**7 Layers of the OSI Model**

OSI model is a layered server architecture system in which each layer is defined according to a specific function to perform. All these seven layers work collaboratively to transmit the data from one layer to another.

- **The Upper Layers**: It deals with application issues and mostly implemented only in software. The highest is closest to the end system user. In this layer, communication from one end-user to another begins by using the interaction between the application layer. It will process all the way to end-user.
- **The Lower Layers**: These layers handle activities related to data transport. The physical layer and datalink layers also implemented in software and hardware.

Upper and Lower layers further divide network architecture into seven different layers as below

- Application
- Presentation
- Session
- Transport
- Network, Data-link
- Physical layers
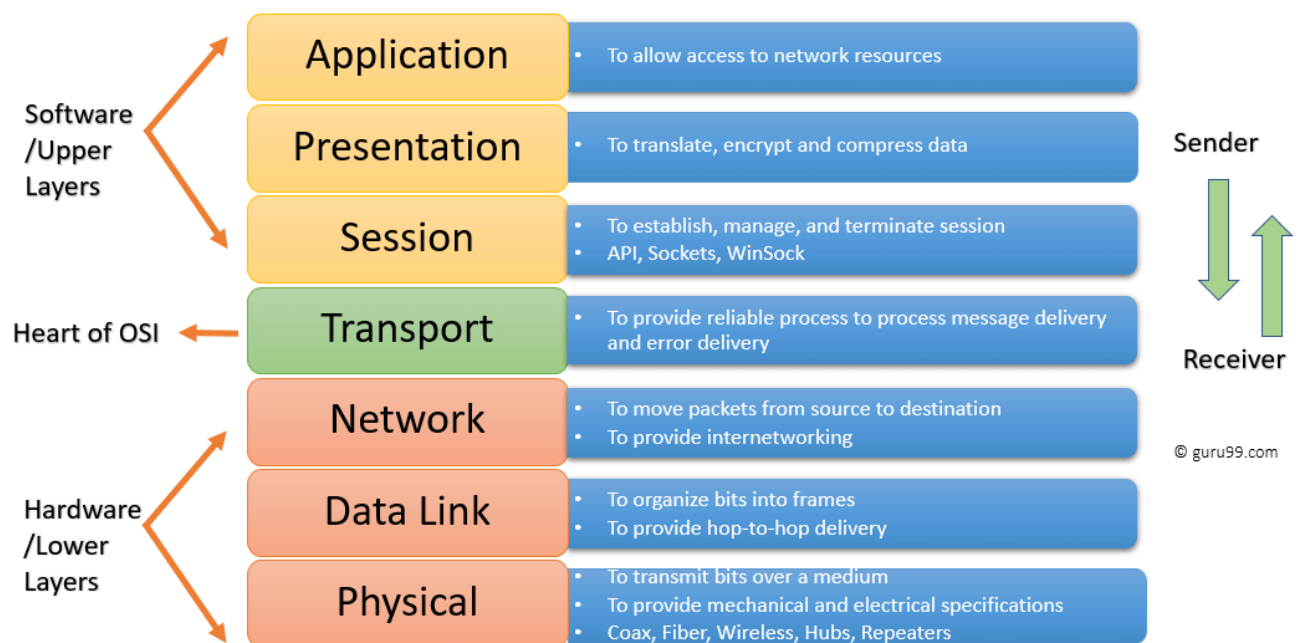
Network Layers Diagram

Let's Study each layer in detail:

Physical Layer

The physical layer helps you to define the electrical and physical specifications of the data connection. This level establishes the relationship between a device and a physical transmission medium. The physical layer is not concerned with protocols or other such higher-layer items.

Examples of hardware in the physical layer are network adapters, ethernet, repeaters, networking hubs, etc.

Data Link Layer:

Data link layer corrects errors which can occur at the physical layer. The layer allows you to define the protocol to establish and terminates a connection between two connected network devices.

It is IP address understandable layer, which helps you to define logical addressing so that any endpoint should be identified.

The layer also helps you implement routing of packets through a network. It helps you to define the best path, which allows you to take data from the source to the destination.

The data link layer is subdivided into two types of sublayers:

1. Media Access Control (MAC) layer- It is responsible for controlling how device in a network gain access to medium and permits to transmit data.
2. Logical link control layer- This layer is responsible for identity and encapsulating network-layer protocols and allows you to find the error.

Important Functions of Datalink Layer:

- Framing which divides the data from Network layer into frames.
- Allows you to add header to the frame to define the physical address of the source and the destination machine
- Adds Logical addresses of the sender and receivers
- It is also responsible for the sourcing process to the destination process delivery of the entire message.
- It also offers a system for error control in which it detects retransmits damage or lost frames.
- Datalink layer also provides a mechanism to transmit data over independent networks which are linked together.

Network Layer:

The network layer provides the functional and procedural means of transferring variable length data sequences from one node to another connected in "different networks".

Message delivery at the network layer does not give any guaranteed to be reliable network layer protocol.

Layer-management protocols that belong to the network layer are:

1. routing protocols
2. multicast group management
3. network-layer address assignment.

Transport Layer:

The transport layer builds on the network layer to provide data transport from a process on a source machine to a process on a destination machine.

It determines how much data should be sent where and at what rate. This layer builds on the message which are received from the application layer. It helps ensure that data units are delivered error-free and in sequence.

Transport layer helps you to control the reliability of a link through flow control, error control, and segmentation or desegmentation.

The transport layer also offers an acknowledgment of the successful data transmission and sends the next data in case no errors occurred. TCP is the best-known example of the transport layer.

Important functions of Transport Layers:

- **It divides the message received from the session layer into segments and numbers them to make a sequence.**
- **Transport layer makes sure that the message is delivered to the correct process on the destination machine.**
- **It also makes sure that the entire message arrives without any error else it should be retransmitted.**

Session Layer

Session Layer controls the dialogues between computers. It helps you to establish starting and terminating the connections between the local and remote application.

This layer request for a logical connection which should be established on end user's requirement. This layer handles all the important log-on or password validation.

Session layer offers services like dialog discipline, which can be duplex or half-duplex. It is mostly implemented in application environments that use remote procedure calls.

Important function of Session Layer:

- It establishes, maintains, and ends a session.
- Session layer enables two systems to enter into a dialog
- It also allows a process to add a checkpoint to steam of data.

Presentation Layer

Presentation layer allows you to define the form in which the data is to exchange between the two communicating entities. It also helps you to handles data compression and data encryption.

This layer transforms data into the form which is accepted by the application. It also formats and encrypts data which should be sent across all the networks. This layer is also known as a **syntax layer**.

The function of Presentation Layers:

two systems are usually exchanging information in the form of character strings, numbers- The infonnation must be changed to bit streams before being transmitted- computers use different encoding systems

sender-dependent format into a common format- receiving machine changes the common format into its receiver-dependent format.

- Character code translation from ASCII to EBCDIC.
- **Data compression**: Allows to reduce the number of bits that needs to be transmitted on the network.
- **Data encryption:** Helps you to encrypt data for security purposes — for example, password encryption.
- It provides a user interface and support for services like email and file transfer.

Application Layer

Application layer interacts with an application program, which is the highest level of OSI model. The application layer is the OSI layer, which is closest to the end-user. It means OSI application layer allows users to interact with other software application.

**It enables the user, to access the network. It provides user interfaces and support for services such as electronic mail,
remote file access and transfer, shared database management, and other types of distributed information services**

Example of the application layer is an application such as file transfer, email, remote login, etc.

The function of the Application Layers are:

- Application-layer helps you to identify communication partners, determining resource availability, and synchronizing communication.
- It allows users to log on to a remote host
- This layer provides various e-mail services
- This application offers distributed database sources and access for global information about various objects and services.