

OSI Reference Model

- OSI is short for Open Systems Interconnection.
- OSI model was first introduced by the International Organization for Standardization (ISO) in 1984
- it contains 7 different layers that interact with each other.
- Each layer in the OSI reference model has a name, a number, protocol that provides specific functions and define service.

- Commonly referred to as the OSI reference model.
- The OSI model is a theoretical blueprint that helps us understand how data gets from one user's computer to another.
- It is a model that helps develop standards so that all of our hardware and software talks nicely to each other.
- OSI is also an excellent model to understand how network work.
- OSI model has a 7 layers.

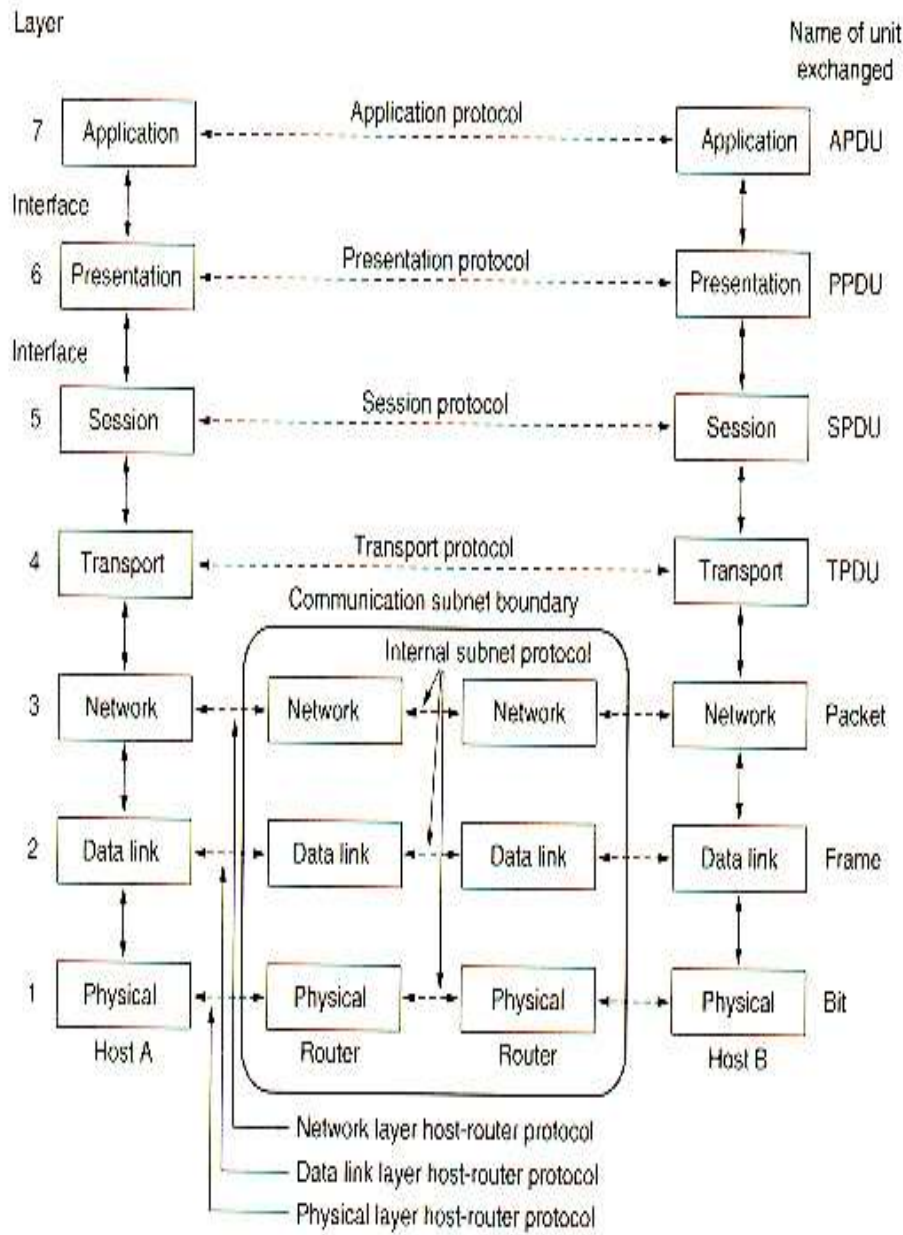


Fig. 1-16. The OSI reference model.

- Each layer communicates logically with its associated layer on the other computer.
- Layer 1,2,3 are the network support layer.
- They deal with physical aspects of moving data from one device to another.
- Layer 4 ensures end to end reliable data transmission.
- Layer 5,6,& 7 are user support layer.

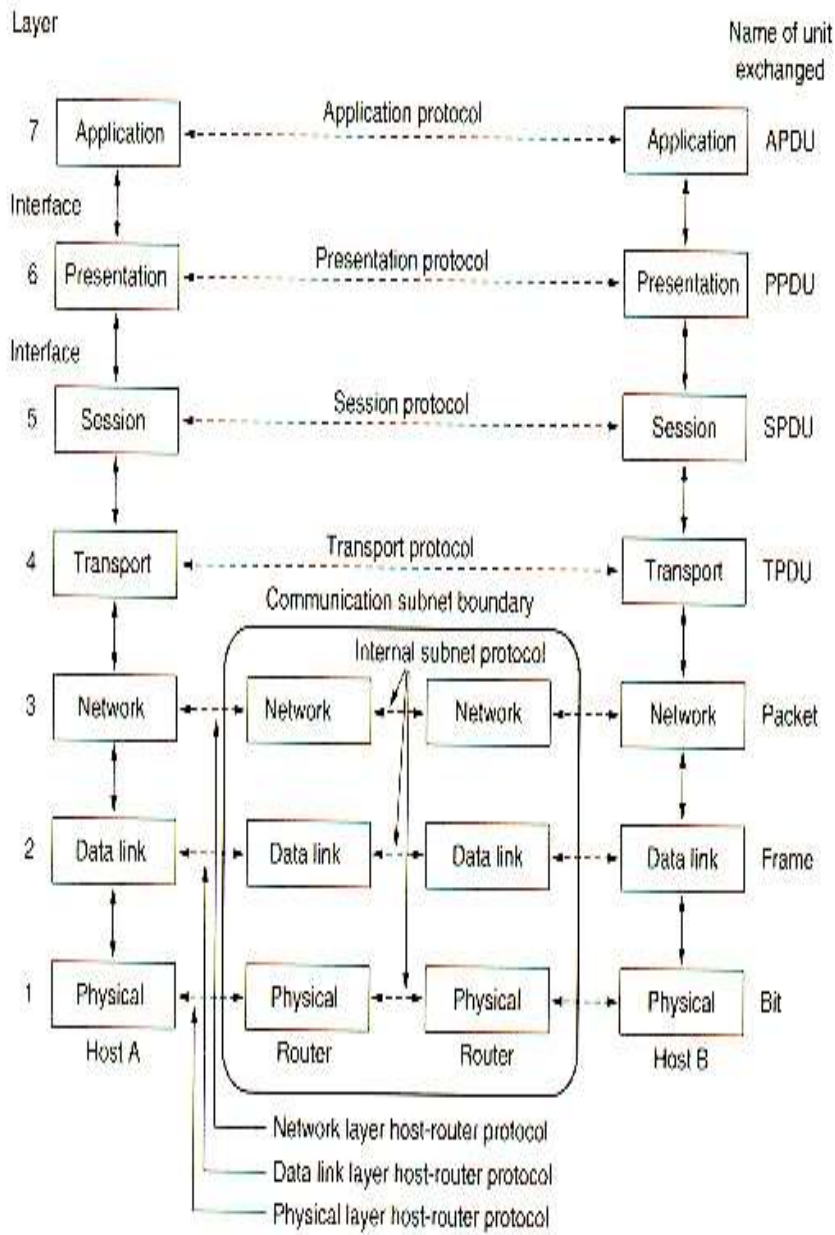
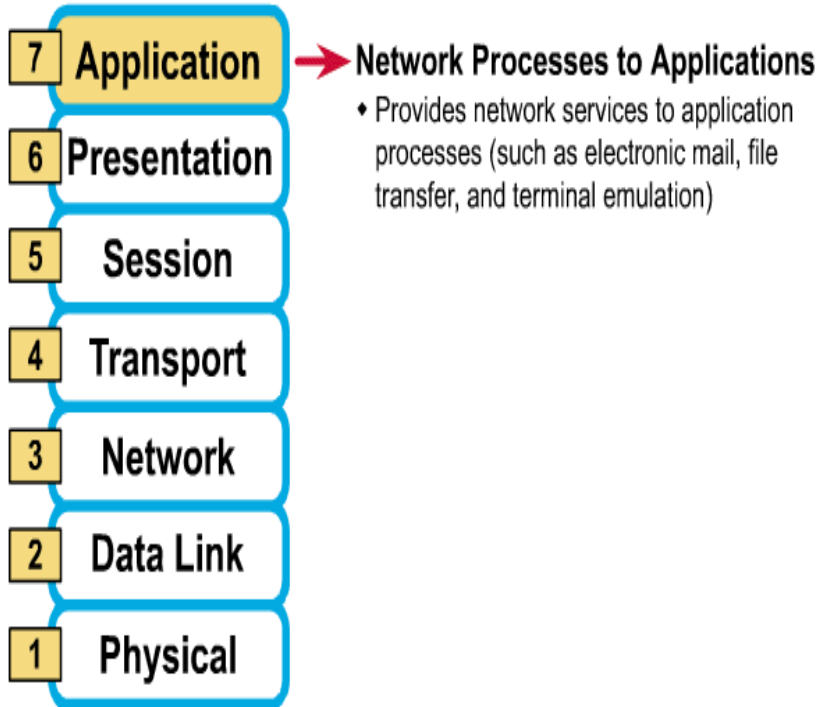


Fig. 1-16. The OSI reference model.

- The upper layer are almost always implemented by software.
- The lower layer a combination of hardware and software, except the physical layer, which is mostly hardware.
- OSI is a model, not a protocol, it is a model for understanding & designing of a network architecture.
- Following fig. shows the structure of the OSI reference model.

Application Layer

The 7 Layers of the OSI Model

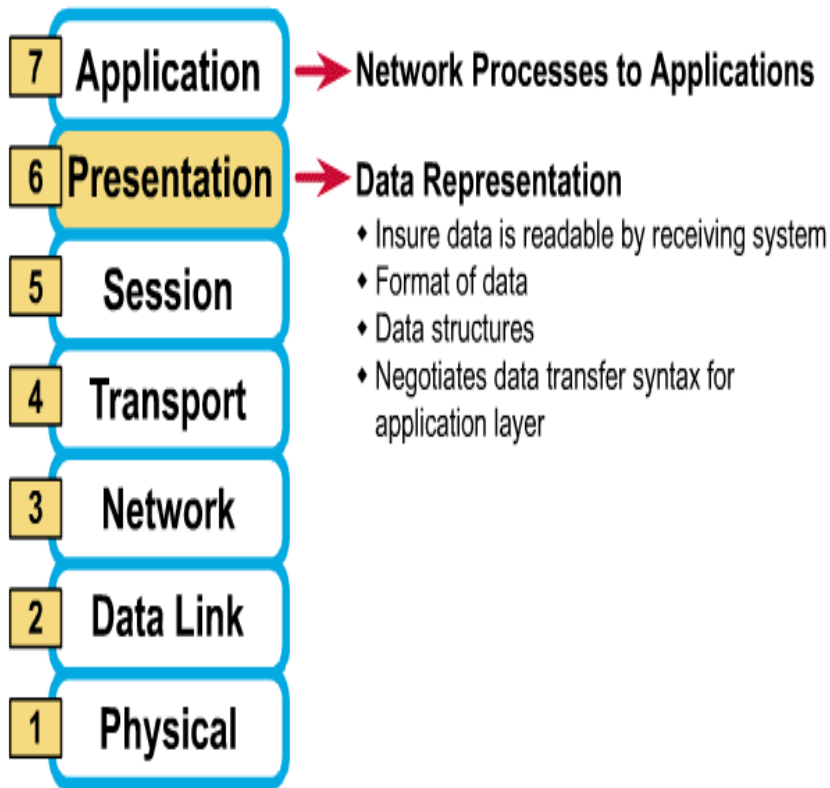


- it is a top most layer of the OSI model.
- it provide services that directly support user application such as e-mail, file transfer etc...
- ✓ User program that generates or uses data
- ✓ The application layer contains a variety of protocols that are commonly needed.

Presentation Layer

- It is concerned with the syntax and semantics of the information exchanged between two system.
- Means Changes syntax (data format) and semantics (their meanings) of information, as necessary
- E.g., conversion between EBCDIC between ASCII code
- For security purpose it carries out encryption at the source and decryption at the receiver.

The 7 Layers of the OSI Model

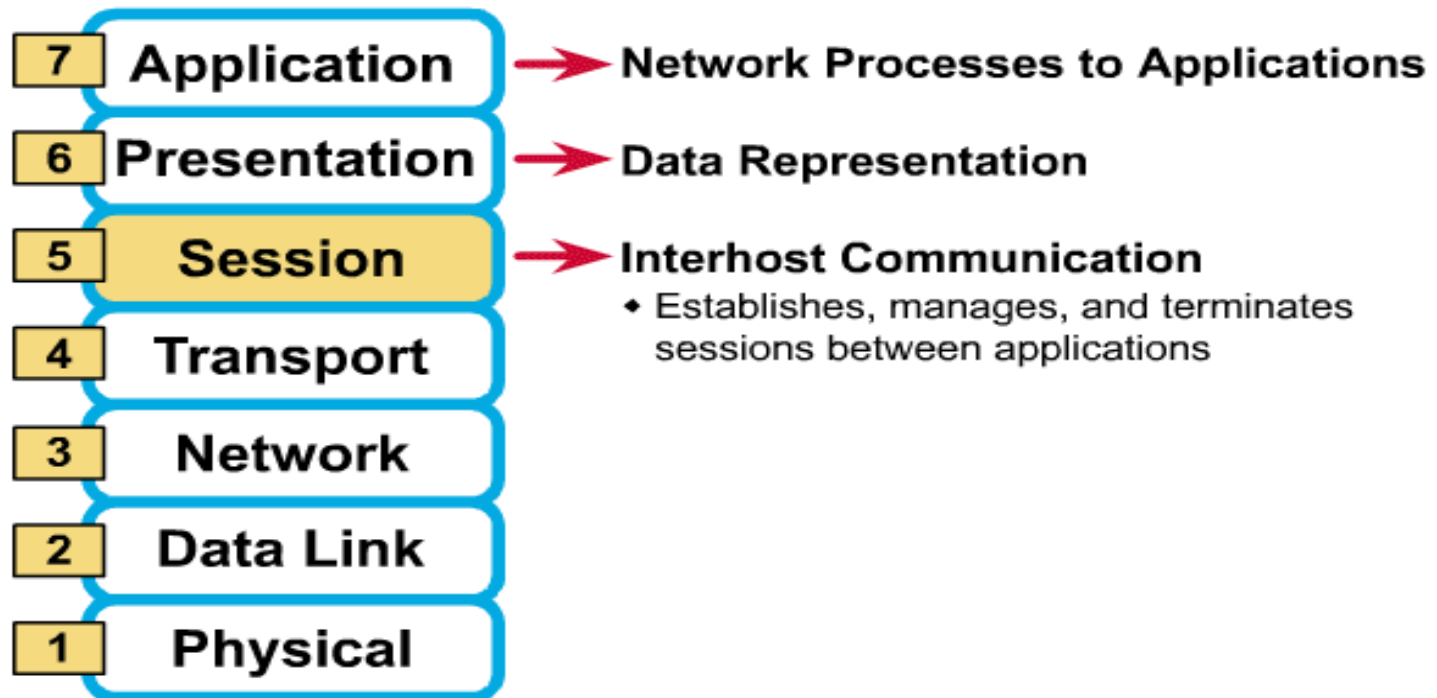


- Main responsibilities are :
- 1. Translation
- II. Encryption
- III. Compression

Session Layer

- It accepts the data from presentation layer and provide services to it and pass to the next layer.
- It allows two application running on machine or computer to establish connection, use the connection and release connection called a session.
- Dialog Controller : to allow the traffic to go in both direction at the same time or only in one direction.
- Token Management :- if two process are ready to transmit then pass the token to them for 1st transmission.
- Provide synchronization by placing checkpoint in the data stream

The 7 Layers of the OSI Model

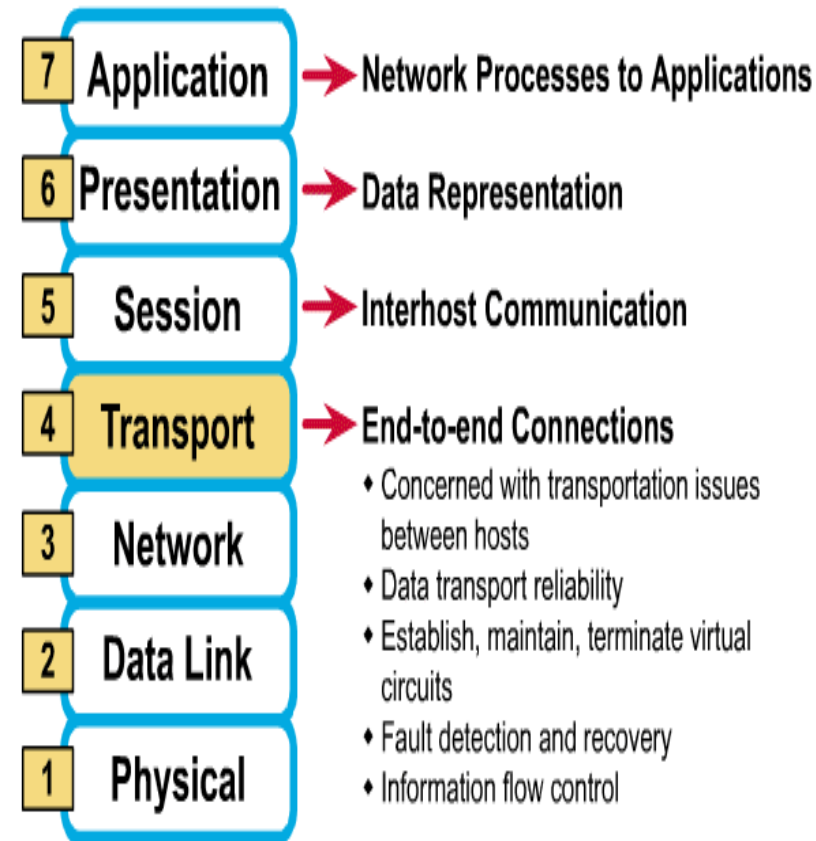


Transport Layer

- It takes the data from upper layer & pass to the lower layer.
- Ensure that packet are delivered error free and in sequence with no losses or duplication.
- Also responsible for end to end (source to destination) delivery of the entire message.
- Basic function is to accept the data from session layer, split it into smaller units if needed.

- Then pass these to the network layer and ensure that all pieces arrive correctly at the other end.
- For each pieces the T. Layer adds the header contains sequence and segmentation number.
- Breaks the large packet in small packet if needed when large packet is very large.
- It provides Connection oriented and connection Less service to the both layers.

The 7 Layers of the OSI Model

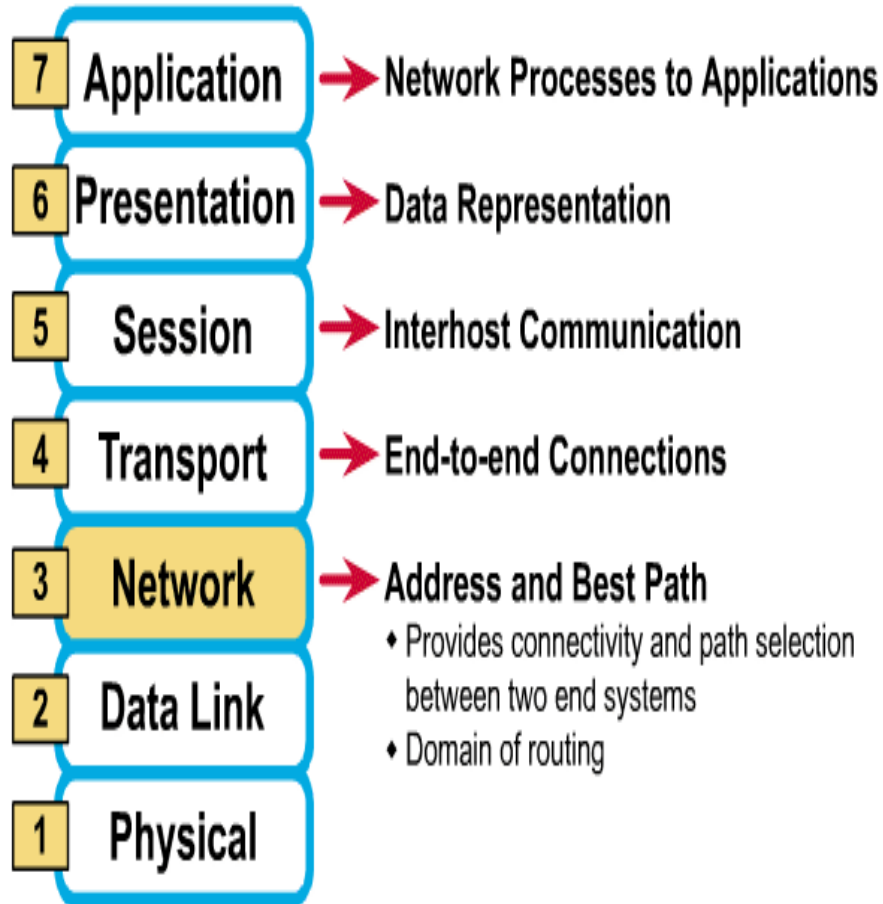


- Main responsibilities of Transport layer are :
 - Segmentation and reassembly
 - Connection control
 - Flow control
 - Error Detection and Recovery
- Features of Transport Layer are :
 - End to end reliable service
 - Break large packet into small packet and assign sequence no. of and send them.
 - In case, packet lost during transmission it will be send again.

Network Layer

- Concerned with the operations of subnets.
- The main function of this layer is to deliver packets from source to destination across multiple networks.
- If the two system connected to the link, there is no need for network layer.
- It receives the data from transport layer and add some header information.
- It related with transport and data link layer.

The 7 Layers of the OSI Model

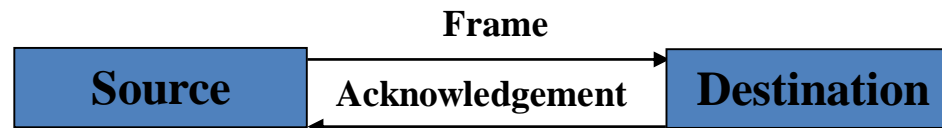


- **Switching:**- temporary connection
- **Routing:** It determines how packets are routed from source to destination.
- **Congestion Control:** Many packets in the subnet trying to use the same route.
- **Internetworking:** It allows different *networks* to be interconnected.
- Basic function of this layer is to accept the data from transport layer and provide to data link layer.

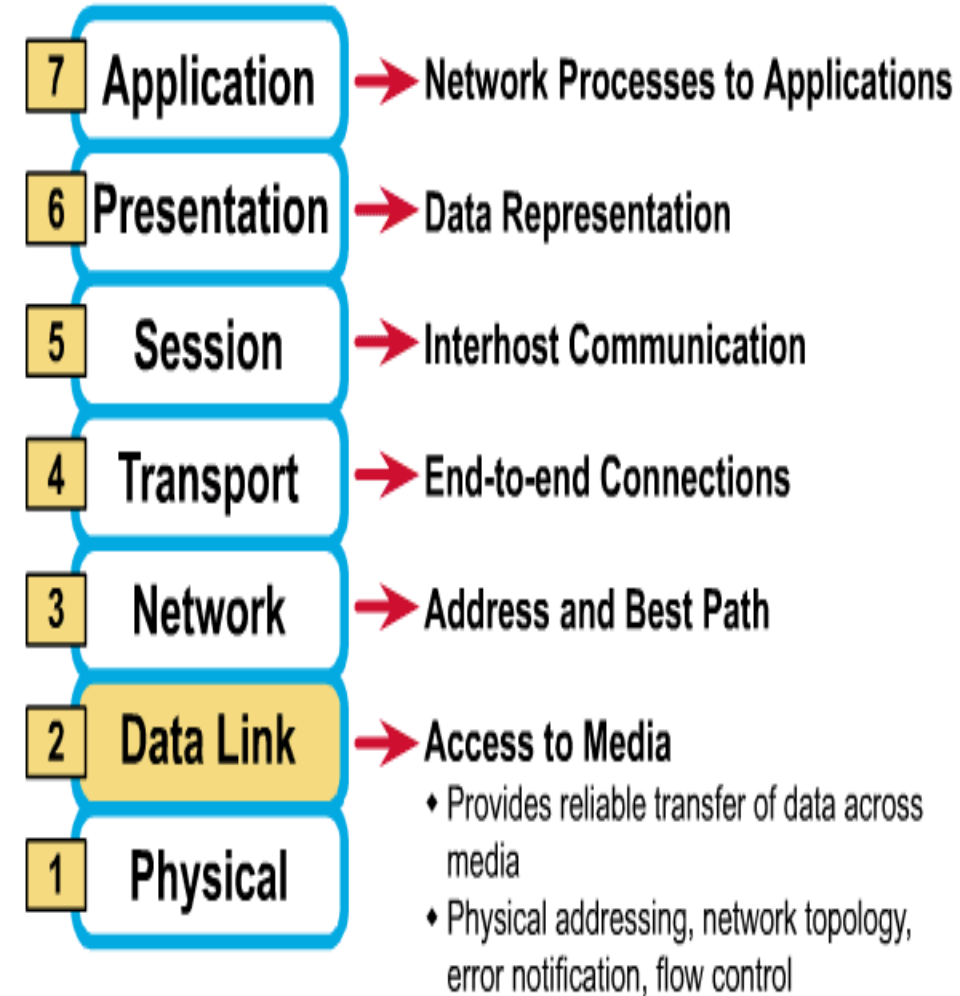
- Provides network-wide addressing and a mechanism to move packets between networks (routing)
- Responsibilities:
 - Network addressing
 - Routing

Data Link Layer

- Reliable error-free transmission on a link, with flow control and synchronization
- Organizes packets into *frames*, adds acknowledgements and retransmissions
- **Point-to-point error control:**
 - If a frame is destroyed, the data link layer retransmits the frame.
 - If an acknowledgement frames is lost, a duplicate frame is produced.



The 7 Layers of the OSI Model

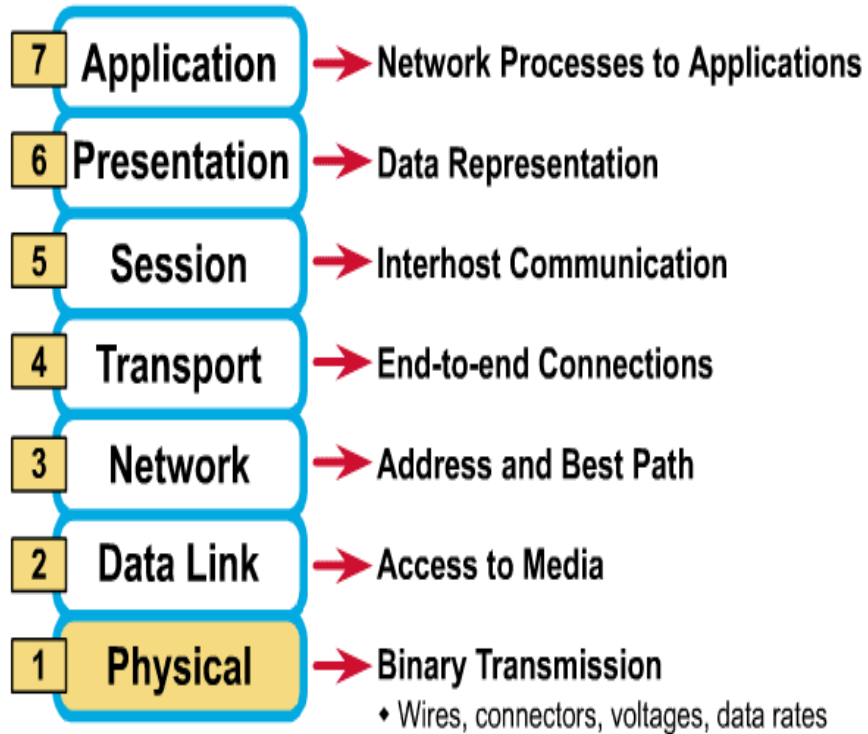


- Responsibilities of Data Link Layer
 - Framing
 - Physical Addressing
 - Flow control
 - Error Control
 - Access Control

Physical Layer

- The physical layer concerned with the activate, maintain and deactivate the connection.
- Physical Layer perform following functions.
- Transmits the unstructured raw bit stream over a physical medium.
- to decide whether the transmission is simple, half duplex or full duplex.

The 7 Layers of the OSI Model



- Data rate: no. of bits sent per second.
- Synchronization of data
- Physical topology
- Transmission mode

