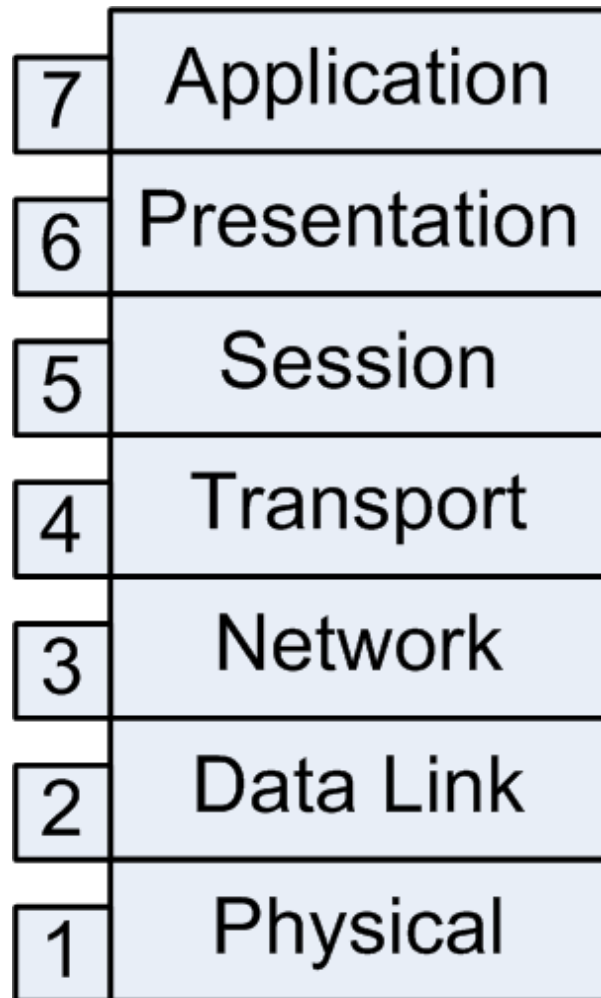


Open Systems Interconnection Model

Outline

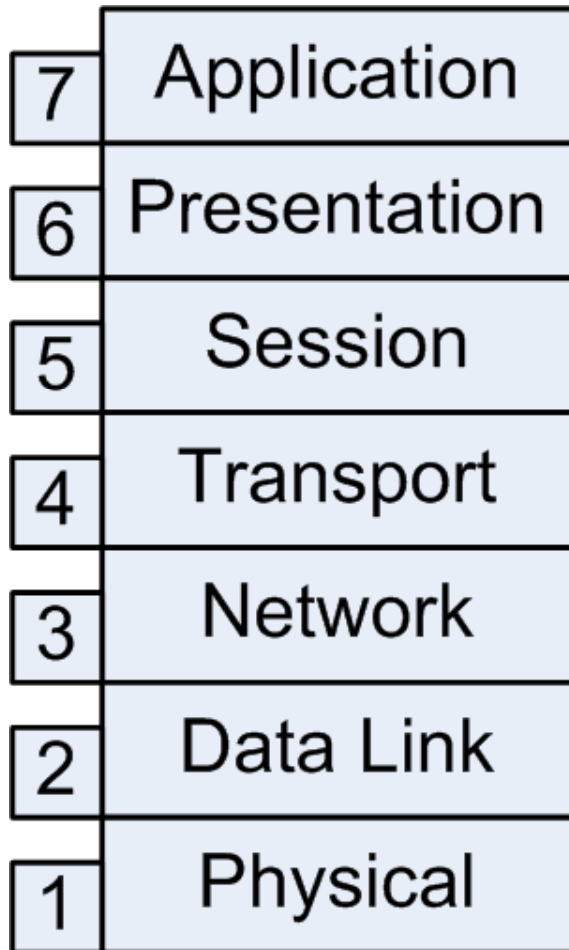
- Overview
- The OSI Reference Model
- The OSI Model Layers and Functions
- Encapsulation and De-capsulation
- Peer-to-Peer Communication
- Network Protocols
- Summary

Why a Layers Network Model?



- Reduces complexity
- Standardizes interferences
- Facilitates modular engineering
- Ensures interoperable technology
- Accelerates evolution
- Simplifies teaching and learning

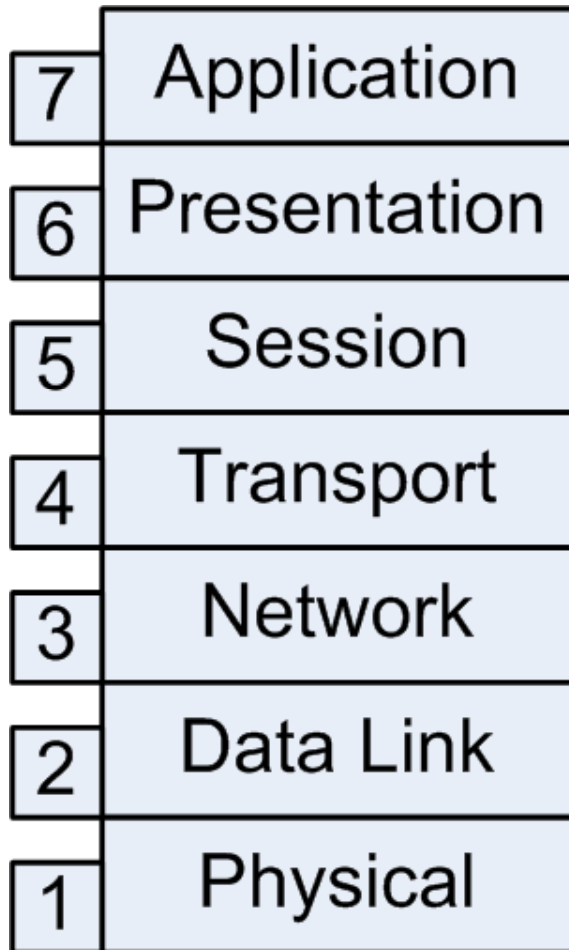
The 7 layers of the OSI Model



Binary Transmission

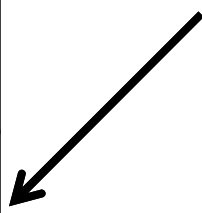
- Defines the electrical, mechanical, procedural, and functional specifications for activating, maintaining, and deactivation the physical link.

The 7 layers of the OSI Model

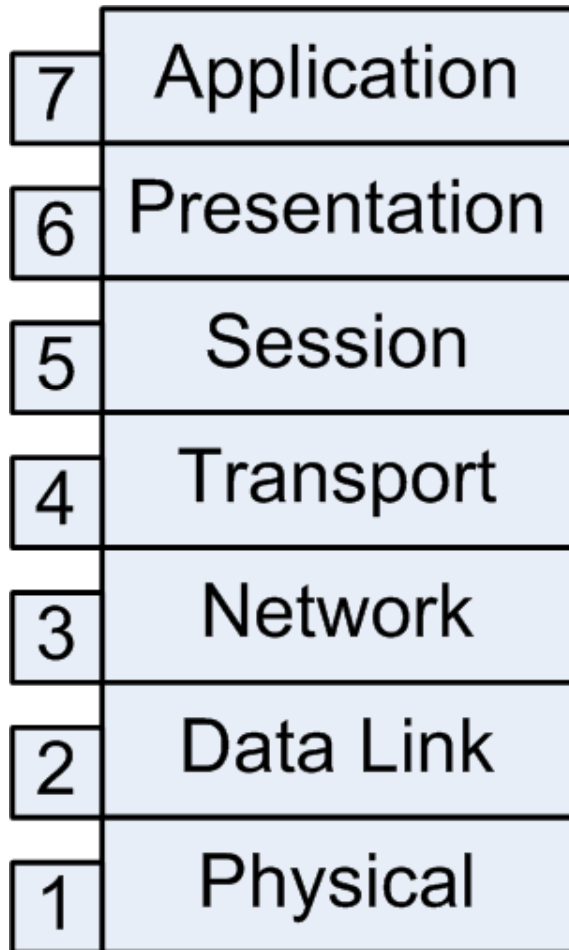


Access to Media

- Defines how data is formatted for transmission and how access to the network is controlled.
- Provides error detection



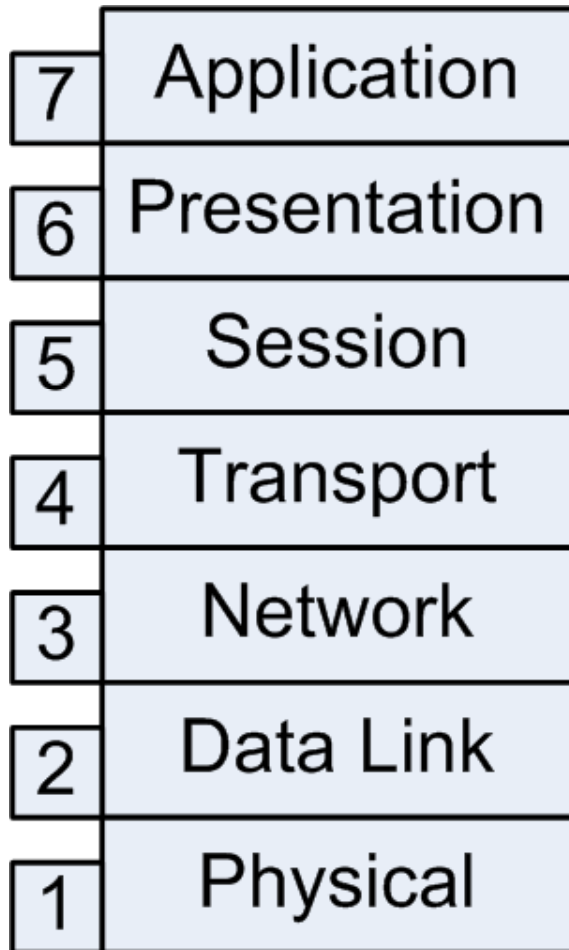
The 7 layers of the OSI Model



Data Delivery

- Routes data packets
- Selects best path to deliver data
- Provides logical addressing and path selection

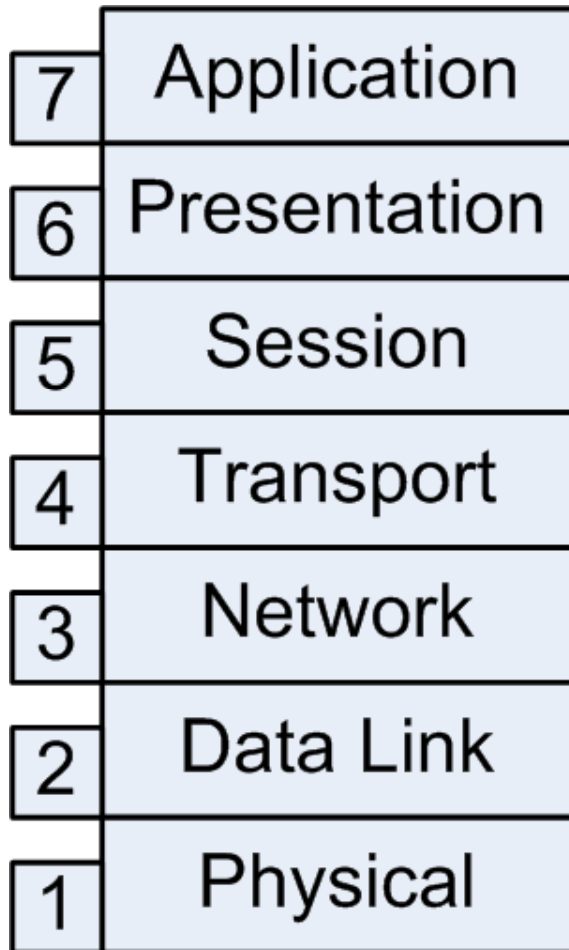
The 7 layers of the OSI Model



End-to-End Connections

- Handles transportation issues between hosts.
- Ensures data transport reliability
- Establishes, maintains, and terminates virtual circuits
- Provides reliability through fault detection and recovery information flow control.

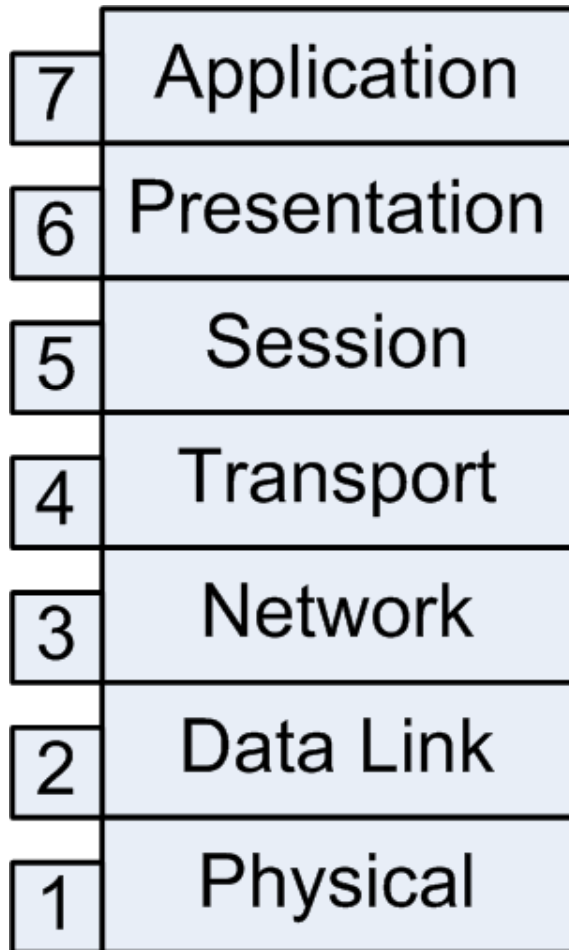
The 7 layers of the OSI Model



Interhost Communication

- Establishes, manages and terminates sessions between applications.

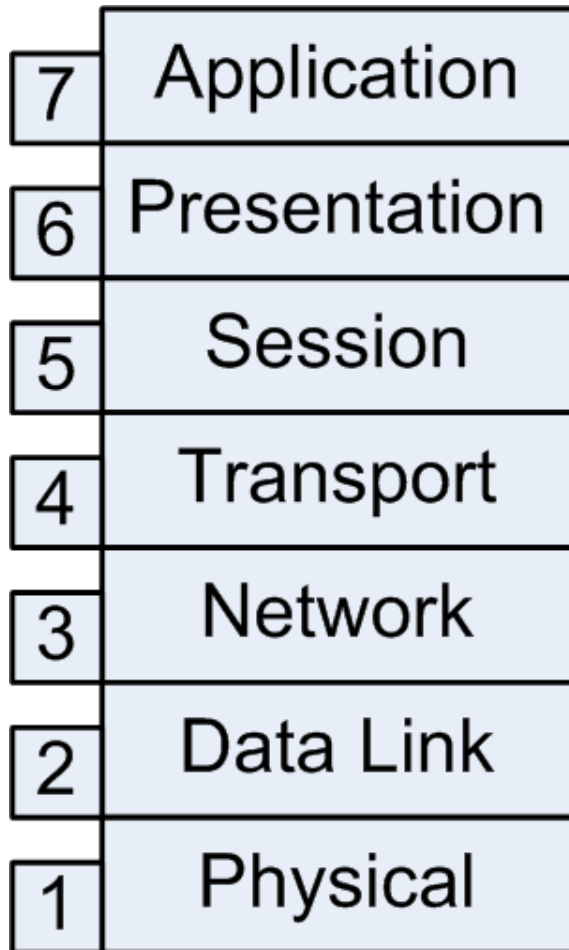
The 7 layers of the OSI Model



Data Representation

- Ensure the data is readable by receiving system
- Formats data
- Negotiates data transfer syntax for application layer
- Provides encryption

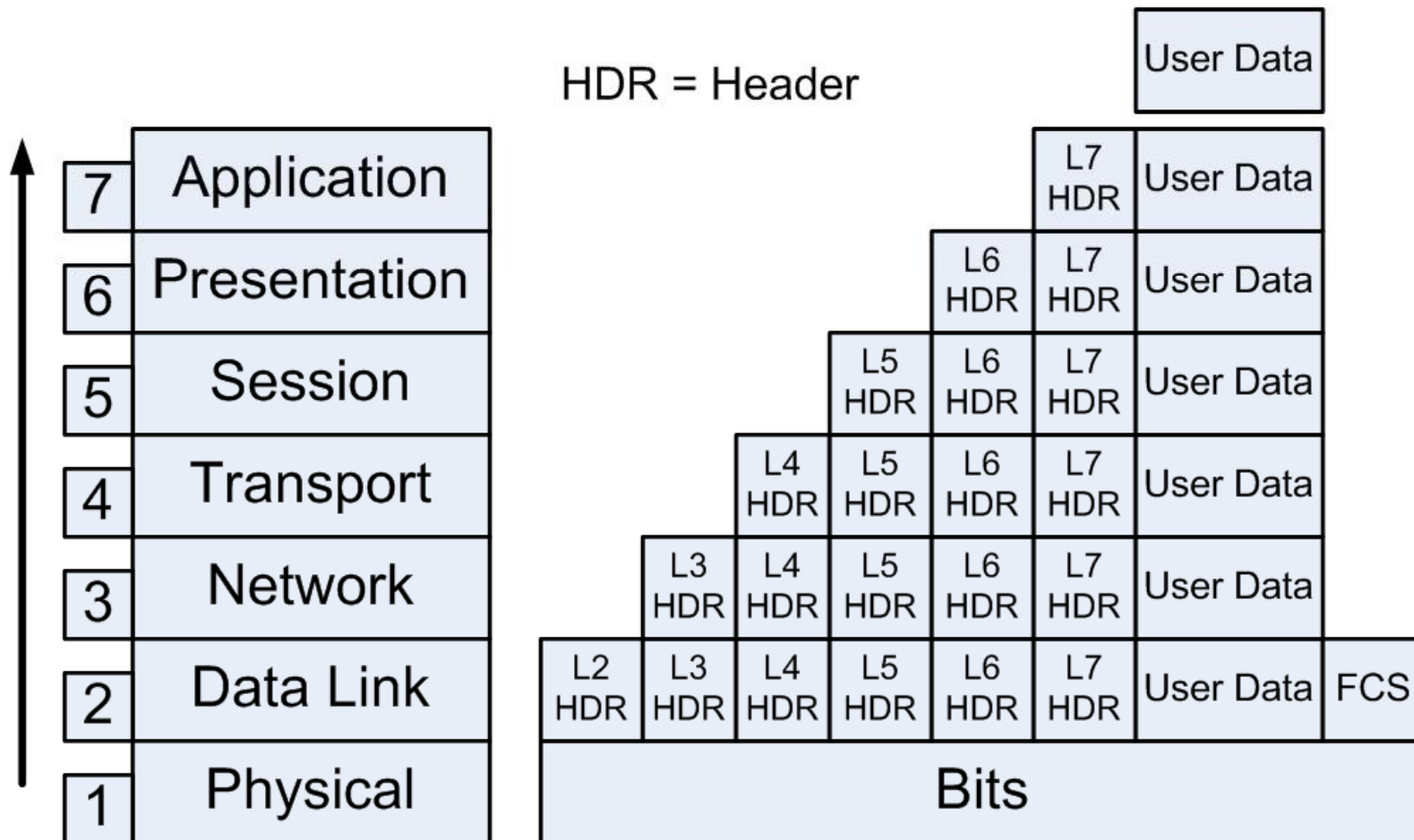
The 7 layers of the OSI Model



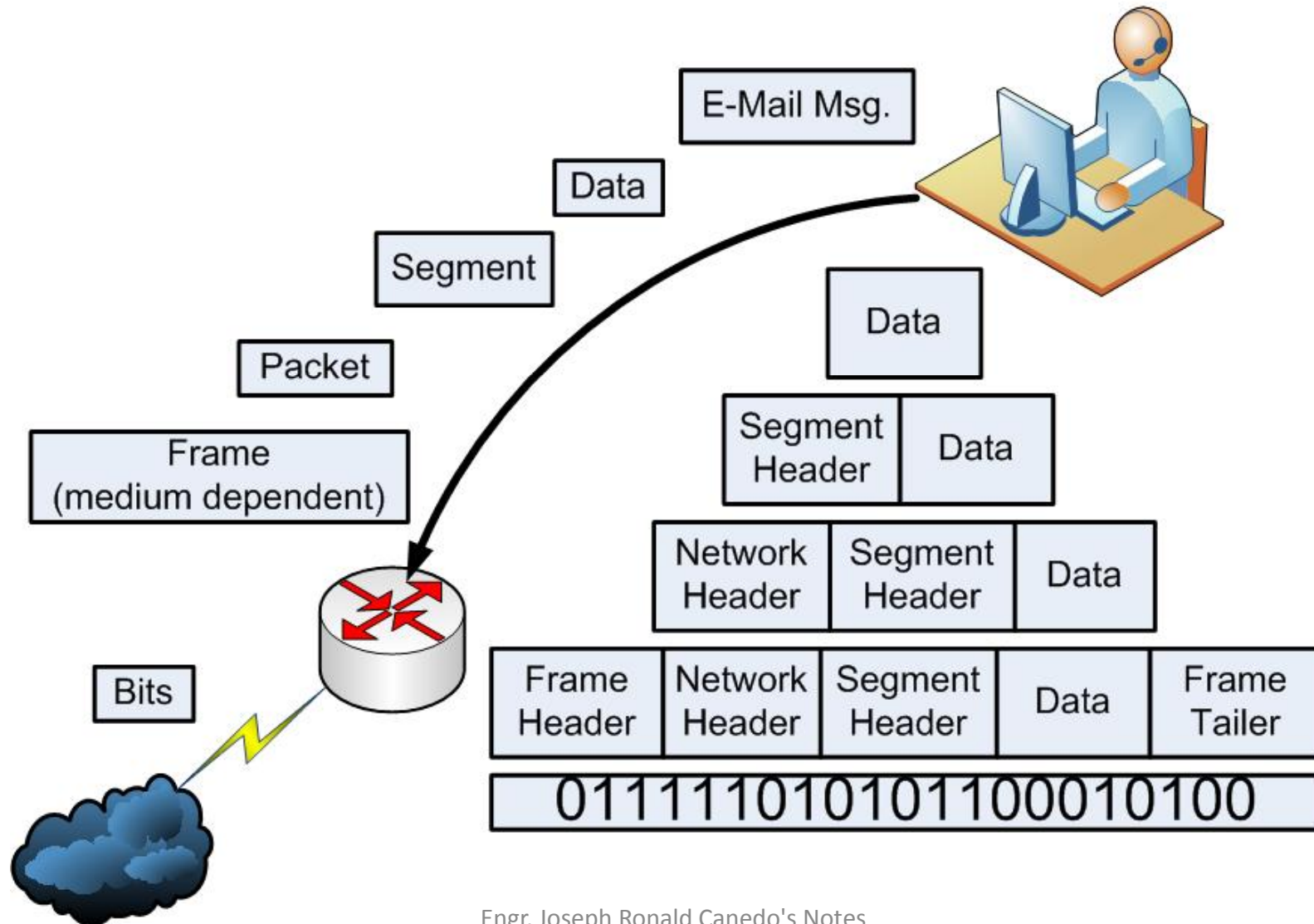
Network Processes to Applications

- Provides network services to application processes (such as electronic mail, file transfer, and terminal emulation)
- Provides user authentication

Data Decapsulation



Peer-to-Peer Communication



Network Protocols

Network Protocol	OSI Layer	Rule
EIA-232-D	1	Defines asynchronous serial connections
HDLC	2	Specifies encapsulation for synchronous serial data links bit-oriented framing
PPP	2	Provides synchronous and asynchronous point-to-point connections
ISDN	1 – 3	Communications protocols that allow telephone networks to carry voice, data, graphics, music and video
TCP	4	Reliable transport method for IP packets

Summary

- The OSI reference model defines the network functions that occur at each layer. More importantly, the OSI reference model facilitates an understanding of how information travels throughout a networks.
- The physical layer defines the electrical, mechanical, procedural, and functional specifications for activating, maintaining, and deactivating the physical link between end systems.
- The data link layer defines how data is formatted for transmission and how access to the physical media is controlled.

Summary

- The network layer provides connectivity and path selection between host systems that may be located on geographically separated networks.
- The transport layer segments data from the system of the sending host and reassembles the data into a data stream on the system of the receiving host.
- The session layer establishes, manages, and terminates sessions between two communicating hosts.
- The presentation layer ensures that the information sent at the application layer of one system is readable by the application layer of another system.

Summary

- The application layer provides network services to the applications of the user, such as e-mail, file transfer, and terminal emulation.
- The information sent on a network is referred to as data or data packets. If one computer wants to send data to another computer, the data must first be packaged by a process called encapsulation.
- When the remote device receives a sequence of bits, the physical layer at the remote device passes the bits to the data link layer for manipulation. This process is referred to as de-encapsulation.

Summary

- So that data packets can travel from the source to the destination, each layer of the OSI model at the source must communicate with its peer layer at the destination. During the peer-to-peer communication process, the protocols at each layer exchange packets of information called PDUs between peer layers.
- Network protocols are sets of rules and standards that tell the services of a network what to do. There are many different kinds of protocols, each with its own function and operating at different layers of the OSI model. Some common network protocols include EIA-232-D, HDLC, PPP, ISDN, and TCP.

