

Application Layer in OSI Model

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The Application Layer of OSI (Open System Interconnection) model, is the top layer in this model and takes care of network communication. The application layer provides the functionality to send and receive data from users. It acts as the interface between the user and the application. The application provides services like file transmission, mail service, and many more.

In this article we will explore the application layer in the OSI model, application layer functions, the working of the application layer, and services provided by the application layer.

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What is an Application Layer in OSI Model?

Application Layer is the topmost layer in the <u>Open System Interconnection</u> (<u>OSI</u>) model. This layer provides several ways for manipulating the data (information) which actually enables any type of user to access network file transfer, and remote login. To fully master the functionalities of the OSI model, especially in relation to the application layer, exploring advanced study materials can be beneficial. The <u>GATE CS and IT – 2025 course</u> covers the OSI model in detail, with a special focus on application layer services, helping you better understand its real-world applications

The Application Layer interface directly interacts with application and provides common web application services. This layer is basically highest level of open system, which provides services directly for application process.

Application Layer

<u>Presentation LayerSession LayerTransport LayerNetwork LayerData</u> LayerPhysical Layer

Functions of Application Layer

The Application Layer, as discussed above, being topmost layer in OSI model, performs several kinds of functions which are requirement in any kind of application or communication process. Following are list of functions which are performed by Application Layer of OSI Model:

Data from User <=> Application layer <=> Data from Presentation Layer

- Application Layer provides a facility by which users can forward several emails and it also provides a storage facility.
- This layer allows users to access, retrieve and manage files in a remote computer.
- It allows users to log on as a remote host.
- This layer provides access to global information about various services.

- This layer provides services which include: e-mail, transferring files, distributing results to the user, directory services, network resources and so on.
- It provides protocols that allow software to send and receive information and present meaningful data to users.
- It handles issues such as network transparency, resource allocation and so on.
- This layer serves as a window for users and application processes to access network services.
- Application Layer is basically not a function, but it performs application layer functions.
- The application layer is actually an abstraction layer that specifies the shared protocols and interface methods used by hosts in a communication network.
- Application Layer helps us to identify communication partners, and synchronizing communication.
- This layer allows users to interact with other software applications.
- In this layer, data is in visual form, which makes users truly understand data rather than remembering or visualize the data in the binary format (0's or 1's).
- This application layer basically interacts with Operating System (OS) and thus further preserves the data in a suitable manner.
- This layer also receives and preserves data from it's previous layer, which is Presentation Layer (which carries in itself the syntax and semantics of the information transmitted).
- The protocols which are used in this application layer depend upon what information users wish to send or receive.
- This application layer, in general, performs host initialization followed by remote login to hosts.

Working of Application Layer in OSI Model

The application layer in the OSI model generally acts only like the interface which is responsible for communicating with host-based and

user applications. This is in contrast with TCP/IP protocol, wherein the layers below the application layer, which is Session Layer and Presentation layer, are clubbed together and form a simple single layer which is responsible for performing the functions, which includes controlling the dialogues between computers, establishing as well as maintaining as well as ending a particular session, providing data compression and data encryption and so on.

Working of Application Layer

- At first, client sends a command to server and when server receives that command, it allocates port number to client.
- Thereafter, the client sends an initiation connection request to server and when server receives request, it gives acknowledgement (ACK) to client through client has successfully established a connection with the server.
- Therefore, now client has access to server through which it may either ask server to send any types of files or other documents or it may upload some files or documents on server itself.

Features Provided by Application Layer Protocols

To ensure smooth communication, application layer protocols are implemented the same on source host and destination host. The following are some of the features which are provided by Application layer protocols-

- The Application Layer protocol defines process for both parties which are involved in communication.
- These protocols define the type of message being sent or received from any side (either source host or destination host).
- These protocols also define basic syntax of the message being forwarded or retrieved.
- These protocols define the way to send a message and the expected response.
- These protocols also define interaction with the next level.

Services Provided by Application Layer

The services provided by application layer in OSI model are:

- It provides interface between user and application.
- It is used for remote login.
- It is used for file transfer.
- It is used for mail services and transfers.
- It is also used to transfer multimedia files.
- It is used for resource sharing.
- It is used for data synchronization.
- It is used for authentication services.

Application Layer Protocols

The application layer provides several protocols which allow any software to easily send and receive information and present meaningful data to its users. The following are some of the <u>application layer protocols</u>.

- **TELNET:** <u>Telnet</u> stands for Telecommunications Network. This protocol is used for managing files over the Internet. It allows the Telnet clients to access the resources of Telnet server. Telnet uses port number 23.
- DNS: DNS stands for Domain Name System. The DNS service translates the domain name (selected by user) into the corresponding IP address. For example- If you choose the domain name as www.abcd.com, then DNS must translate it as 192.36.20.8 (random IP address written just for understanding purposes). DNS protocol uses the port number 53.
- DHCP: DHCP stands for Dynamic Host Configuration Protocol. It provides IP addresses to hosts. Whenever a host tries to register for an IP address with the DHCP server, DHCP server provides lots of information to the corresponding host. DHCP uses port numbers 67 and 68.
- **FTP:** FTP stands for File Transfer Protocol. This protocol helps to transfer different files from one device to another. FTP promotes sharing of files via remote computer devices with reliable, efficient data