#### **ICT4255-Data Communication and Networks**

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# **Chapter 2**Network Models

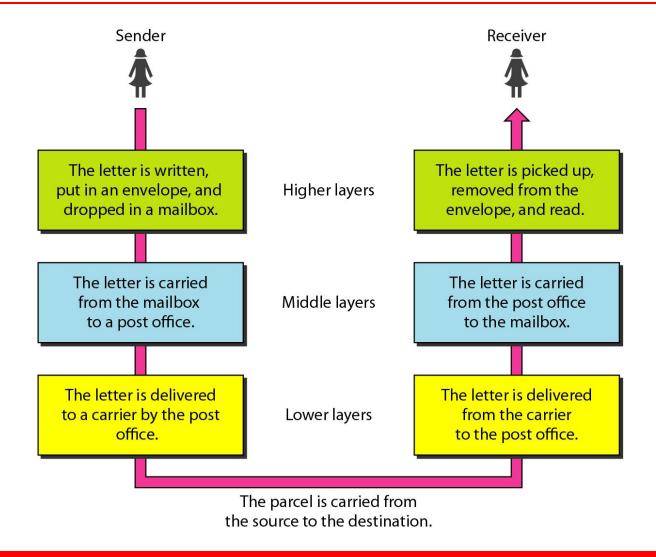
#### 2-1 LAYERED TASKS

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



## ISO is the organization. OSI is the model.

#### Figure 2.2 Seven layers of the OSI model

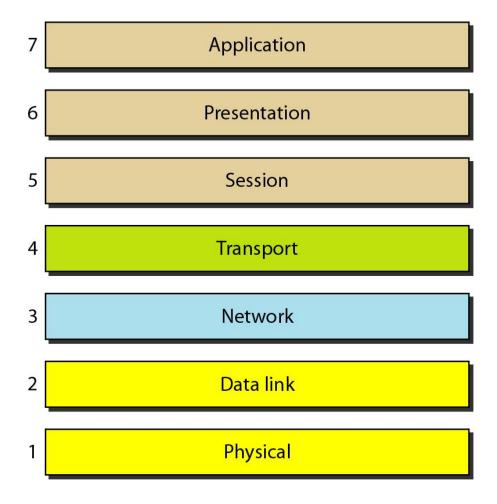


Figure 2.3 The interaction between layers in the OSI model

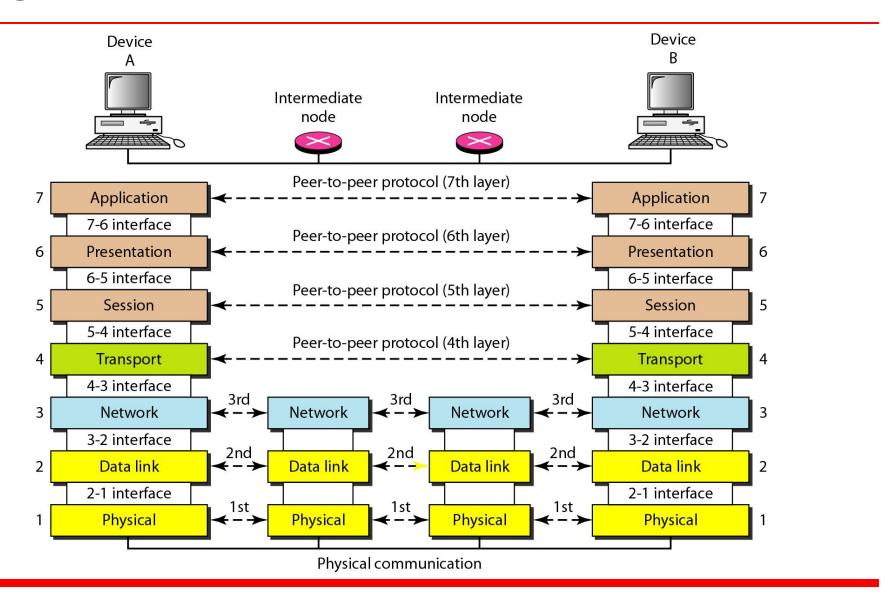
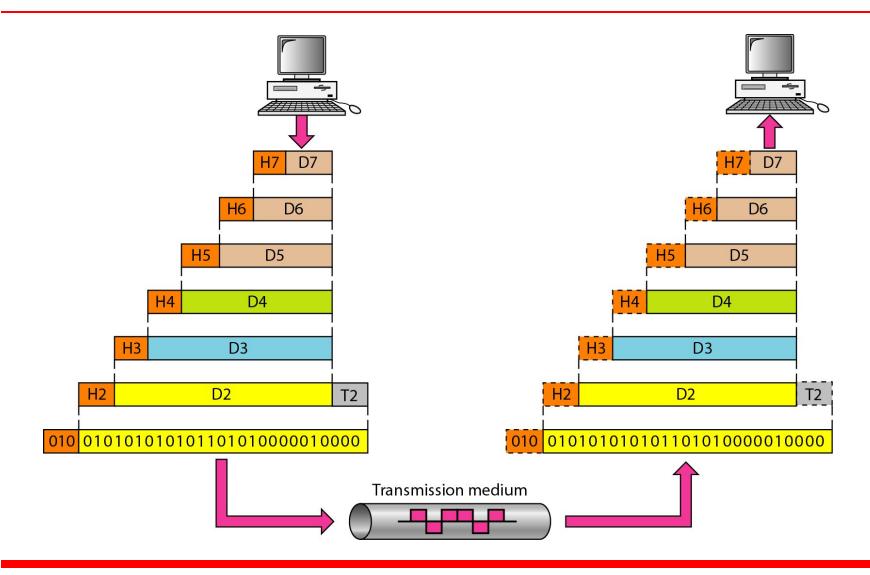


Figure 2.4 An exchange using the OSI model



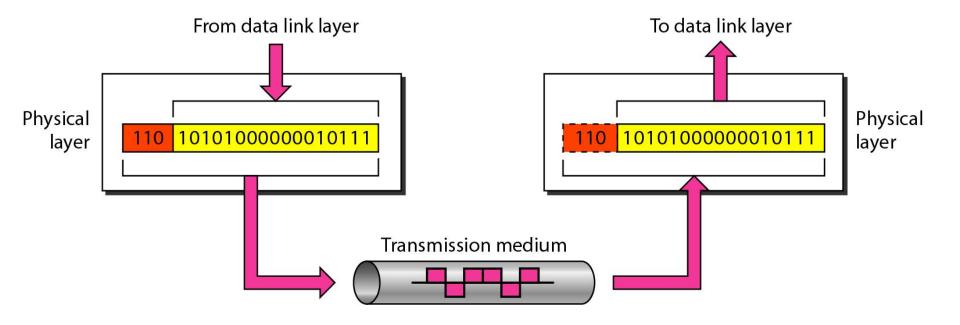
#### 2-3 LAYERS IN THE OSI MODEL

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

#### Topics discussed in this section:

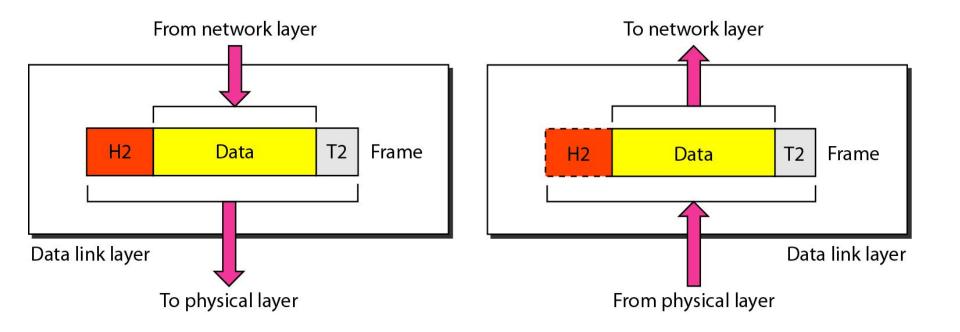
Physical Layer
Data Link Layer
Network Layer
Transport Layer
Session Layer
Presentation Layer
Application Layer

#### Figure 2.5 Physical layer



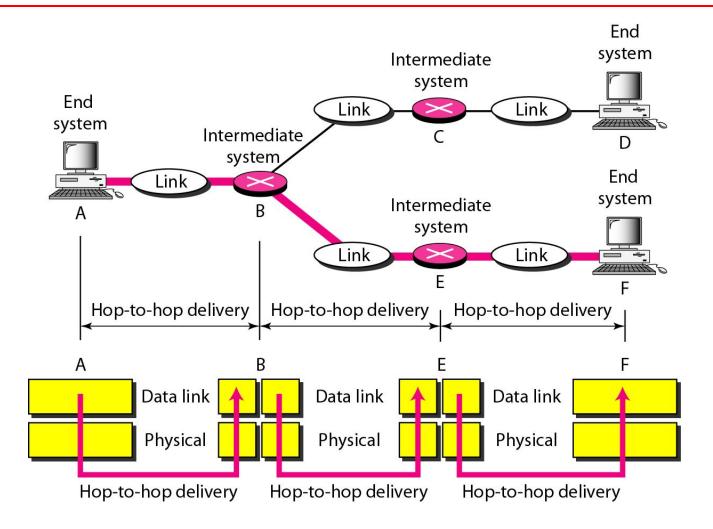
The physical layer is responsible for movements of individual bits from one hop (node) to the next.

#### Figure 2.6 Data link layer

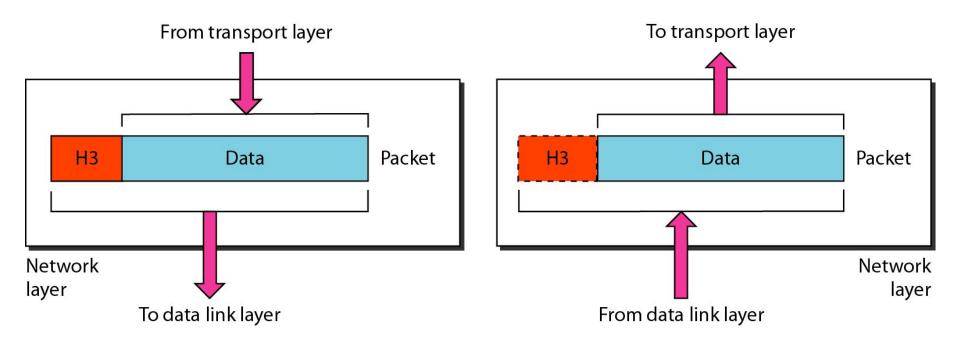


The data link layer is responsible for moving frames from one hop (node) to the next.

#### Figure 2.7 Hop-to-hop delivery

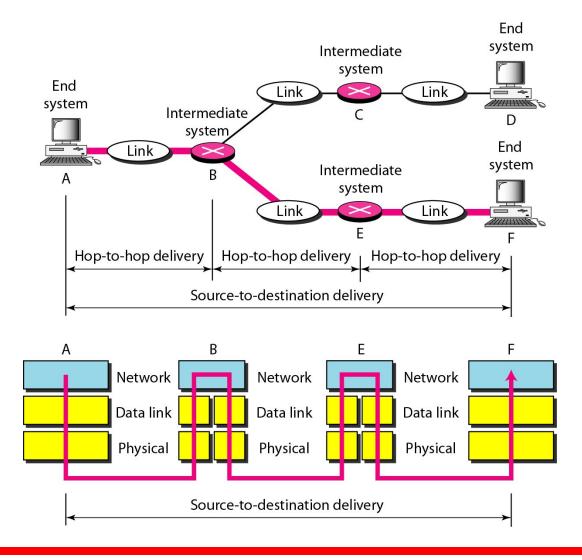


#### Figure 2.8 Network layer

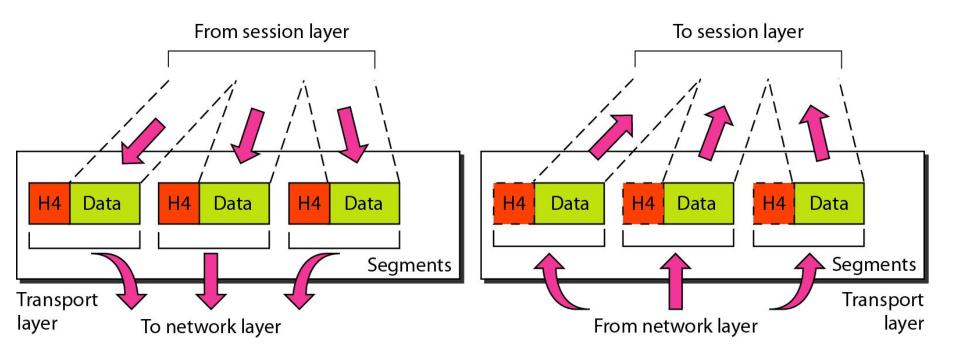


The network layer is responsible for the delivery of individual packets from the source host to the destination host.

#### Figure 2.9 Source-to-destination delivery

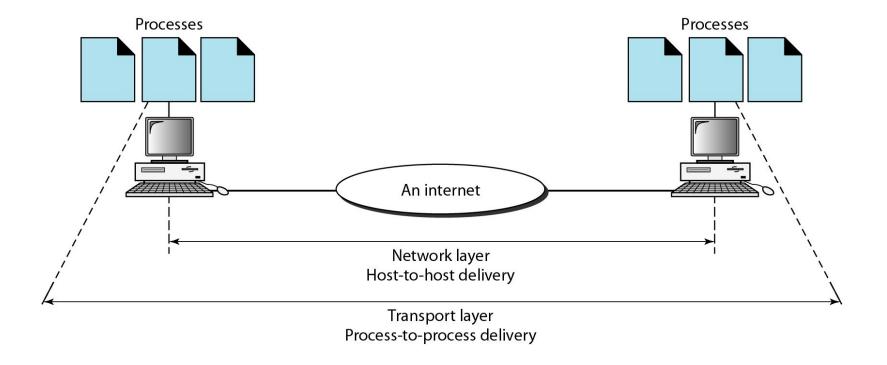


#### Figure 2.10 Transport layer

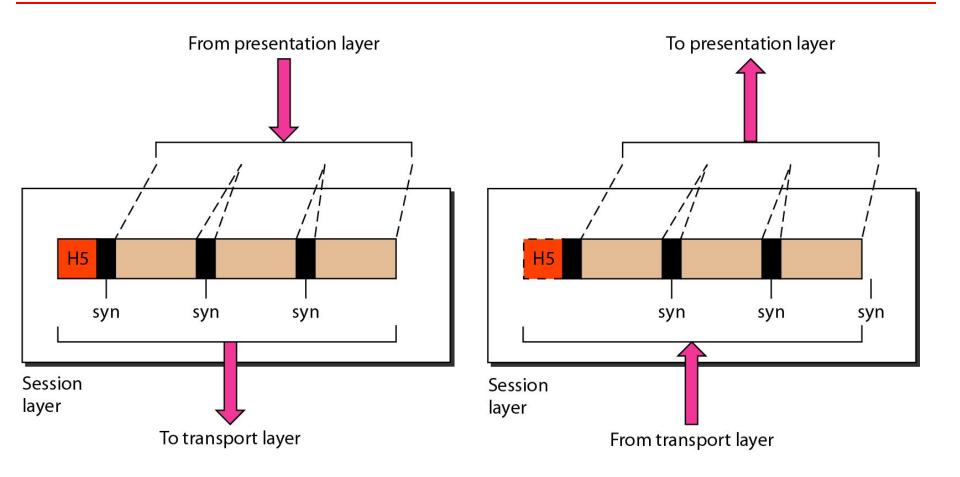


The transport layer is responsible for the delivery of a message from one process to another.

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

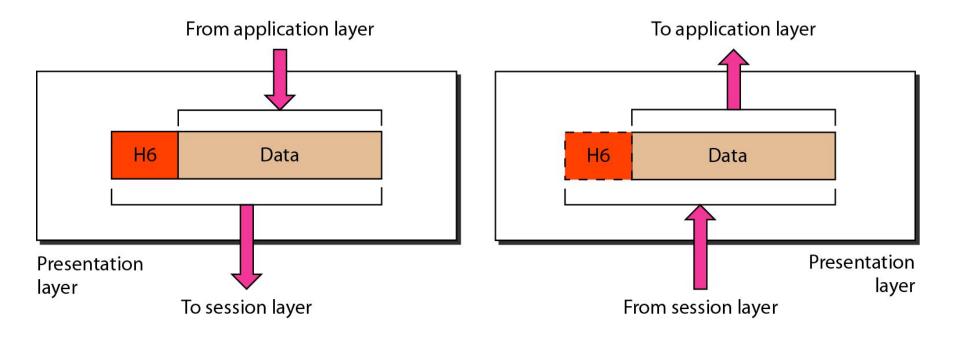


#### Figure 2.12 Session layer



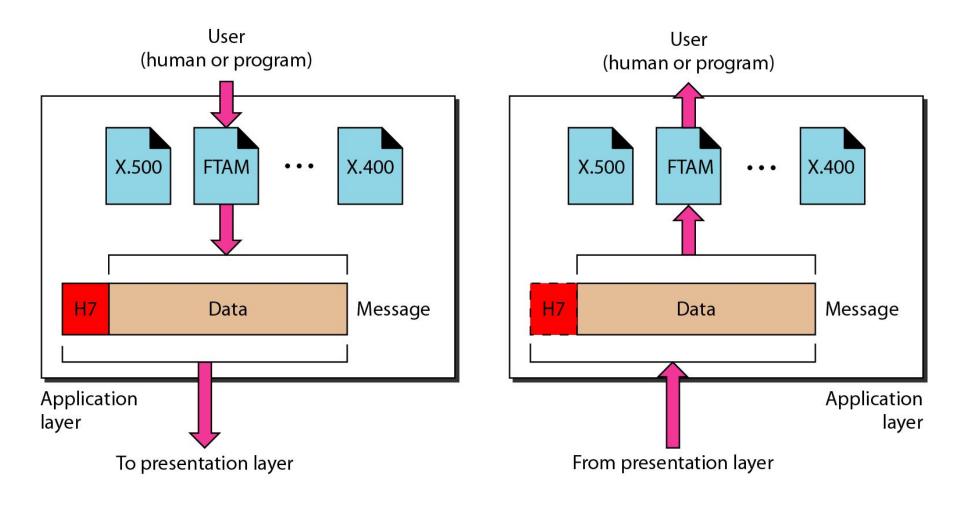
The session layer is responsible for dialog control and synchronization.

#### Figure 2.13 Presentation layer



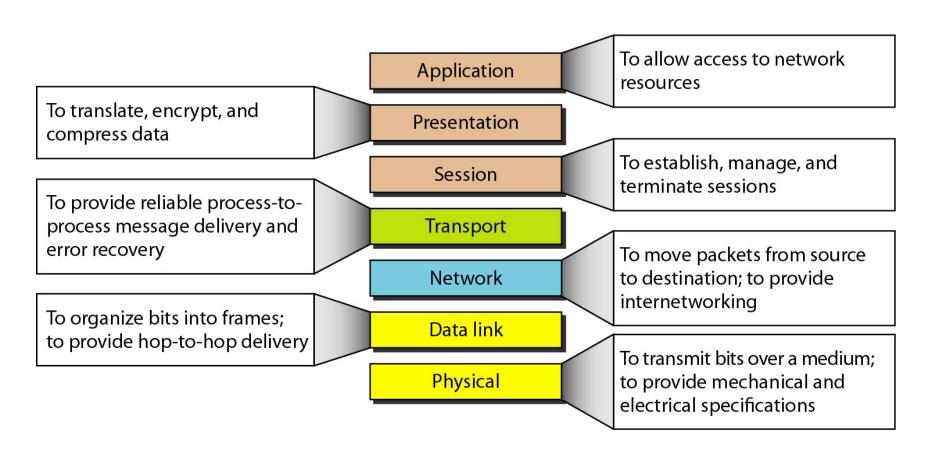
The presentation layer is responsible for translation, compression, and encryption.

#### Figure 2.14 Application layer



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

#### Figure 2.15 Summary of layers



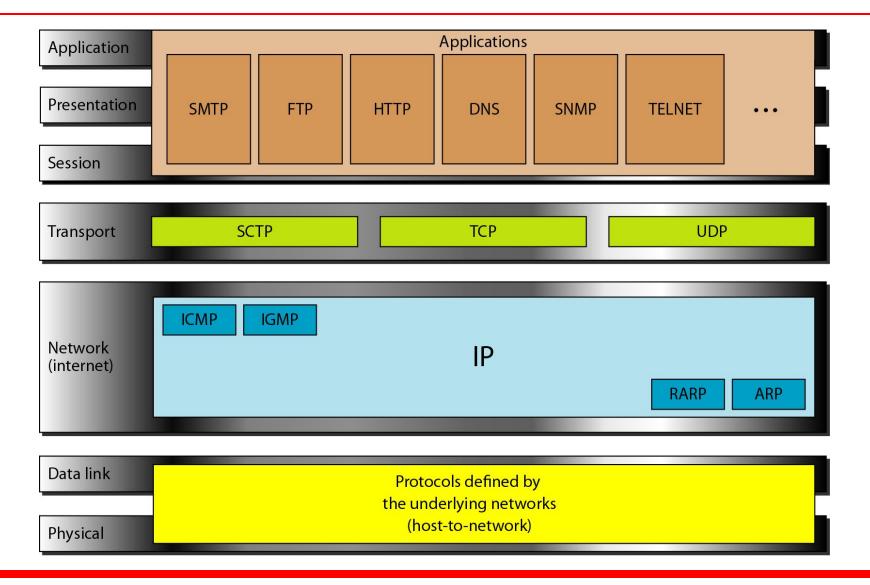
#### 2-4 TCP/IP PROTOCOL SUITE

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





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