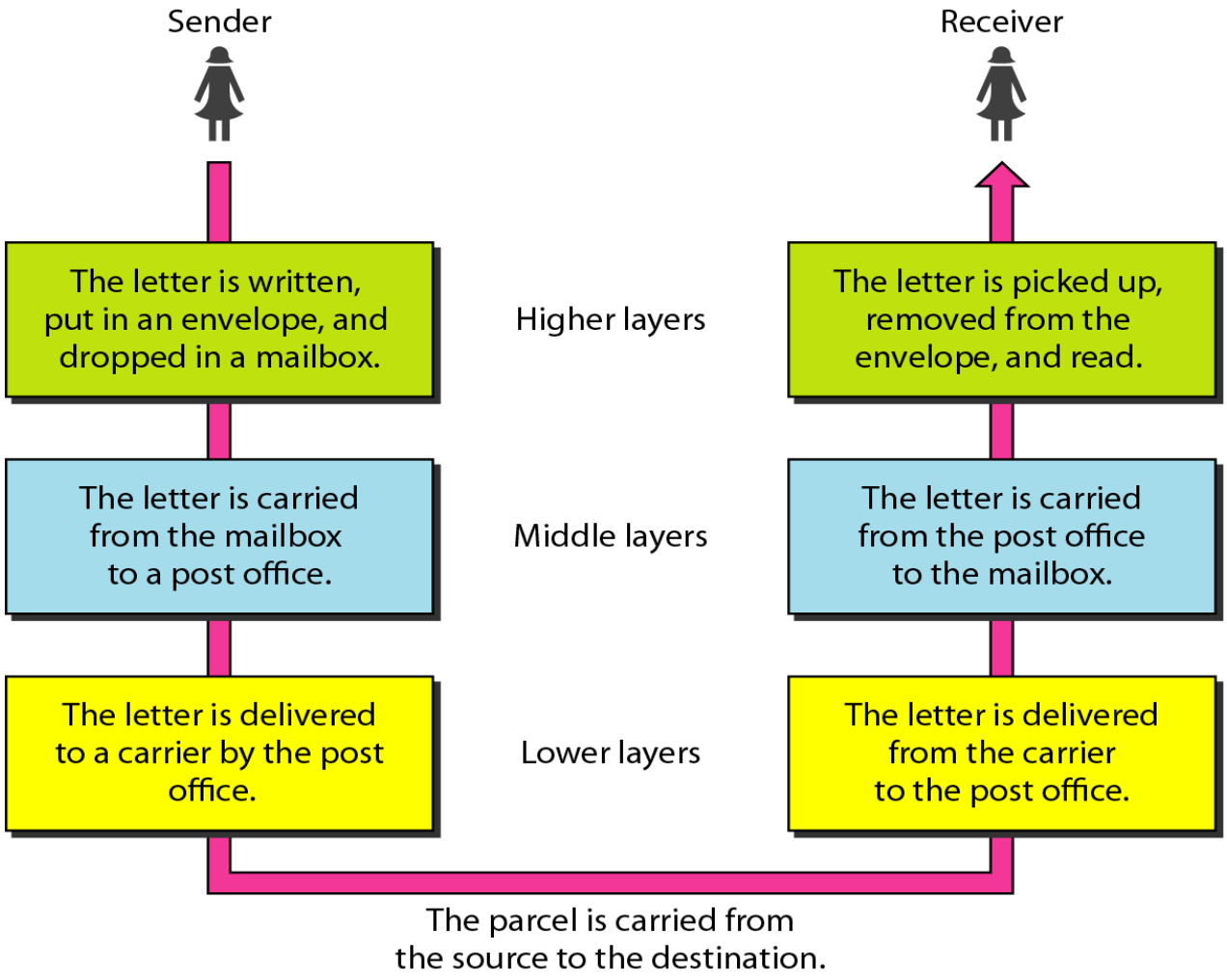
OSI Model and TCP/IP protocol suite)

CSE306

Tasks involved in sending a letter



THE OSI MODEL

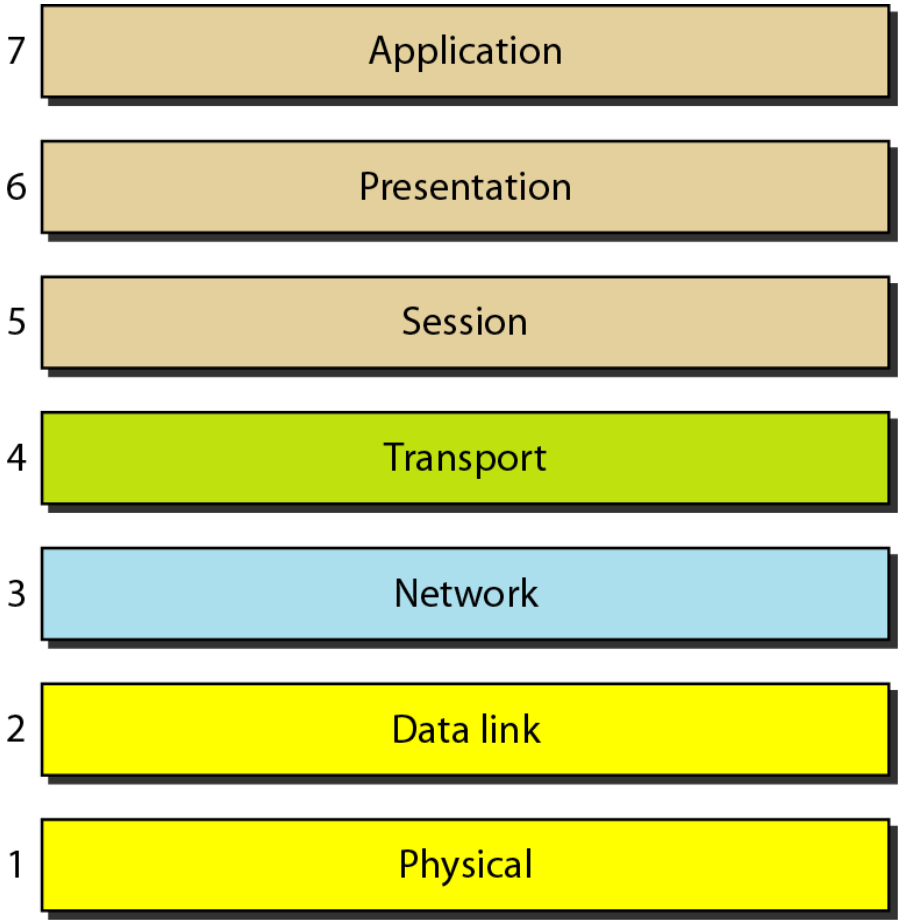
Established in 1947, the International Standards Organization (ISO) is a multinational body dedicated to worldwide agreement on international standards. An ISO standard that covers all aspects of network communications is the Open Systems Interconnection (OSI) model. It was first introduced in the late 1970s.

Topics discussed in this section:

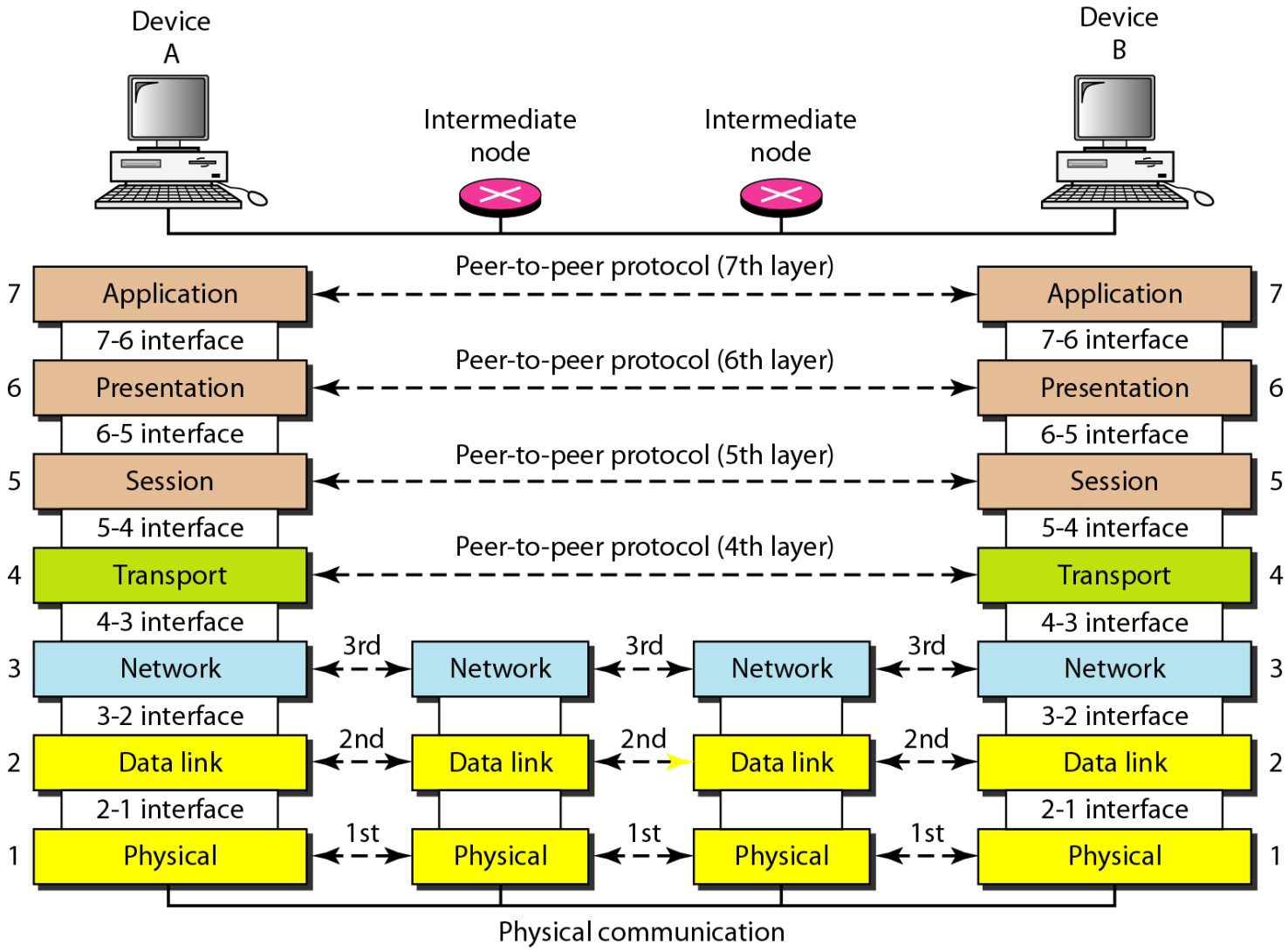
Layered Architecture
Peer-to-Peer Processes
Encapsulation

ISO is the organization.
OSI is the model.

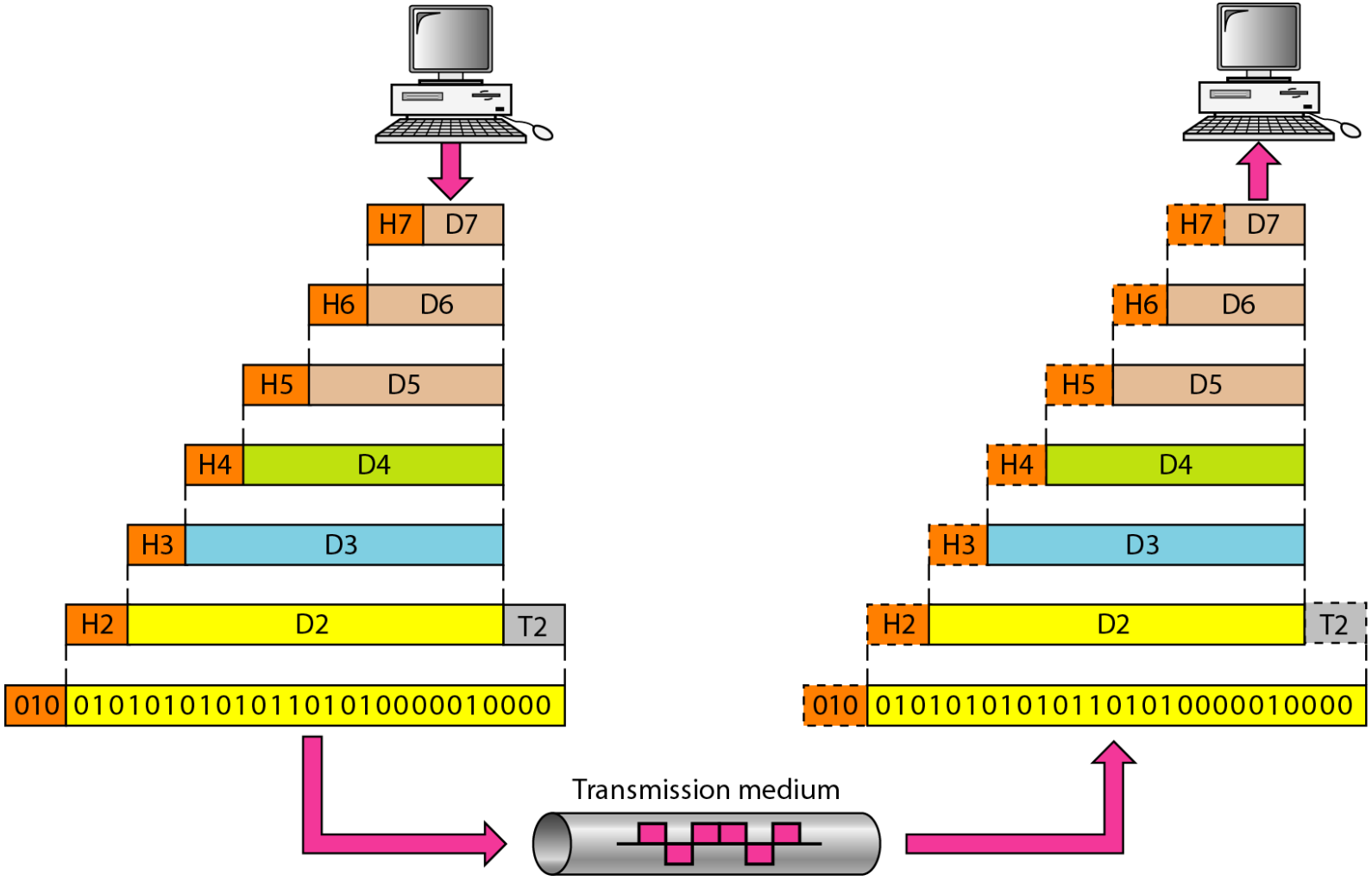
Seven layers of the OSI model



The interaction between layers in the OSI model



An exchange using the OSI model



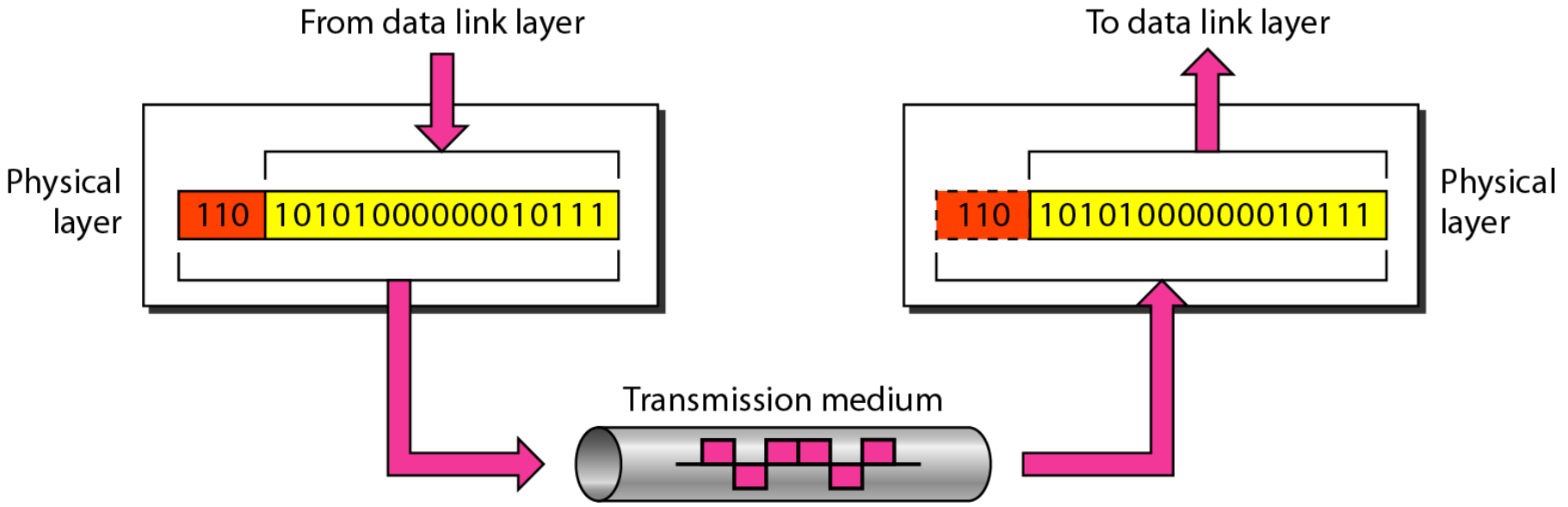
LAYERS IN THE OSI MODEL

In this section we briefly describe the functions of each layer in the OSI model.

Topics discussed in this section:

Physical Layer
Data Link Layer
Network Layer
Transport Layer
Session Layer
Presentation Layer
Application Layer

Physical layer

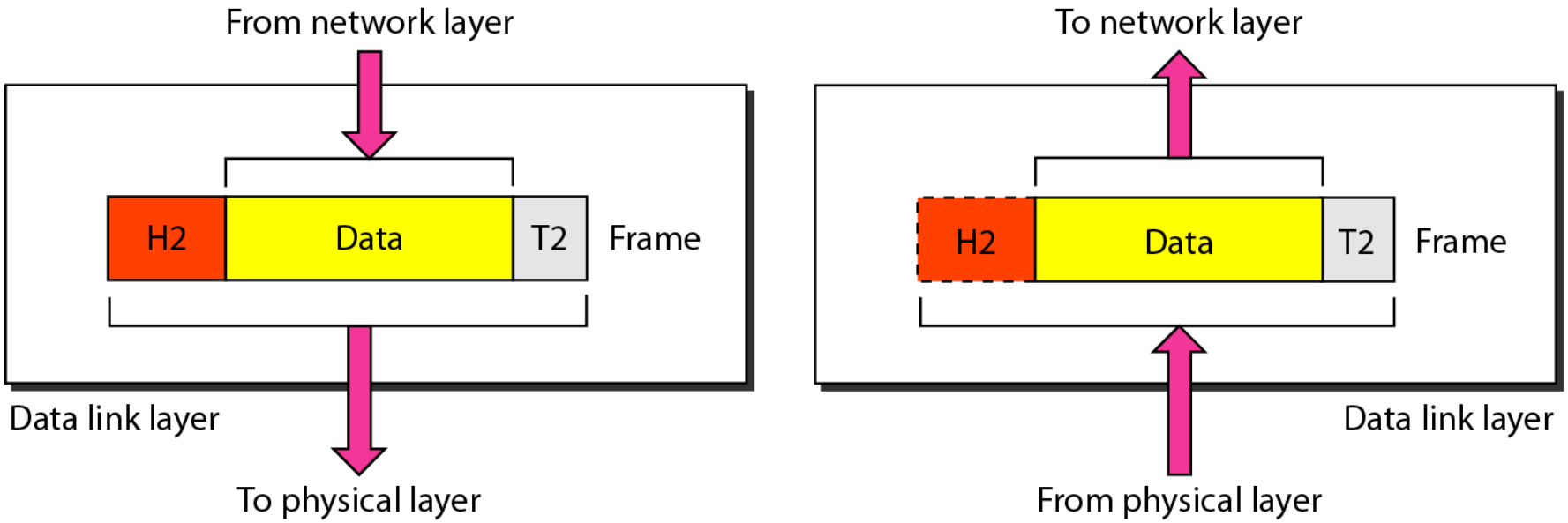


The physical layer is responsible for movements of individual bits from one hop (node) to the next.

Physical layer

- Type of transmission media
- Representation of bits
- Data rate
- Synchronization of bits
- Line Configuration
- Topology
- Transmission mode

Data link layer

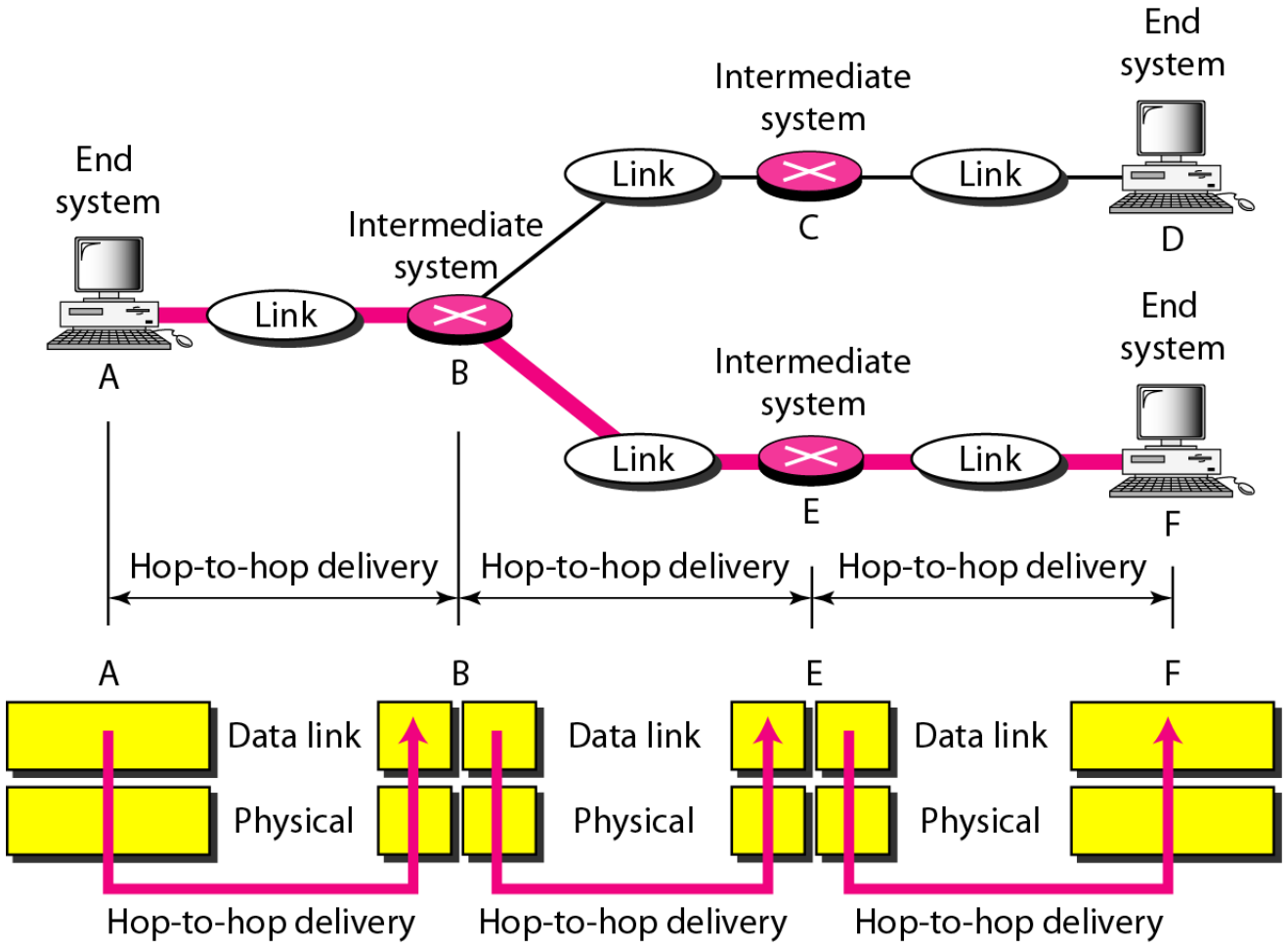


The data link layer is responsible for moving frames from one hop (node) to the next.

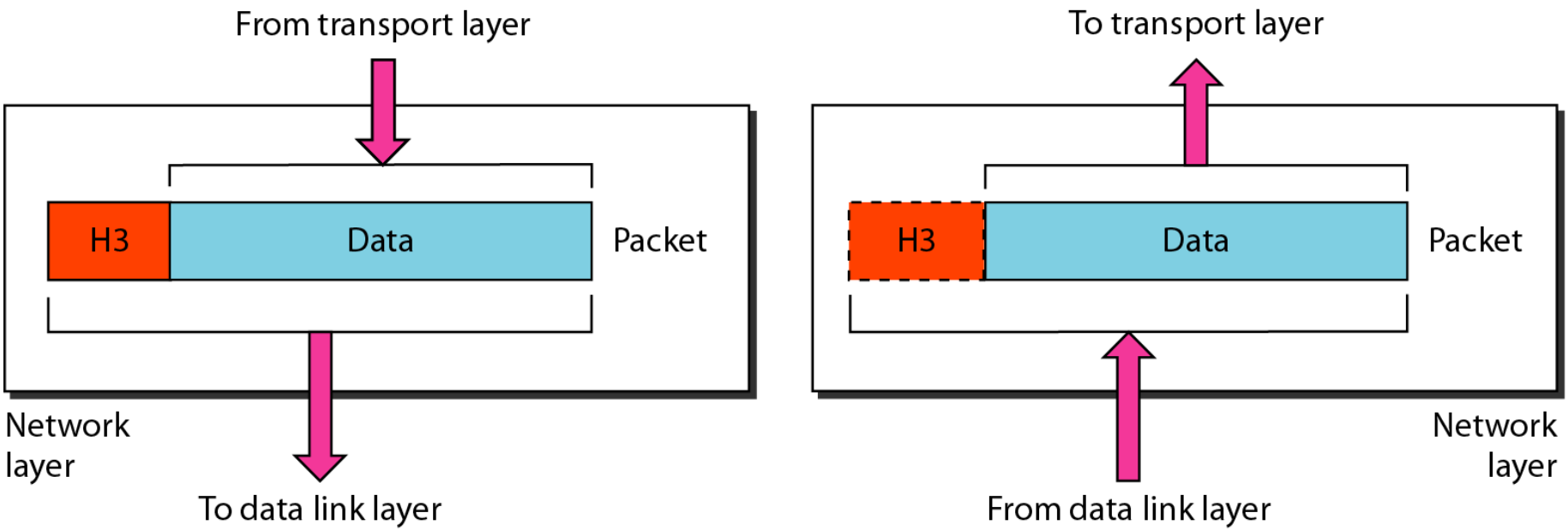
Data link layer

- Framing
- Physical addressing
- Flow control
- Error control
- Access control

Hop-to-hop delivery



Network layer

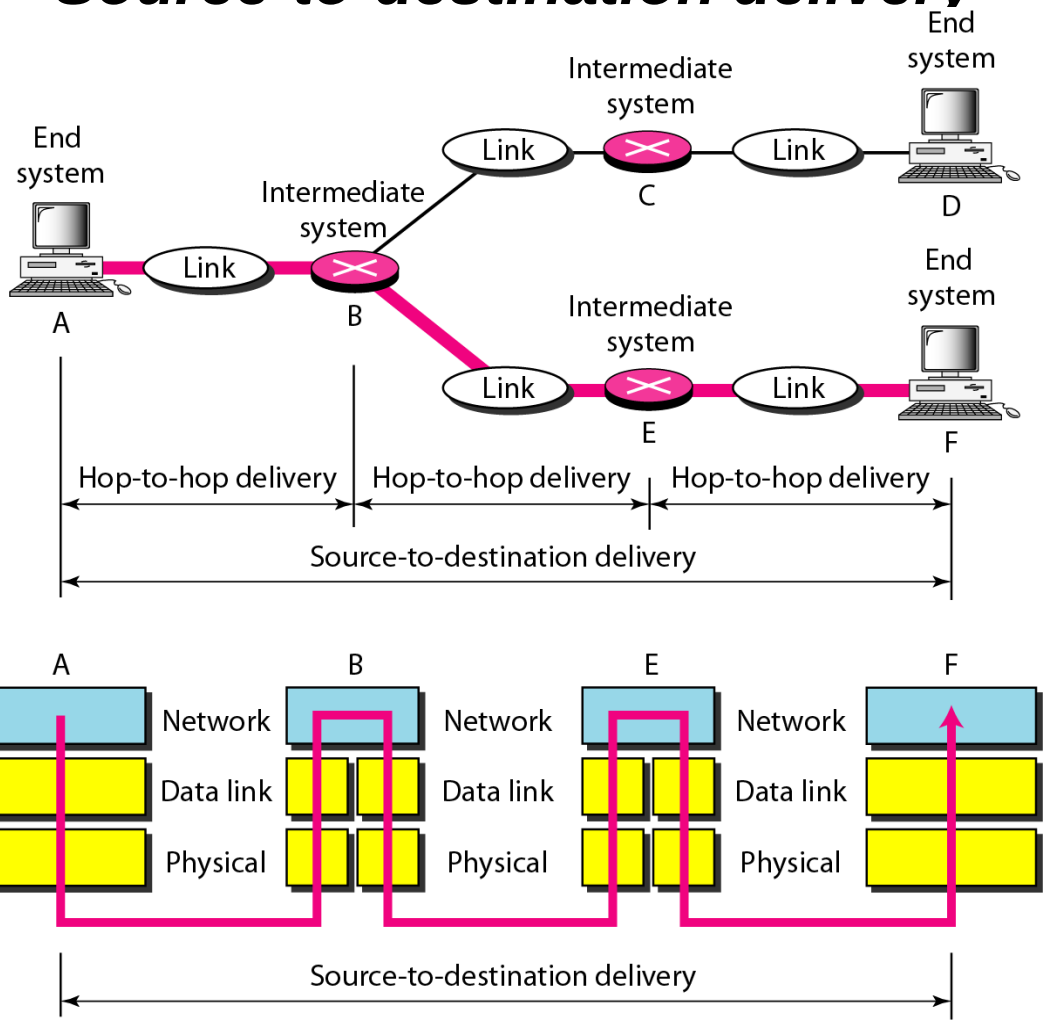


The network layer is responsible for the delivery of individual packets from the source host to the destination host.

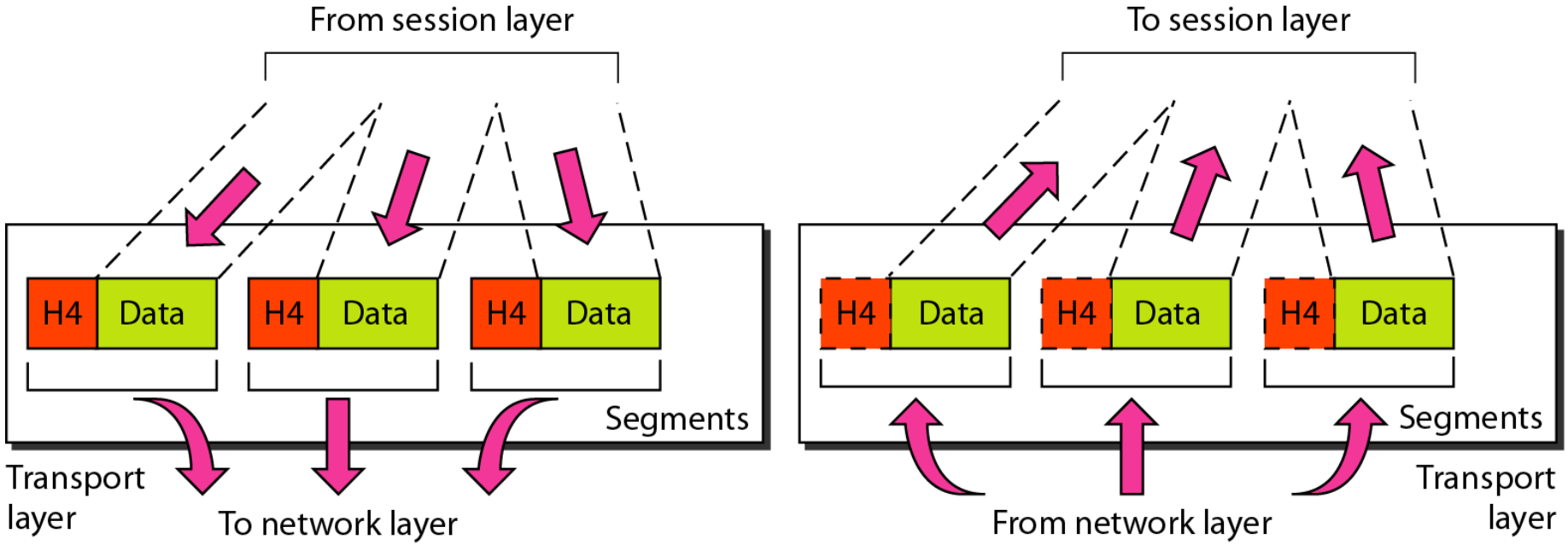
Network layer

- Logical addressing
- Routing

Source-to-destination delivery



Transport layer

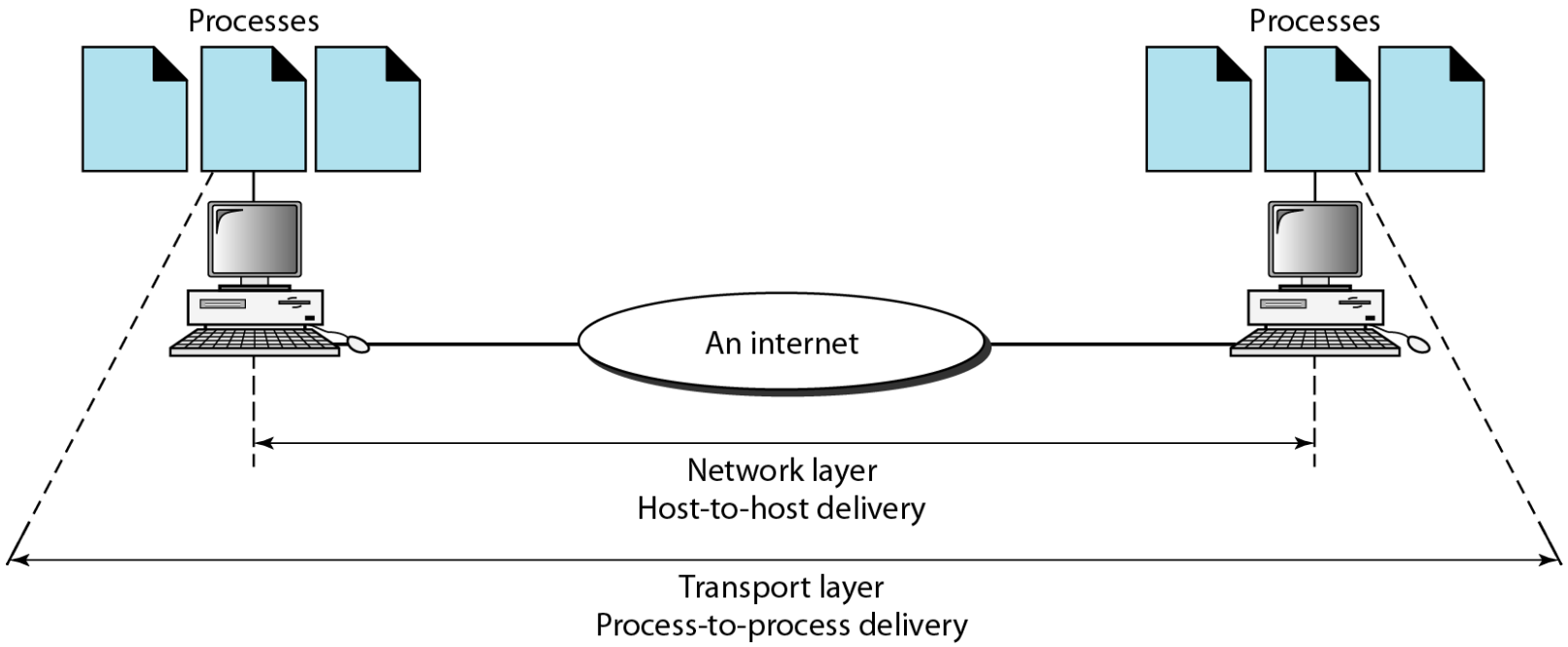


The transport layer is responsible for the delivery of a message from one process to another.

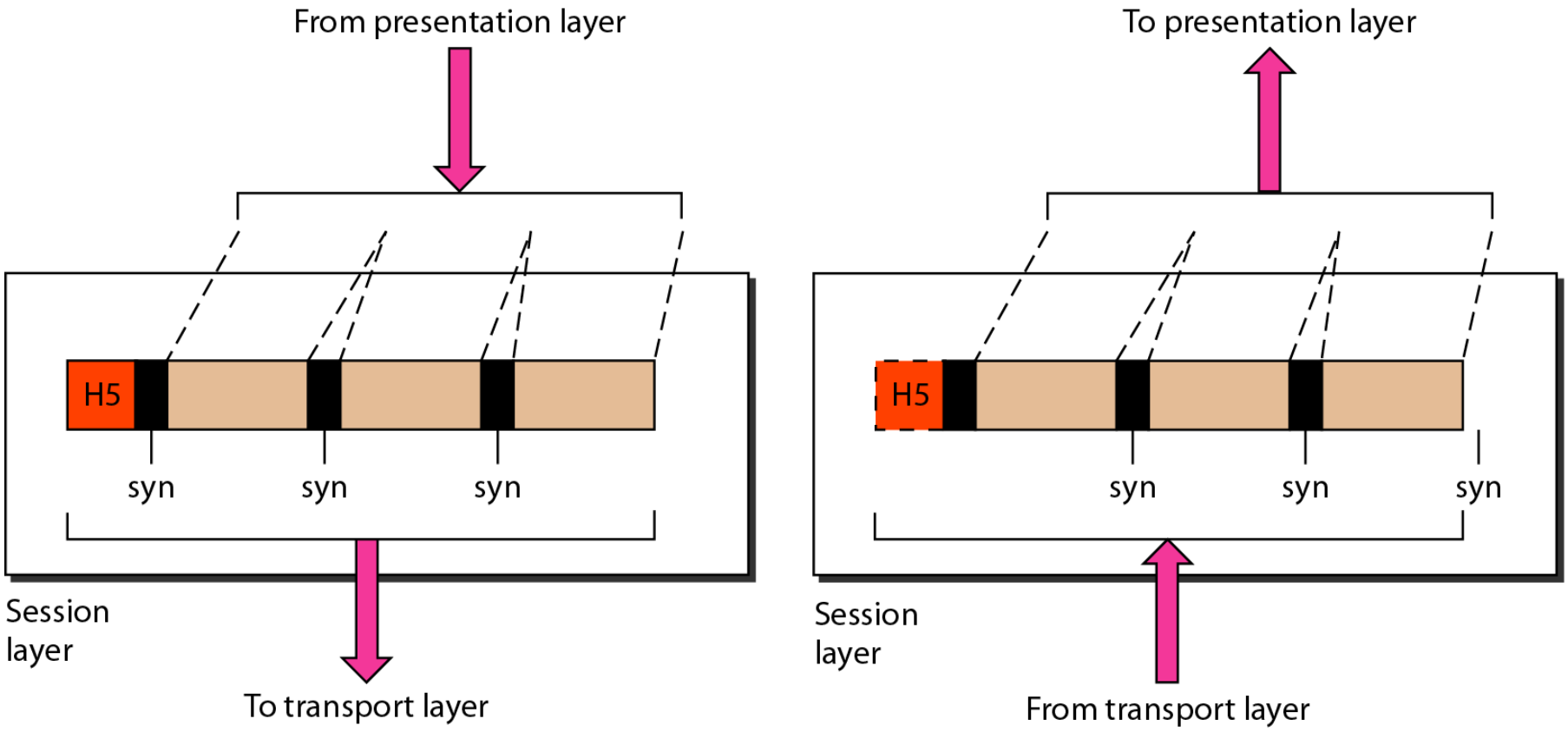
Transport layer

- Service-point addressing
- Segmentation and reassembly
- Connection control
- Flow control
- Error control

Reliable process-to-process delivery of a message



Session layer

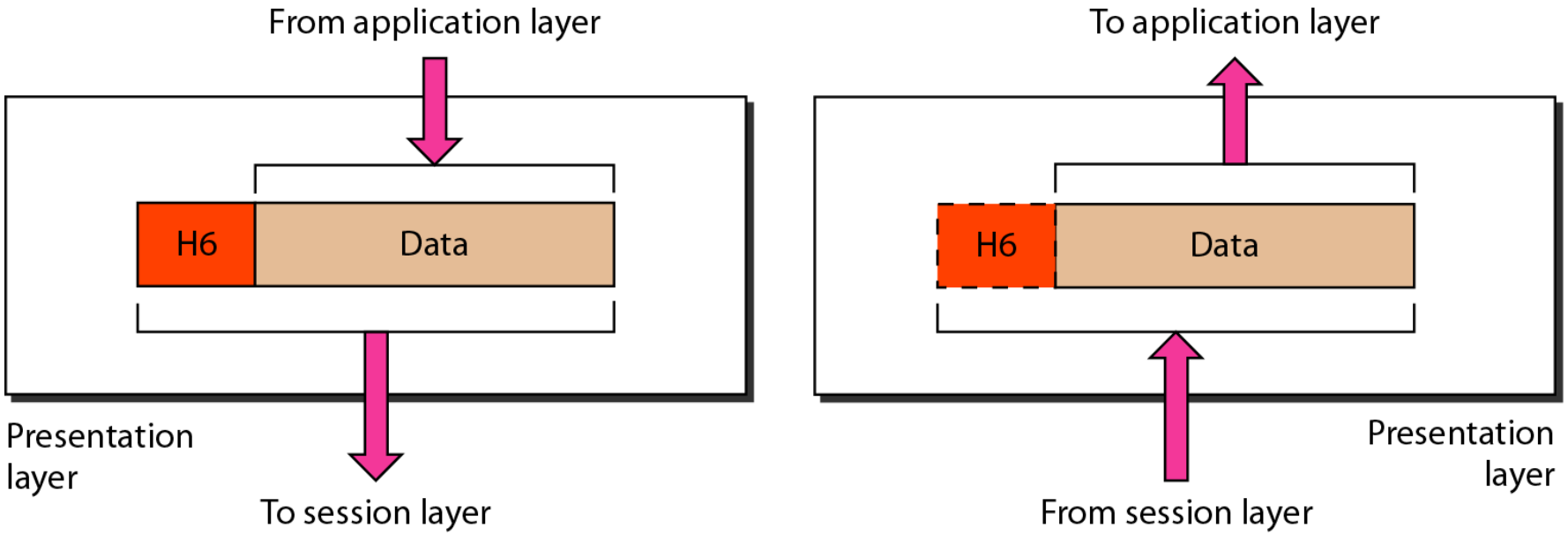


The session layer is responsible for dialog control and synchronization.

Session layer

- Dialog control (turn to transmit)
- Synchronization (introducing check point)

Presentation layer

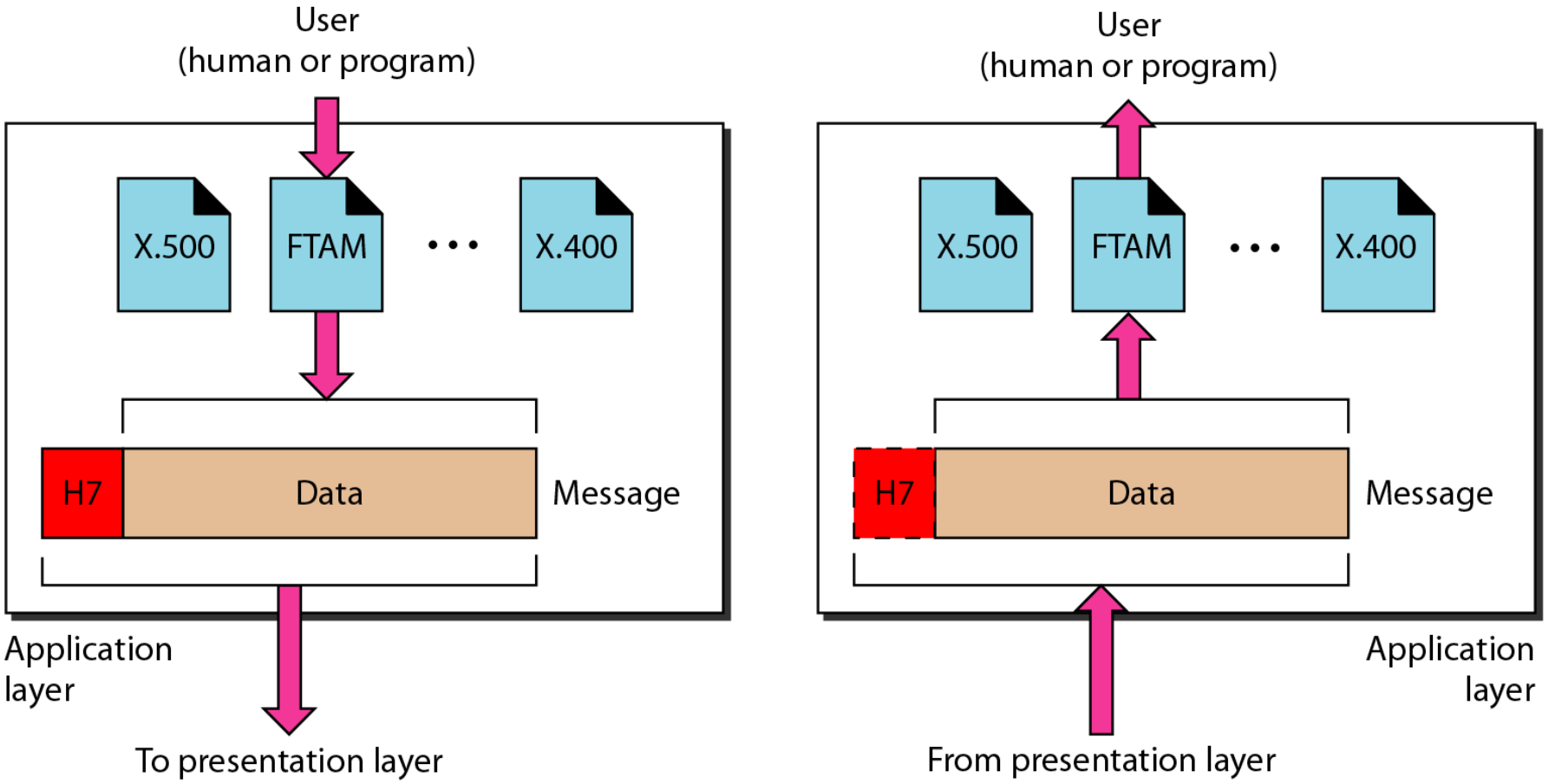


The presentation layer is responsible for translation, compression, and encryption.

Presentation layer

- Translation
- Encryption
- Compression

Application layer

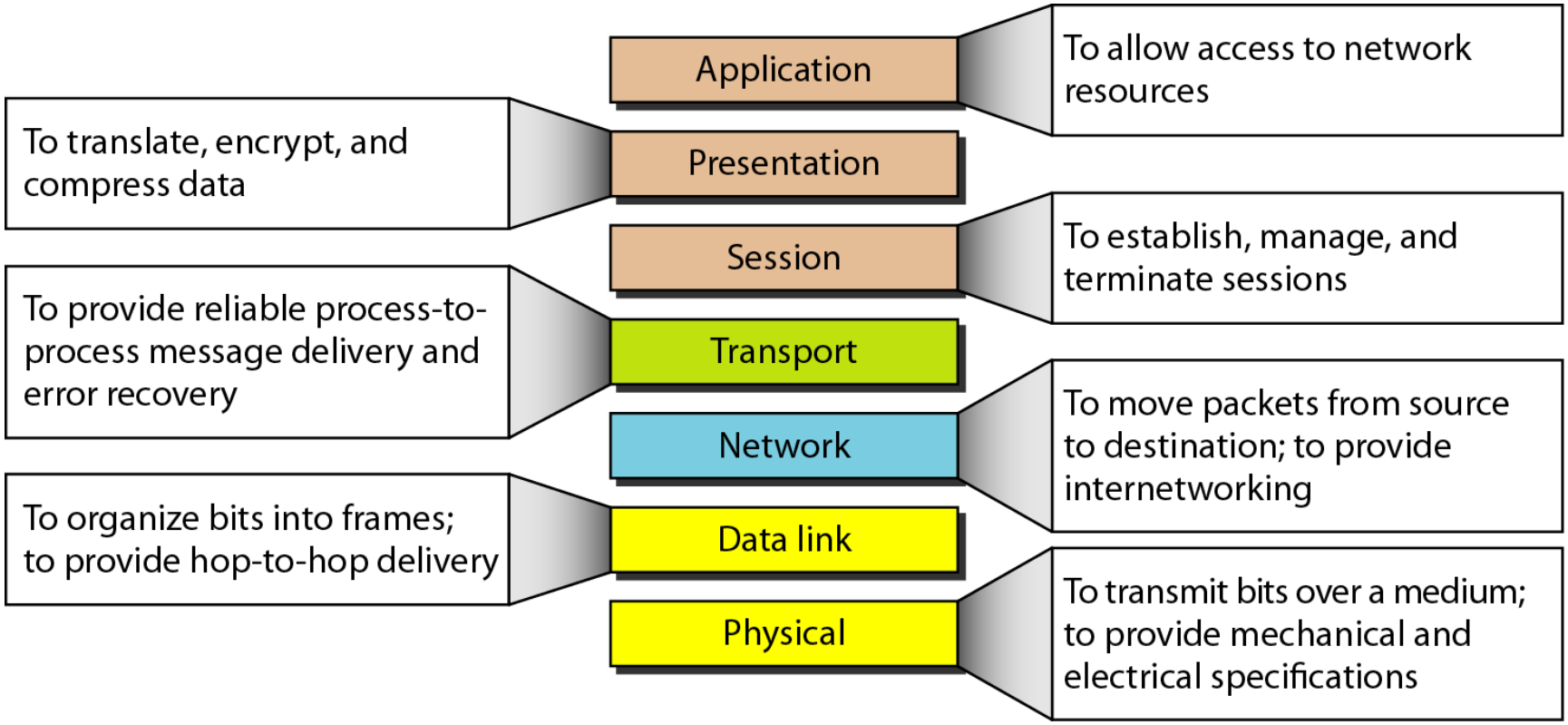


The application layer is responsible for providing services to the user.

Application layer

- Network Virtual Terminal
- File transfer, access, and management.
- Mail services
- Directory Services

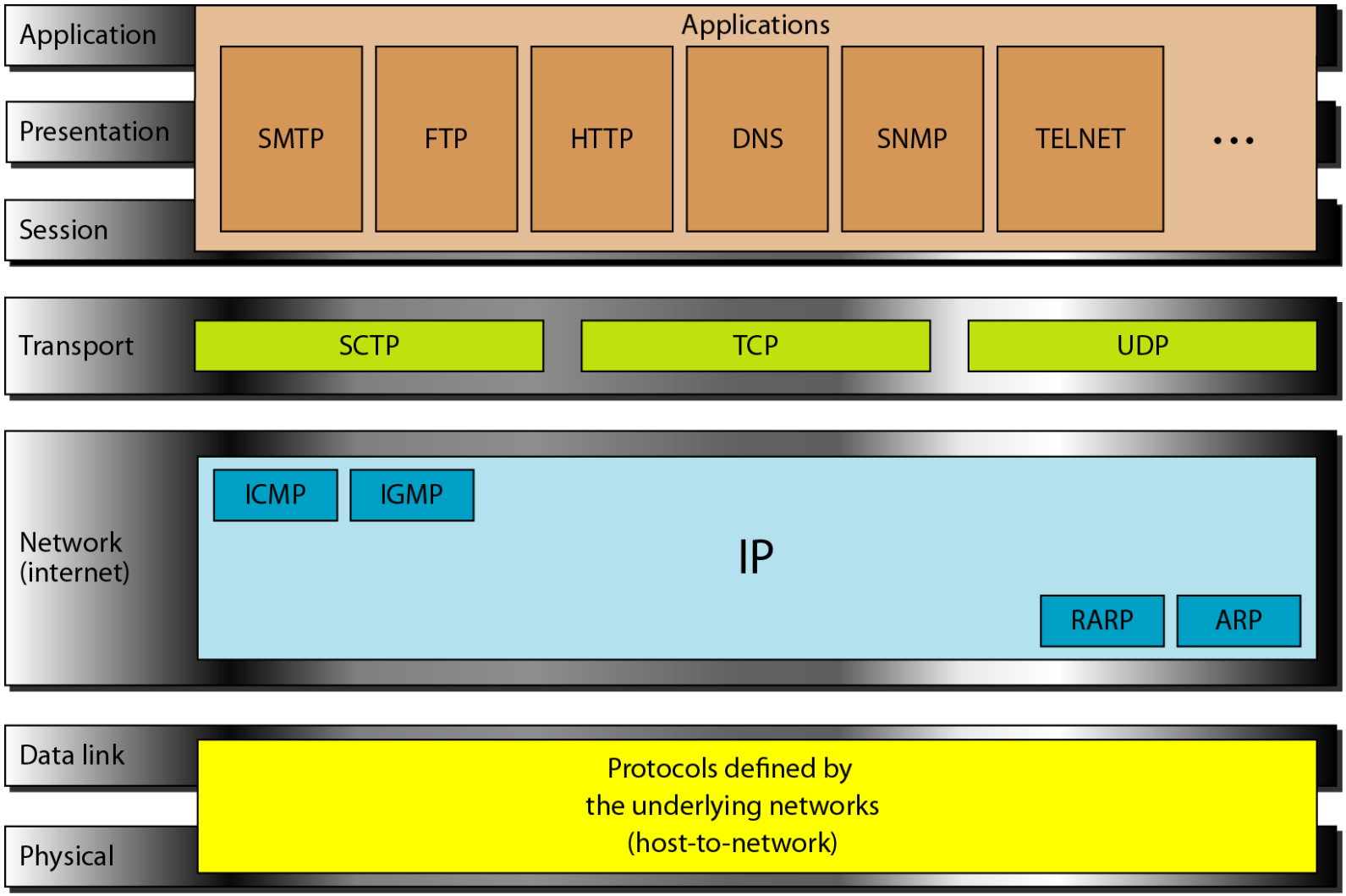
Summary of layers



TCP/IP PROTOCOL SUITE

The layers in the TCP/IP protocol suite do not exactly match those in the OSI model. The original TCP/IP protocol suite was defined as having four layers: host-to-network, internet, transport, and application. However, when TCP/IP is compared to OSI, we can say that the TCP/IP protocol suite is made of five layers: physical, data link, network, transport, and application.

TCP/IP and OSI model

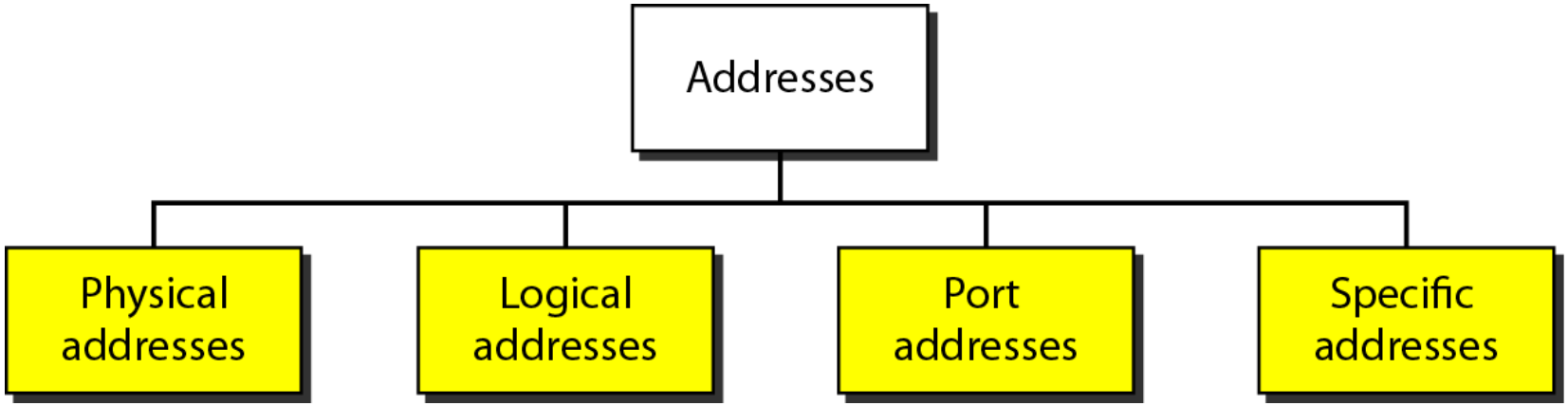


ADDRESSING

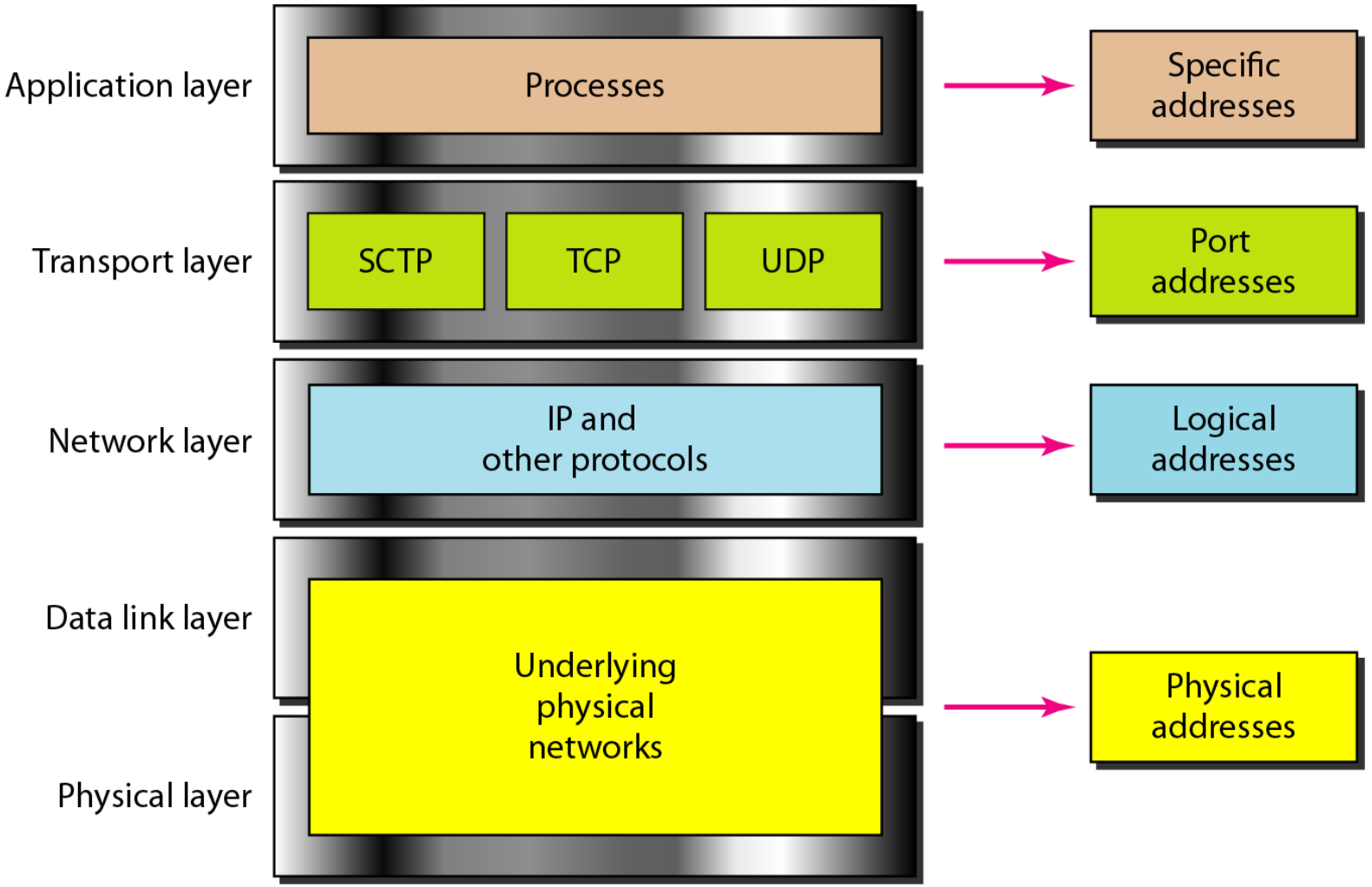
Four levels of addresses are used in an internet employing the TCP/IP protocols: physical, logical, port, and specific.

Physical Addresses
Logical Addresses
Port Addresses
Specific Addresses

Addresses in TCP/IP



Relationship of layers and addresses in TCP/IP



Comparison of the OSI and TCP/IP Reference Models

- Functionality of the layers is roughly similar

Concepts central to OSI model

- Services : The service definition tells what the layer does, not how entities above it access it . It defines the layer's semantics.
- Interfaces : tells the processes above it how to access it. It specifies what the parameters are and what results to expect
- Protocols: the layer's own business.

Comparison of the OSI and TCP/IP Reference Models

- OSI reference model was devised before the corresponding protocols were invented. This ordering means that the model was not biased toward one particular set of protocols
- In TCP/IP, the protocols came first, and the model was really just a description of the existing protocols
- Number of layers: the OSI model has seven layers and the TCP/IP has four layers.
- The TCP/IP model has only one mode in the network layer (connectionless) but supports both modes in the transport layer.