# Unit 3
Lecture 9

Open Systems Interconnection (OSI) Model:

- An Open System is a set of protocols that allows any two different systems to communicate regardless of their underlying architecture.

- The purpose of the OSI Model is to show how to facilitate communication between different systems without requiring changes to the logic of the underlying hardware and software.

- The OSI Model is a model for understanding and designing a network architecture that is flexible, robust, and interoperable.

- The OSI model is a layered framework for the design of network systems that allows communication between all types of computer systems.

- It consists of seven separate but related layers, each of which defines a part of the process of moving information across a network.
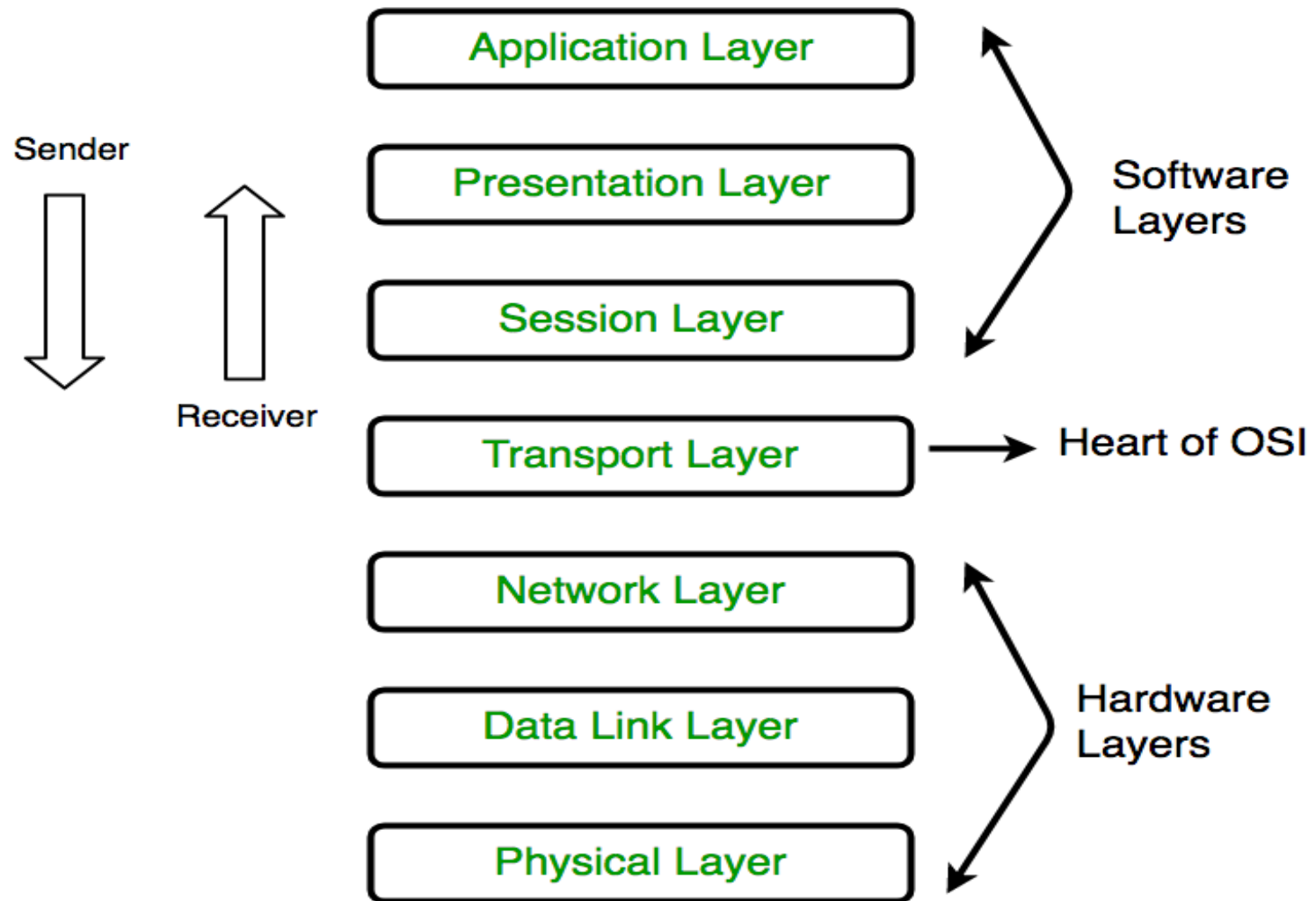
Functions of a Physical layer:

- **Line Configuration:** It defines the way how two or more devices can be connected physically.

- **Data Transmission:** It defines the transmission mode whether it is simplex, half-duplex or full-duplex mode between the two devices on the network.

- **Topology:** It defines the way how network devices are arranged.

- **Signals:** It determines the type of the signal used for transmitting the information.

2. Data Link Layer

- **Physical Addressing:** The Data link layer adds a header to the frame that contains a destination address.

- **Flow Control:** Flow control is the main functionality of the Data-link layer. It is the technique through which the constant data rate is maintained on both the sides so that no data get corrupted

- **Error Control:** Error control is achieved by adding a calculated value CRC (Cyclic Redundancy Check) that is placed to the Data link layer's trailer which is added to the message frame before it is sent to the physical layer.

- **Access Control:** When two or more devices are connected to the same communication channel, then the data link layer protocols are used to determine which device has control over the link at a given time.

3. Network Layer:

- **Internetworking:** An internetworking is the main responsibility of the network layer. It provides a logical connection between different devices.

- **Addressing:** A Network layer adds the source and destination address to the header of the frame.

- **Routing:** Routing is the major component of the network layer, and it determines the best optimal path out of the multiple paths from source to the destination.

- **Packetizing:** A Network Layer receives the packets from the upper layer and converts them into packets. This process is known as Packetizing.

3. Transport layer

- The Transport layer is a Layer 4 ensures that messages are transmitted in the order in which they are sent and there is no duplication of data.

- The main responsibility of the transport layer is to transfer the data completely.

- It receives the data from the upper layer and converts them into smaller units known as segments.

- This layer can be termed as an end-to-end layer as it provides a point-to-point connection between source and destination to deliver the data reliably

Functions:

- Segmentation and reassembly

- Connection control

- Flow control

- Error control

5. Session Layer

- The Session layer is used to establish, maintain and synchronizes the interaction between communicating devices.

Functions:

- **Dialog control:** Session layer acts as a dialog controller that creates a dialog between two processes or we can say that it allows the communication between two processes which can be either half-duplex or full-duplex.

- **Synchronization:** Session layer adds some checkpoints when transmitting the data in a sequence. If some error occurs in the middle of the transmission of data, then the transmission will take place again from the checkpoint

6. Presentation Layer

- A Presentation layer is mainly concerned with the syntax and semantics of the information exchanged between the two systems.

- It acts as a data translator for a network.

- This layer is a part of the operating system that converts the data from one presentation format to another format.

- The Presentation layer is also known as the syntax layer.

Functions:

- Translation:

- Encryption:

- Compression:

7. Application Layer

- An application layer serves as a window for users and application processes to access network service.

- It handles issues such as network transparency, resource allocation, etc.

- An application layer is not an application, but it performs the application layer functions. This layer provides the network services to the end-users

Functions:

- File transfer, access, and management (FTAM): An application layer allows a user to access the files in a remote computer, to retrieve the files from a computer and to manage the files in a remote computer.

- Mail services: An application layer provides the facility for email forwarding and storage.

- Directory services