

# Telecommunication Networks

## 15B11EC611



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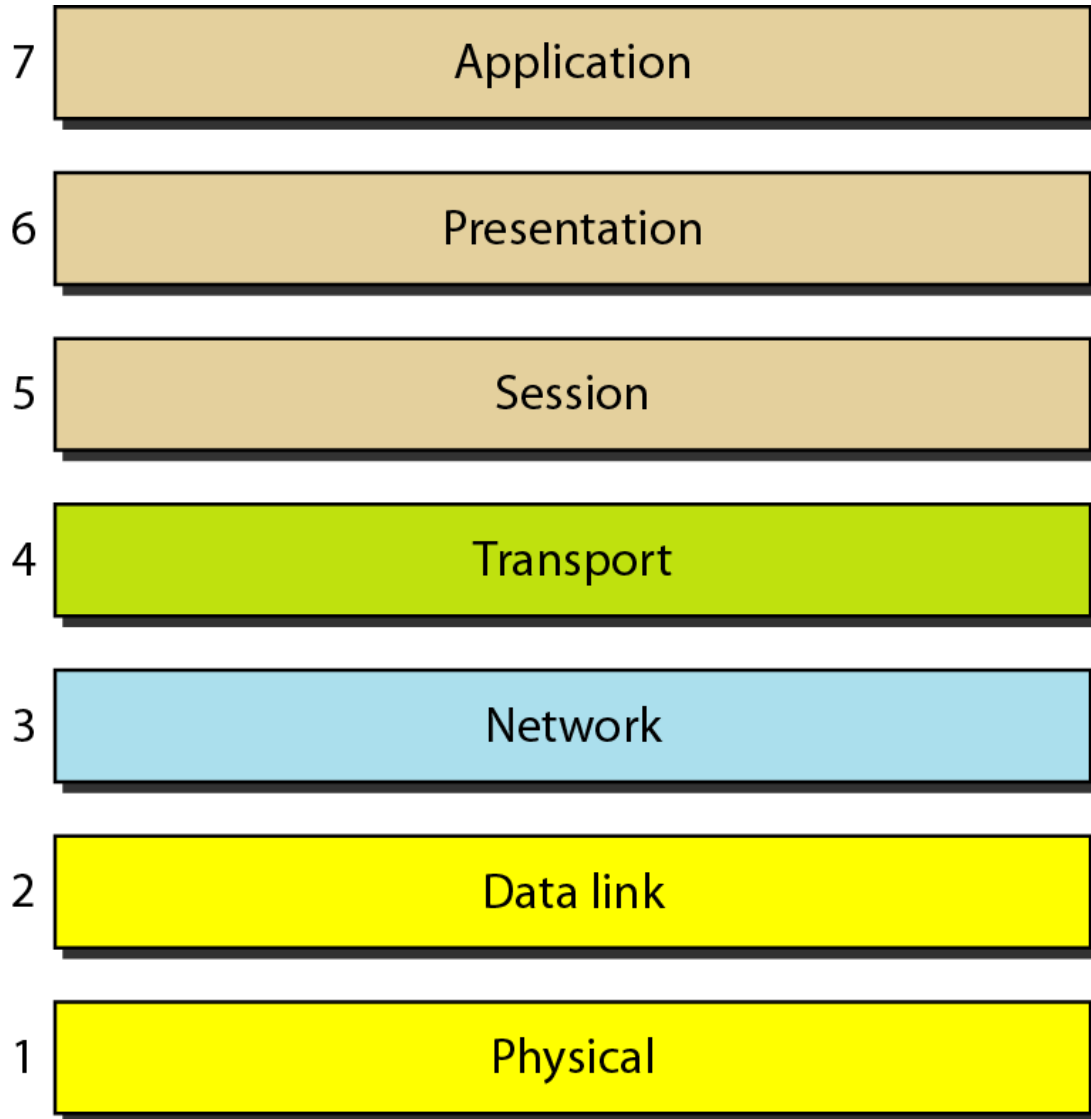
# **THE OSI MODEL**

- ❖ **This PPT is containing the discussion of OSI Model.**
- ❖ **Kindly refer page number 29 to 42 of the Book\_1\_Data-Communications-and-Networking - By Forouzan for detailed discussion.**

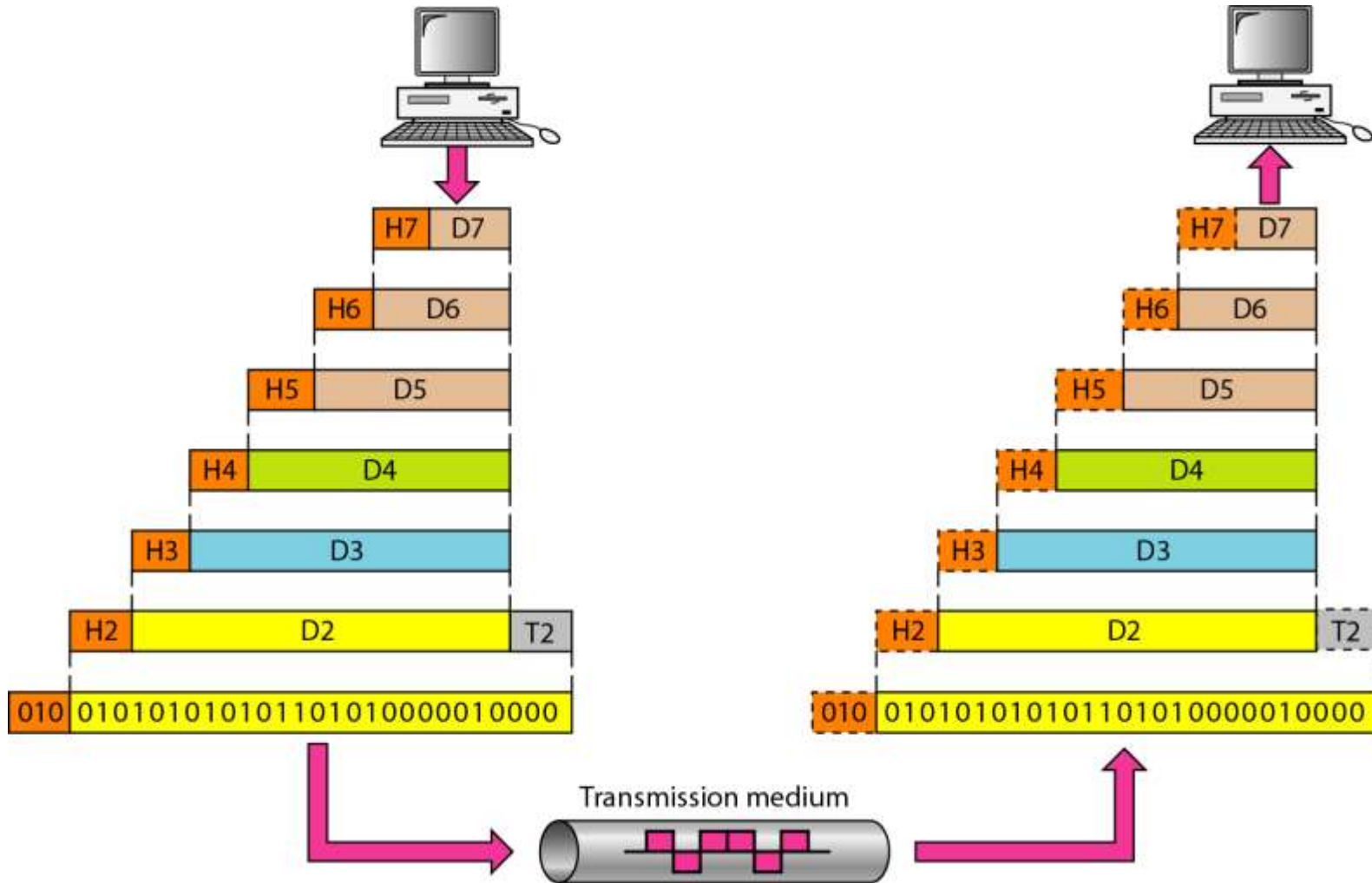
# **THE OSI MODEL**

- **Rapid growth of computer networks caused compatibility problems**
- **ISO recognized the problem and released the OSI model in 1970s**
- **OSI stands for Open Systems Interconnection and consists of 7 Layers**
- **An open system is a set of protocols that allows any two different systems to communicate regardless of their underlying architecture.**
- **The use of layers is designed to reduce complexity and make standardization easier**
- **Note:**
  - **ISO is the organization.**
  - **OSI is the model.**
- **The OSI model is not a protocol; it is a model for understanding and designing a network architecture that is flexible, robust, and interoperable.**

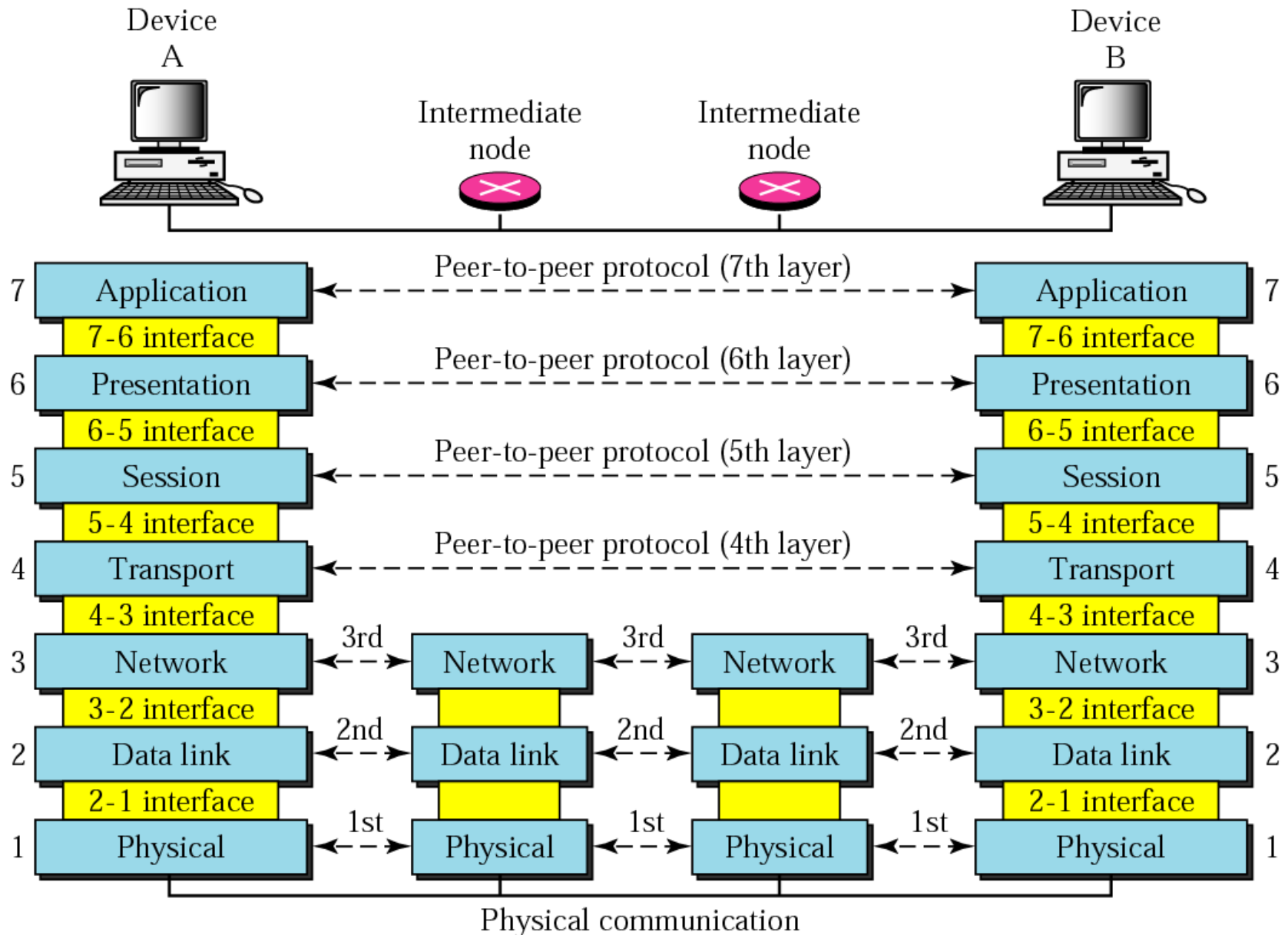
# Seven layers of the OSI model



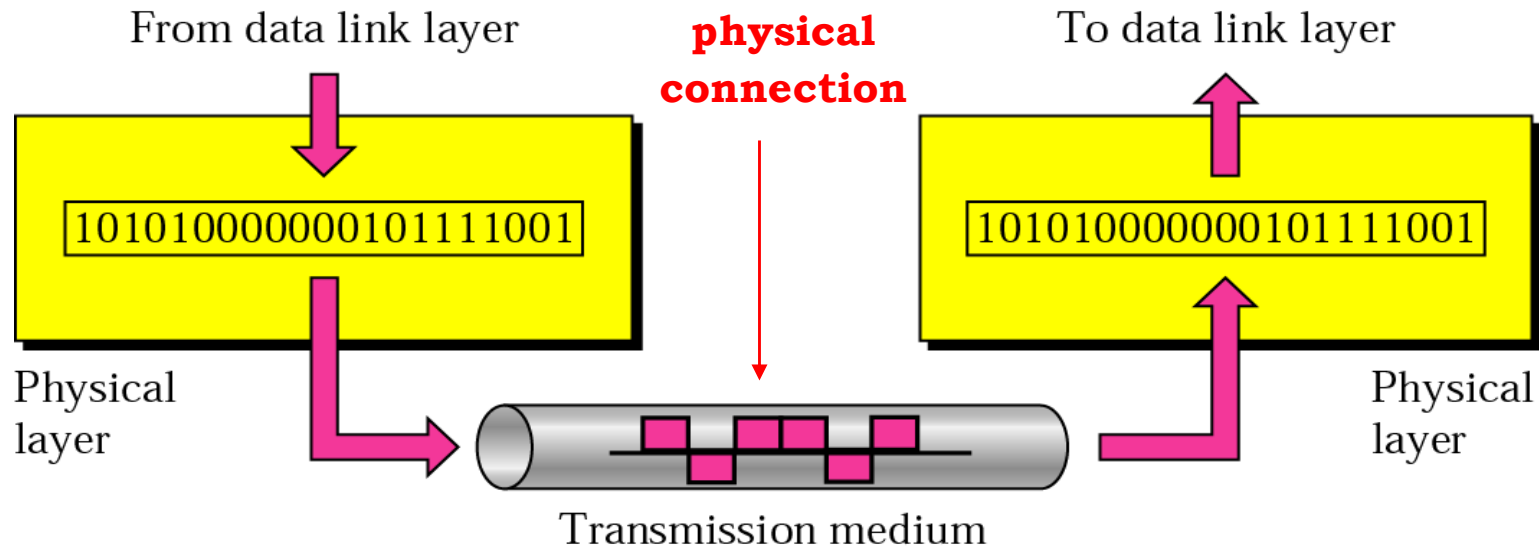
# Exchange using OSI Model



# OSI Model – Layered Architecture



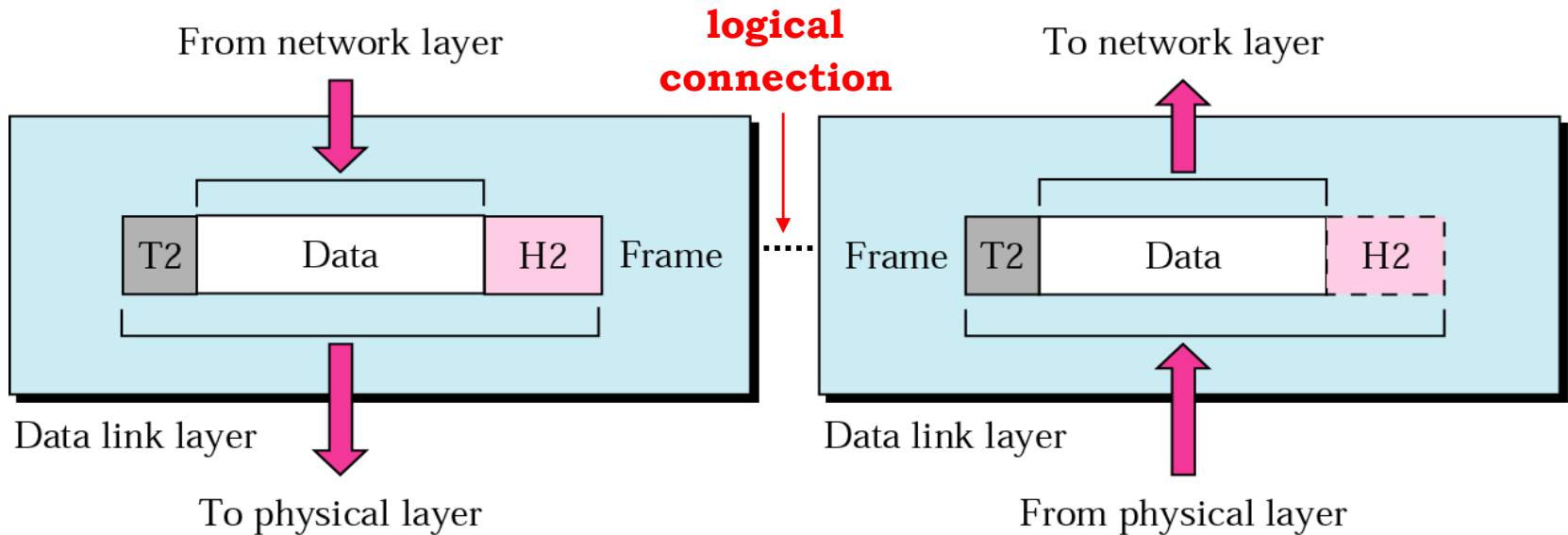
# Physical layer



## ❖ Responsible for movements of bits from one node to the next.

- Type of transmission medium (**twisted-pair, coax, optical fiber, air**).
- **Representation of bits:** bits must be encoded into signals--electrical or optical.
- **Data rate:** The **transmission rate**--the number of bits sent each second.
- **Synchronization of bits:** **sender and the receiver clocks must be synchronized.**
- **Physical topology:** The physical topology **defines how devices are connected to make a network.** (**mesh, star, ring, bus, hybrid**)
- **Transmission mode:** The physical layer also **defines the direction of transmission between two devices:** **simplex, half-duplex, or full-duplex.**

# Data Link layer



❖ **Responsible for moving frames from one node to the next.**

- **Framing:** divides the stream of bits into frames.
- **Physical addressing:** If frames are to be distributed to different systems on the network, the data link layer **adds a header to the frame to define the sender and/or receiver of the frame.**
- **Flow control:** imposes a flow control mechanism to avoid overwhelming the receiver.
- **Error control:** mechanisms to detect and retransmit damaged or lost frames.
- **Access control:** to determine which device has control over the link at any given time.





# Network Layer

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- ❑ Implements routing of frames (packets) through the network.- **ROUTING**
- ❑ Defines the most optimum path the packet should take from the source to the destination.
- ❑ Defines logical addressing so that any endpoint can be identified. –**IP addressing**
- ❑ Handles congestion in the network.
- ❑ Facilitates interconnection between heterogeneous networks (Internetworking).

# Transport Layer

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- ❏ Process to Process delivery of data.
- ❏ Service Point addressing—**Port address**
- ❏ Ensures that the data units are delivered error free.—**Error control end to end**
- ❏ Ensures that data units are delivered in sequence.
- ❏ Ensures that there is no loss or duplication of data units.—**Flow control end to end**
- ❏ Provides connectionless or connection oriented service.

# Session Layer

-  **Dialog control:** Session layer provides mechanism for controlling the dialogue between the two end system processes. It defines how to start, control and end conversations (called sessions) between applications. This layer provides services like dialogue discipline which can be full duplex or half duplex.
-  **Synchronization:** Session layer can also provide check-pointing mechanism such that if a failure of some sort occurs between checkpoints, all data can be retransmitted from the last checkpoint.



# Presentation Layer

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- ❑ Deals with syntax and semantics mismatch.
- ❑ Presentation layer defines the format in which the data is to be exchanged between the two communicating entities. --**Encoding format**
- ❑ Also handles data compression and data encryption (cryptography).

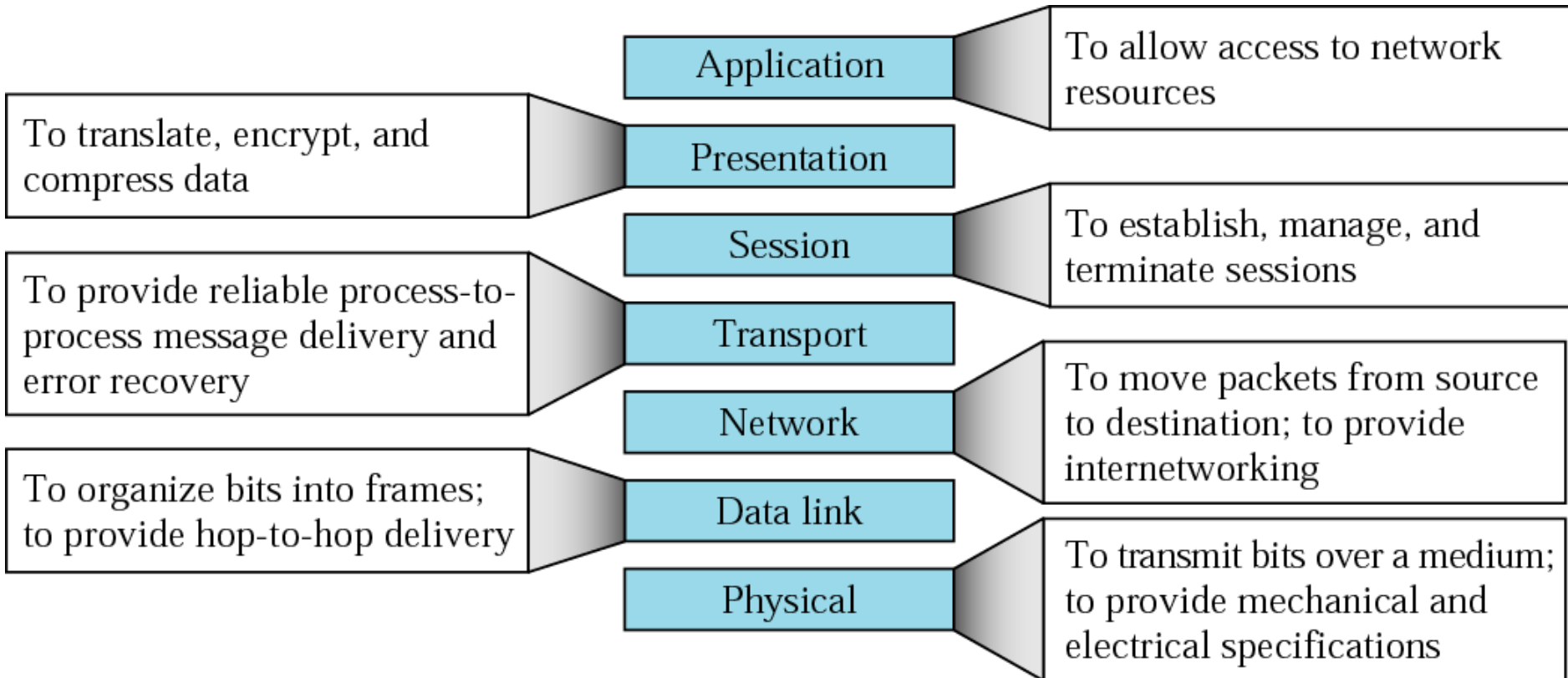


# Application Layer

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- ❑ Application layer interacts with application programs and is the highest level of OSI model.
- ❑ **Virtual network terminal:** Allows user to remote login.
- ❑ Application layer contains management functions to support distributed applications.
- ❑ Examples of application layer are applications such as **file transfer, electronic mail, remote login etc.**

# Summary of OSI Layers



**THANK YOU**