جامعة الحمدانية
كلية التربية
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Network Layers

المرحلة الرابعة
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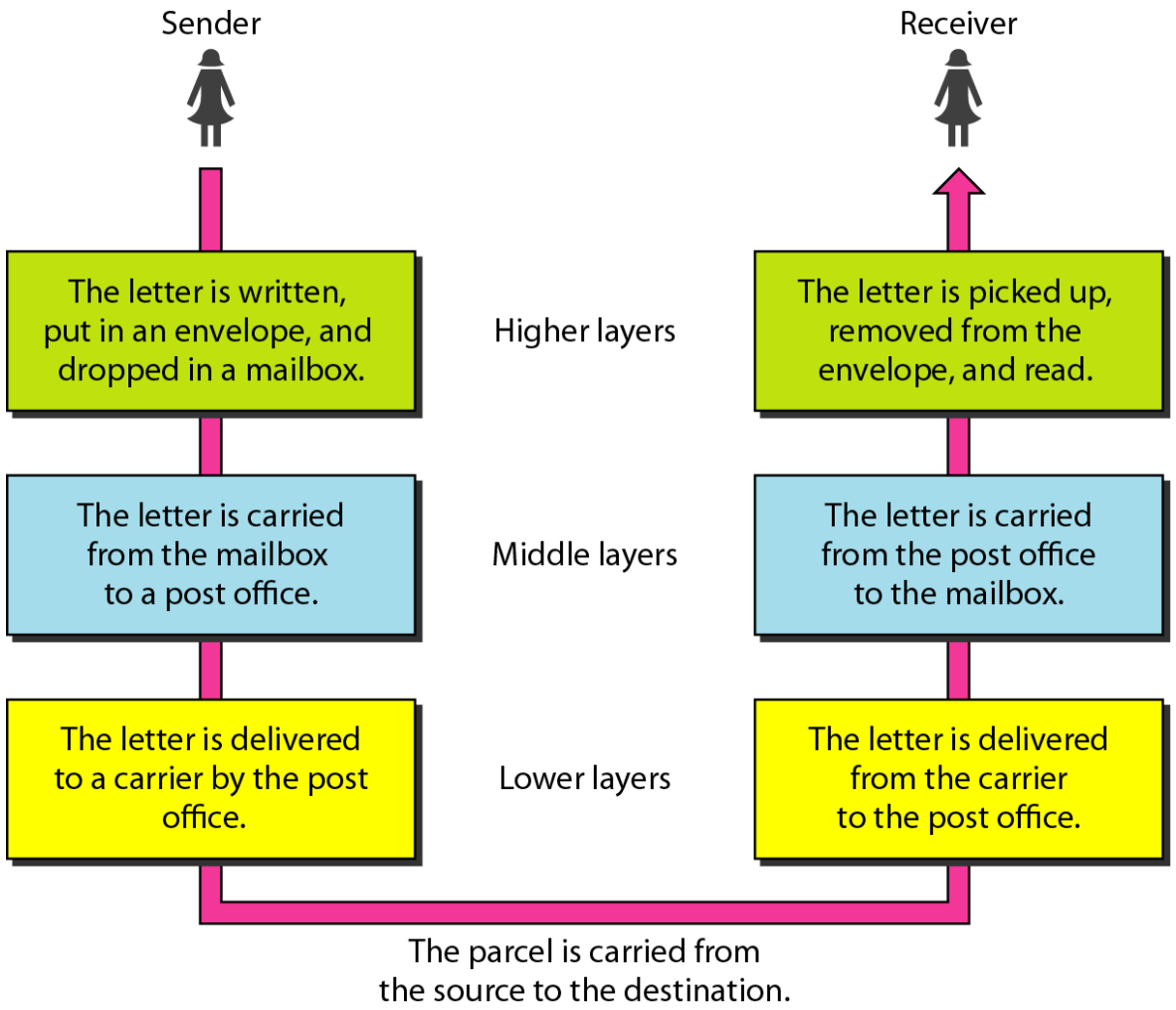
LAYERED TASKS

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.

Figure 2.1 Tasks involved in sending a letter



Models

Each layer at the sending site uses the services of the layer immediately below it. The sender at the higher layer uses the services of the middle layer. The middle layer uses the services of the lower layer. The lower layer uses the services of the carrier.

The layered model that dominated data communications and networking literature before 1990 was the Open Systems Interconnection (OSI) model. Everyone believed that the OSI model would become the ultimate standard for data communications, but this did not happen. The TCP/IP protocol suite became the dominant commercial architecture because it was used and tested extensively in the Internet; the OSI model was never fully implemented.

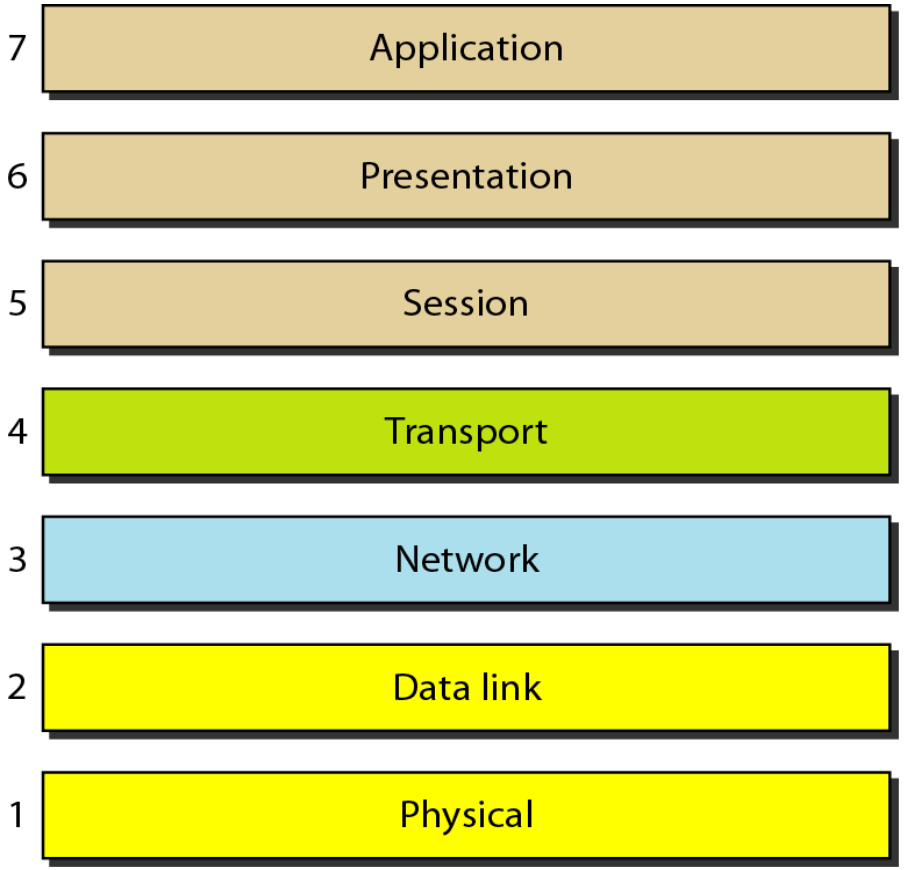
In this Lecture , first we briefly discuss the OSI model, and then we concentrate on TCP/IP as a protocol suite.

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.

The purpose of the OSI model is to show how to facilitate communication between different systems without requiring changes to the logic of the underlying hardware and software. The OSI model is not a protocol; it is a model for understanding and designing a network architecture that is flexible and robust.

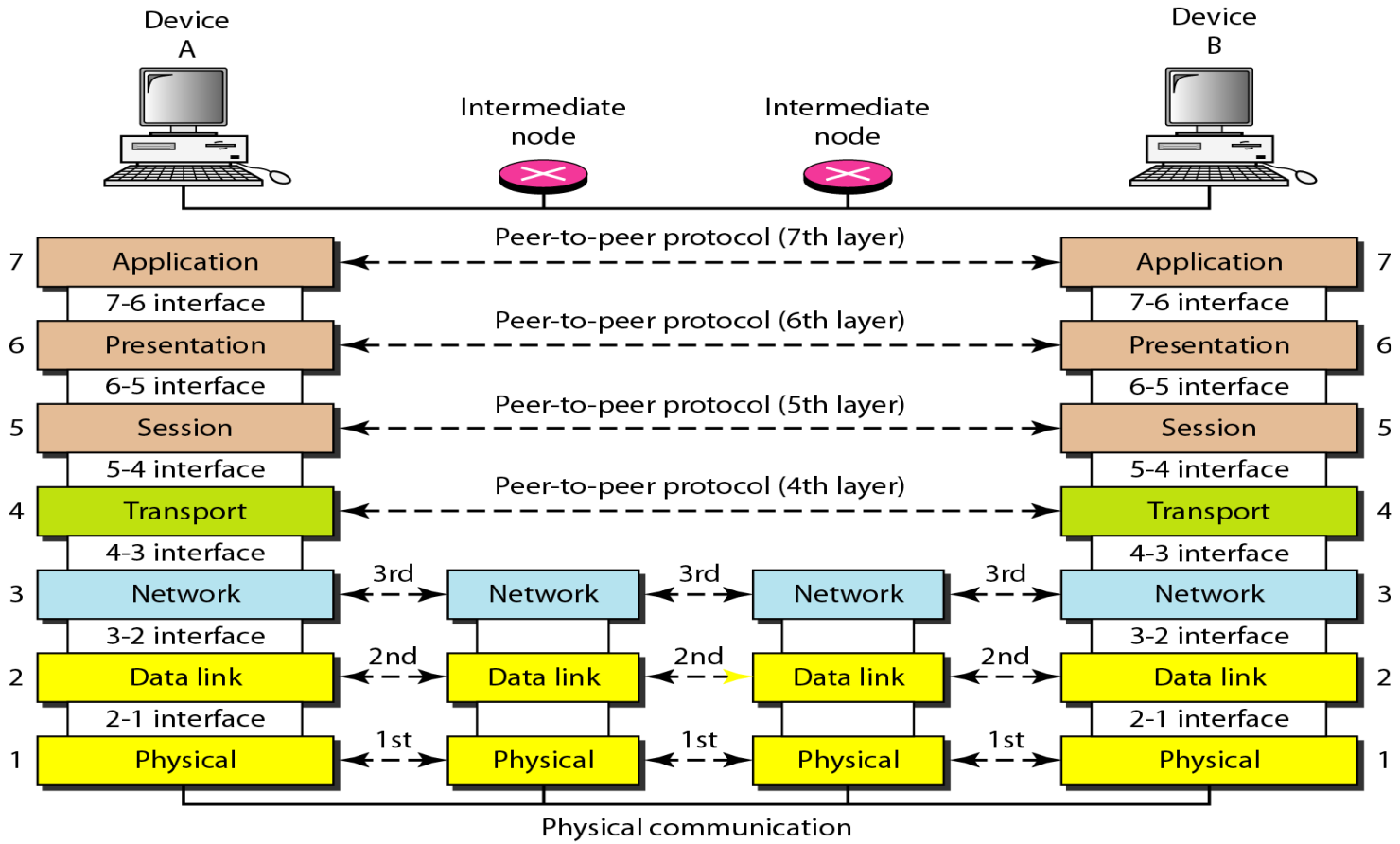
Figure ***Seven layers of the OSI model***



Each layer defines a family of functions separate from those of the other layers. but each one depends on the others.

Peer-to-Peer Processes

At the physical layer, communication is direct: In the Figure below , device A sends a stream of bits to device B (through intermediate nodes). At the higher layers, however, communication must move down through the layers on device A, over to device B, and then back up through the layers. Each layer in the sending device adds its own information to the message it receives from the layer just above it and passes the whole package to the layer just below it.
At layer I the entire package is converted to a form that can be transmitted to the receiving device. At the receiving machine, the message is unwrapped layer by layer, with each process receiving and removing the data meant for it. For example, layer 2 removes the data meant for it, then passes the rest to layer 3. Layer 3 then removes the data meant for it and passes the rest to layer 4, and so on.



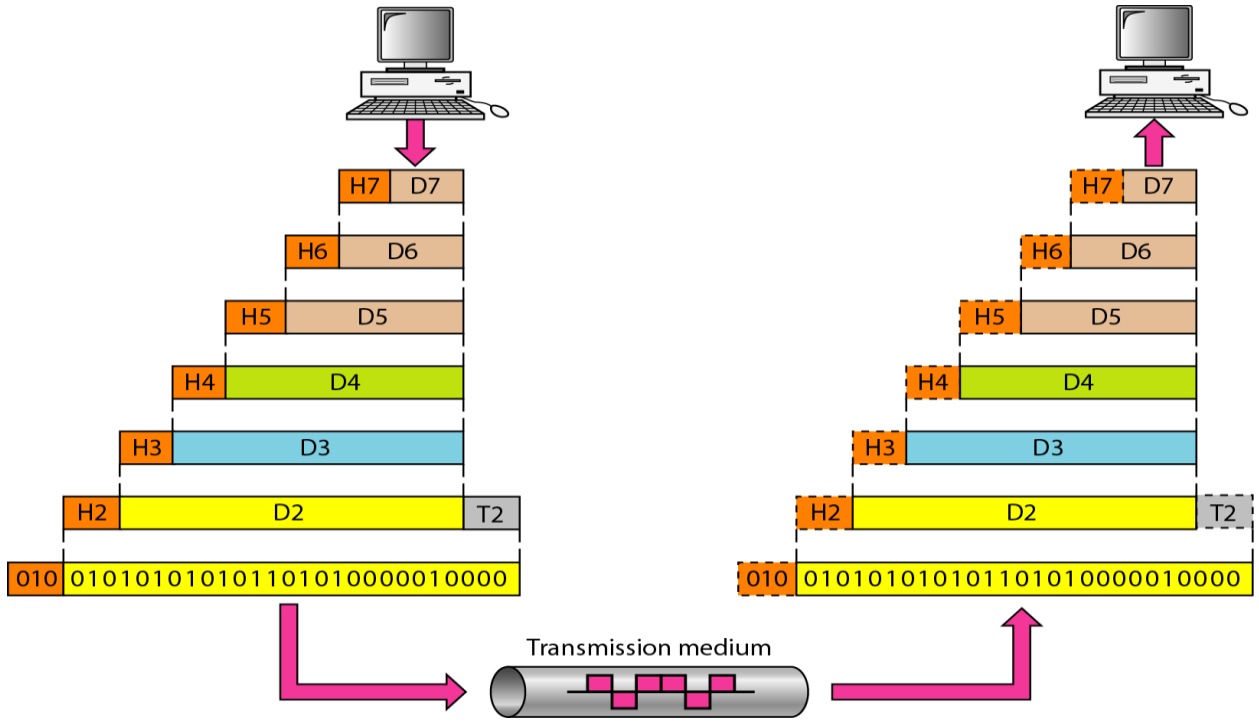
Each interface defines the information and services a layer must provide for the layer above it.

Organization of the Layers

The seven layers can be classified into three subgroups:
Layers:1,2and 3 -Physical, Data link and Network are the network support layers. They deal with the physical aspects of moving data from one device to another (such as electrical specifications, physical connections, physical addressing, and transport timing and reliability).

Layers 5, 6, and 7- session, presentation, and application can be thought of as the user support layers.

Layer 4, the transport layer, links the two subgroups and ensures that what the lower layers have transmitted is in a form that the upper layers can use.



Header Control information added to the beginning of a data packet.

Trailer Control information appended (ended) to a data unit just in layer 2.

Encapsulation A packet (header and data) at level 7 is encapsulated in a packet at level 6. The whole packet at level 6 is encapsulated in a packet at level 5, and so on.