UNIT _- 5

Application Layer Introduction

Application layer is the top most layer in OSI and TCP/IP layered model. This layer exists in both layered Models because of its significance, of interacting with user and user applications. This layer is for applications which are involved in communication system.

A user may or may not directly interacts with the applications. Application layer is where the actual communication is initiated and reflects. Because this layer is on the top of the layer stack, it does not serve any other layers. Application layer takes the help of Transport and all layers below it to communicate or transfer its data to the remote host.

On the other hand, when we use a Web Browser, which is actually using Hyper Text Transfer Protocol (HTTP) to interact with the network. HTTP is Application Layer protocol.

Another example is File Transfer Protocol, which helps a user to transfer text based or binary files across the network. A user can use this protocol in either GUI based software like FileZilla or CuteFTP and the same user can use FTP in Command Line mode.

Protocols in Application Layer

Application Layer:-

The application layer is present at the top of the OSI model. It is the layer through which users interact. It provides services to the user.

Application Layer protocol:-

1 . TELNET:

Telnet stands for the **TEL**ecomunications **NET**work. It helps in terminal emulation. It allows Telnet client to access the resources of the Telnet server. It is used for managing the files on the internet. It is used for initial set up of devices like switches. The telnet command is a command that uses the Telnet protocol to communicate with a remote device or system. Port number of telnet is 23.

Command

```
telnet [\\RemoteServer]
```

```
\\RemoteServer   : Specifies the name of the server to which you want to
connect
```

2. FTP:

FTP stands for file transfer protocol. It is the protocol that actually lets us transfer files.It can facilitate this between any two machines using it. But FTP is not just a protocol but it is also a program.FTP promotes sharing of files via remote computers with reliable and efficient data transfer. Port number for FTP is 20 for data and 21 for control.

Command

```
ftp machinename
```

3. TFTP:

The Trivial File Transfer Protocol (TFTP) is the stripped-down, stock version of FTP, but it's the protocol of choice if you know exactly what you want and where to find it. It's a technology for transferring files between network devices and is a simplified version of FTP

Command

```
tftp [ options... ] [host [port]] [-c command]
```

4. NFS:

It stands for network file system.It allows remote hosts to mount file systems over a network and interact with those file systems as though they are mounted locally. This enables system administrators to consolidate resources onto centralized servers on the network.

Command

```
service nfs start
```

5. SMTP:

It stands for Simple Mail Transfer Protocol. It is a part of the TCP/IP protocol. Using a process called "store and forward," SMTP moves your email on and across networks. It works closely with something called the Mail Transfer Agent (MTA) to send your communication to the right computer and email inbox. Port number for SMTP is 25.

Command

```
MAIL FROM:<mail@abc.com?
```

6 . X window:

It defines a protocol for the writing of graphical user interface–based client/server applications. The idea is to allow a program, called a client, to run on one computer. It is primarily used in networks of interconnected mainframes.

7. DNS:

It stands for Domain Name Service. Every time you use a domain name, therefore, a DNS service must translate the name into the corresponding IP address. For example, the domain name www.abc.com might translate to 198.105.232.4.
Port number for DNS is 53.
Command

```
ipconfig /flushdns
```

8. DHCP:

It stands for Dynamic Host Configuration Protocol (DHCP).It gives IP addresses to hosts.There is a lot of information a DHCP server can provide to a host when the host is registering for an IP address with the DHCP server. Port number for DHCP is 67, 68.

Command

```
clear ip dhcp binding {address | * }
```

TCP/IP Network Model

The TCP/IP Model separates networking functions into discrete layers. Each layer performs a specific function and is transparent to the layer above it and the layer below it. Network models are used to conceptualize how networks should work, so that hardware and network protocols can interoperate. The TCP/IP model is one of the two most common network models, the other being the OSI Model.

The TCP/IP Model of networking is a different way of looking at networking. Because the model was developed to describe TCP/IP, it is the closest model of the Internet, which uses TCP/IP.

The TCP/IP network model breaks down into four (4) layers:

- Application Layer
- Transport Layer
- Internet Layer
- Network Access Layer

TCP/IP Model Layers

It was designed and developed by Department of Defense (DoD) in 1960s and is based on standard protocols. It stands for Transmission Control Protocol/Internet Protocol. The **TCP/IP model** is a concise version of the OSI model.

Application Layer

The Application Layer provides the user with the interface to communication. This could be your web browser, e-mail client (Outlook, Eudora or Thunderbird), or a file transfer client.

The Application Layer is where your web browser, a telnet, ftp, e-mail or other client application runs. Basically, any application that rides on top of TCP and/or UDP that uses a pair of virtual network sockets and a pair of IP addresses.

The Application Layer sends to, and receives data from, the Transport Layer.

Transport Layer

The Transport Layer provides the means for the transport of data segments across the Internet Layer. The Transport Layer is concerned with end-to-end (host-to-host) communication.

Transmission Control Protocol provides reliable, connection-oriented transport of data between two endpoints (sockets) on two computers that use Internet Protocol to communicate.

User Datagram Protocol provides unreliable, connectionless transport of data between two endpoints (sockets) on two computers that use Internet Protocol to communicate.

The Transport Layer sends data to the Internet layer when transmitting and sends data to the Application Layer when receiving.

Internet Layer

The Internet Layer provides connectionless communication across one or more networks, a global logical addressing scheme and packetization of data. The Internet Layer is concerned with network to network communication.

The Internet Layer is responsible for packetization, addressing and routing of data on the network. Internet Protocol provides the packetization, logical addressing and routing functions that forward packets from one computer to another.

The Internet Layer communicates with the Transport Layer when receiving and sends data to the Network Access Layer when transmitting.

Network Access Layer

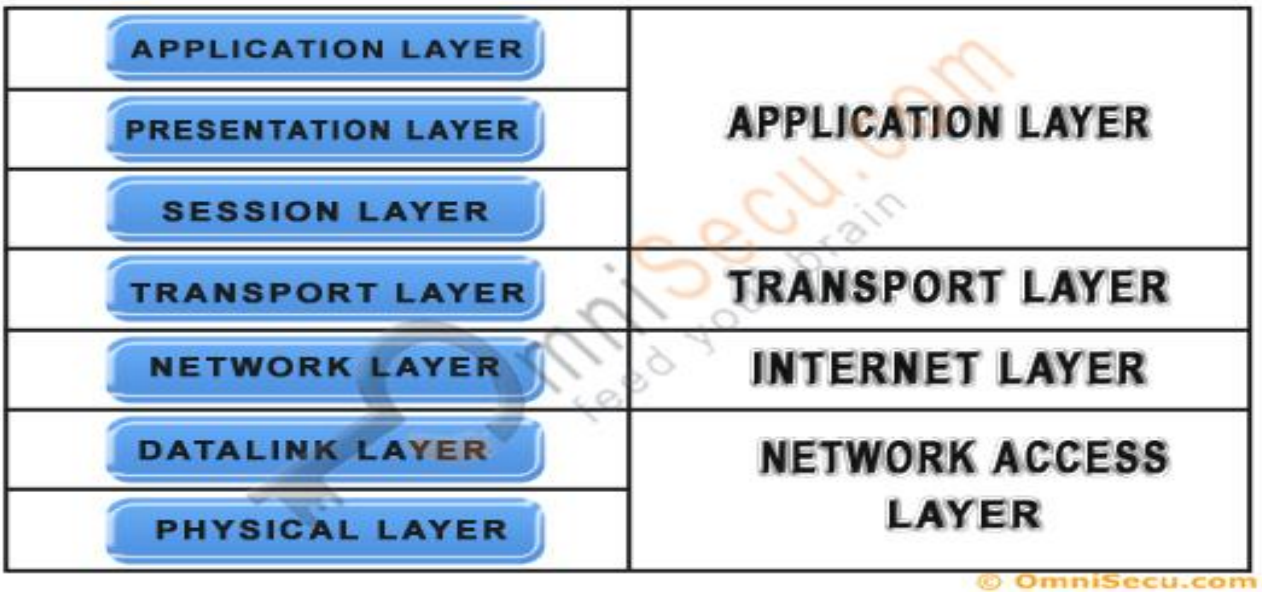
The Network Access Layer provides access to the physical network.

This is your network interface card. Ethernet, FDDI, Token Ring, ATM, OC, HSSI, or even Wi-Fi are all examples of network interfaces. The purpose of a network interface is to allow your computer to access the wire, wireless or fiber optic network infrastructure and send data to other computers.

The Network Access Layer transmits data on the physical network when sending and transmits data to the Internet Layer when receiving.

All Internet-based applications and their data, whether it is a web browser downloading a web page, Microsoft Outlook sending an e-mail, a file, an instant message, a Skype video or voice call; the data is chopped into data segments and encapsulated in Transport Layer Protocol Data Units or PDU's (TCP or UDP segments). The Transport Layer PDU's are then encapsulated in Internet Layer's Internet Protocol packets. The Internet Protocol packets are then chopped into frames at the Network Access layer and transmitted across the physial media (copper wires, fiber optic cables or the air) to the next station in the network.

The OSI Model uses seven layers, and differs quite a bit from the TCP/IP model. The TCP/IP model does a better job of representing how TCP/IP works in a network, but the OSI Model is still the networking model most technical people refer to during troubleshooting or network architecture discussions.



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