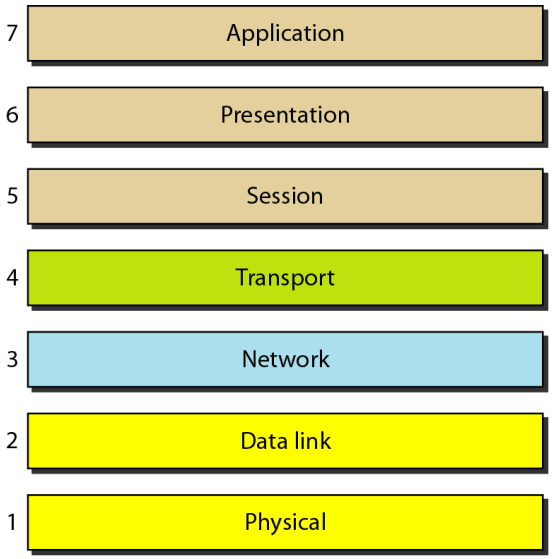
Chapter Two

The OSI Model

2.1- The Model



2.1.1- OSI Layered Architecture:

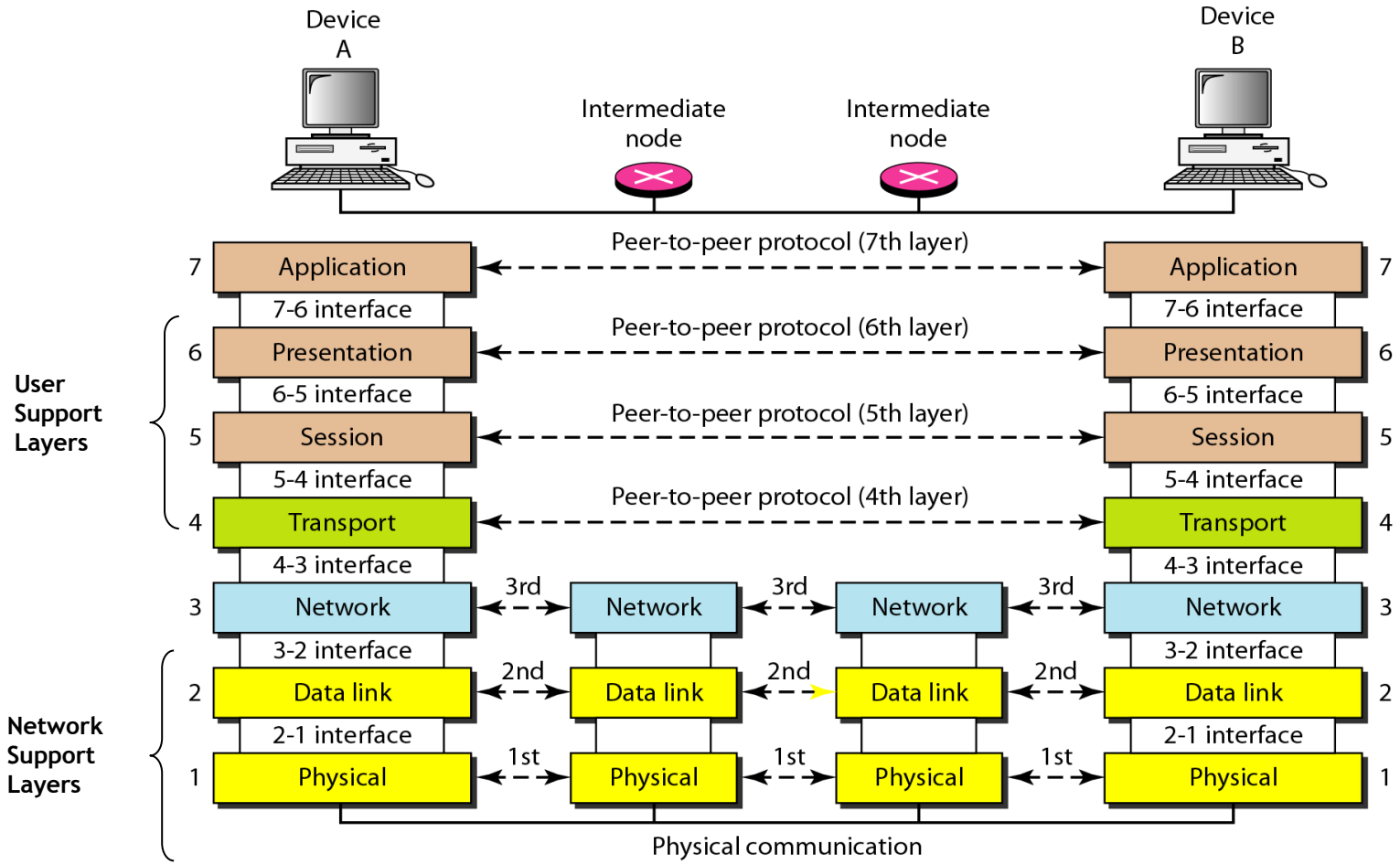
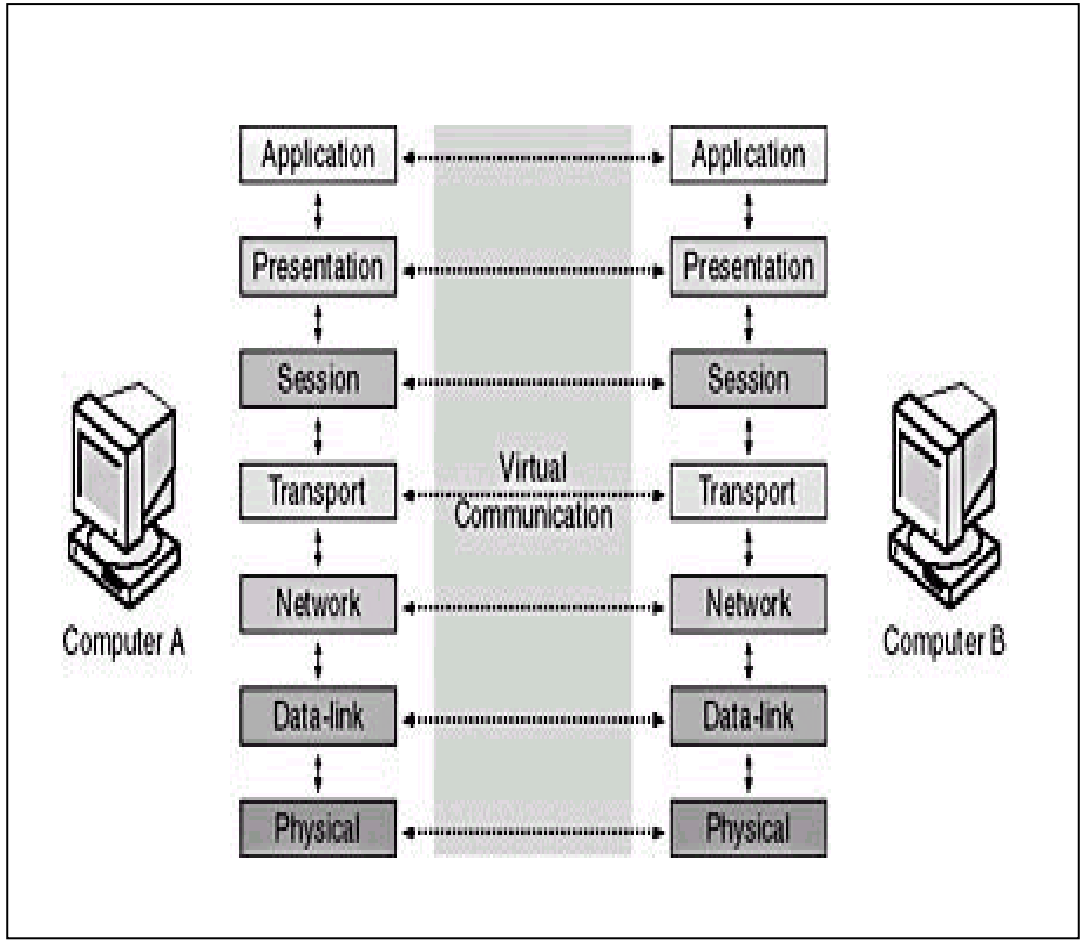


Figure (2.1) shows the layers involved when a message sent from device A to device B.

2.1.2- Interfaces between Layers

2.1.3- OSI Peer-to-Peer Processes



2.1.4- Encapsulation and Protocol data unit (PDU)

- Data
- Segment
- Packet
- Frame
- Bits

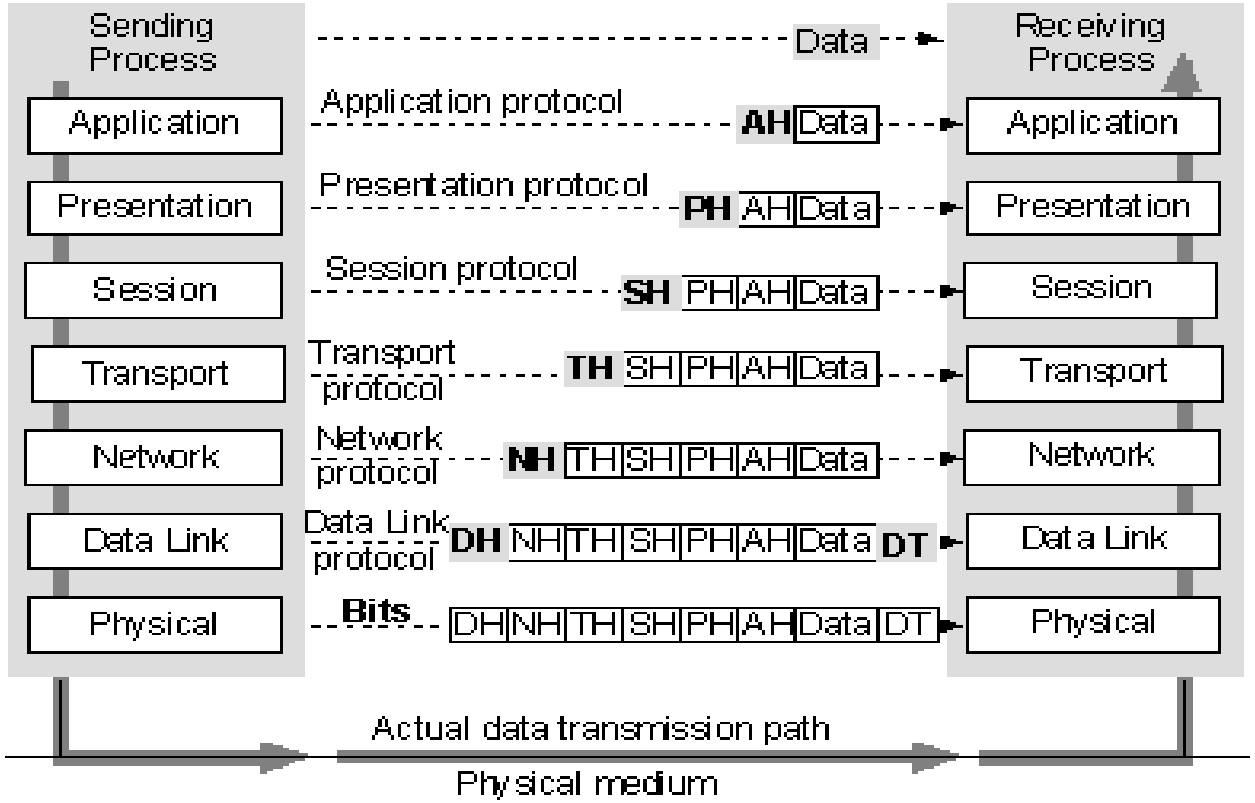
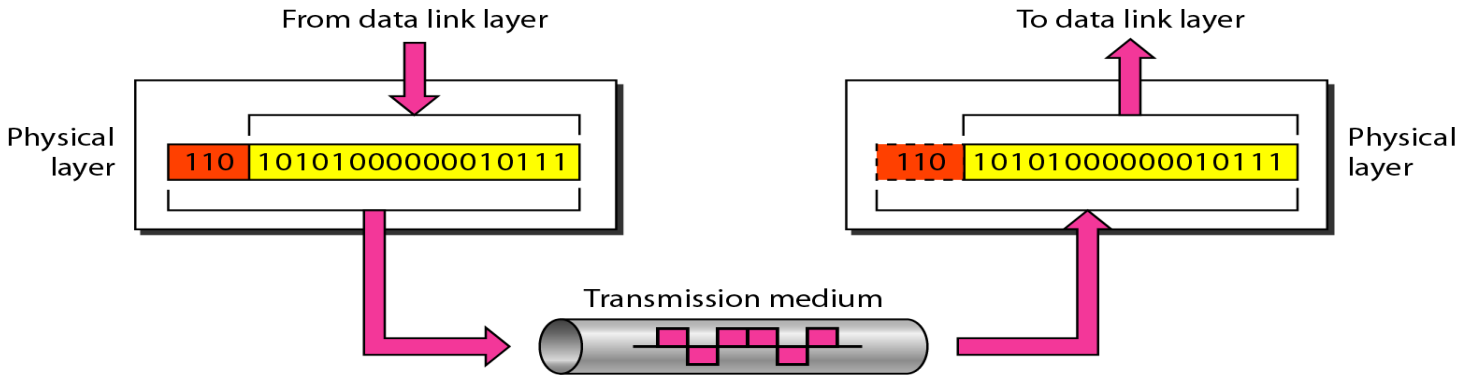


Figure (2.2): The encapsulation process

2.2- Functions of the Layers

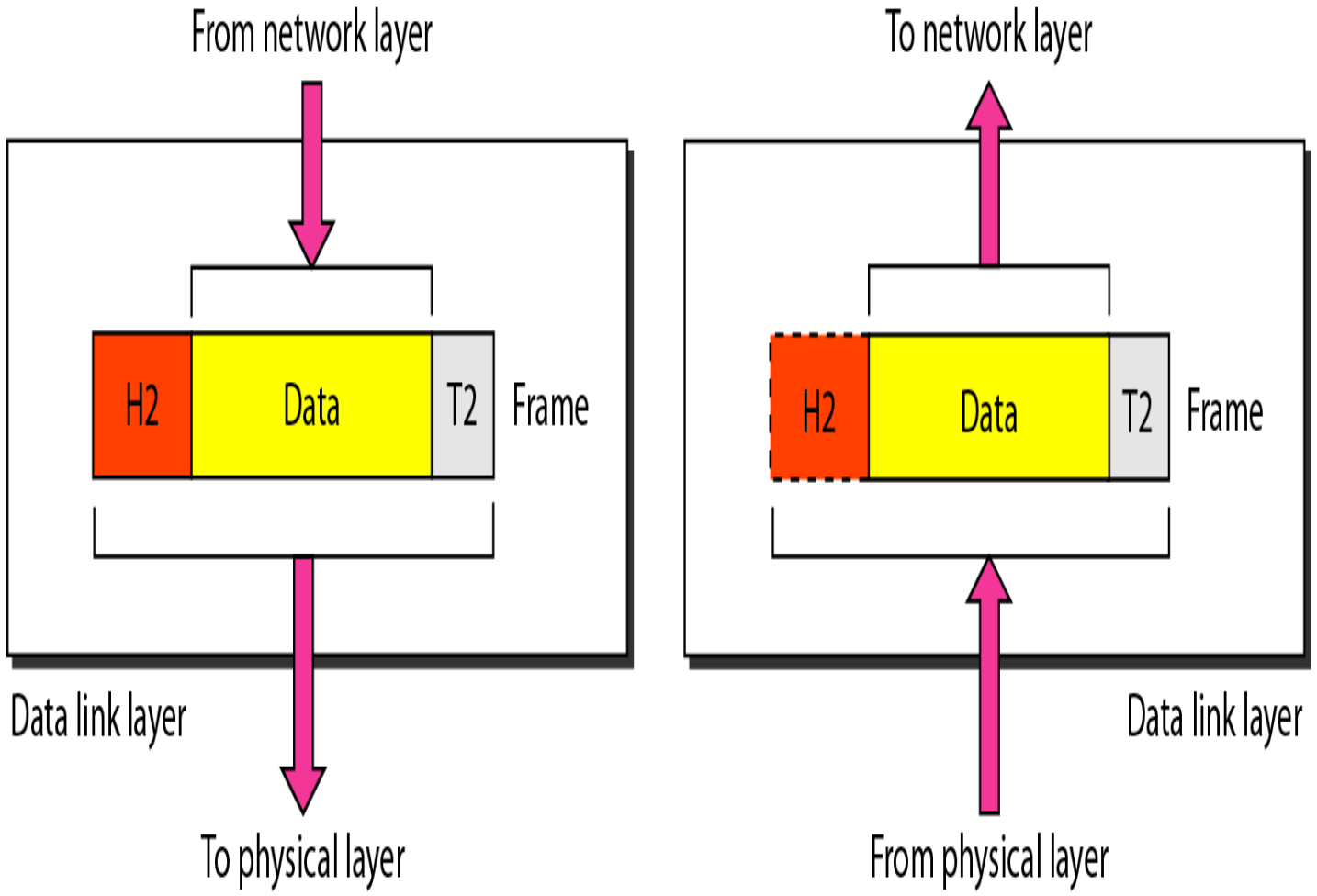
2.2.1- Physical Layer



This task requires a number of considerations:

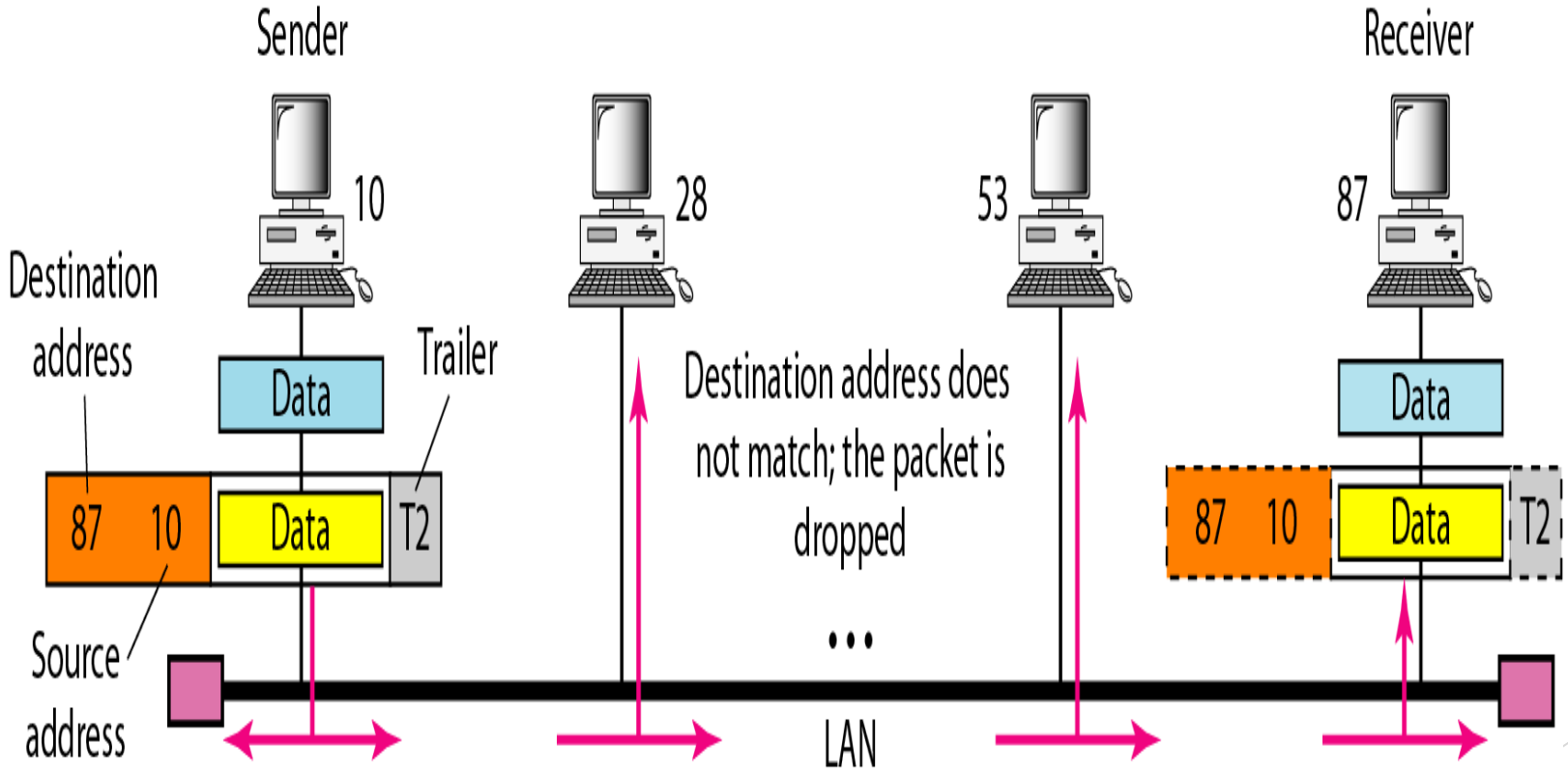
* - Line configuration
* - Data transmission mode
* - Topology
* - Signals
* - Encoding
* - Interface
* - Medium
* - Multiplexing

2.2.2- *Data link Layer*

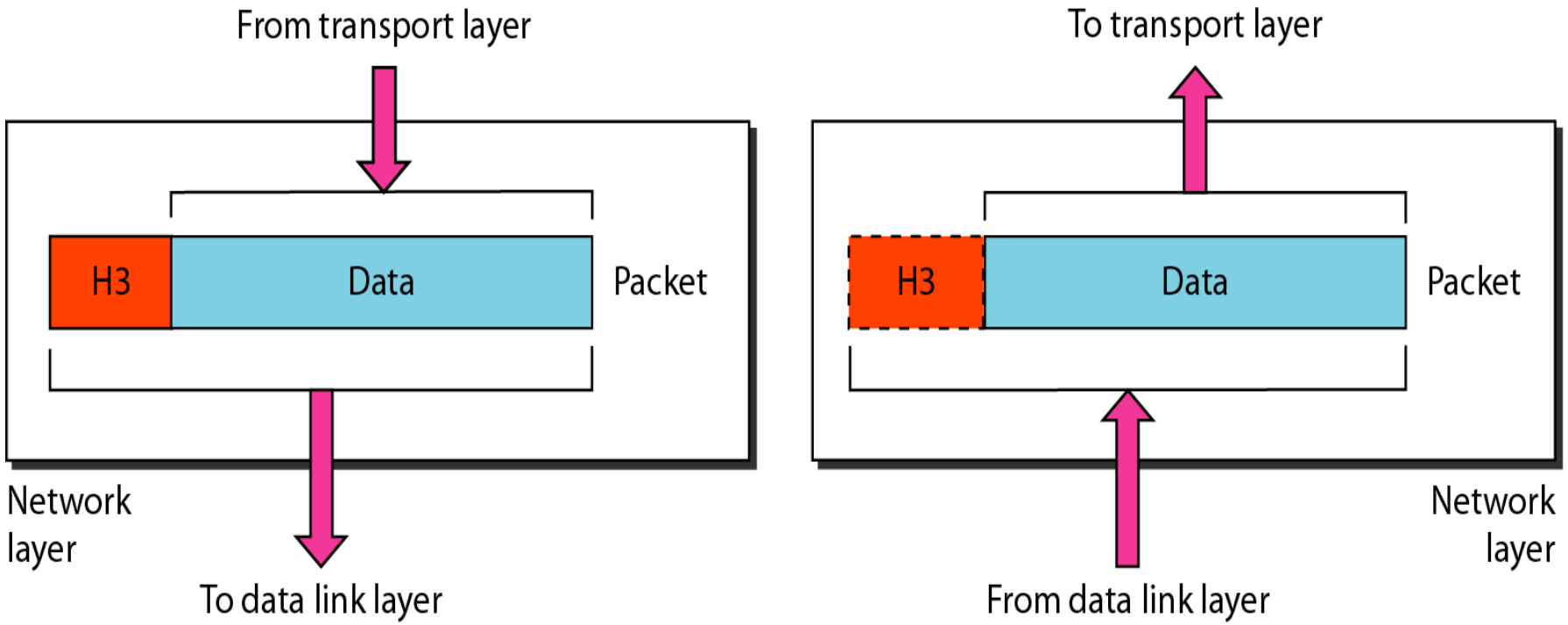


The responsibilities of the data link layer include the following:

***Node-to-node delivery**
***Physical Addressing**
***Access control**
***Flow control**
***Error handling**



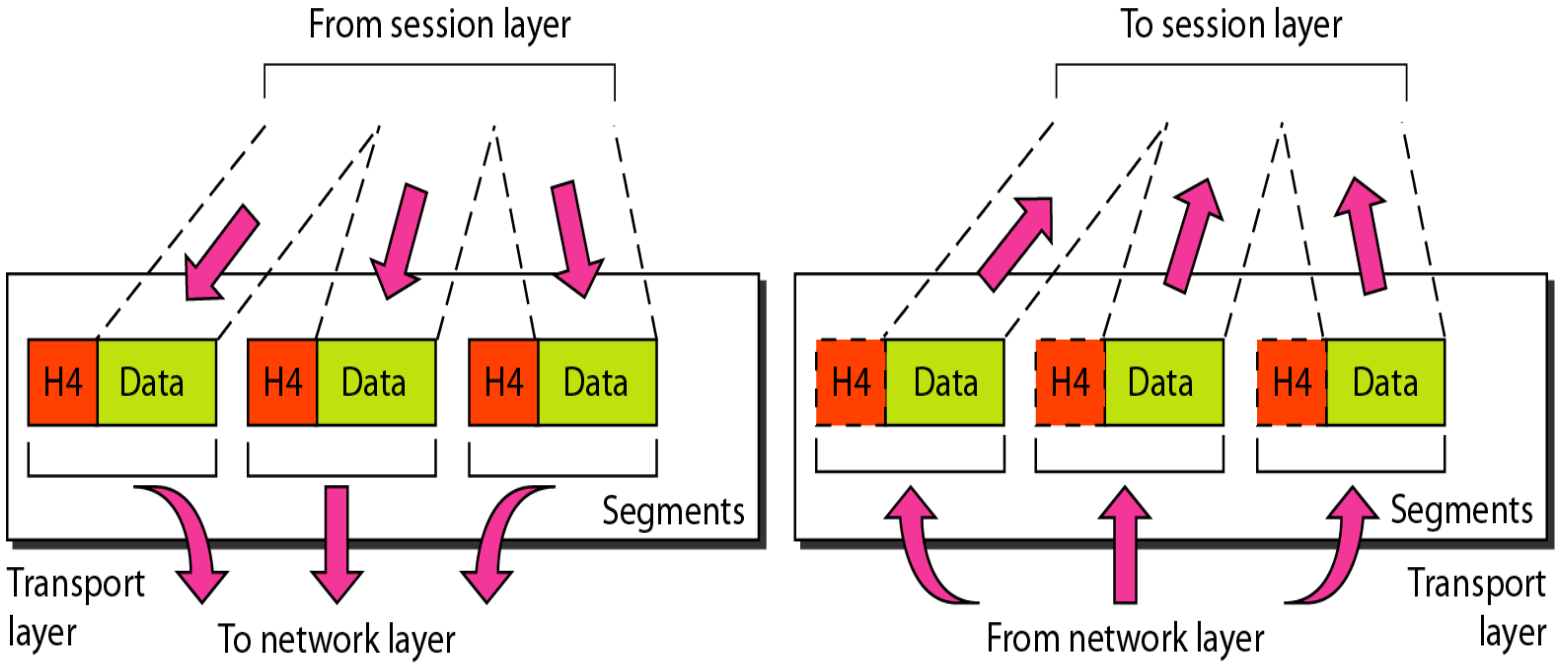
2.2.3- ***Network Layer***



Specific responsibilities of the network layer include the following:

***Source-to-destination delivery**
***Logical addressing**
***Routing**
***Address transformation**

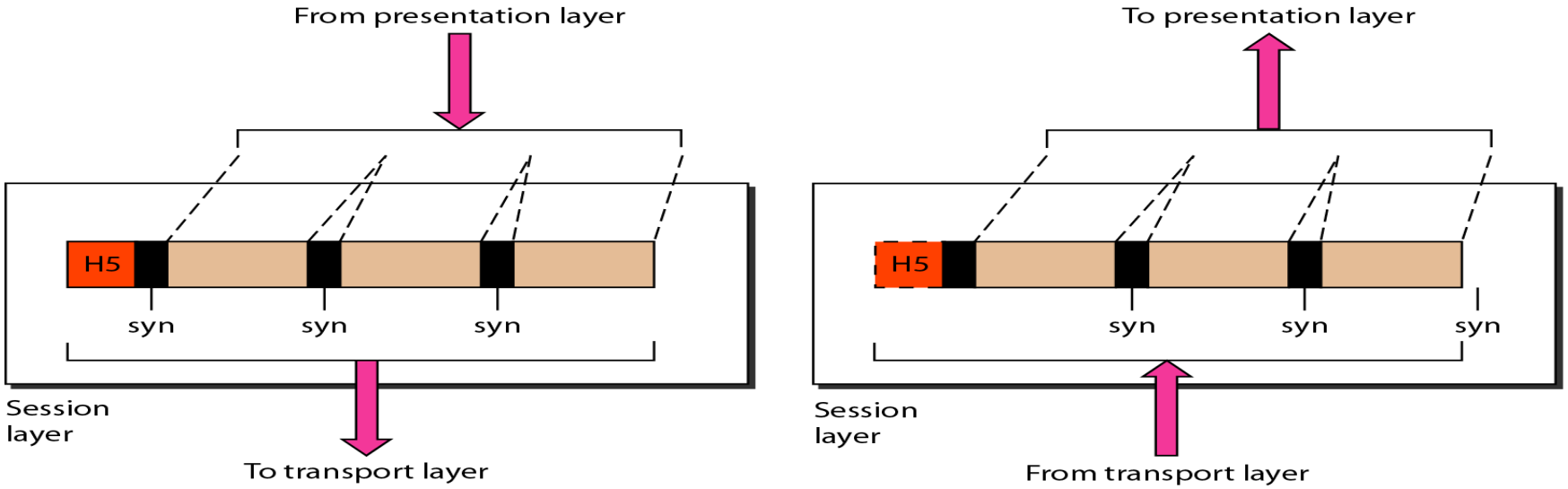
2.2.4- *Transport Layer*



Specific responsibilities of the transport layer include the following:

***End-to-end message delivery**
***Service-point (port) addressing**
***Segmentation and reassembly**
***Connection control**

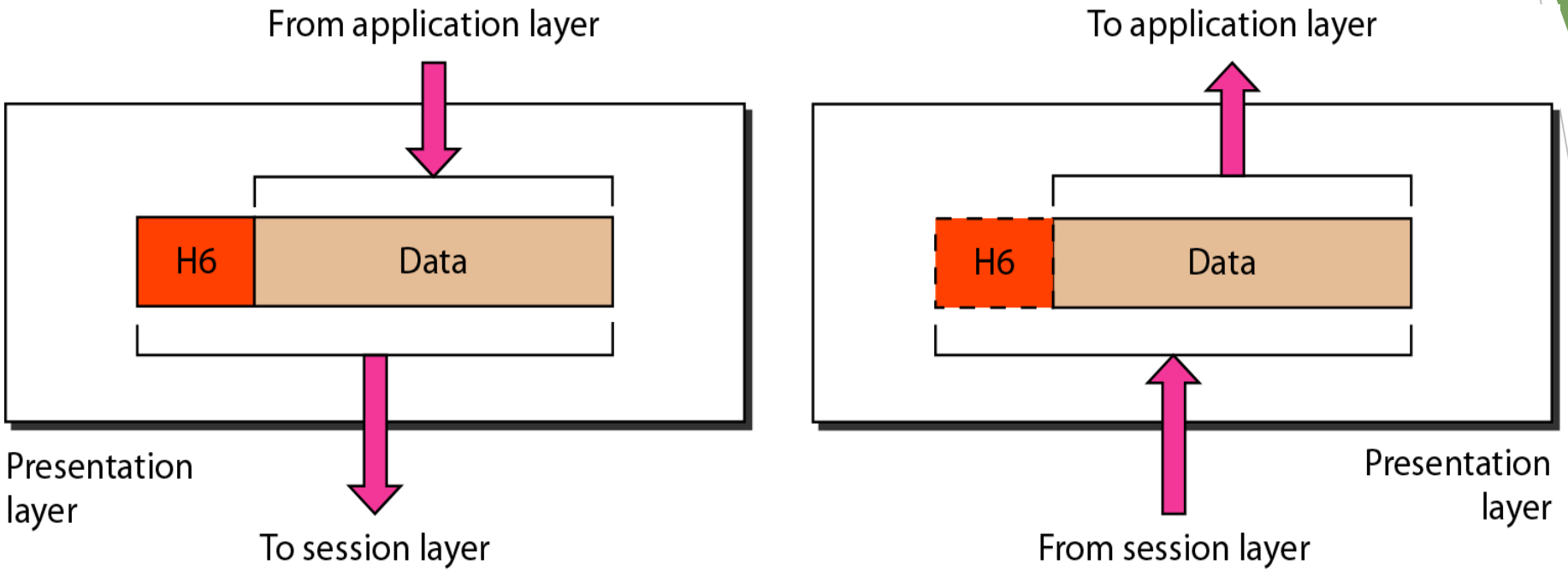
2.2.5- Session Layer



Specific responsibilities of the session layer include the following:

*Session management
*Synchronization
*Dialog control
*Graceful close

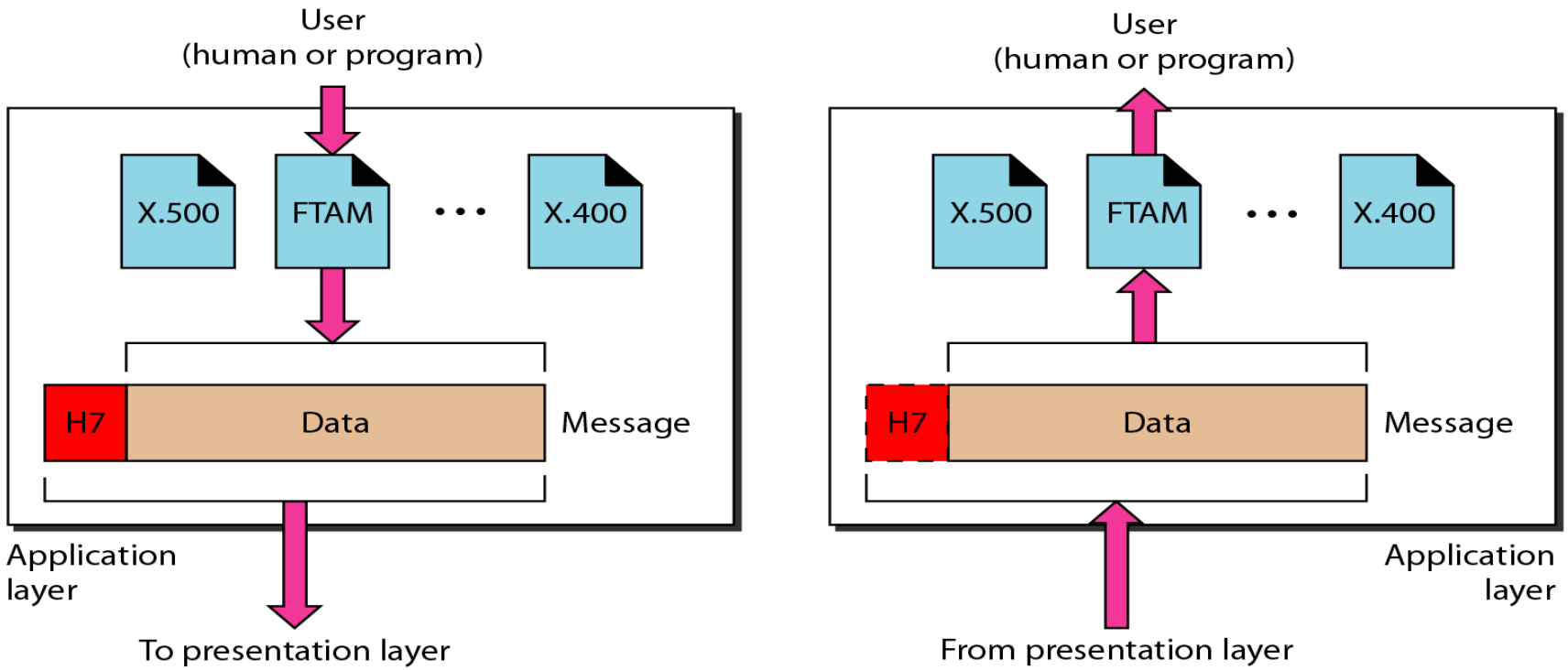
2.2.6- *Presentation Layer*



Specific responsibilities of the presentation layer include following:

***Translation**
***Encryption**
***Compression**
***Security**

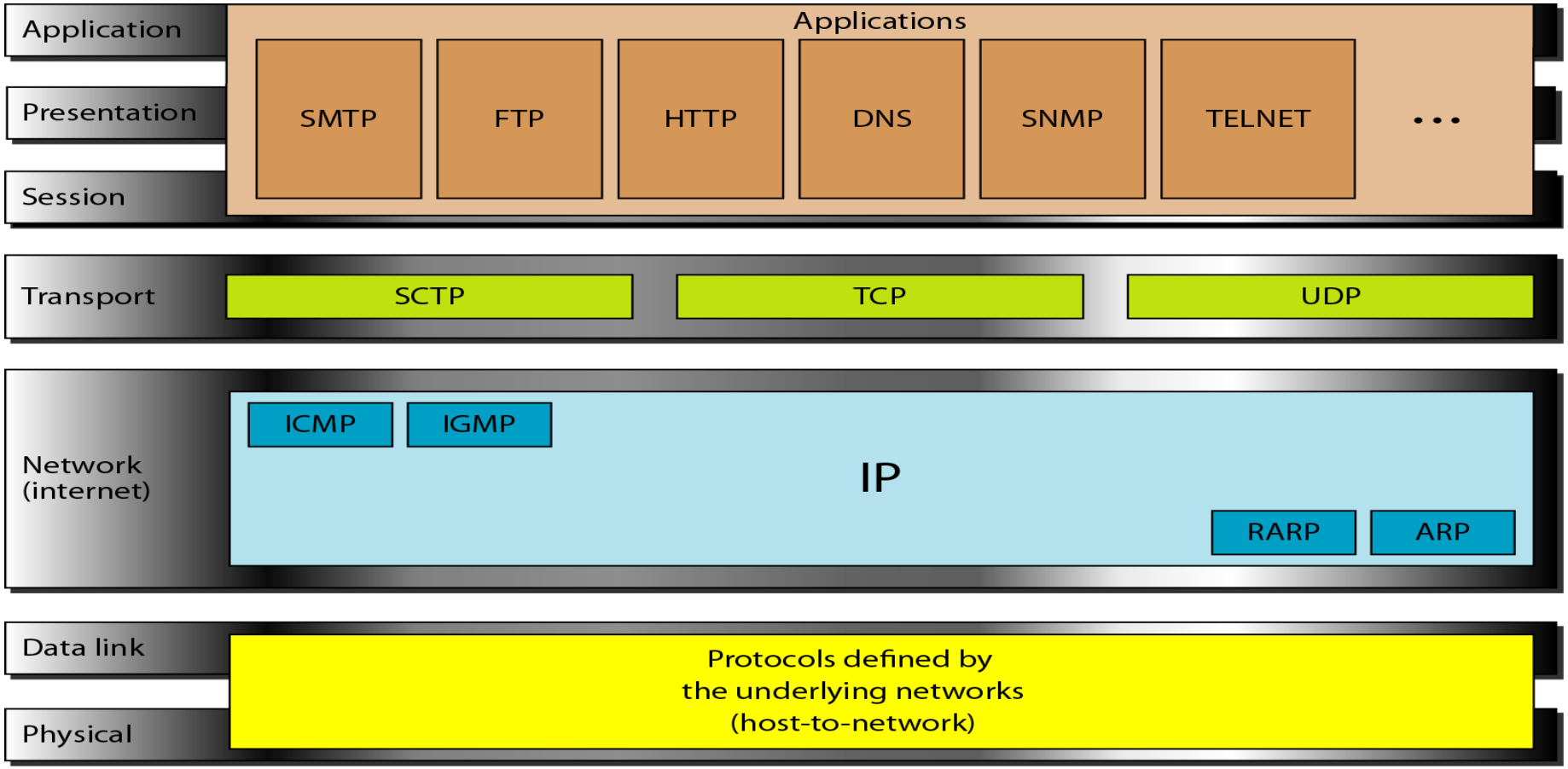
2.2.7- Application Layer



Specific services provided by the application layer include the following:

*Web Services
*File access, transfer, and management
*Mail services
*Directory services

2.3- TCP/IP Protocol Suite



*The main differences between TCP/IP and the OSI 7-layer model are:

Number of layers

- TCP/IP defines only 4 or 5 layers.

* Functions performed at a given layer

* Interface between adjacent layers

2.4- Addressing

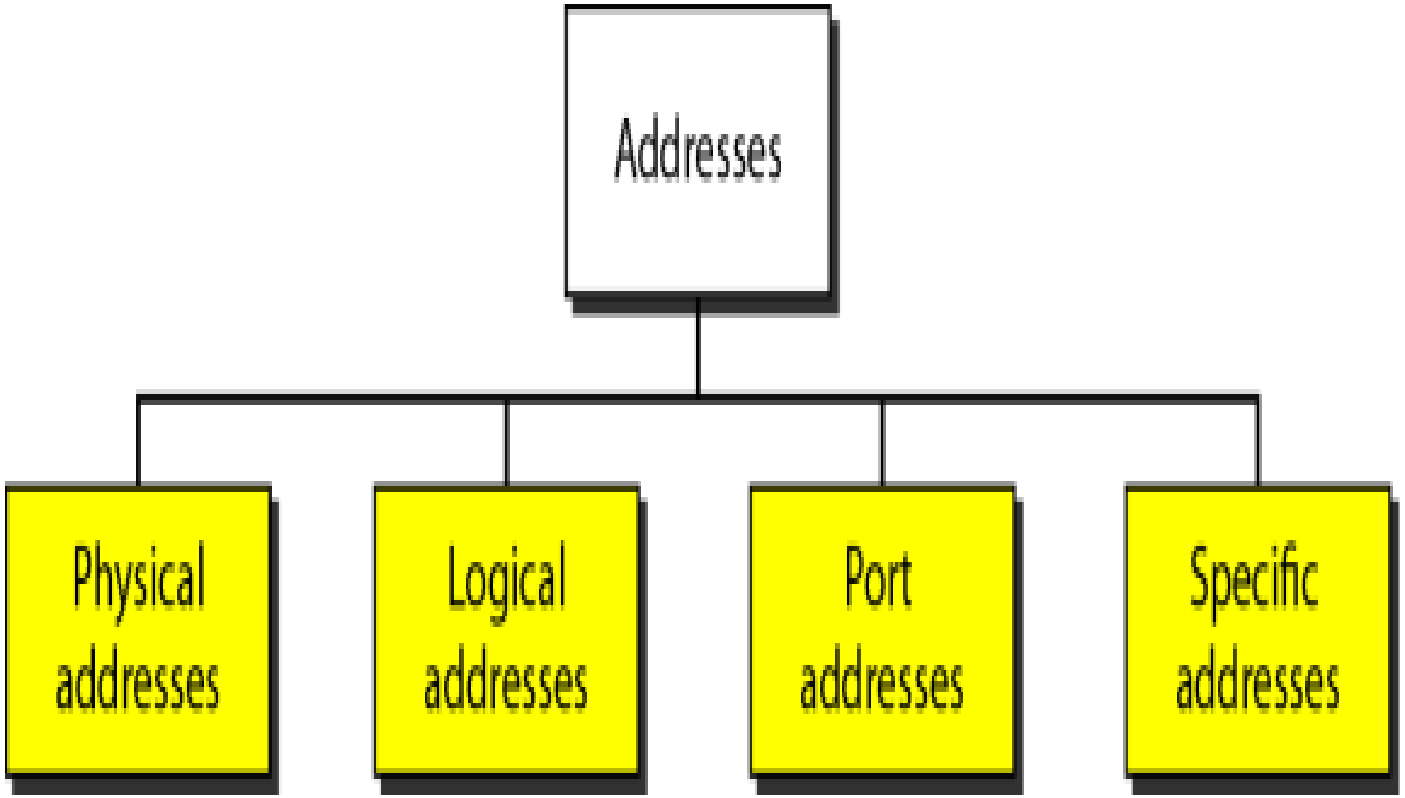
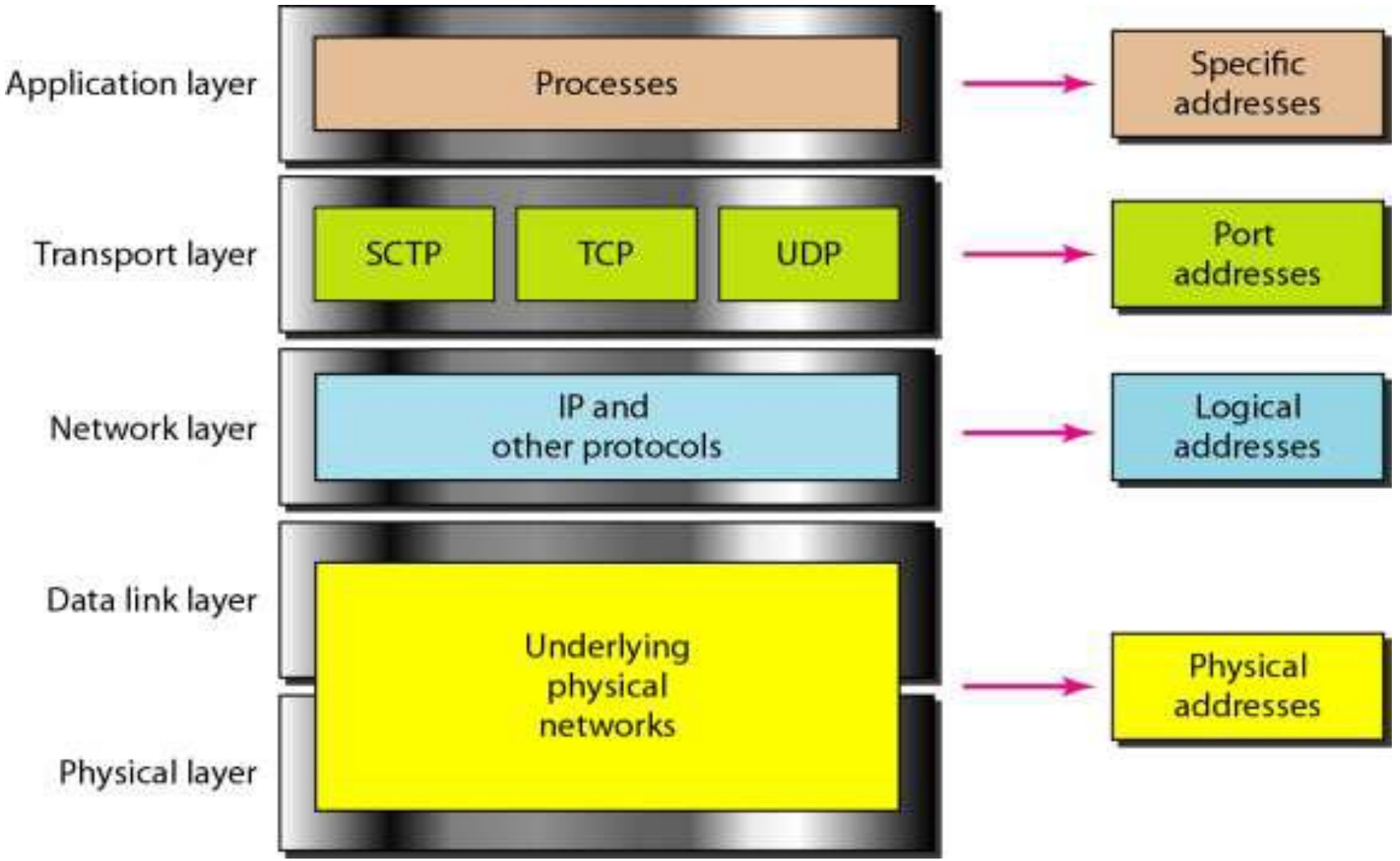


Figure (2.5): Addresses in TCP/IP



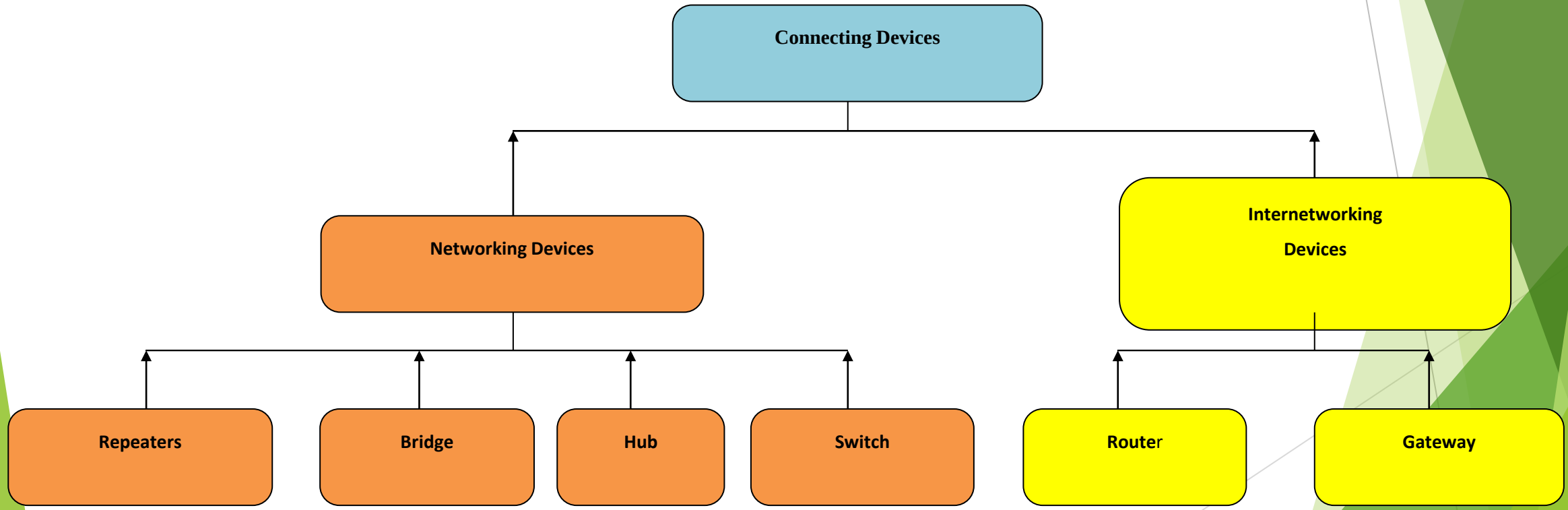
Figure(2.6): Relationship of layers and addresses in TCP/IP

2.4.1-Physical Addresses

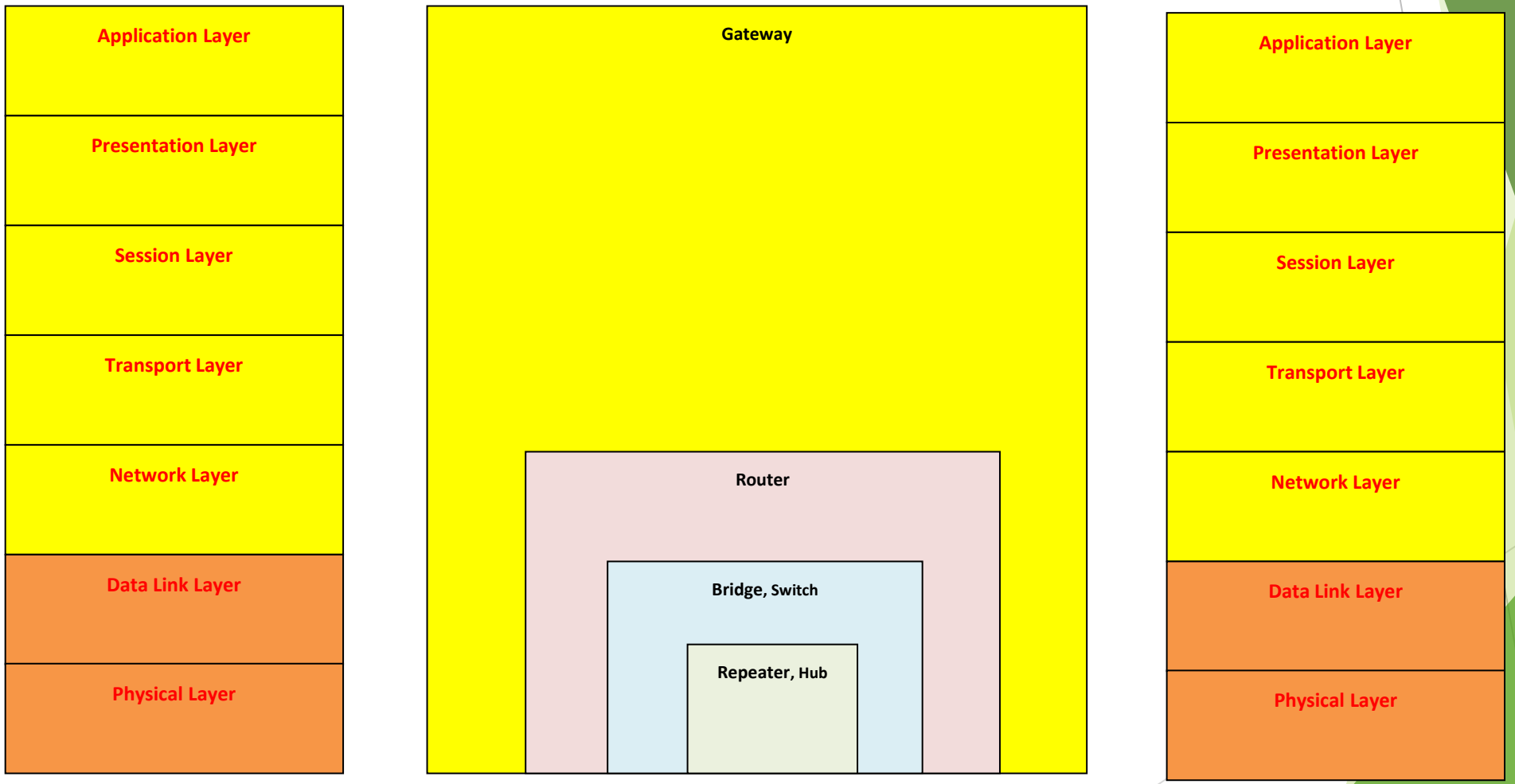
2.4.2-Logical Addresses (IP)

2.4.3- Port Addresses

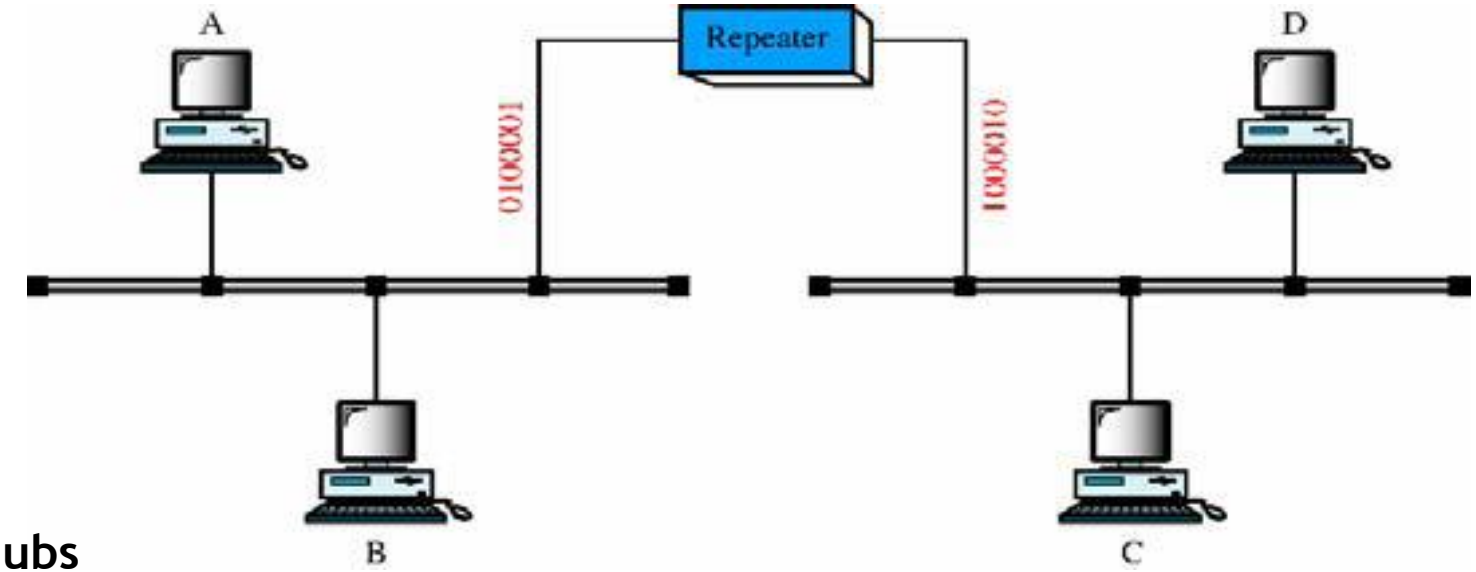
2.5- Networking and Internetworks



Each of these devices operates at different layer of the OSI model as shown in figure below:

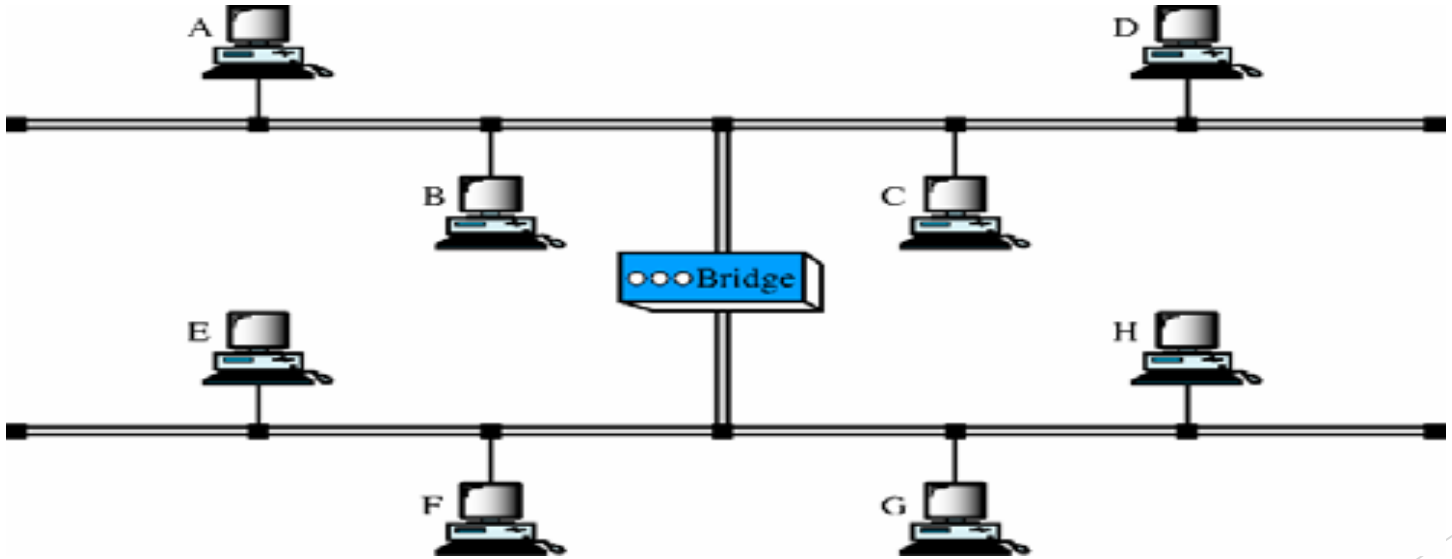


2.5.1- Repeater:



2.5.2- Hubs

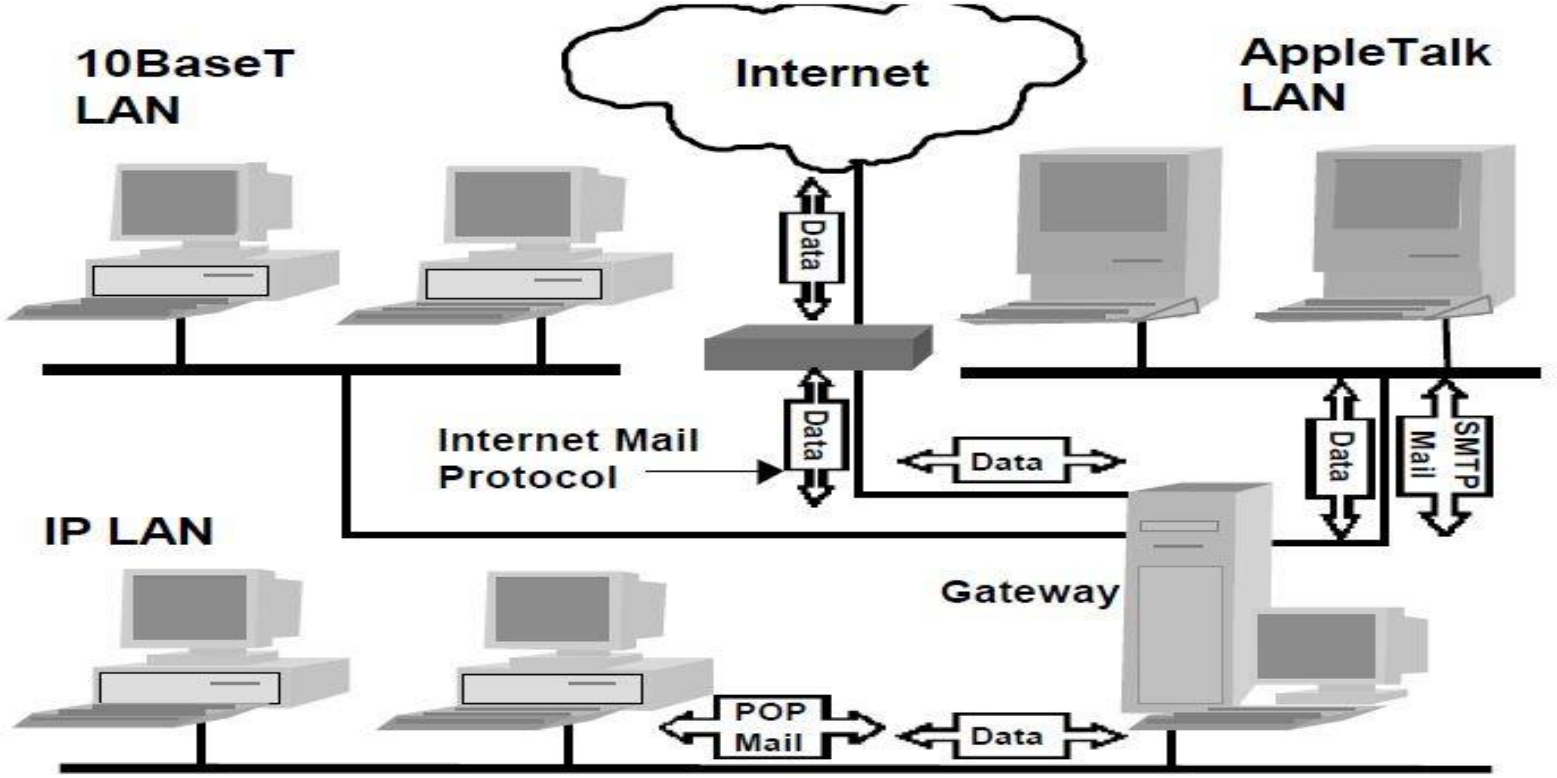
2.5.3- Bridges



2.5.4 Switches

2.5.5- Routers

2.5.6- Gateway



2.6 Connection-Oriented Versus Connectionless Communication