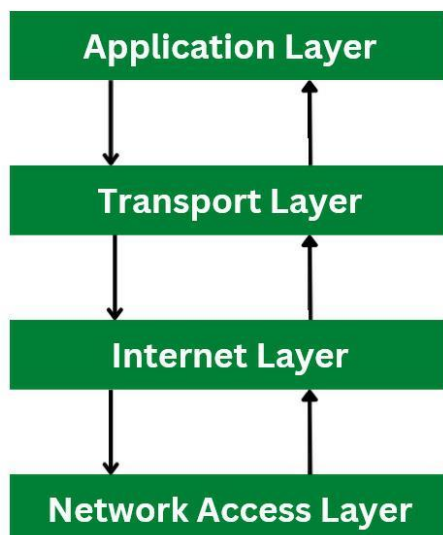
11. a) Overview of TCP/IP and application layer.

Application Layer Protocols in TCP/IP

TCP/IP stands for Transport Control Protocol/Internet Protocol. TCP/IP suite is considered as a basis on which a virtual network exists. TCP/IP makes use of client-server model for communication where service is provided by the server to the client or other systems. TCP/IP protocol consists of four layers. TCP/IP defines the rules, standards, and formats in which the message is transmitted from one system to another. Whenever any packet is transmitted over the internet it then passes through all the layers of the TCP/IP model. While a packet is being transmitted from one layer to another, each layer removes its header information.

Layers of TCP/IP Model

There are four layers in the TCP/IP model. Each layer works in order to coordinate another layer above or below it. Below is a detailed description of each layer.



Layer 1: Network Access Layer

Network access layer is the lowest layer of [TCP/IP model](#). It is a combination of data link layer and physical layer present in the OSI model. The main function of network access layer is to transmit the information from one system to another that are connected in the same network.

Layer 2: Internet Layer

Internet layer is also known as network layer. Internet layer ensures that data is sent accurately and fastly by controlling the flow and routing of traffic. If the internet traffic is more it takes more time to transfer the data.

Layer 3: Transport Layer

Transport layer is responsible to provide a reliable connection between two communicating devices. In the incoming data is divided into packets by the transport layer and makes an acknowledgement when packet is received from the sender. [UDP](#) and TCP protocols are used in transport layer.

Layer 4: Application Layer

Application layer is the top most layer in TCP/IP model. Application layer provides the devices to access network and applications such as emails, cloud storage etc. While communicating from one application layer protocol to another application layer the information is forwarded to transport layer.

Application Layer Protocols

Application layer is the top most layer of TCP/IP model. This layer performs all the task that are performed by the session layer, presentation layer and application layer. The protocols used at application layer conveys the user request to transport layer. These protocols help to transfer mail, sharing of file and terminal login. Below are the protocols used at application layer of TCP/IP Model.

1. HTTP

HTTP stands for Hypertext Transfer Protocol. This protocol is majorly used for exchanging the hyper text on different systems. HTTP is a request response protocol. With the help of Uniform Resource Locators(URLs) HTTP resources are identifiable on the networks. HTTP is considered as a base of [World Wide Web](#)(WWW). For example, HTTP is used for transferring the web pages. HTTP protocol transmits the data in MIME-like format. A HTTP request consists of HTTP version type, a URL, an HTTP method, HTTP request headers and optional HTTP body. HTTP request carries a sequence of data that is in encoded format.

2. TELNET

TELNET protocol is also known as Remote login protocol. This protocol is used for accessing the remote end protocols. TELNET protocol allows the users client to interactively log in to the server host. TELNET defines a device that is known as NVT(Network Virtual Terminal). This NVT device provides with a standard network representation of a terminal. TELNET protocol also consists of features

for the client and server for negotiating the options that can enhance their communications. Once the client and server agrees upon certain condition they can initiate their communication. When the connection between client and server is established successfully it is being presented to the Operating System of telnet server.

3. FTP

FTP stands for File Transfer Protocol. In order to perform file operations FTP allows the users to log into remote host. Various file operations supported by [FTP](#) are copying files to remote host, copying files from remote host, listing the remote directories, delete and rename remote directories. In order to provide reliable transportation of data FTP makes use of Transport Control Protocol([TCP](#)). When a successful connection is being established between FTP client and the server FTP makes an request for username and password for accessing the server host. This authorisation provides with security by denying the access to unauthorised user. FTP protocol supports various types of file formats that includes binary and ASCII format.

4. SMTP

SMTP stands for simple mail transfer protocol. This protocol is used for transferring the mails. It works on store and forward model. Within the working of a network this mail being used twice. First it is used between the sender and senders mail server. At second time it is used between the two mail servers. In this protocol the transfer of mails is being done by the Message Transfer Agents([MTA](#)). Therefore the system that wants to send the mail from one system to another they must have client message transfer agents and server message transfer agents. When any client sends a mail to server it keeps a copy of mail until the mail is successfully received by the server client. IT makes use of TCP for reliable transmission of data.

5. DNS

DNS stands for Domain Name System. [DNS](#) is a decentralised naming system used by the computer system and other devices over the internet. It translates the domain name into IP address and IP address into domain name. The advantage provided by DNS is that the user need not to remember the IP address, but Domain name is sufficient. Once the user searches for particular website using domain name, this DNS query is being sent to DNS server that maps the IP address against domain name. When it gets the address an HTTP session is then built with the IP address. The protocols supported by Domain

Name System are TCP and UDP. These domains are classified into three types namely generic domain, country domain and inverse domain.

6. DHCP

DHCP stands for Dynamic Host Configuration Protocol. DHCP is a network management protocol at the application layer of TCP/IP model. The Internet Protocol can allocate IP address to the devices connected in network so that they can communicate with each other with the help of Dynamic Host Configuration Protocol.