

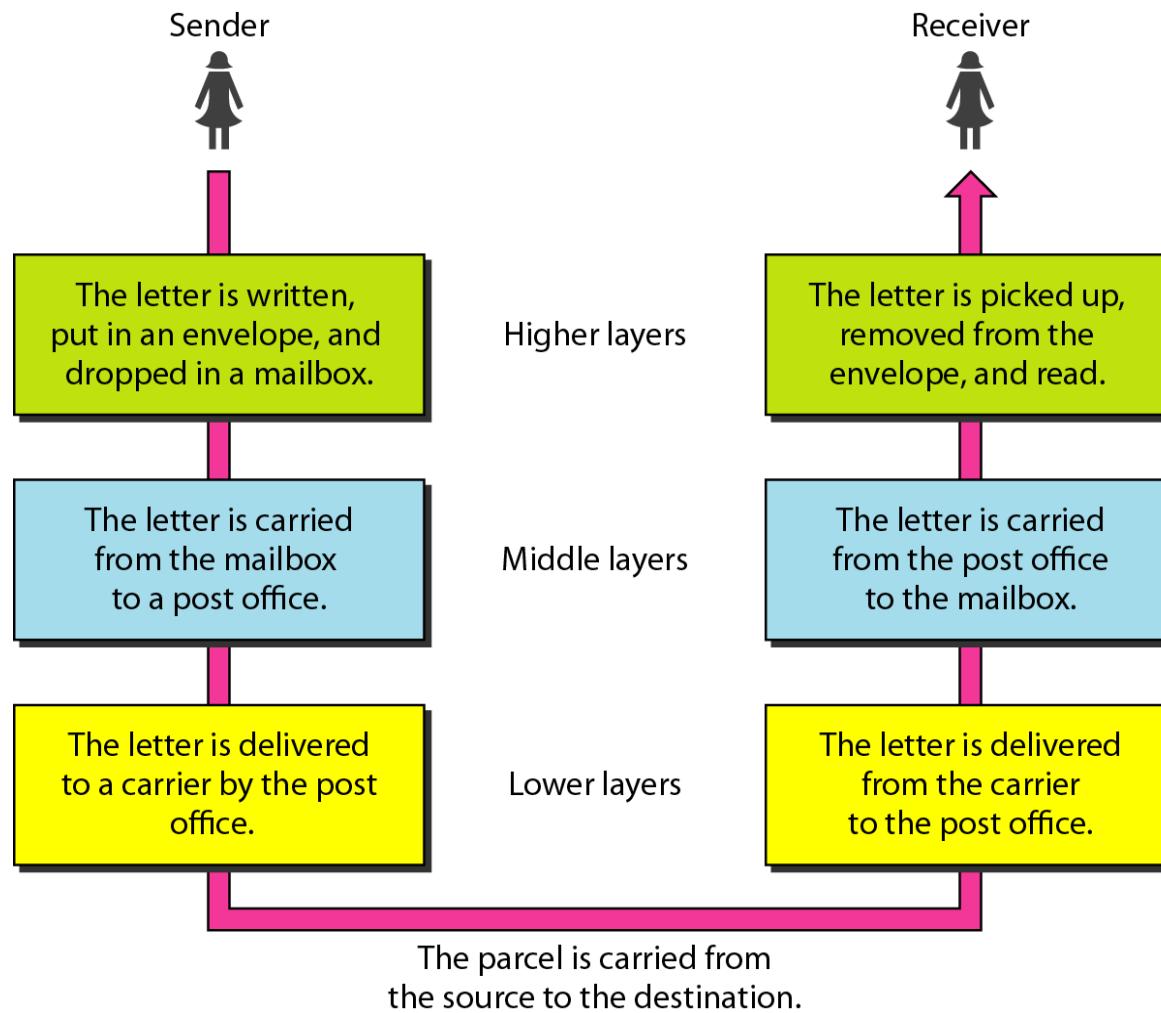
## 2-1 LAYERED TASKS/ARCHITECTURE

*We use the concept of **layers** in our daily life. As an example, let us consider two friends who communicate through postal mail. The process of sending a letter to a friend would be complex if there were no services available from the post office.*

### **Topics discussed in this section:**

**Sender, Receiver, and Carrier  
Hierarchy**

## Figure 2.1 Tasks involved in sending a letter



## 2-2 THE OSI MODEL

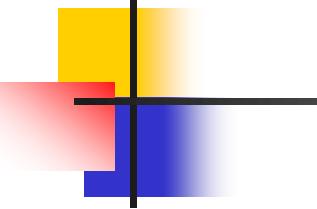
*Established in 1947, the International Standards Organization (**ISO**) is a multinational body dedicated to worldwide agreement on international standards. An ISO standard that covers all aspects of network communications is the Open Systems Interconnection (**OSI**) model. It was first introduced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

### **Topics discussed in this section:**

Layered Architecture

Peer-to-Peer Processes

Encapsulation



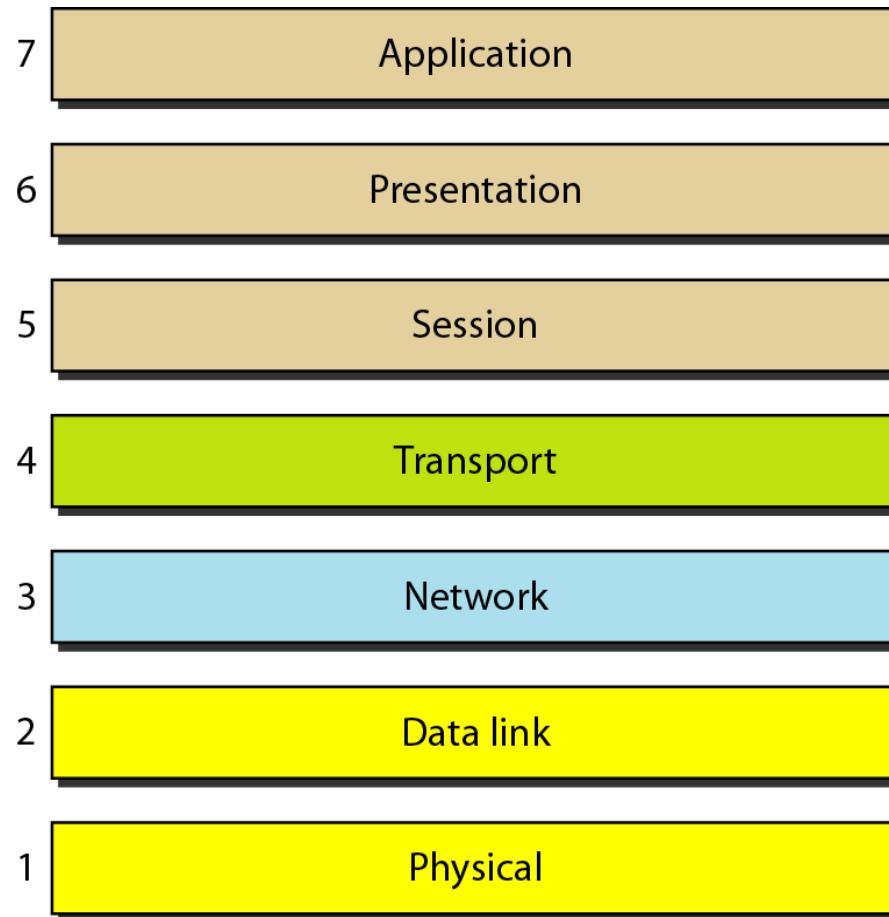
***Note***

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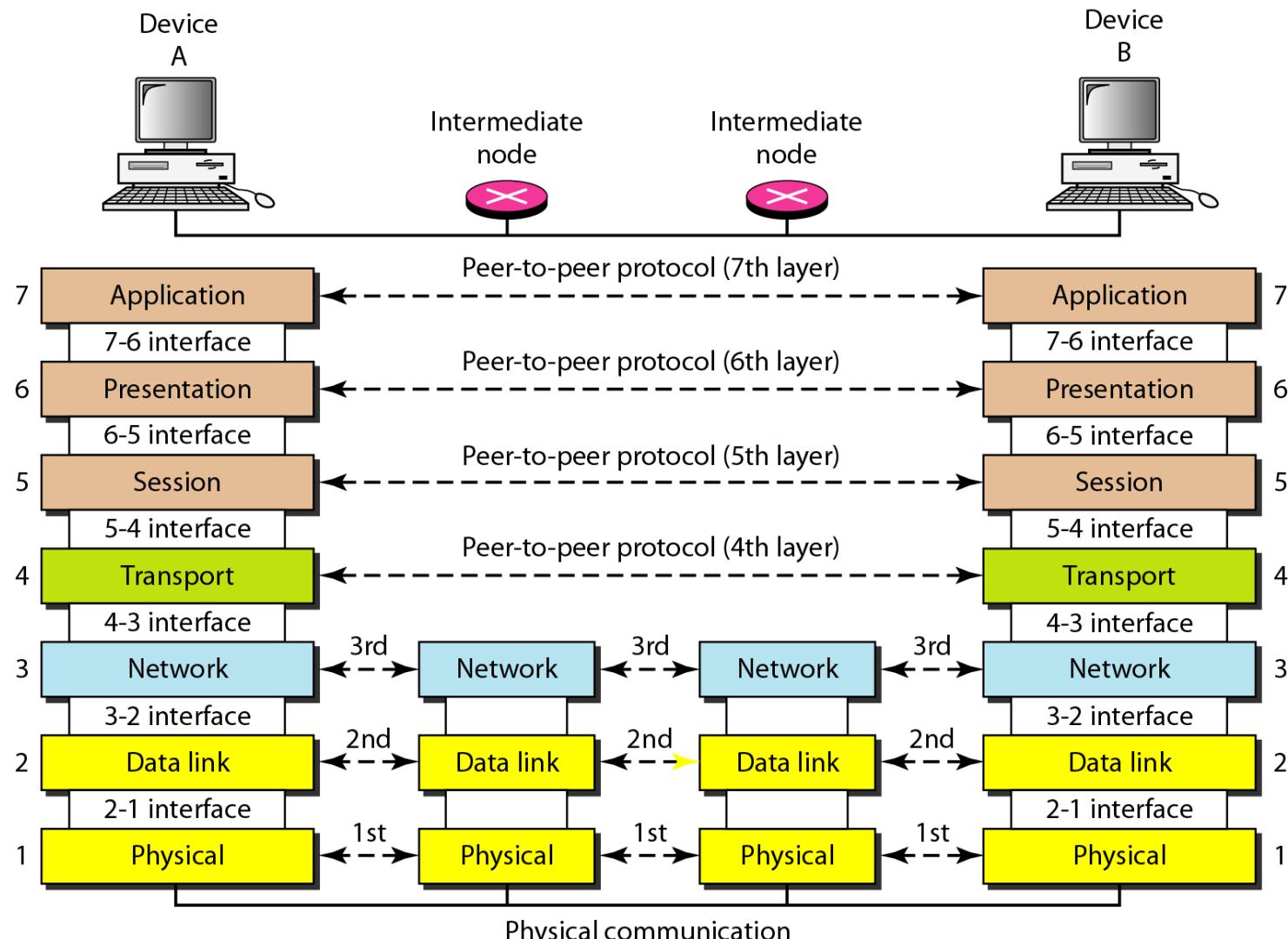
**ISO is the organization.  
OSI is the model.**

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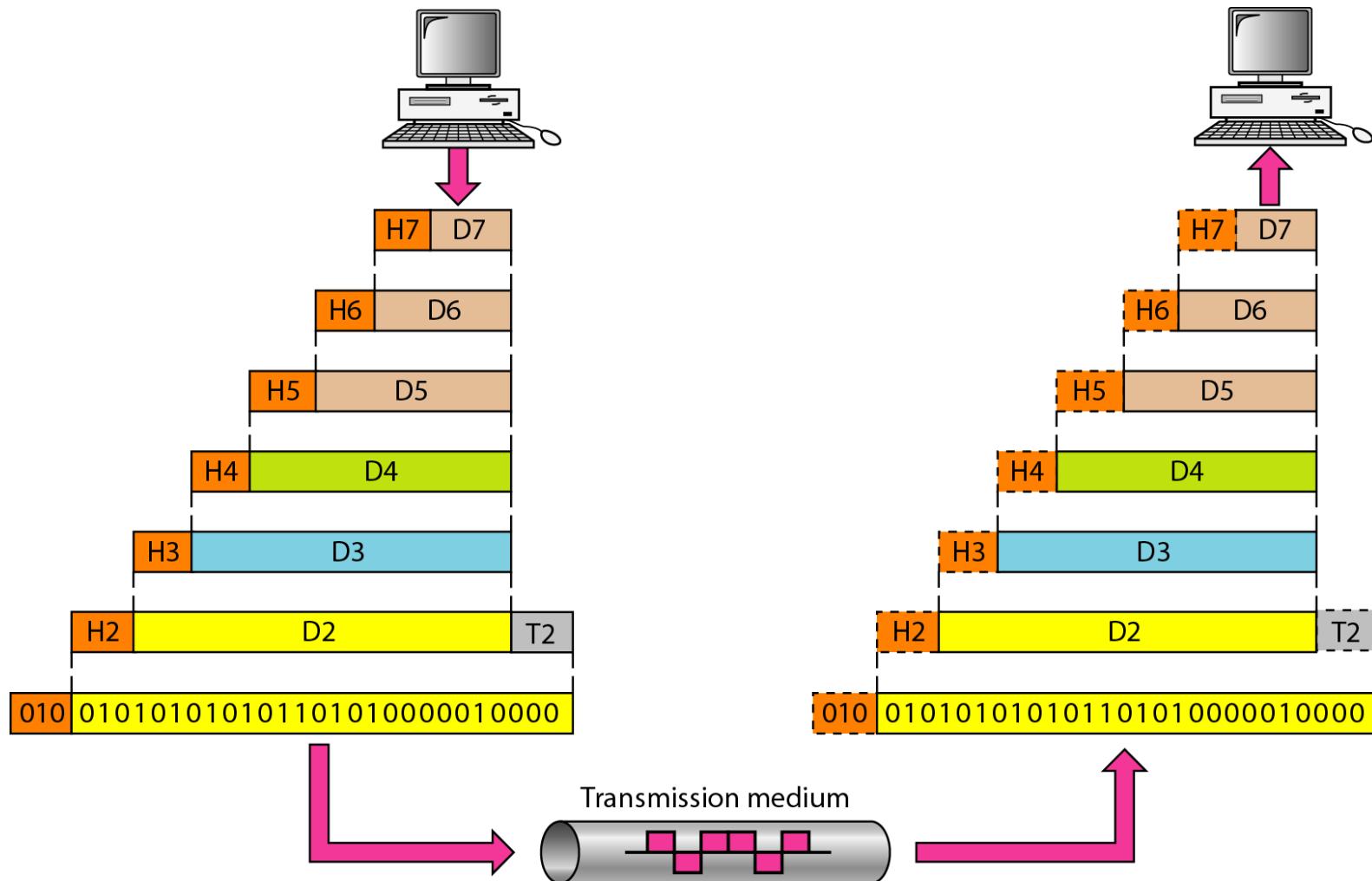
## Figure 2.2 Seven layers of the OSI model



**Figure 2.3** *The interaction between layers in the OSI model*



**Figure 2.4** An exchange using the OSI model



## 2-3 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**

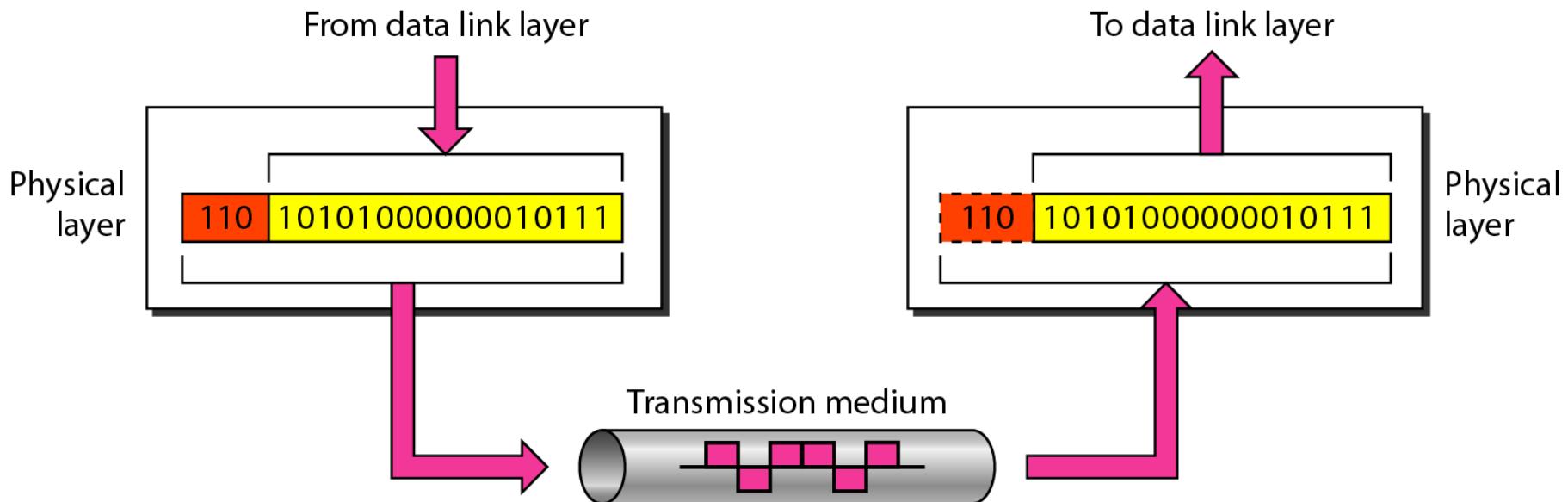
**Transport Layer**

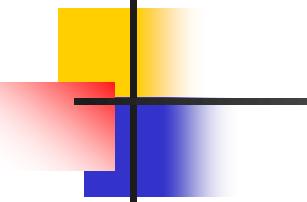
**Session Layer**

**Presentation Layer**

**Application Layer**

**Figure 2.5 Physical layer**

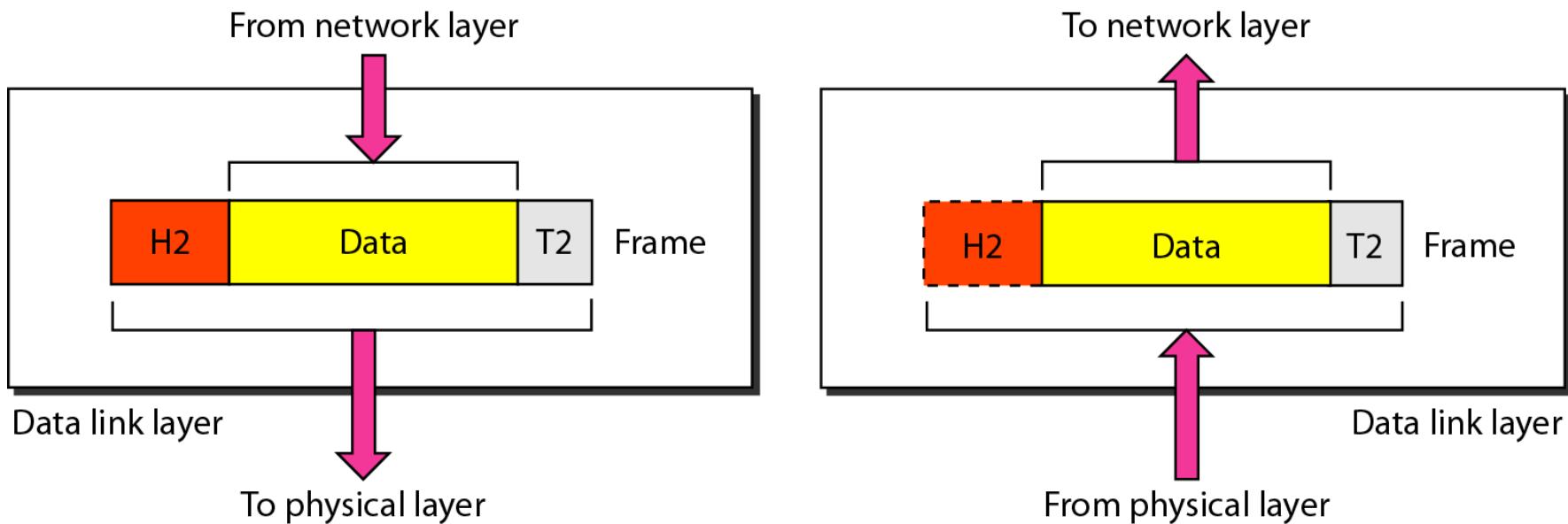


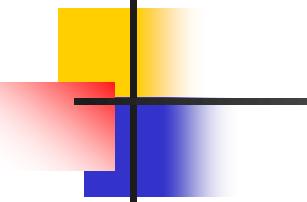


## **Note**

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

## Figure 2.6 Data link layer





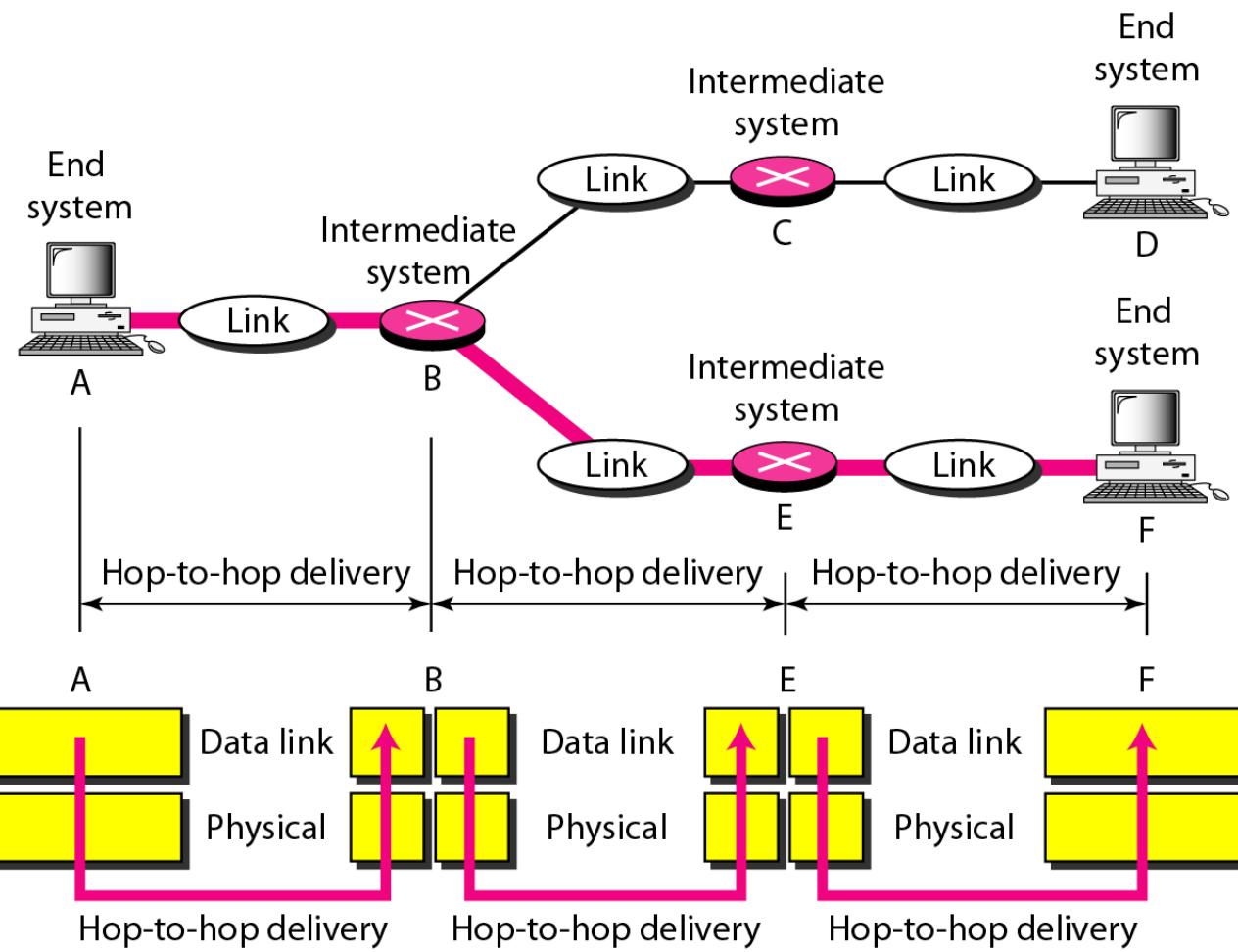
## ***Note***

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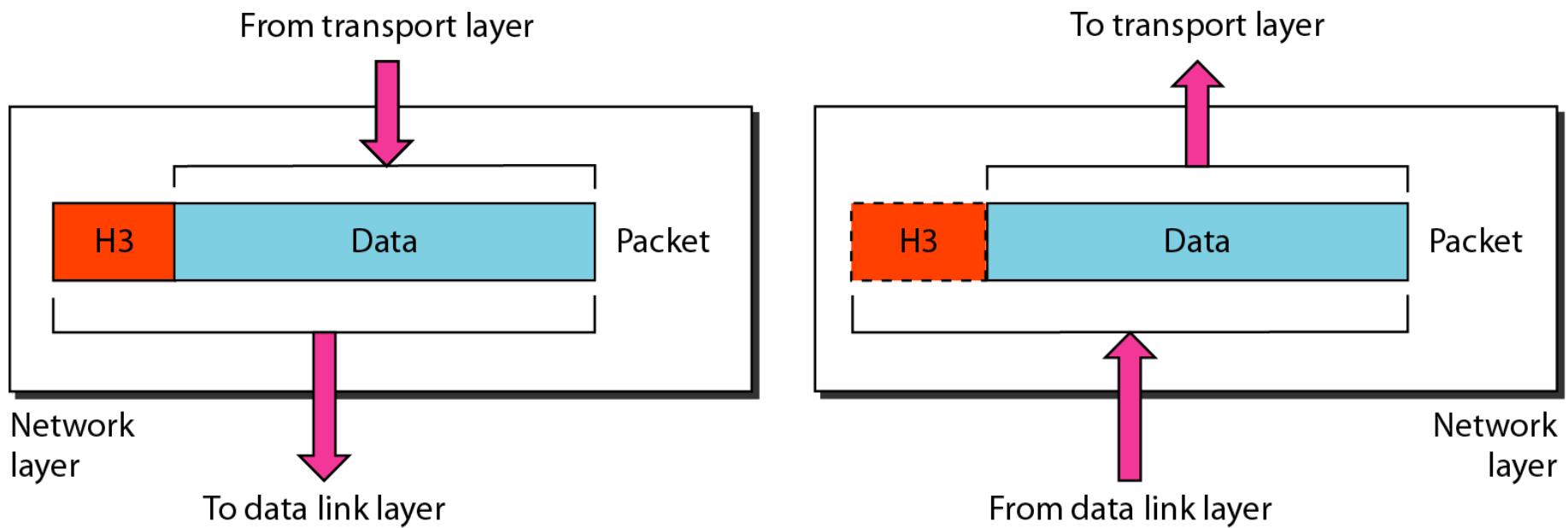
**The data link layer is responsible for moving frames from one hop (node) to the next.**

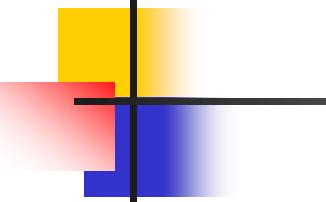
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## Figure 2.7 Hop-to-hop delivery



**Figure 2.8 Network layer**

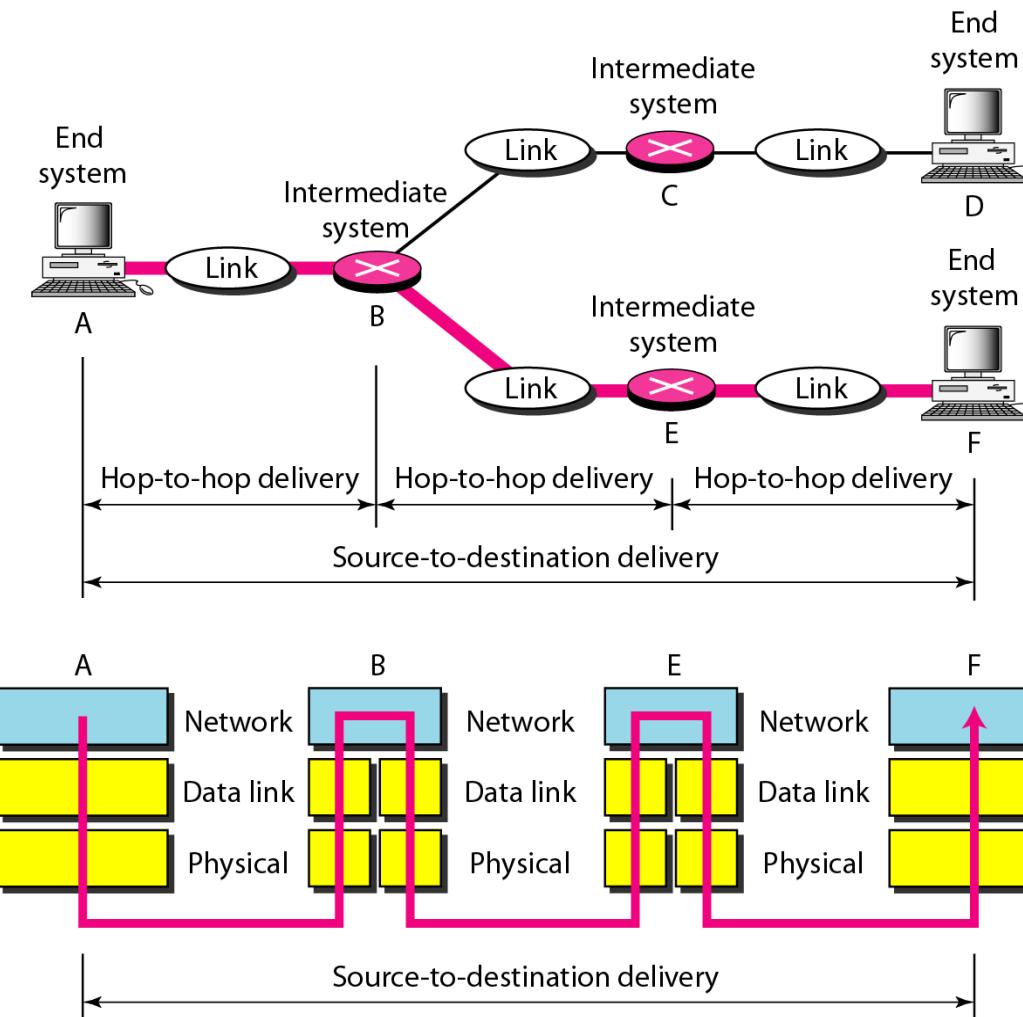




## **Note**

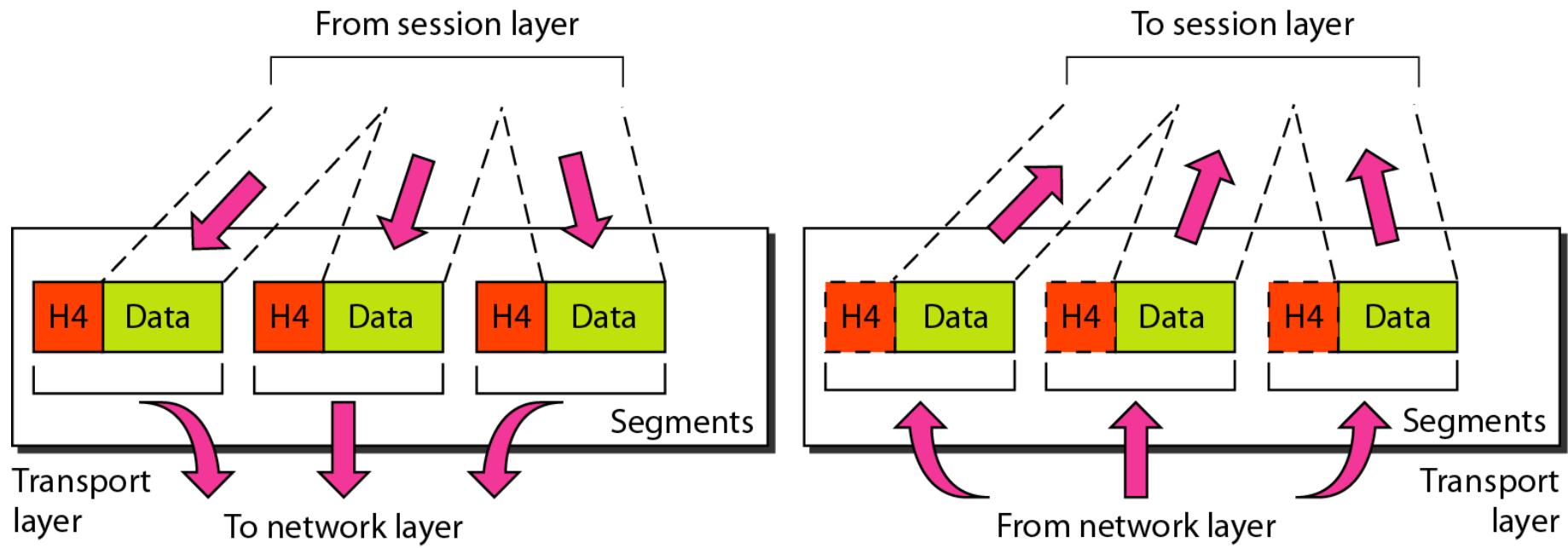
**The network layer is responsible for the delivery of individual packets from the source host to the destination host.**

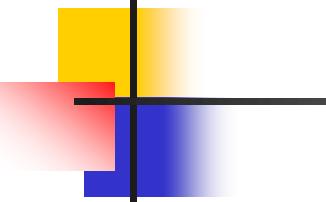
## Figure 2.9 Source-to-destination delivery



**Figure 2.10 Transport layer**

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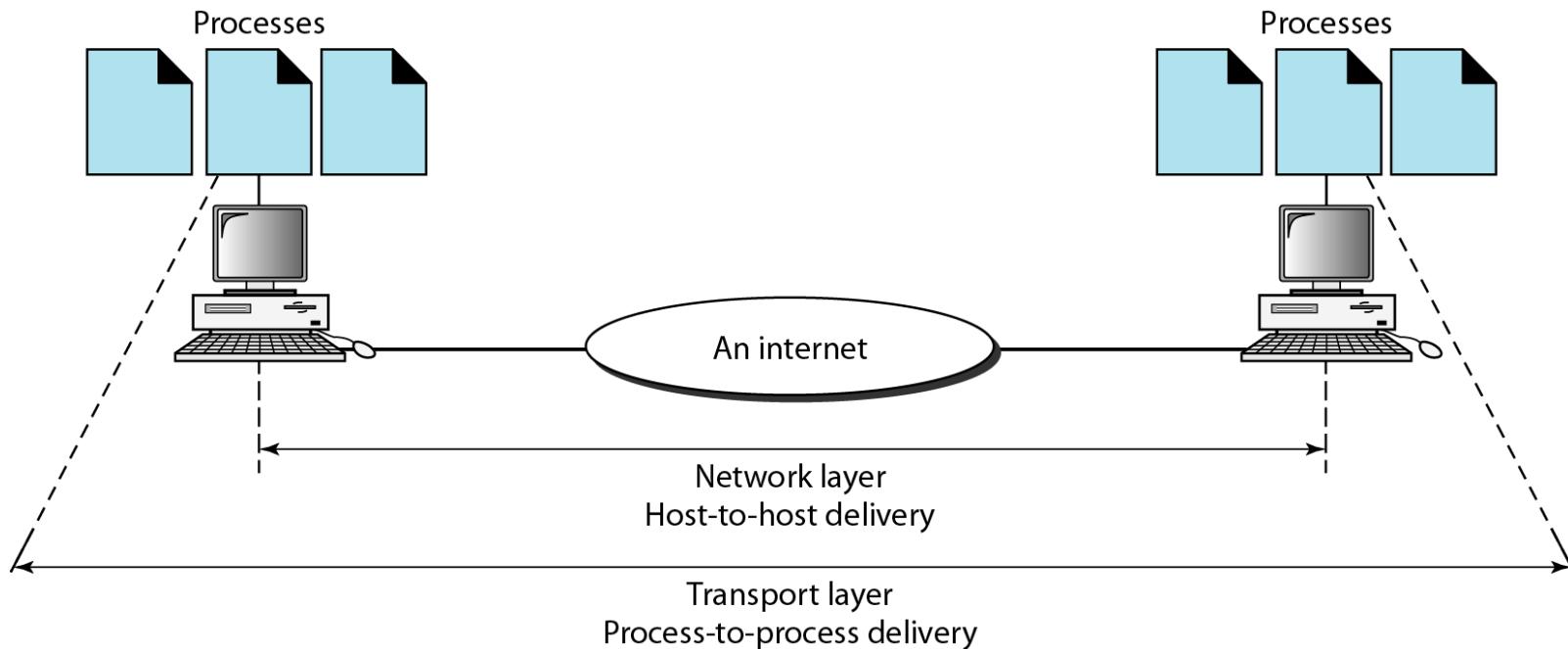


## **Note**

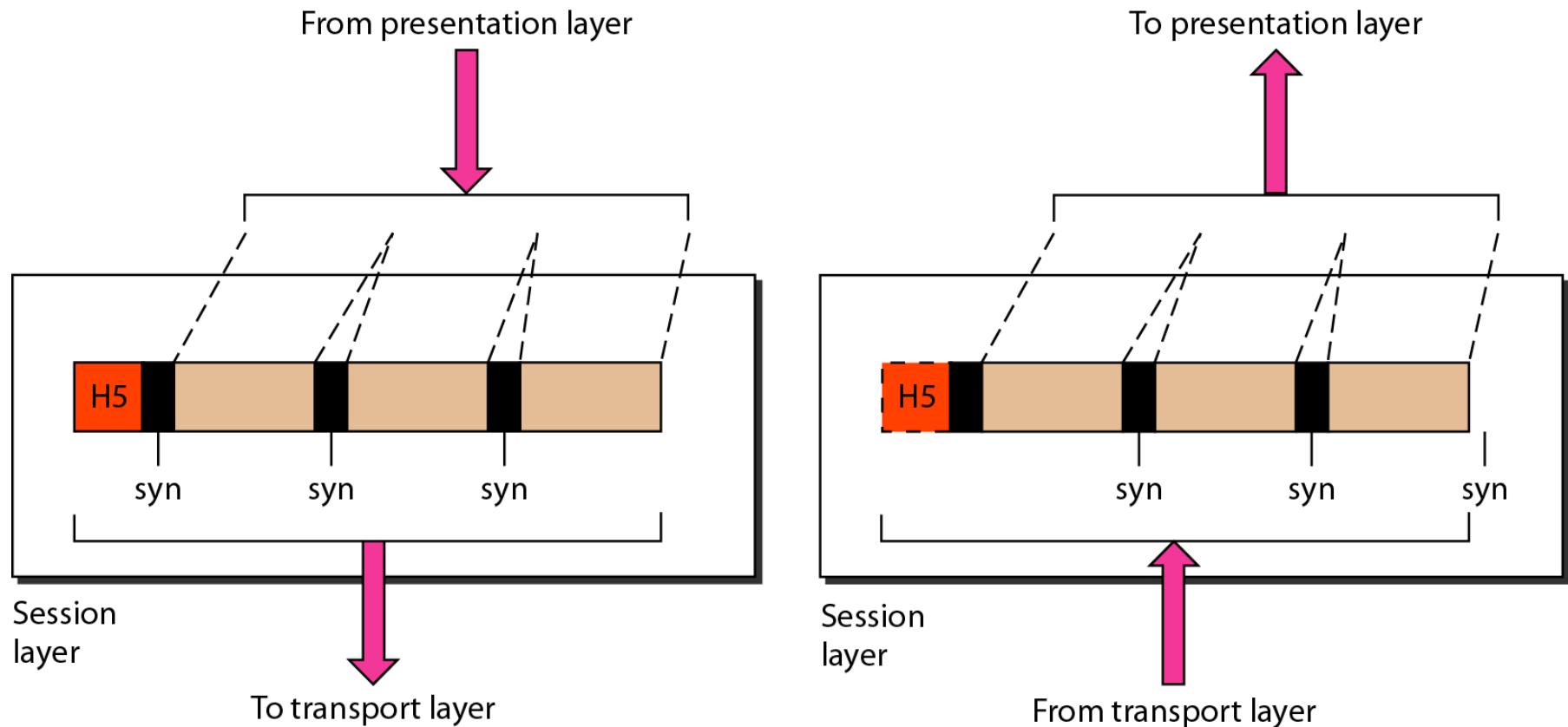
**The transport layer is responsible for the delivery  
of a message from one process to another.**

**Figure 2.11** *Reliable process-to-process delivery of a message*

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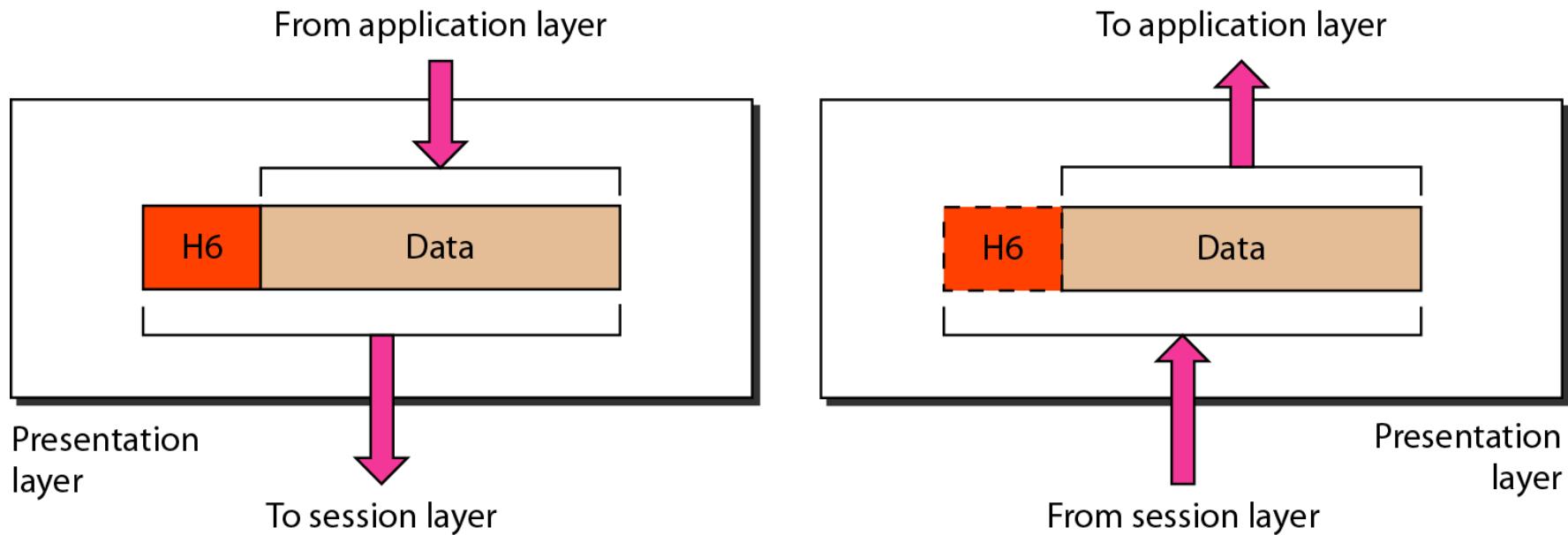
## Figure 2.12 Session layer

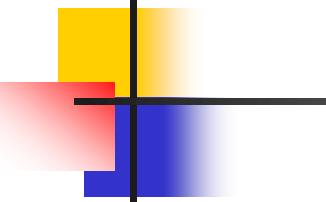


**Note**

The session layer is responsible for dialog control and synchronization.

**Figure 2.13** *Presentation layer*

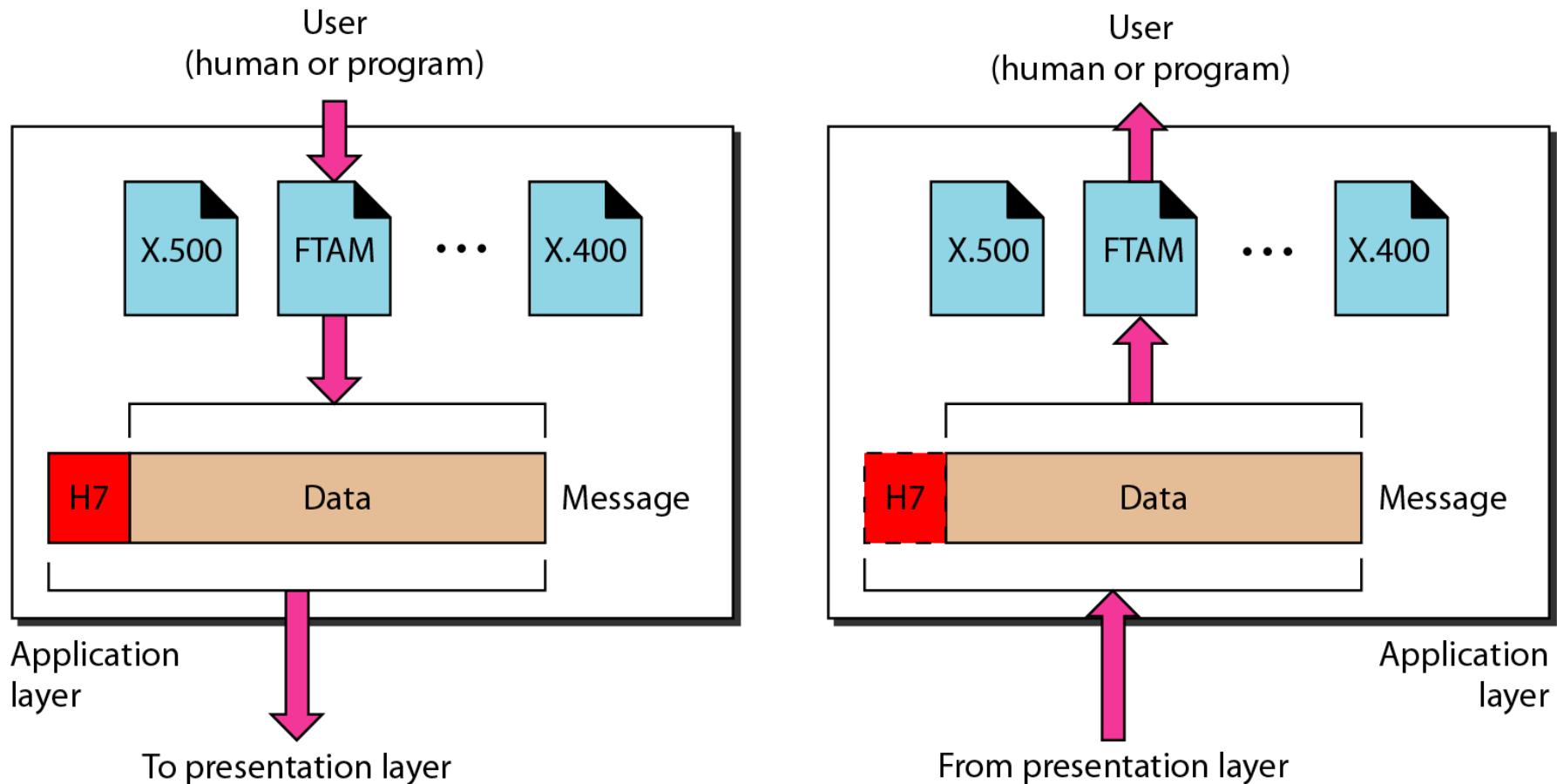


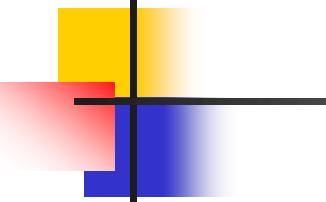


## **Note**

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

## Figure 2.14 Application layer



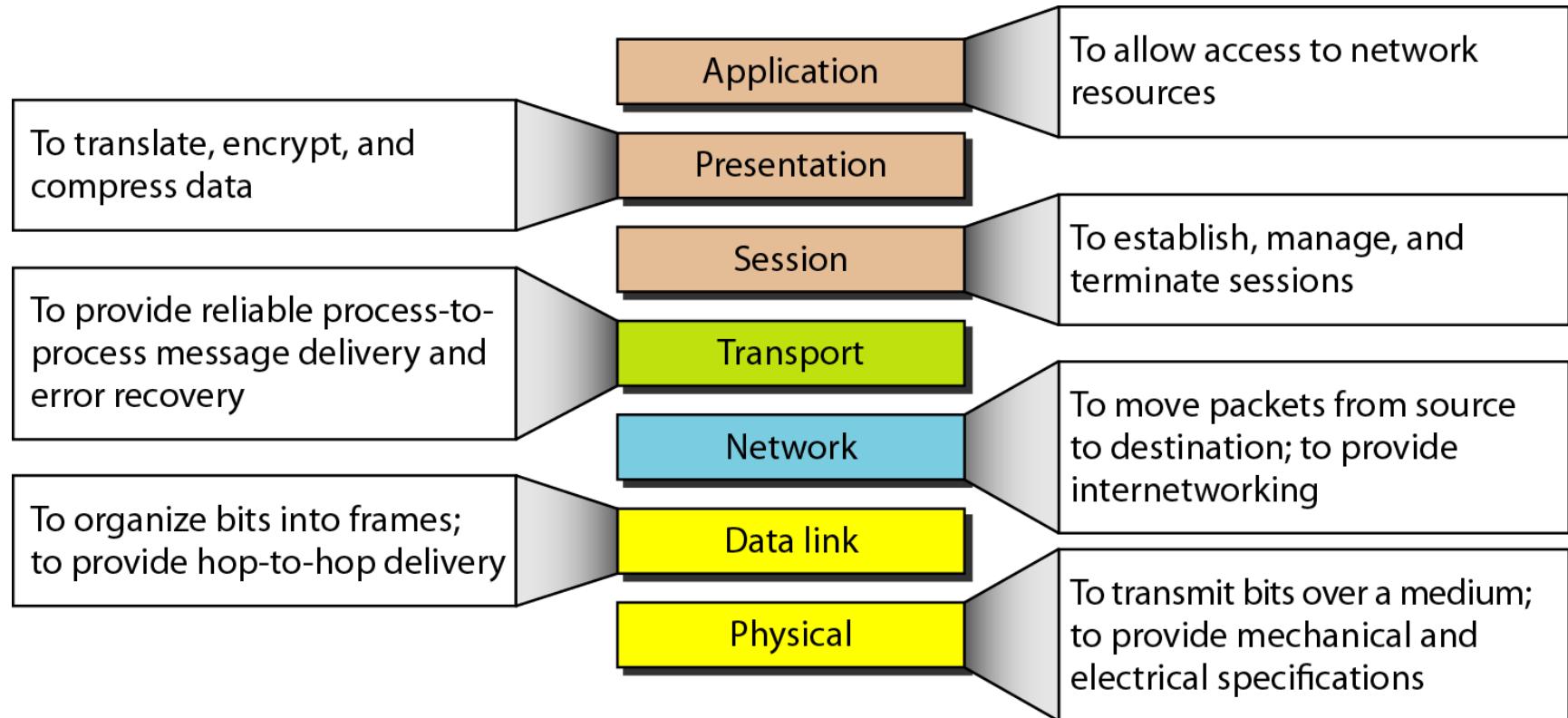


## *Note*

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

## Figure 2.15 Summary of layers

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## 2-4 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**.*

### **Topics discussed in this section:**

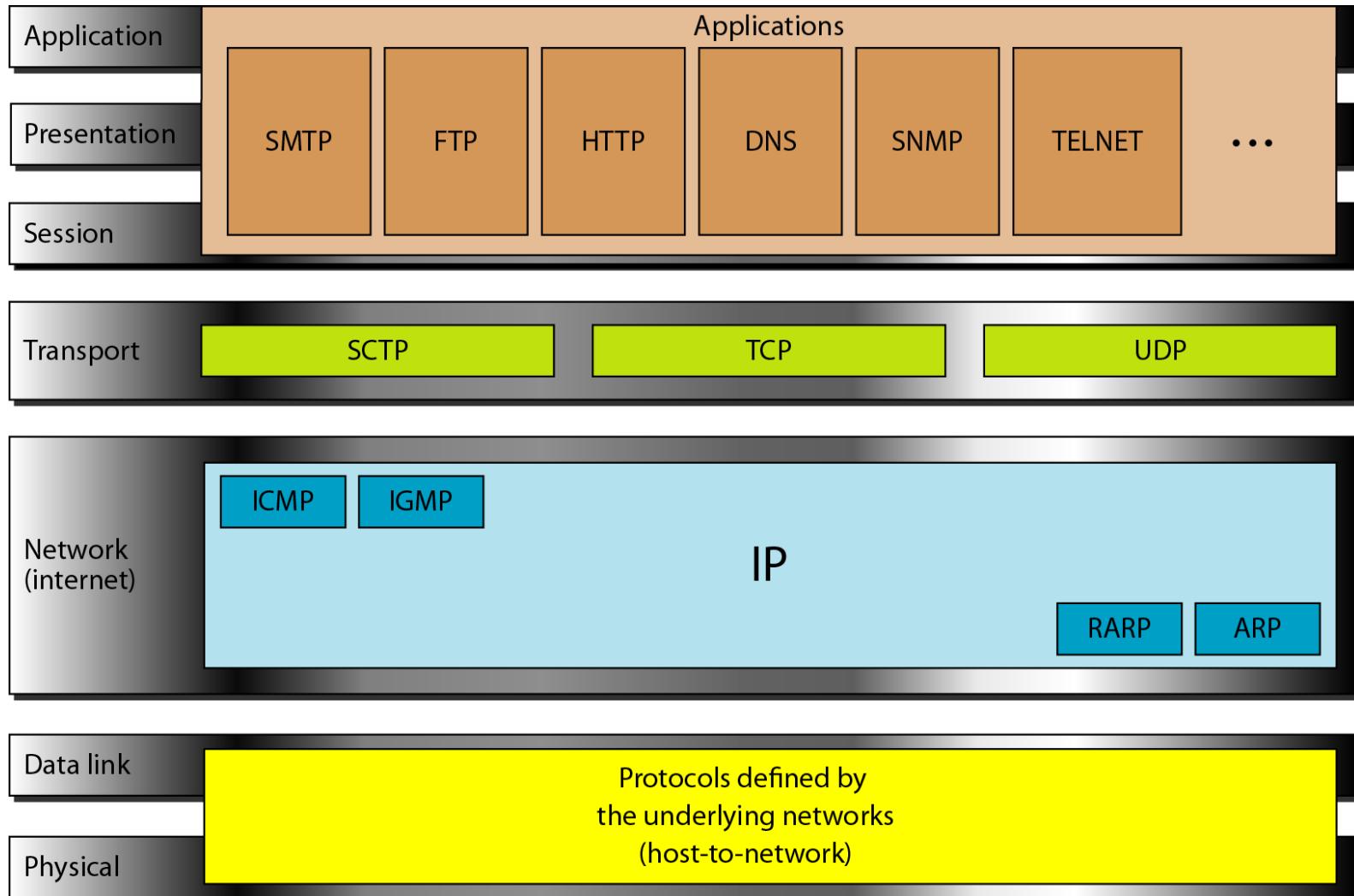
**Physical and Data Link Layers**

**Network Layer**

**Transport Layer**

**Application Layer**

## Figure 2.16 TCP/IP and OSI model



## 2-5 ADDRESSING

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

**Topics discussed in this section:**

Physical Addresses

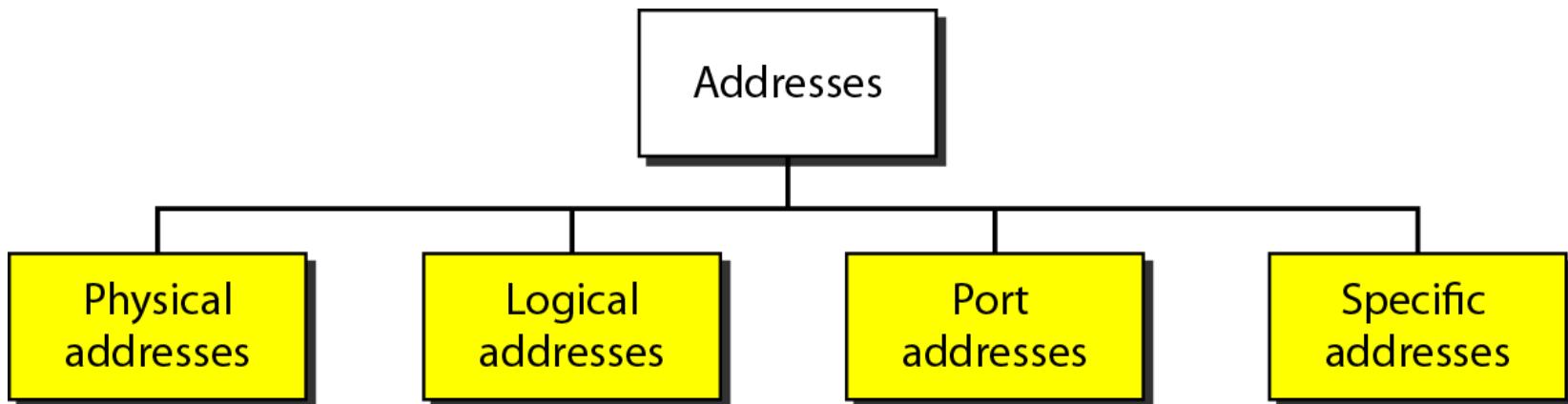
Logical Addresses

Port Addresses

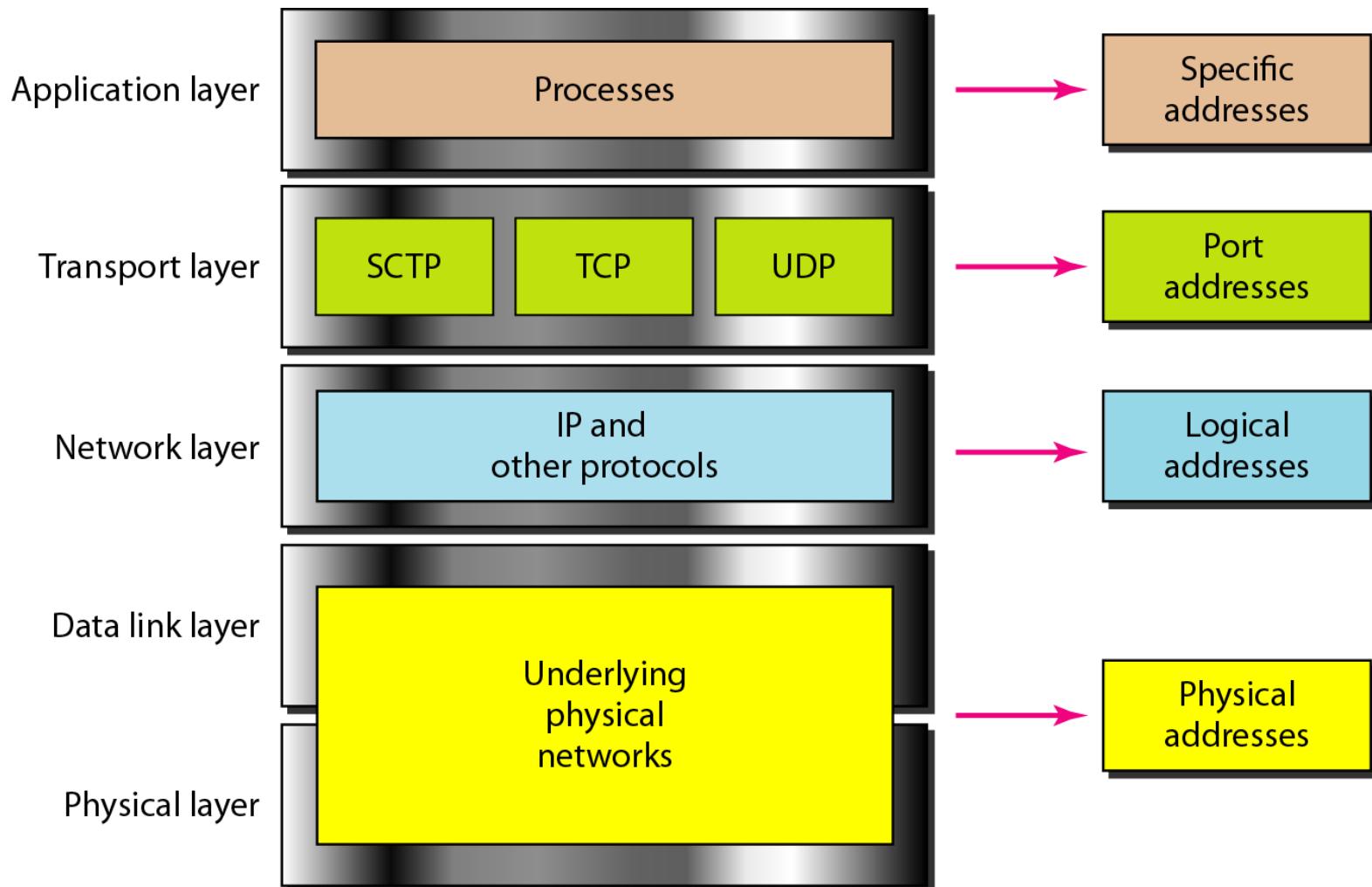
Specific Addresses

**Figure 2.17 Addresses in TCP/IP**

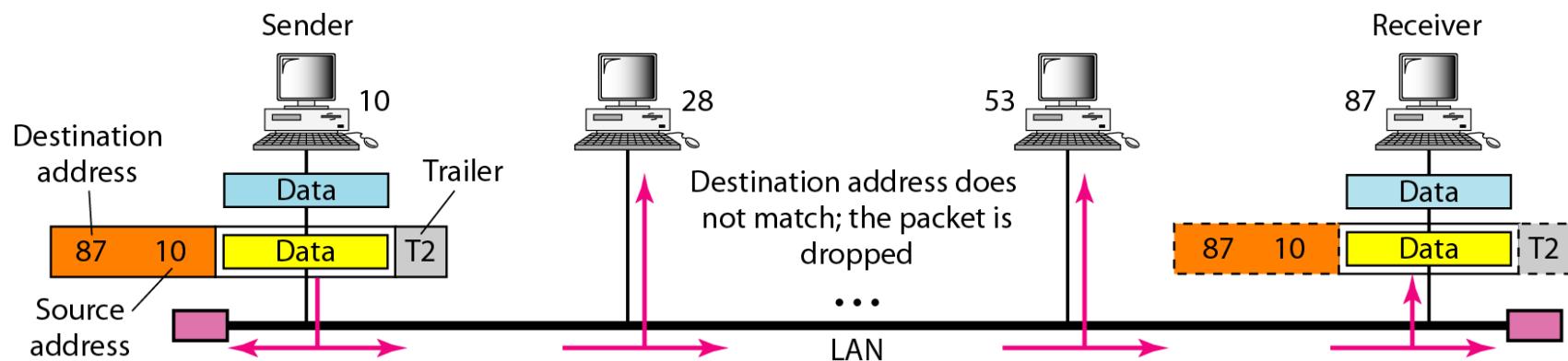
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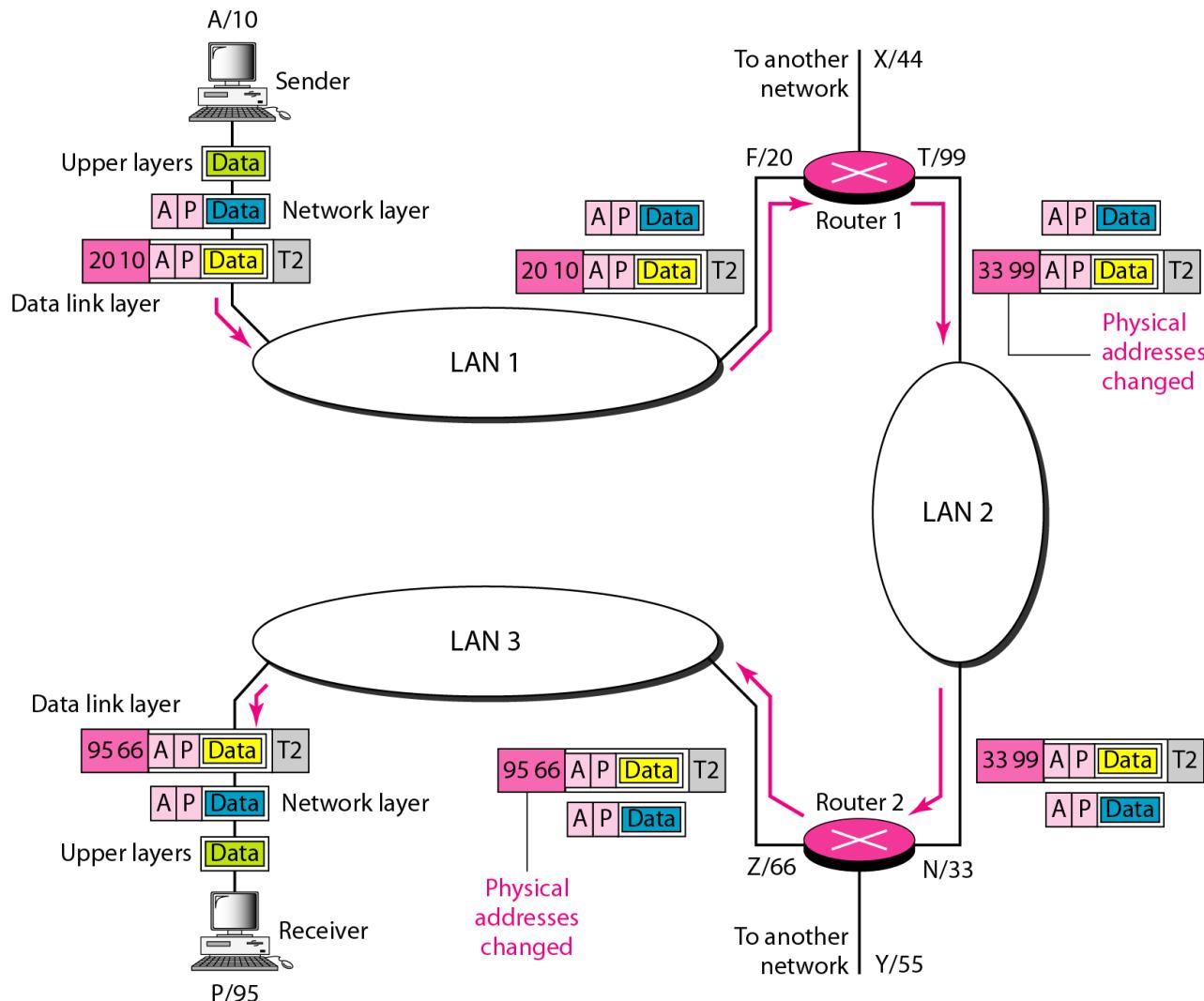
**Figure 2.18 Relationship of layers and addresses in TCP/IP**



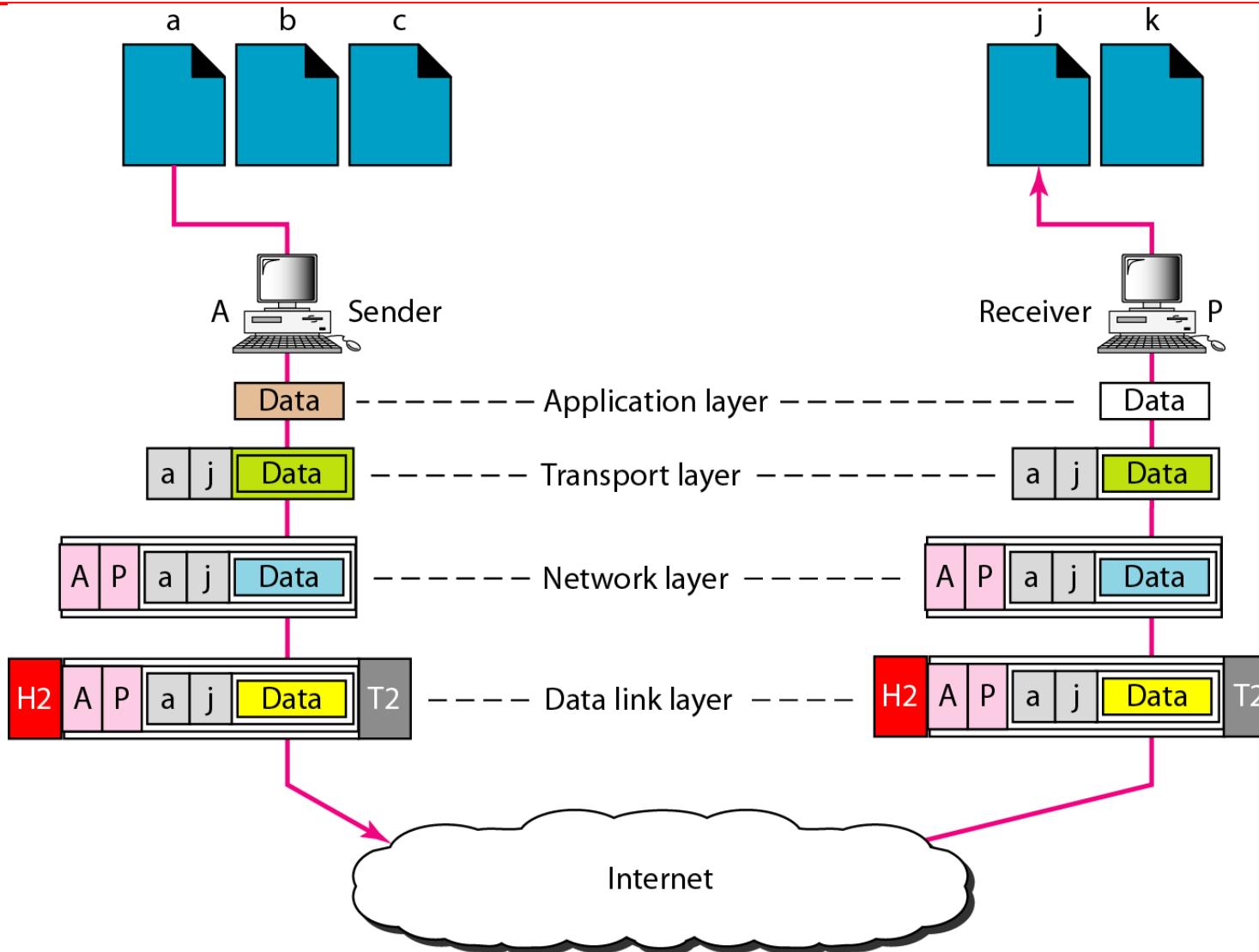
## Figure 2.19 Physical addresses

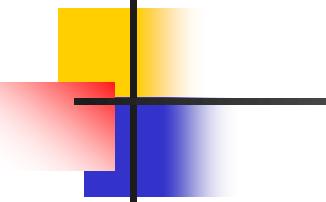


## Figure 2.20 IP addresses



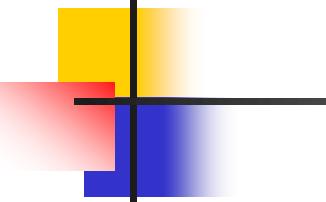
**Figure 2.21 Port addresses**





## **Note**

**The physical addresses will change from hop to hop,  
but the logical addresses usually remain the same.**



## *Note*

**The physical addresses change from hop to hop,  
but the logical and port addresses usually remain the same.**