Computer Network Protocols Reference Model
Lesson -1

جامعة المستقبل
كلية الهندسة والتقنيات الهندسية
قسم هندسة تقنيات الحاسوب
المرحلة الرابعة

By

Dr. Layth Abdulkareem Hassnawi

What is the network?

Network Structure

Each network consist of number of nodes connect together to perform a specific task such as information manipulation or any networking task

Network Architecture (inside each node)

*A set of **layers** and **protocols** is called the network architecture.*

Protocol Hierarchies

- *Networks are organized as layers to reduce design complexity.*

- *Each layer offers services to the higher layers. Between adjacent layers is an interface. The basic elements of a layered model are*

Services	Interface	Primitives
Connection oriented or connectionless.	Defines which primitives and services the lower layer will offer to the upper layer.	Operations such as request, indicate, response, confirm.

Design Issues for the Layers

1. *Mechanism for connection establishment*
2. *Rules for data transfer*
3. *Error control*
4. *Fast sender swamping a slow receiver*
5. *Routing in the case of multiple paths*

Protocol: *is a* ***format order of messages*** *sent and received among the network entities and* ***action taken on messages transmission receipt****.*

Protocol process:

1. *The format or structure of the message*
2. *The process by which networking devices share information about pathways with other networks*
3. *How and when error and system messages are passed between devices*
4. *The setup and termination of data transfer sessions*

Layering in Networked Computing

- *OSI Model (open system interconnection)*
- *TCP/IP Model*

Why a layered model?

1. *Breaks down communication into smaller, simpler parts.*
2. *Easier to teach communication process.*
3. *Allows different hardware and software to work together.*
4. *Reduces complexity*

The OSI model

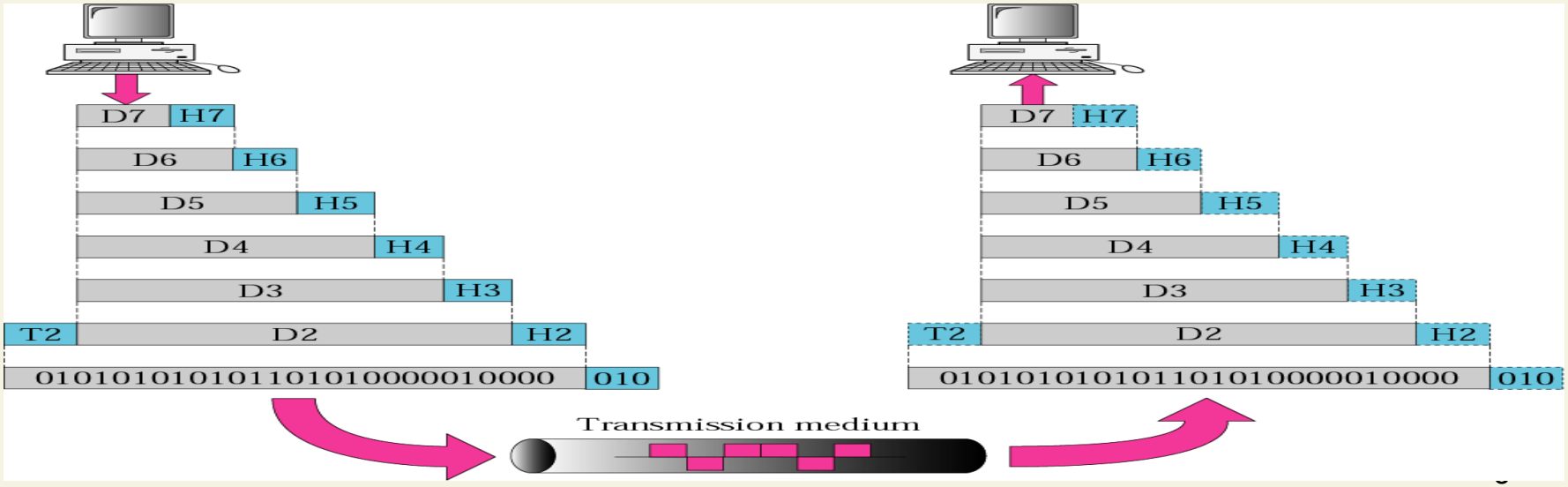
*The **Open Systems Interconnection (OSI)** is the model developed by the International Standards Organization. The OSI model benefits are:*

- *Helps us understand how data gets from one user's computer to another.*
- *It aids to provide an organized structure for hardware and software developers to follow.*
- *Serves as an outline of rules for how protocols can be used to allow communication between computers.*
- *Each layer has its own function and provides support to other layers.*

OSI Layers

OSI model

Layer	Name	Example protocols
7	Application Layer	HTTP, FTP, DNS, SNMP, Telnet
6	Presentation Layer	SSL, TLS
5	Session Layer	NetBIOS, PPTP
4	Transport Layer	TCP, UDP
3	Network Layer	IP, ARP, ICMP, IPSec
2	Data Link Layer	PPP, ATM, Ethernet
1	Physical Layer	Ethernet, USB, Bluetooth, IEEE802.11



OSI Advantages & Disadvantages

Benefits(Advantage)	Negative Aspect (disadvantage)
• Interconnection of different systems (open) • Not limited to a single vendor solution	• Systems might be less secure • Systems might be less stable

Services Of OSI Model

Connection-Oriented	Connectionless
Before data is sent, the service from the sending computer must establish a connection with the receiving computer.	Data can be sent at any time by the service from the sending computer.

End Of Lesson 1

Thanks For Listening