COMPUTER NETWORK

Introduction

Data Communication

Components

Data Representation

Direction of Data Flow

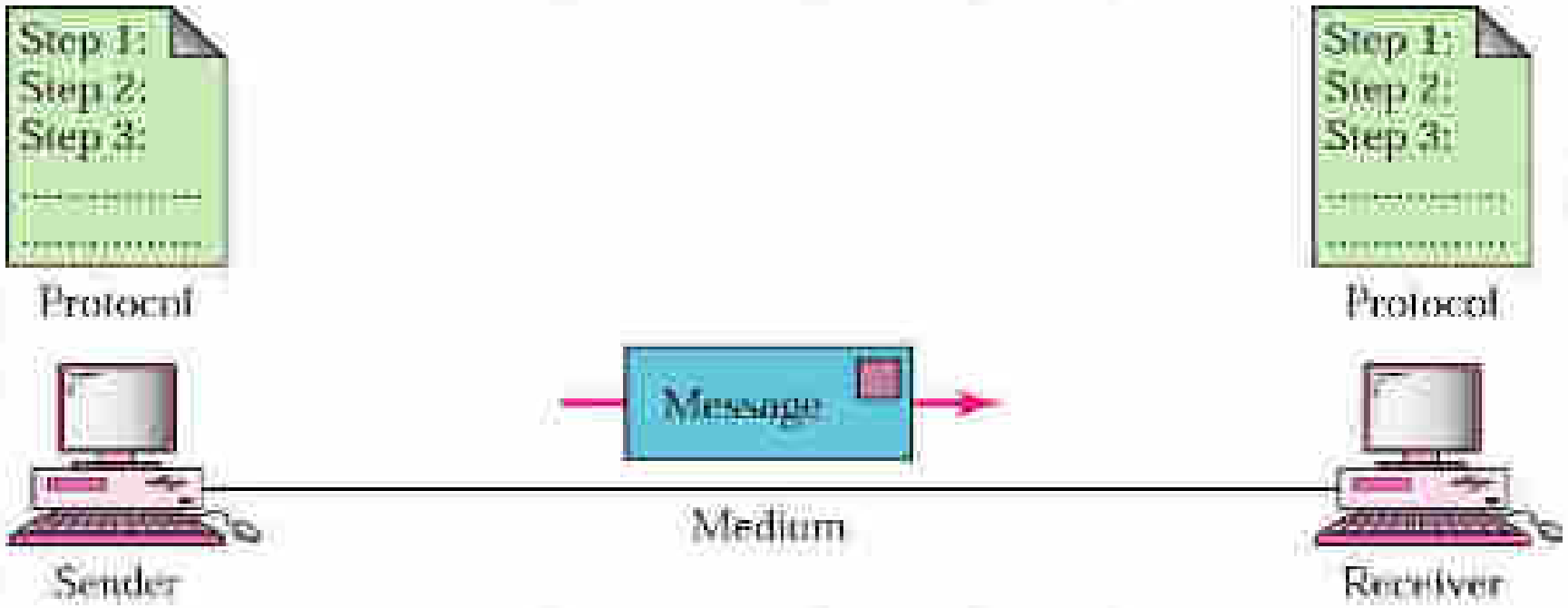


Figure 1.1 *Five components of data communication*

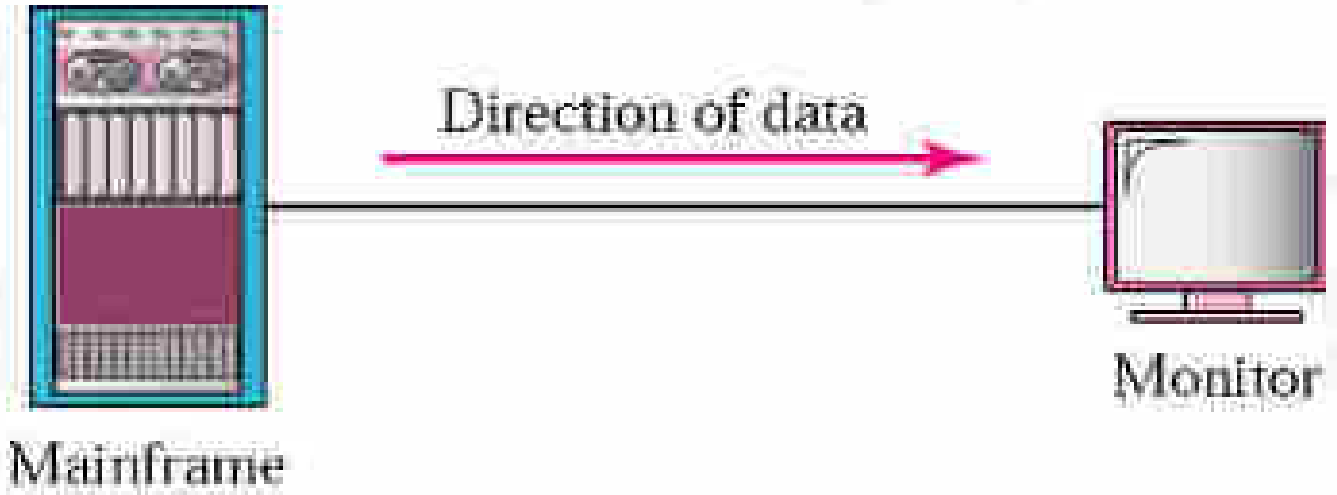


Figure 1.2 *Simplex*

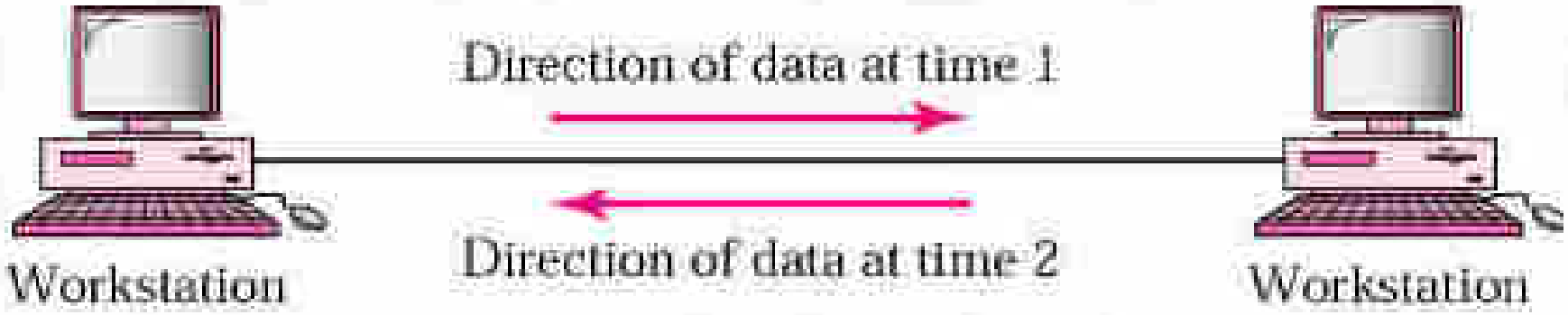


Figure 1.3 *Half-duplex*

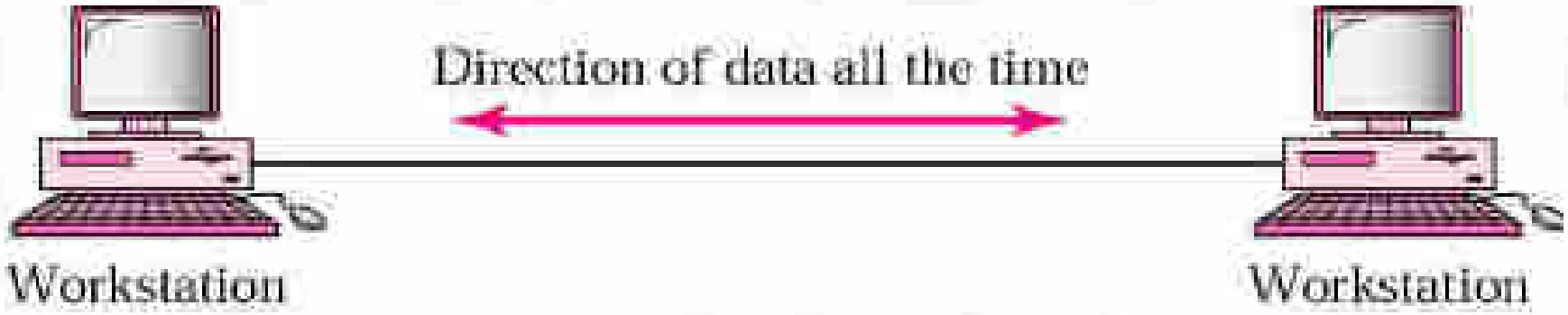


Figure 1.4 *Full-duplex*

1.2 Networks

Distributed Processing

Network Criteria

Physical Structures

Categories of Networks

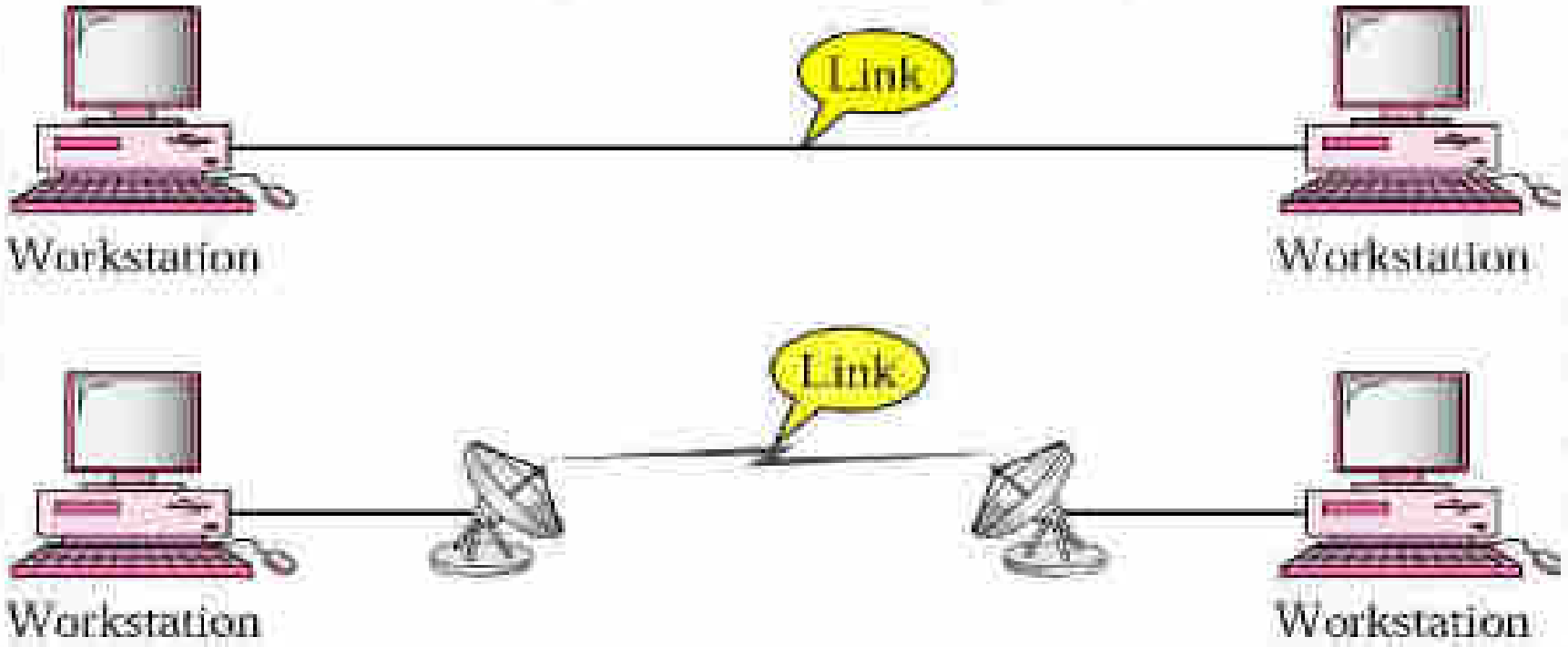


Figure 1.5 *Point-to-point connection*

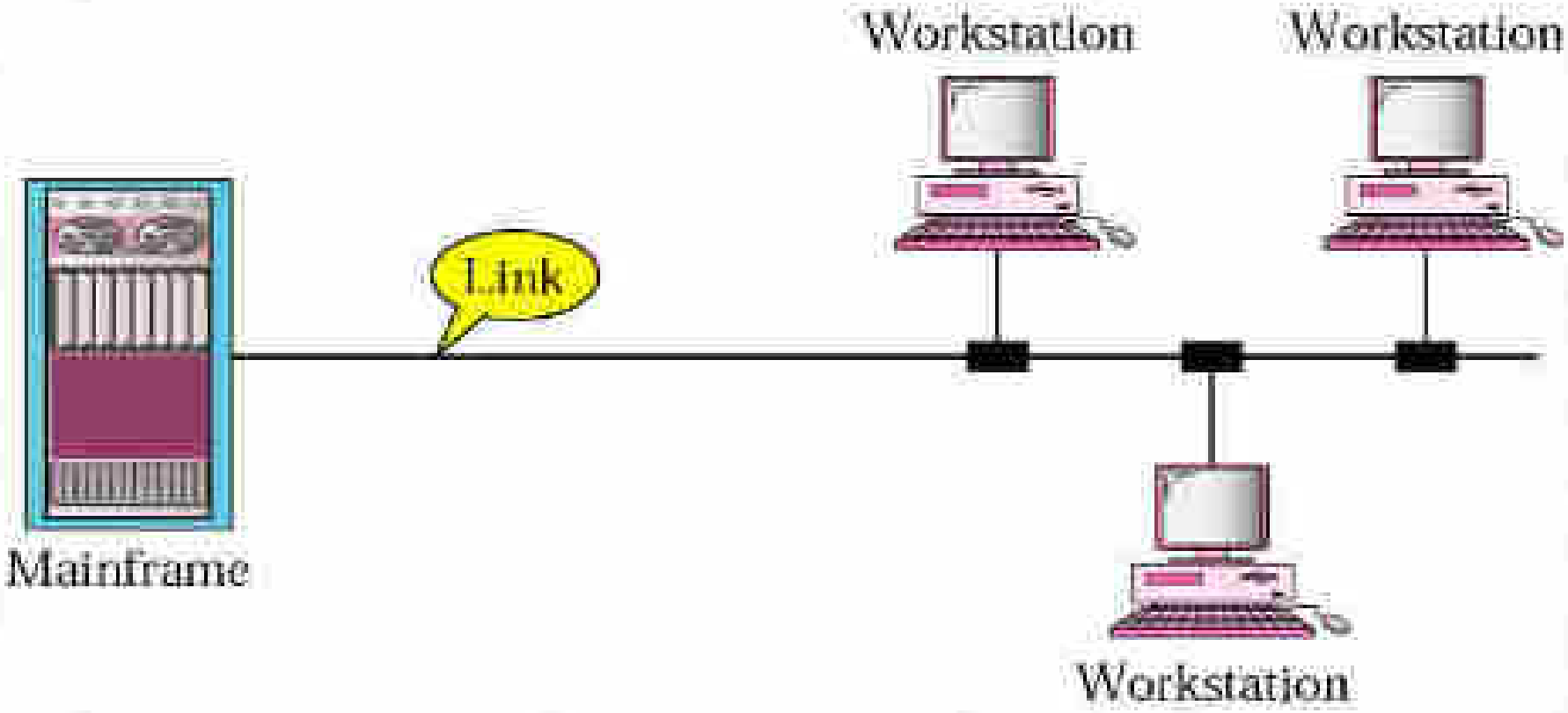


Figure 1.6 *Multipoint connection*

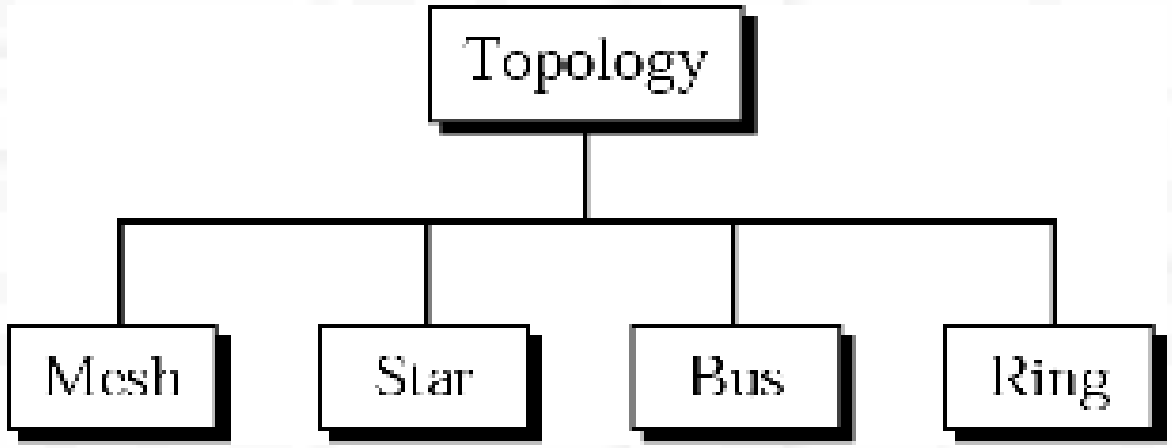


Figure 1.7 *Categories of topology*

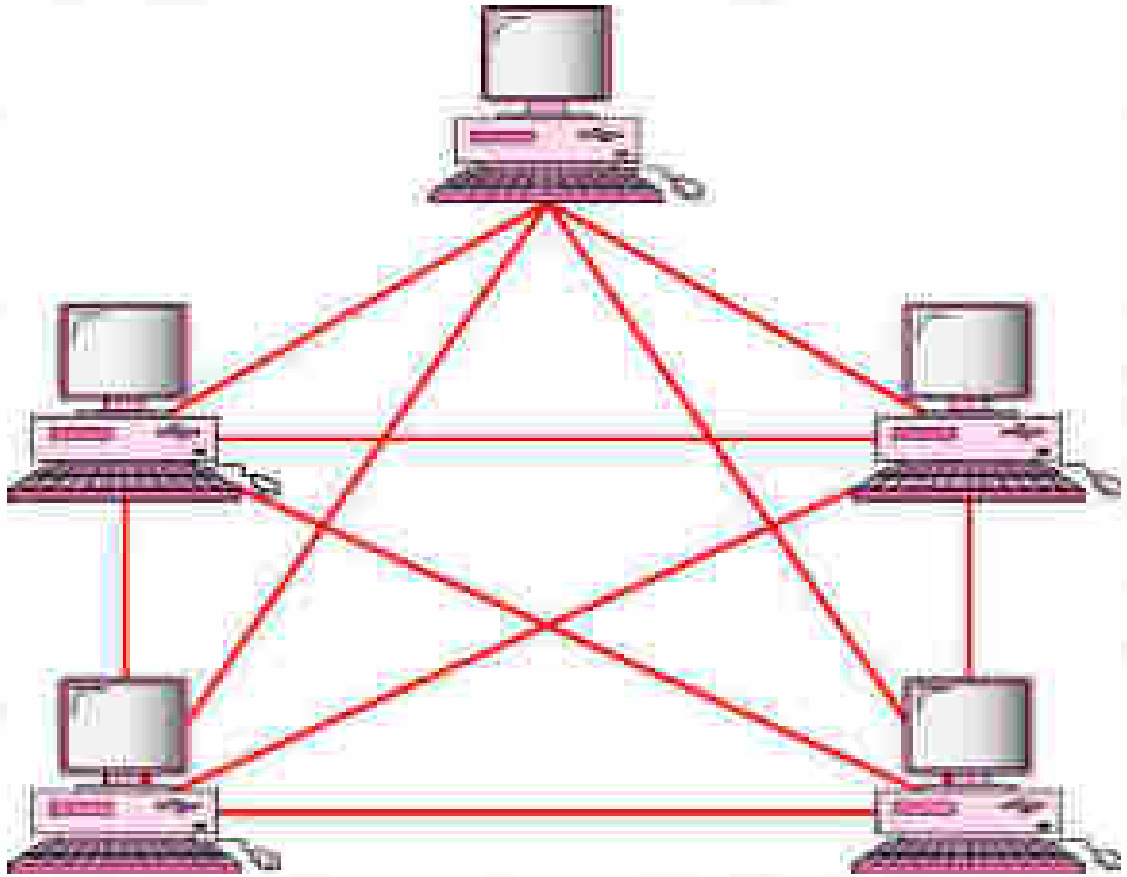


Figure 1.8 *Fully connected mesh topology (for five devices)*

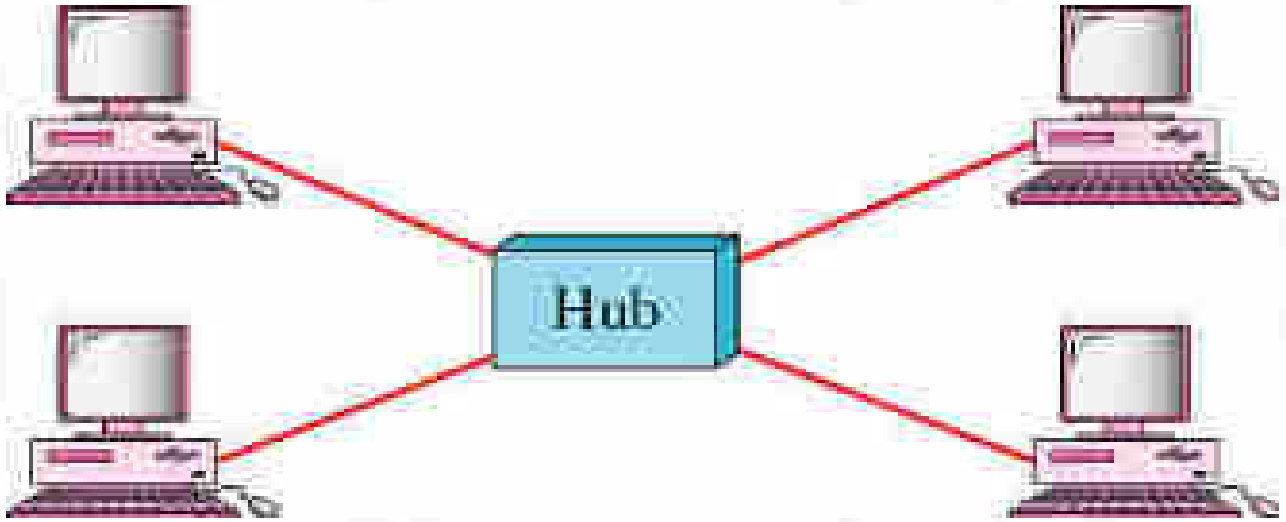


Figure 1.9 *Star topology*

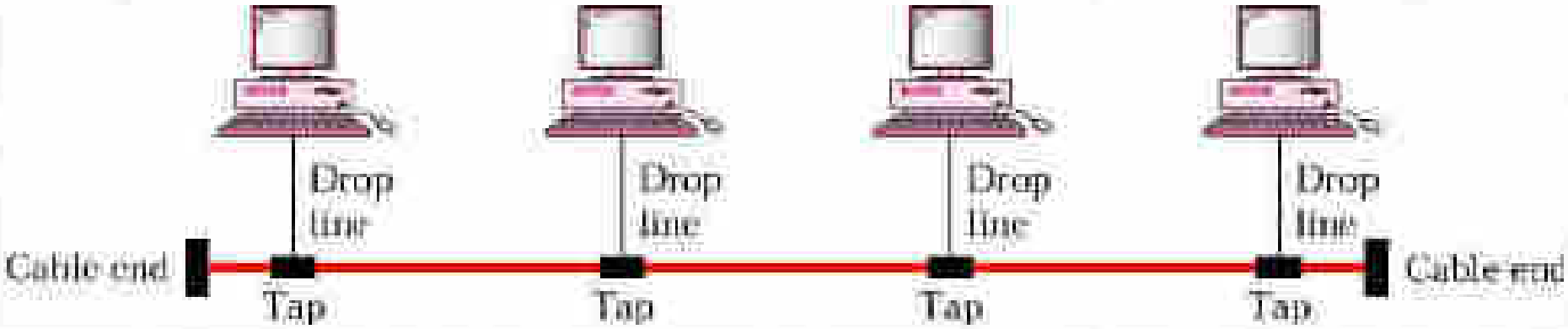


Figure 1.10 *Bus topology*

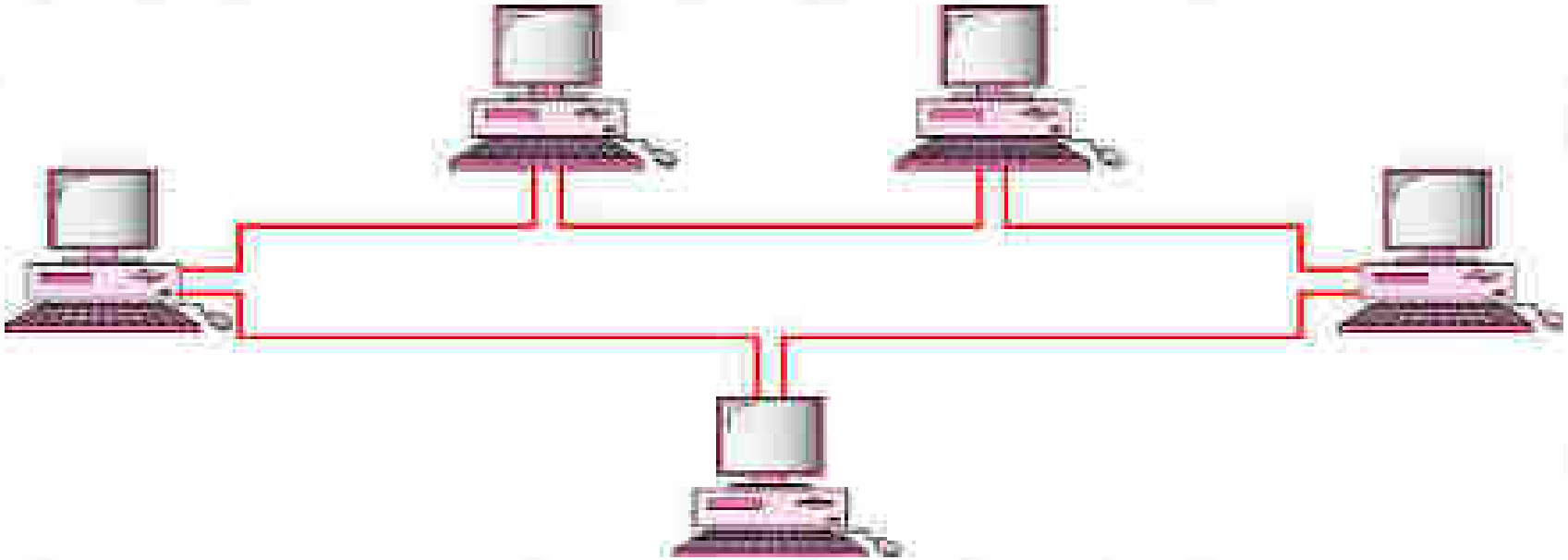


Figure 1.11 *Ring topology*

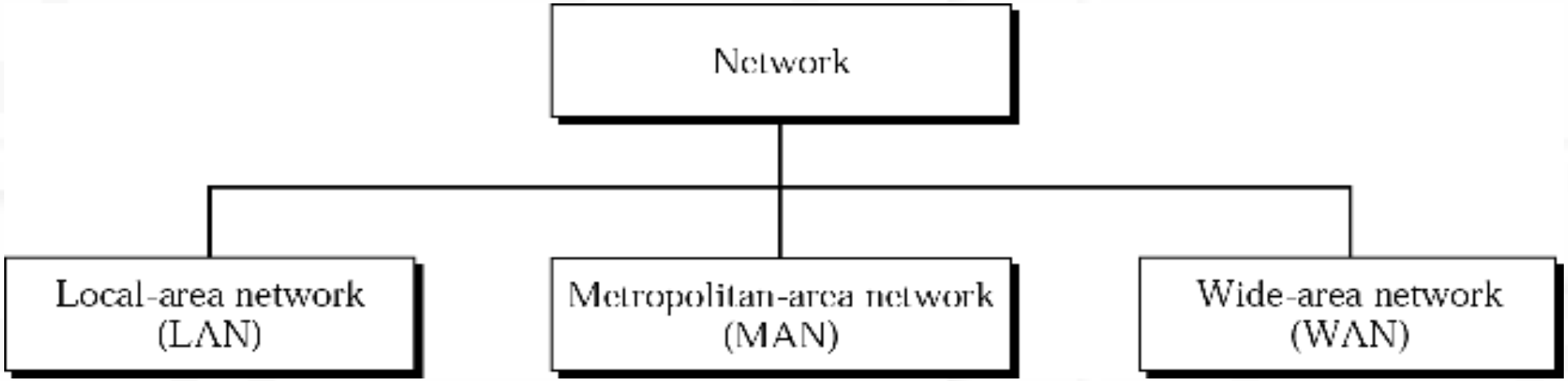
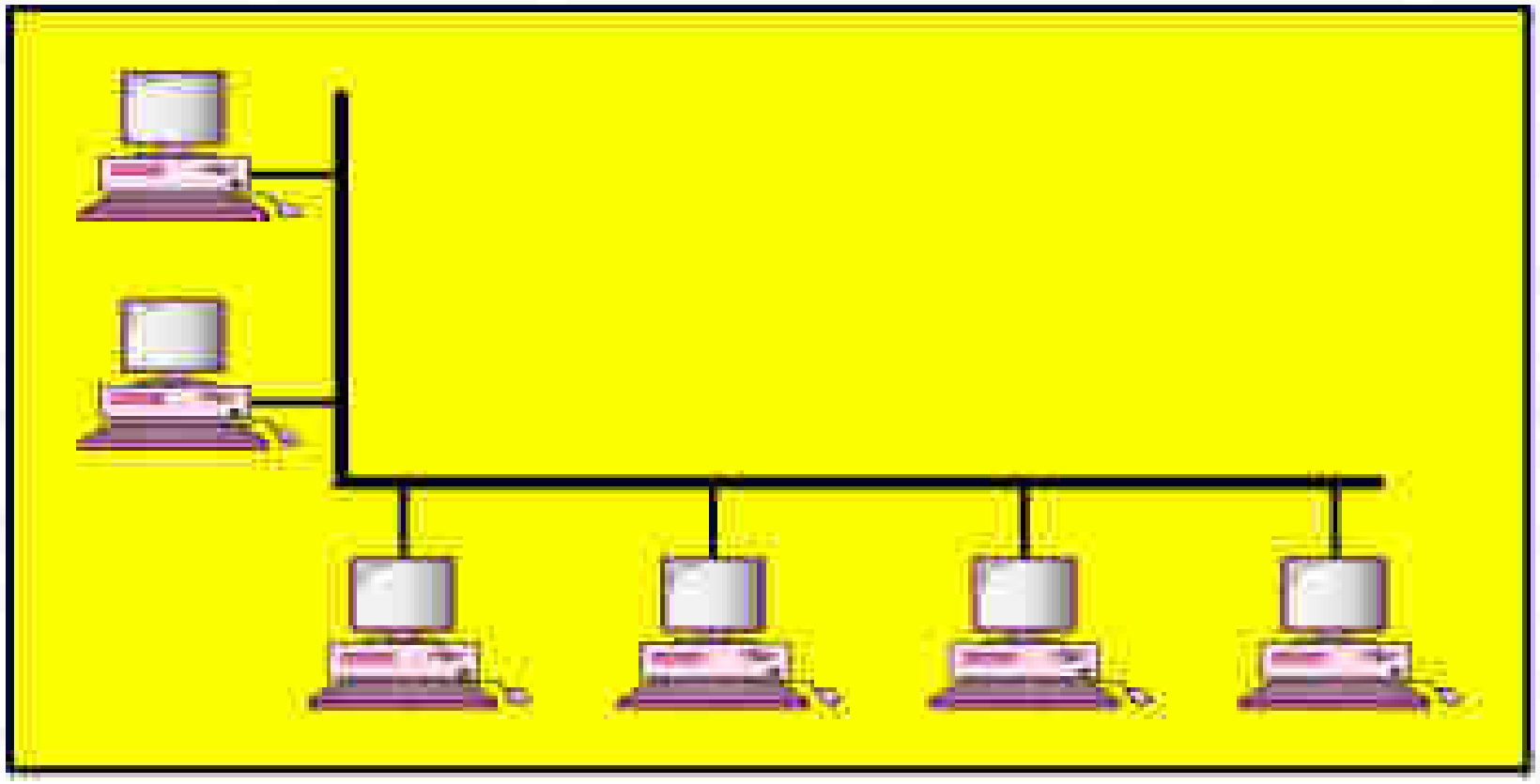


Figure 1.12 *Categories of networks*



a. Single-building LAN

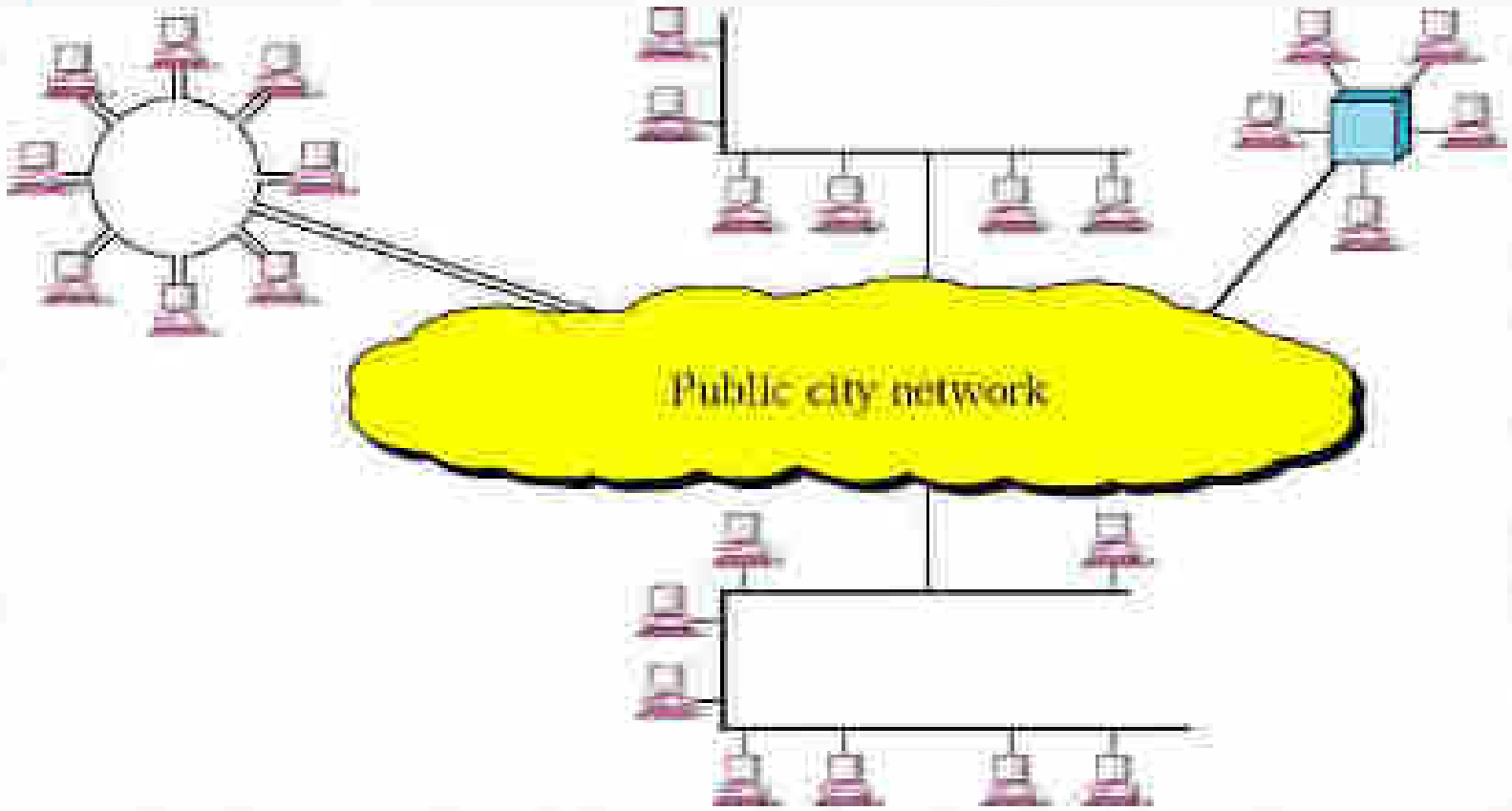


Figure 1.14 *MAN*

Figure 1.15 *WAN*

Network Models

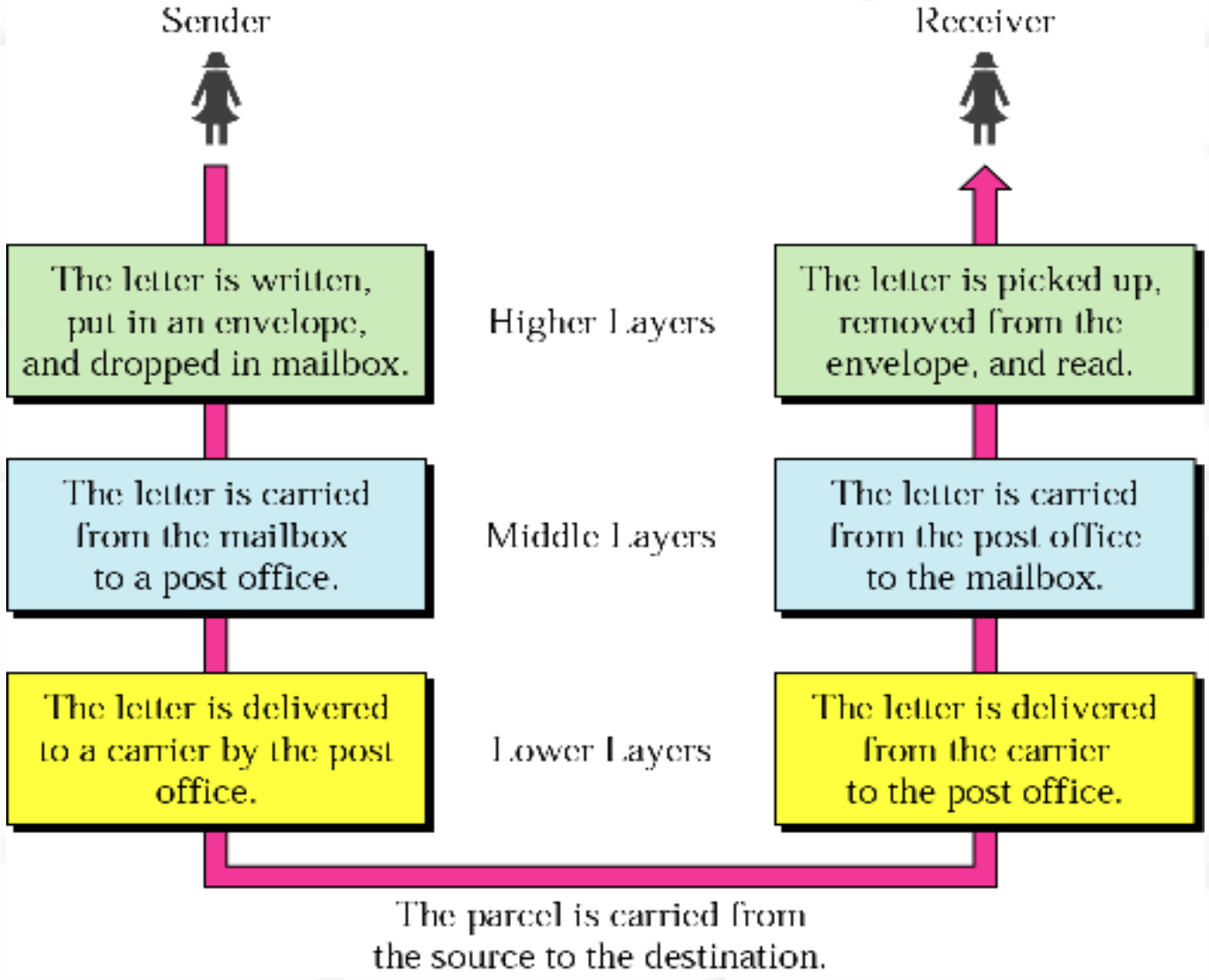
Layered Tasks

Sender, Receiver, and Carrier

Hierarchy

Services

Sending a letter



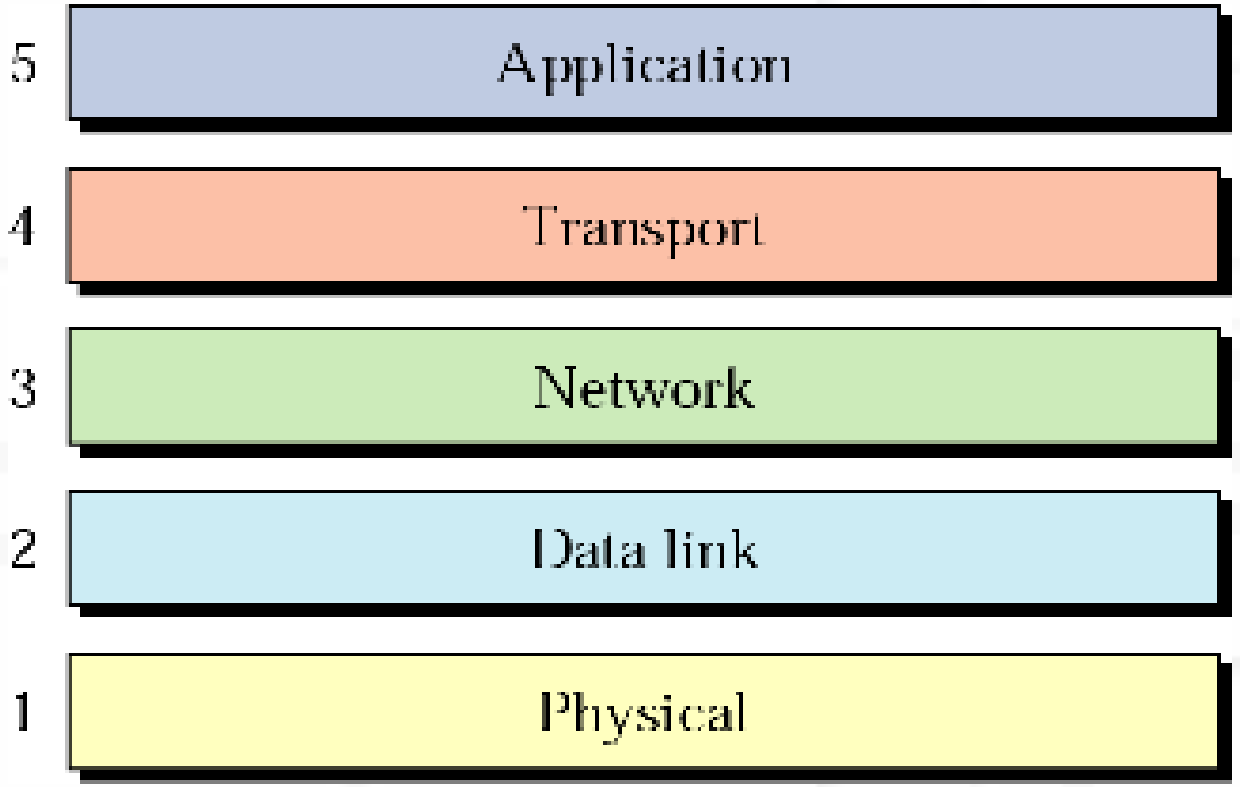
Internet Model

Peer-to-Peer Processes

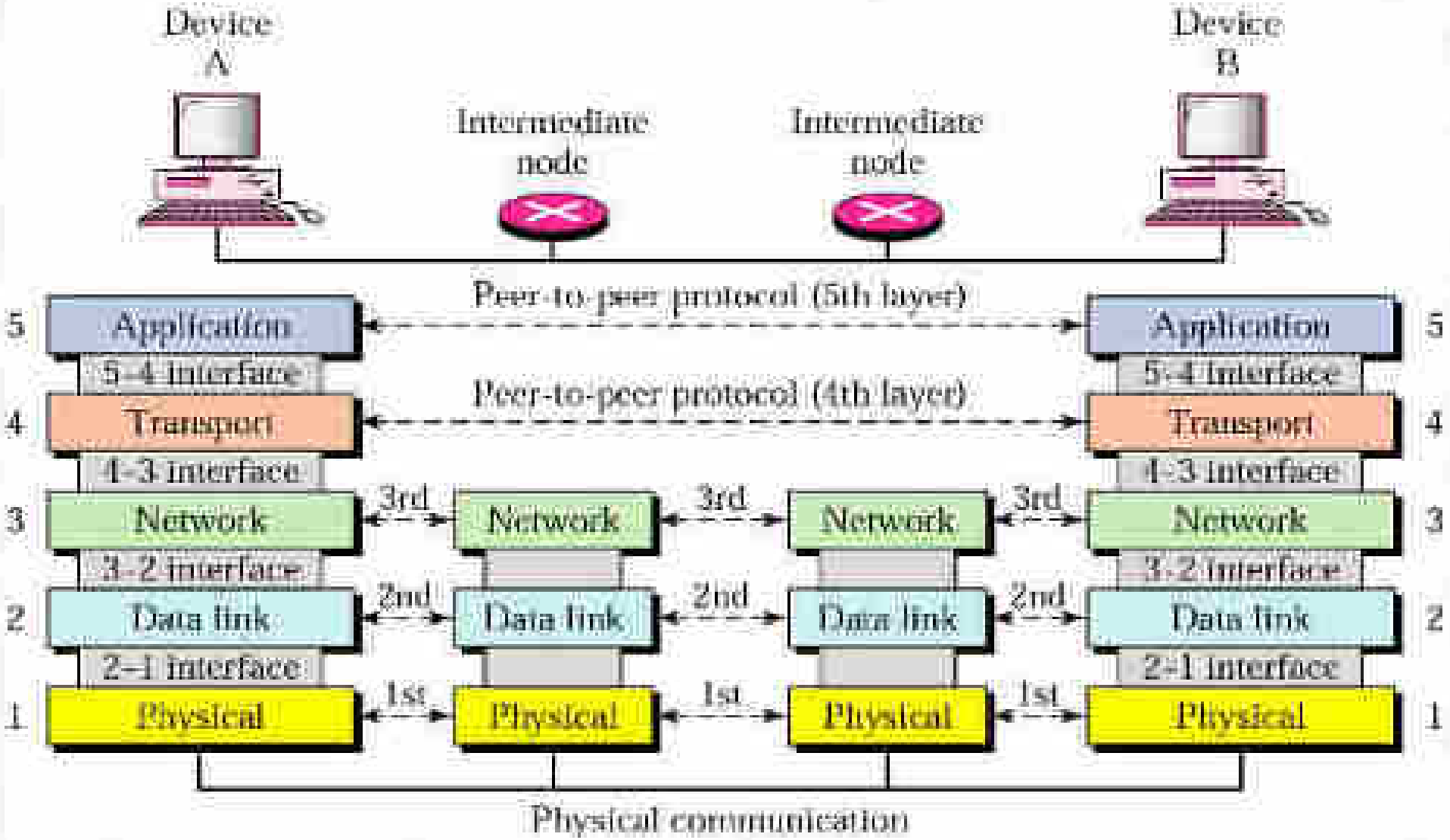
Functions of Layers

Summary of Layers

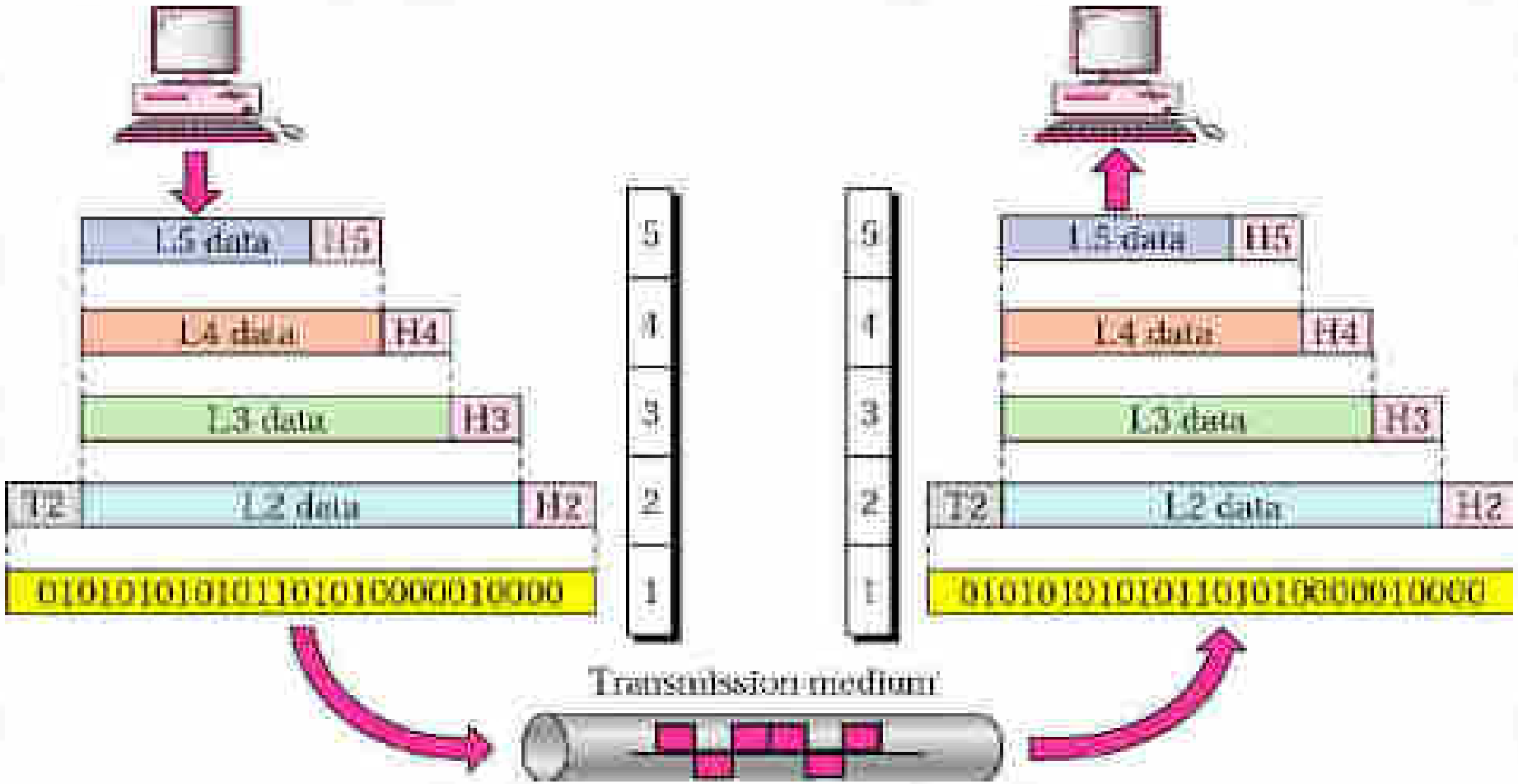
Internet layers



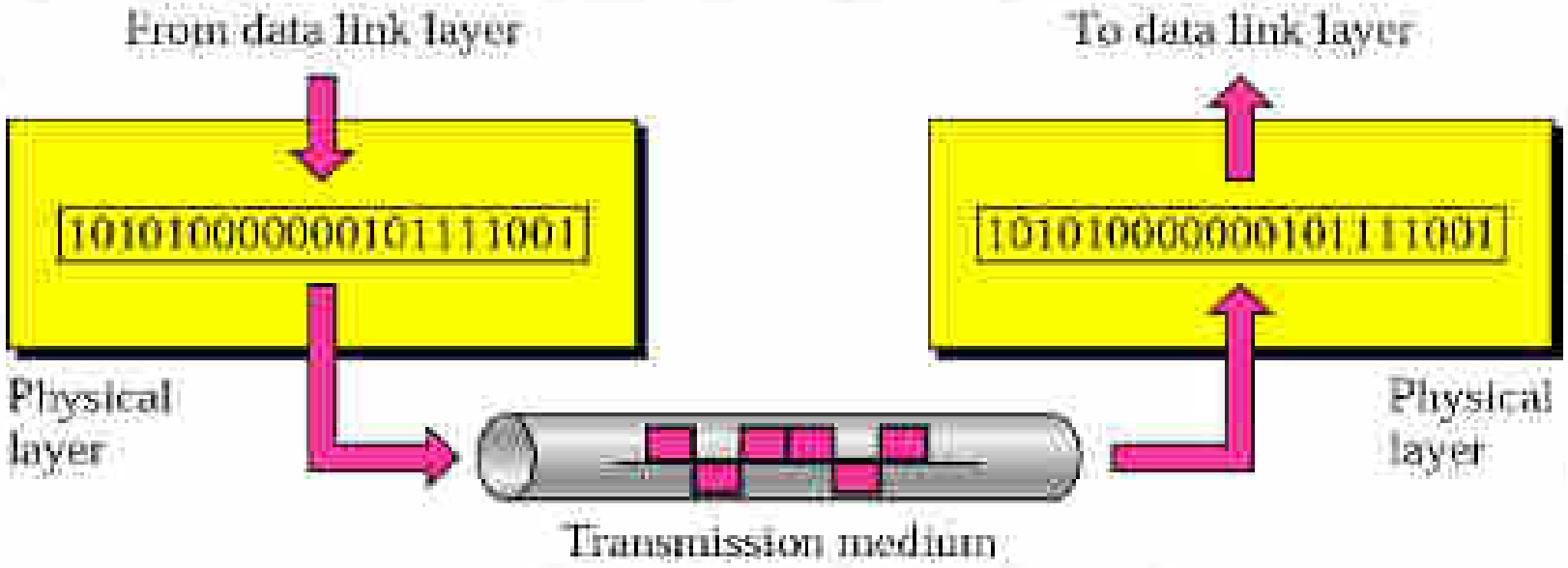
Peer-to-peer processes



An exchange using the Internet model



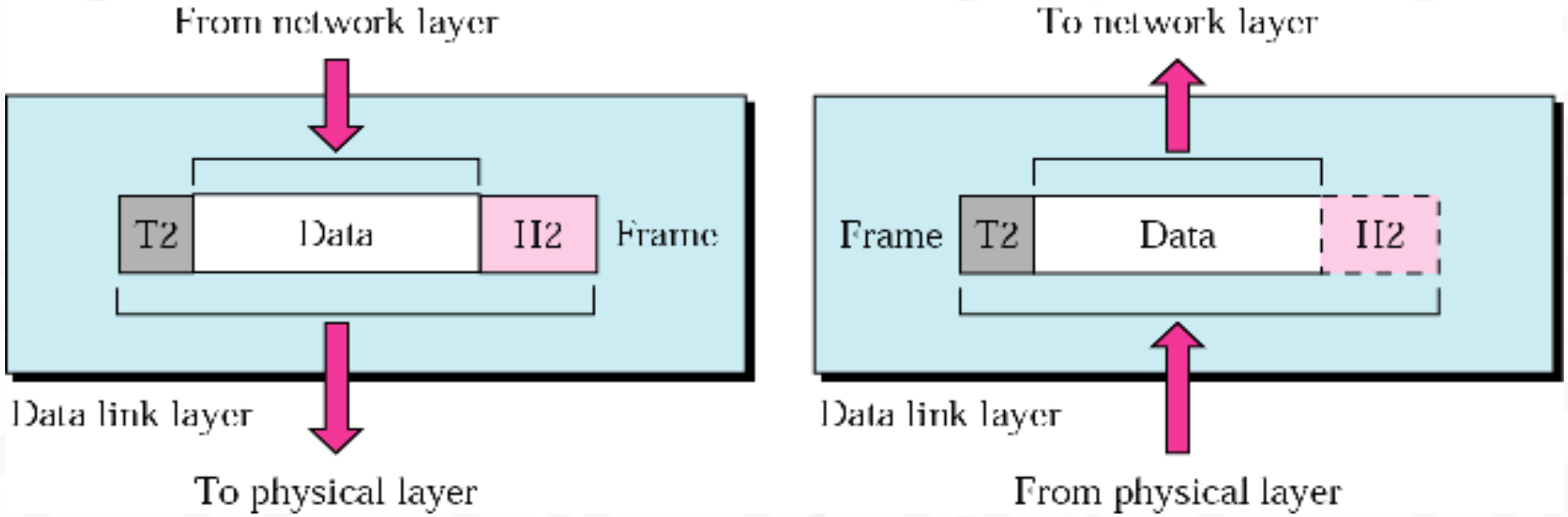
Physical layer



Note:

The physical layer is responsible for transmitting individual bits from one node to the next.

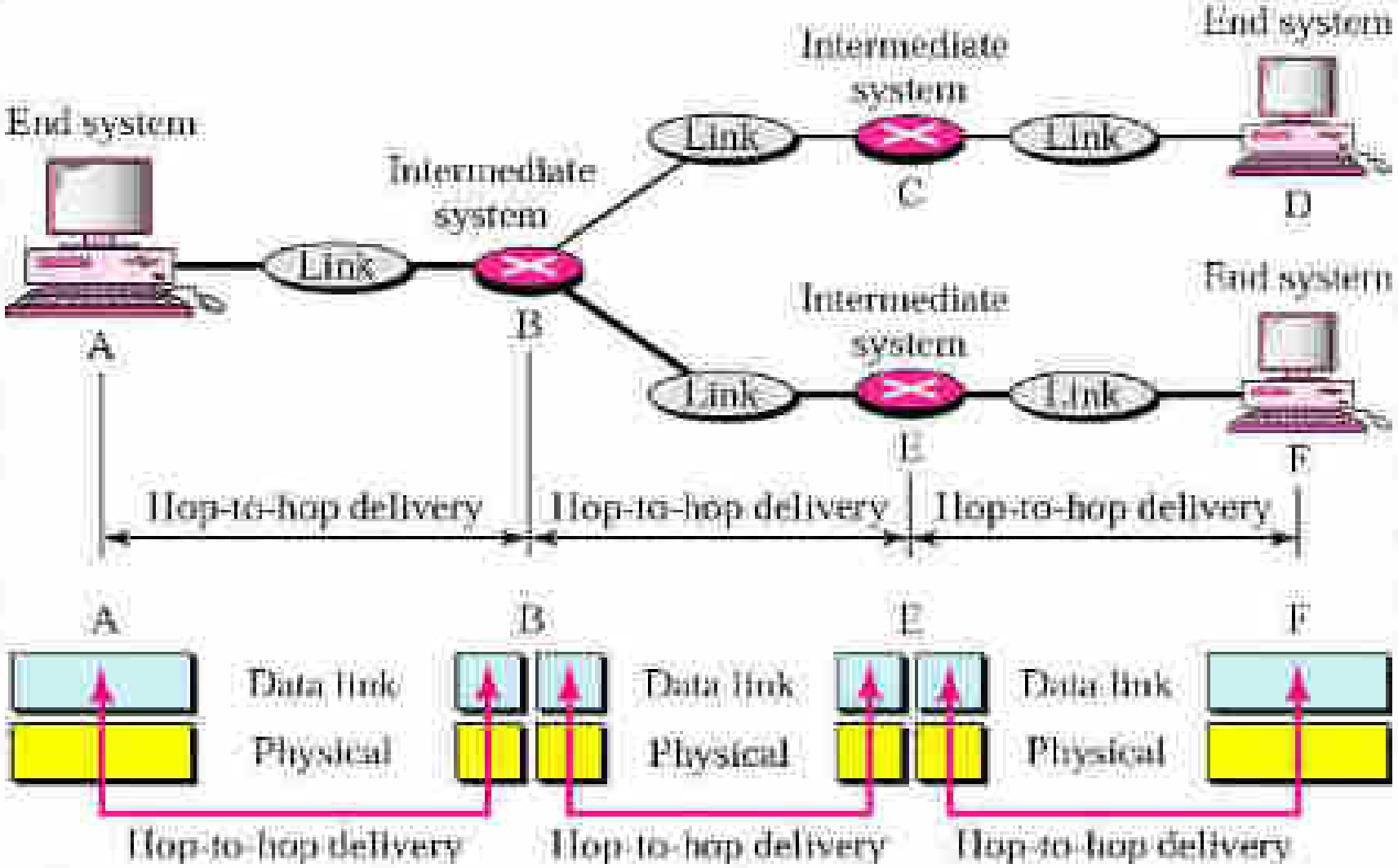
Data link layer



Note:

The data link layer is responsible for transmitting frames from one node to the next.

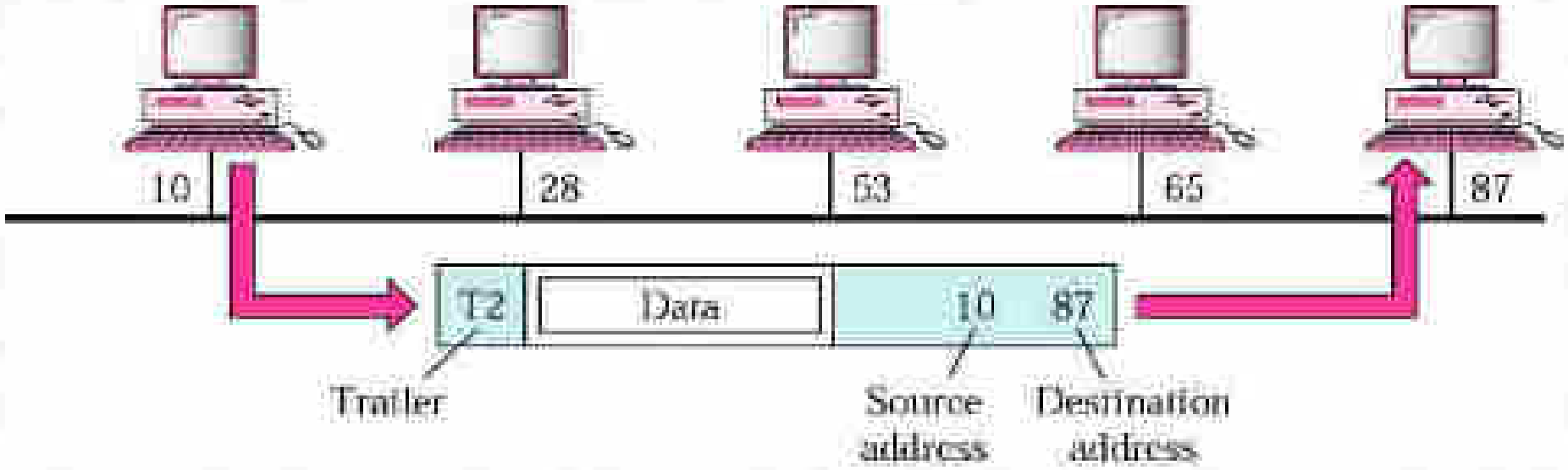
Node-to-node delivery



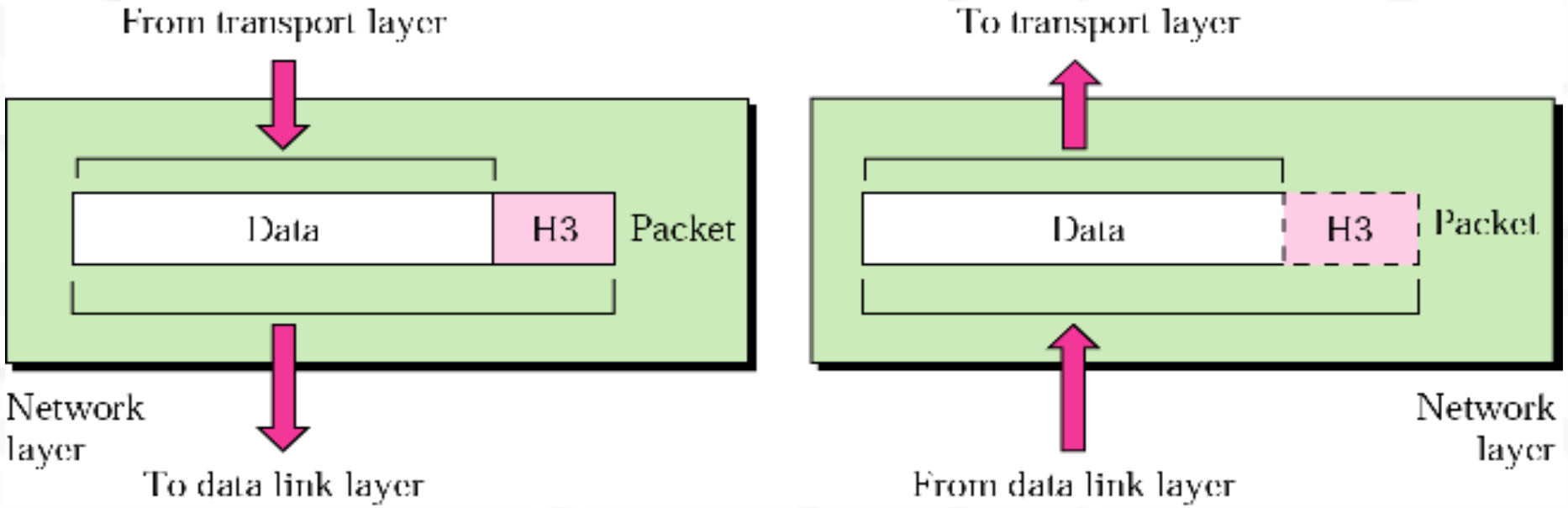
Example 1

In Figure 2.8 a node with physical address 10 sends a frame to a node with physical address 87. The two nodes are connected by a link. At the data link level this frame contains physical addresses in the header. These are the only addresses needed. The rest of the header contains other information needed at this level. The trailer usually contains extra bits needed for error detection

Example 1


10
28
53
65
87
Data
10
87
Trailer
Source address
Destination address

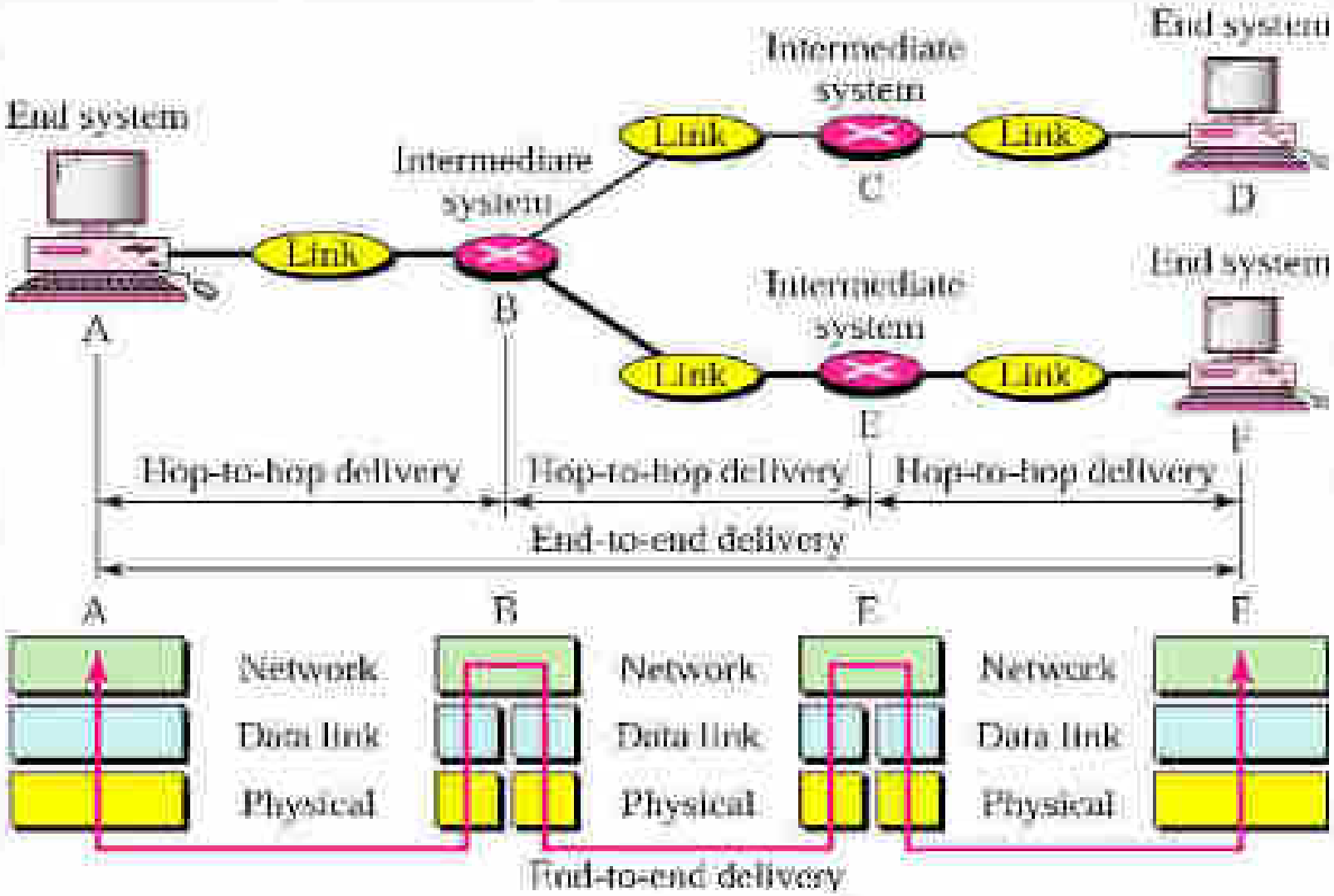
Network layer



Note:

The network layer is responsible for the delivery of packets from the original source to the final destination.

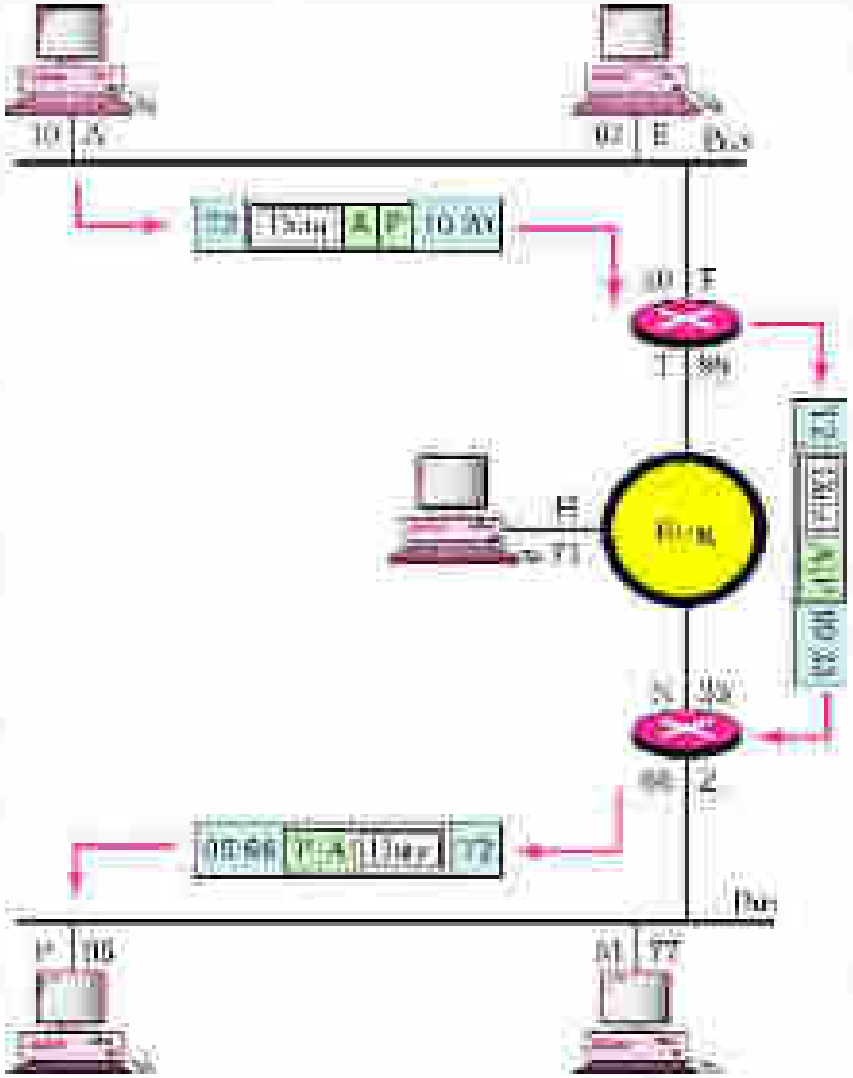
Source-to-destination delivery



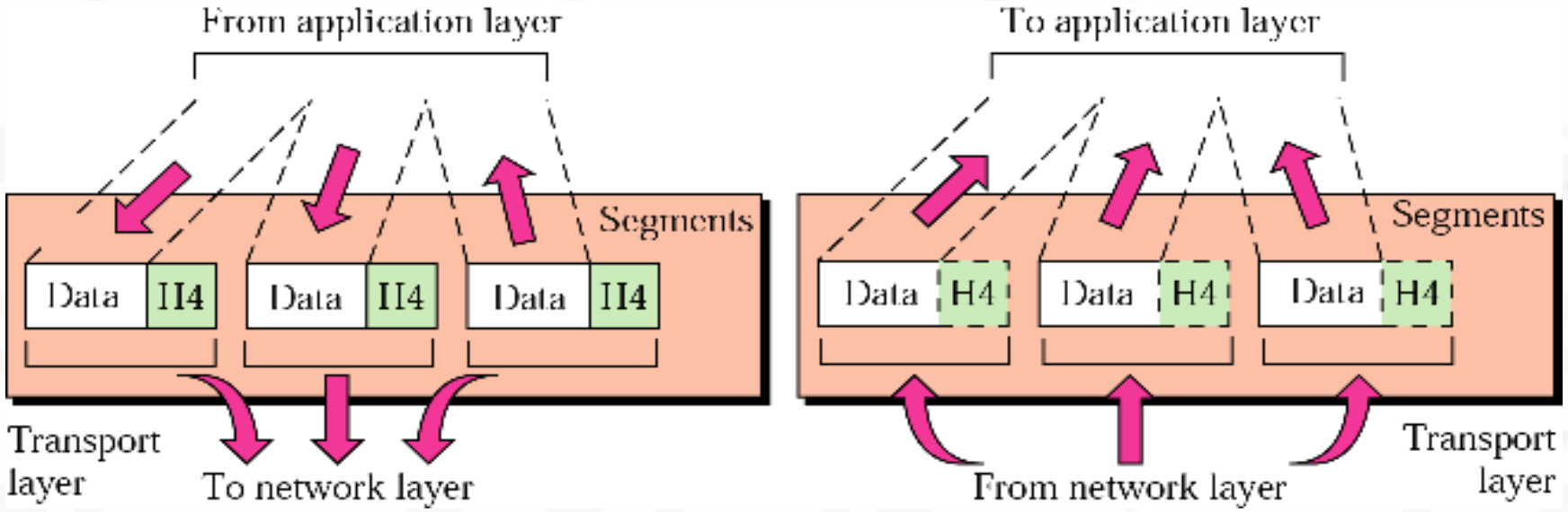
Example 2

In Figure 2.11 we want to send data from a node with network address A and physical address 10, located on one LAN, to a node with a network address P and physical address 95, located on another LAN. Because the two devices are located on different networks, we cannot use physical addresses only; the physical addresses only have local jurisdiction. What we need here are universal addresses that can pass through the LAN boundaries. The network (logical) addresses have this characteristic.

Example 2



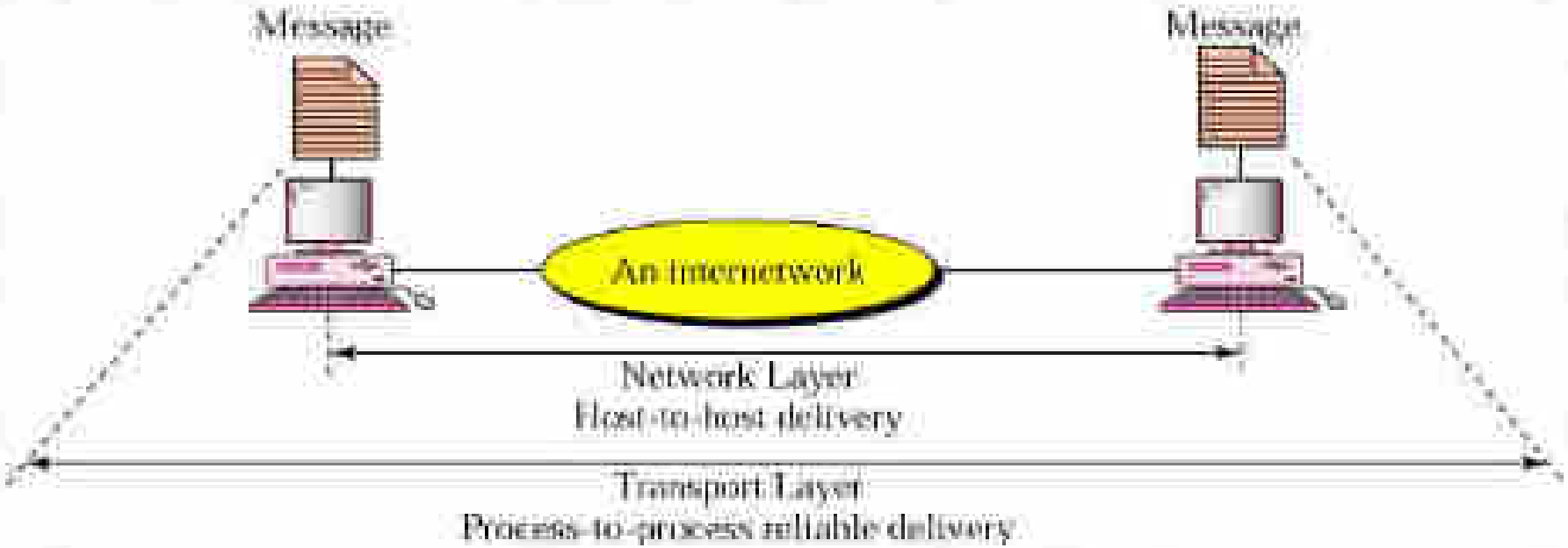
Transport layer



Note:

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

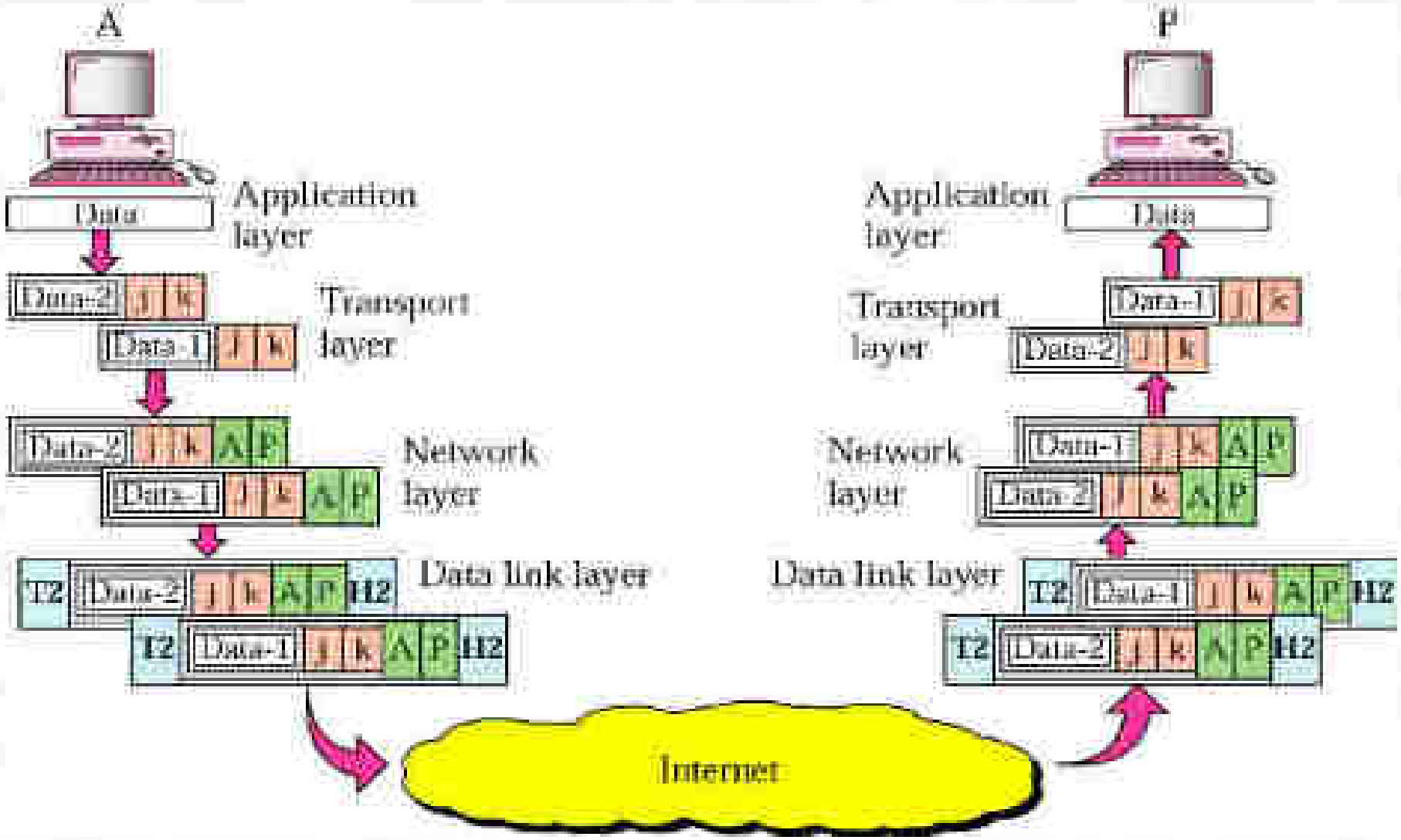
Reliable process-to-process delivery of a message



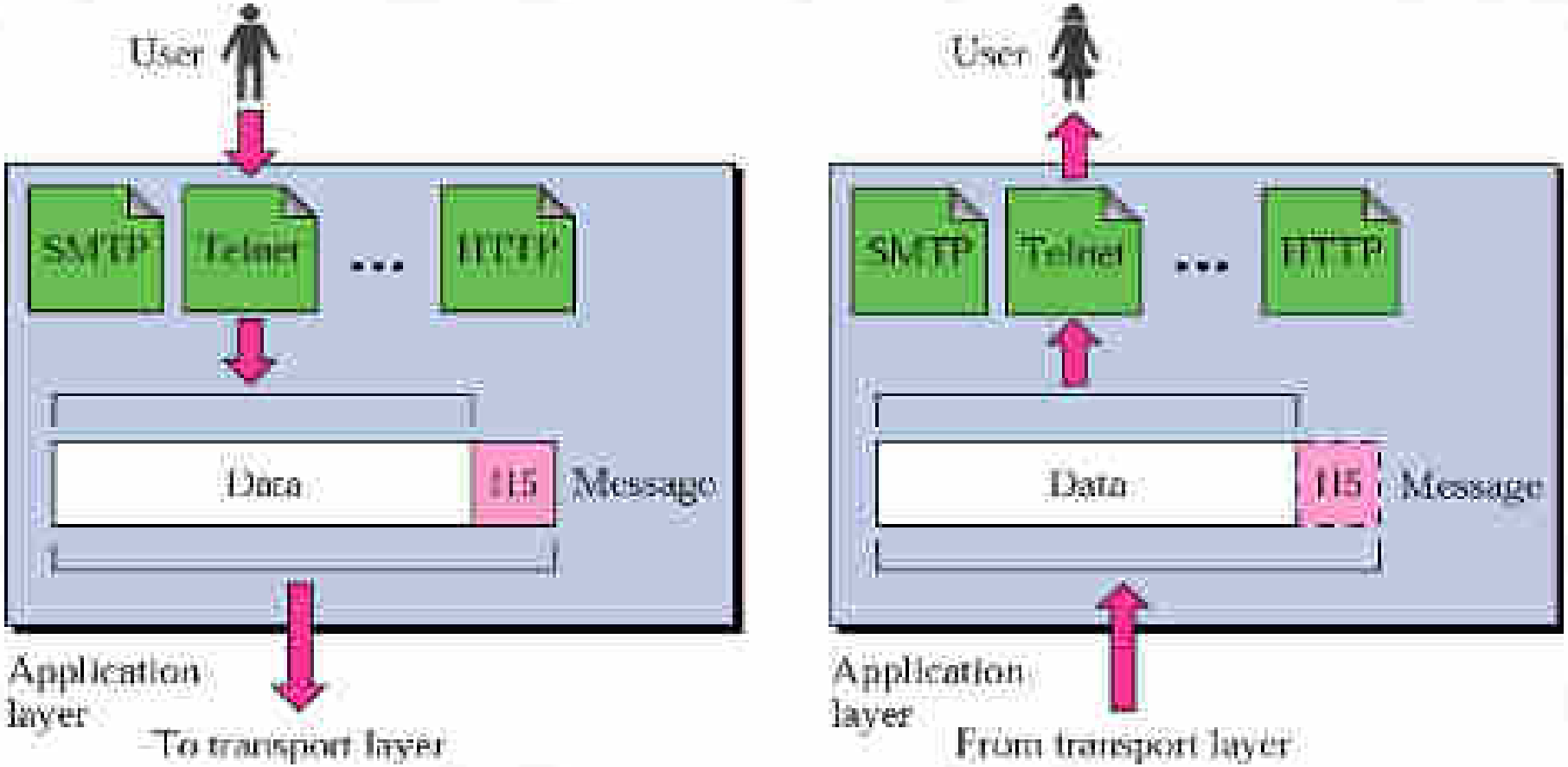
Example 3

Figure 2.14 shows an example of transport layer communication. Data coming from the upper layers have port addresses j and k (j is the address of the sending process, and k is the address of the receiving process). Since the data size is larger than the network layer can handle, the data are split into two packets, each packet retaining the port addresses (j and k). Then in the network layer, network addresses (A and P) are added to each packet.

Example 3


A
P
Application layer
Transport layer
Network layer
Data link layer
Data
Data-2
Data-1
J
K
A
P
T2
H2
Internet

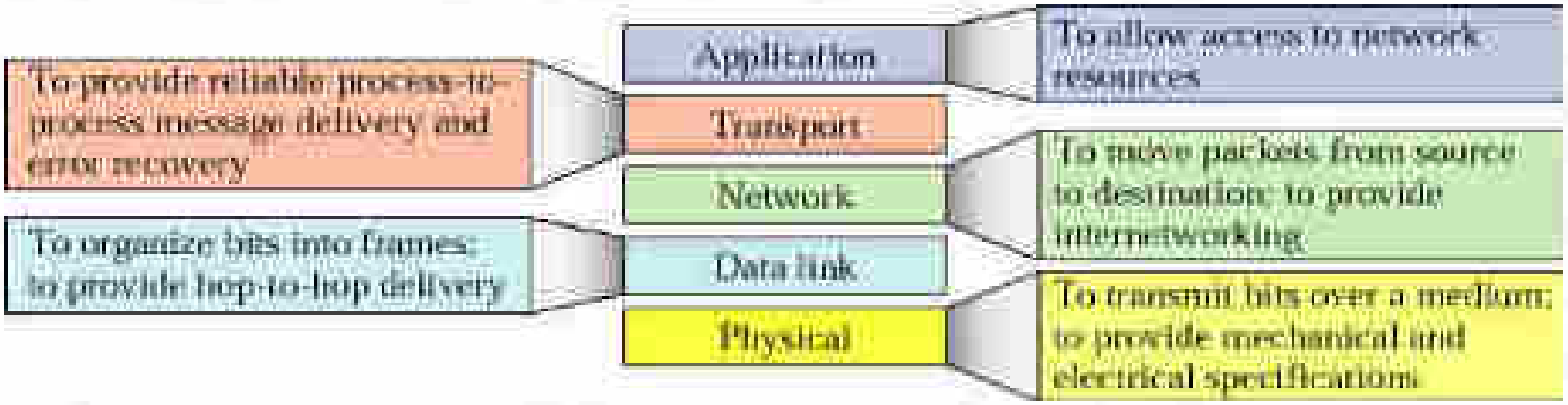
Application layer



Note:

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

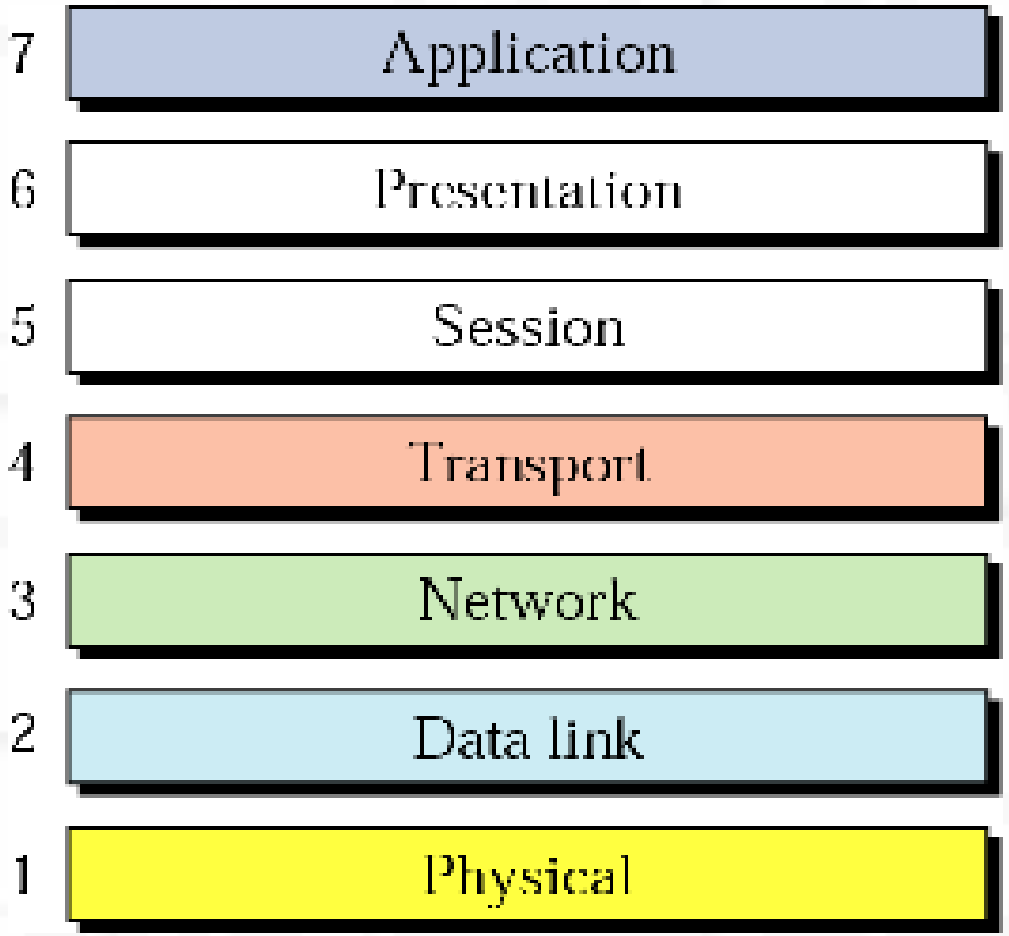
Summary of duties



OSI Model

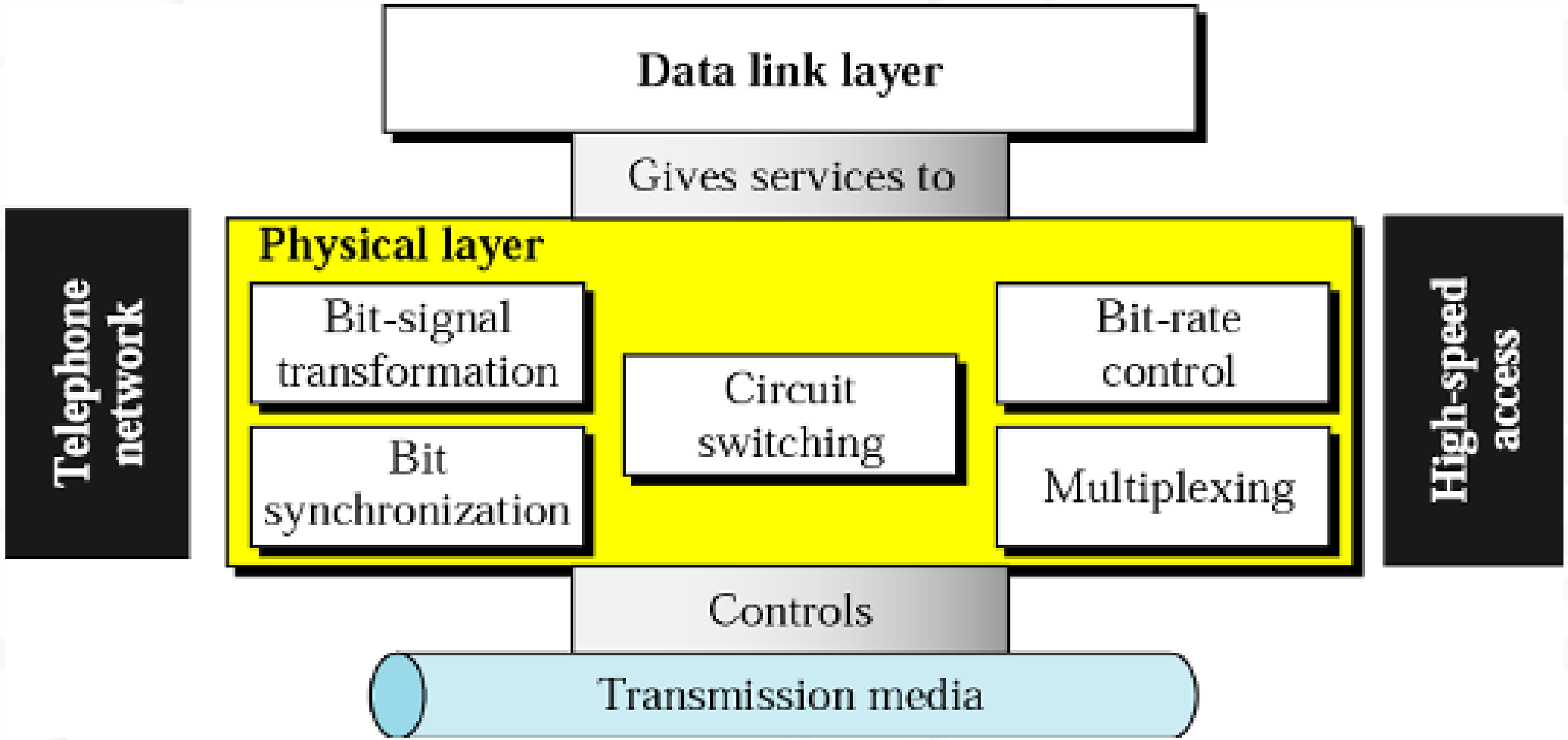
A comparison

OSI model

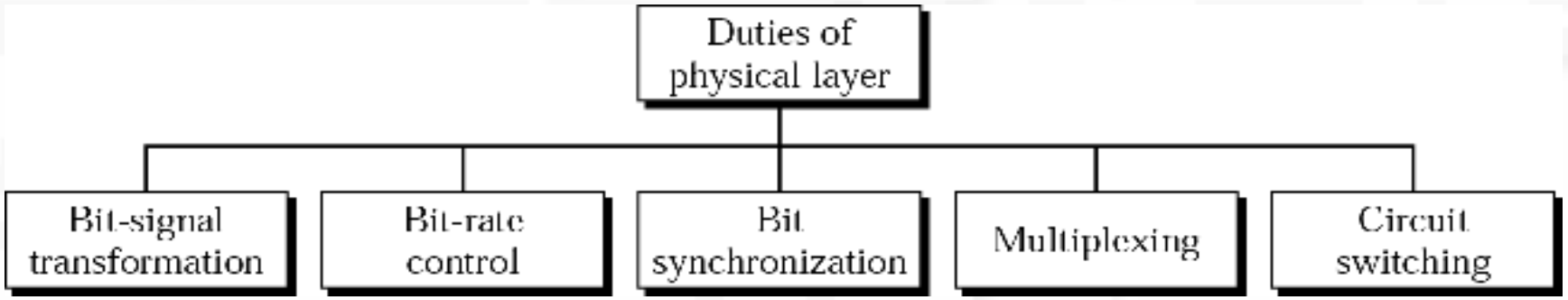

7
Application
6
Presentation
5
Session
4
Transport
3
Network
2
Data link
1
Physical

Physical Layer

Position of the physical layer



Services


Duties of physical layer
Bit-signal transformation
Bit-rate control
Bit synchronization
Multiplexing
Circuit switching

FAQ :

- What do you mean by DSL?
- What do you mean by Crossbar switches?
- What are the types of switching?
- How we can check the effectiveness of data communication?
- What are the elements of data communication?
- Explain about Network Topology
- Explain about Categories of networks 7. Explain about Cable Networks

REFERENCES:

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