Mobile and Wireless Technology

CT090-3-2-MWT Version VD01

Review of Core Concepts

Topic & Structure of The Lesson

ISO/OSI Reference Model

Network Devices

TCP/IP Over Ethernet

Learning Outcomes

At the end of this topic, You should be able to

- Remember the functionalities of 7 layers in the OSI Model.
- Understand differences in various network devices.
- Explain the functions of TCP/IP over internet.

Key Terms You Must Be Able To Use

If you have mastered this topic, you should be able to use the following terms correctly in your assignments and exams:

OSI Model

Repeater, Hub, Switch & Router

TCP/IP

OSI Model

The ***O**pen **S**ystem **I**nterconnection (OSI)* model defines *a networking framework to implement protocols in seven layers*. They are:

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

OSI Model

- **Physical Layer -** Physical layer transforms a sequence of bits into signals for transmission. The signal will be different for different communication media. E.g., dial-up phone, dial-up cellular phone, fiber optic LAN, Ethernet.
- The details of communicating over the available communication channel (link) are transparent to higher layers.

- **Data Link Layer -** Data Link Layer is responsible for orderly access to the communication link.
- The CSMA/CD protocol in the Ethernet is an example of a data link layer protocol.
- It provides the ability to transmit packets of bits from one host to the next.

OSI Model

- **Network Layer –** Facilitates the exchange of packets between to remote hosts. For that purpose, it provides the ability to route packets.
- I.e., at each intermediate host (router) a decision is made on which link the packet should be forwarded.

- **Transport Layer –** Reassembles packets into a sequence of information bits. The transport layer must be able to cope with an unreliable network layer.
- Most importantly, packets may be lost or arrive out of sequence.

OSI Model

- **Session Layer** - Its main aim is to establish, maintain and synchronize the interaction between communicating systems. Session layer manages and synchronize the conversation between two different applications.

- **Presentation Layer** - It is used to present data to in an accurate, well-defined and standardized format.

- **Application layer -** protocol defines how an application processes (clients and servers) , running on different end systems, pass messages to each other.

Network Devices

- **Repeater**: In digital communication systems, a repeater is a device that receives a digital signal on an electromagnetic or optical transmission medium and regenerates the signal along the next leg of the medium.

- **Hub:** Hubs are commonly used to connect segments of a LAN. A hub contains multiple ports. When a packet arrives at one port, it is copied to the other ports so that all segments of the LAN can see all packets.

Network Devices

- **Switch**: In a telecommunications network, a switch is a device that channels incoming data from any of multiple input ports to the specific output port that will take the data toward its intended destination.

- **Router:** a router is a device or, in some cases, software in a computer, that determines the next network point to which a packet should be forwarded toward its destination.

TCP/IP

- Short for **Transmission Control Protocol/Internet Protocol**, **TCP/IP** is a set of rules (protocols) governing communications among all computers on the Internet. More specifically, TCP/IP dictates how information should be packaged (turned into bundles of information called packets), sent, and received, as well as how to get to its destination.

Segment, datagram, frame

- These terms are used to refer at which OSI layer we are referring to, the data remain same but the headers and trailers are getting added or removed.
- In Physical layer i.e. physical layer the actual data is in "bits" i.e. 0 and 1.
- When it reaches to data link layer or Layer 2 it becomes "frame" with source and destination MAC address getting added.
- When it reaches the third layer or the networking layer it becomes a "packet" with source and destination IP address attached to it.

Segment, datagram, frame

- Finally it become "segment" at Layer 4 or TCP/IP layer. Basically "segment" term is used for TCP connections and "datagrams" for UDP.

Quick Review Question

- Briefly explain OSI model.

Summary of Main Teaching Points

This chapter discussed the core concepts of networking and networking devices such as repeater, hub, switch and router.

This chapter explained the functions of TCP/IP protocol and its associated terminologies like segment, datagram, etc.

Question and Answer Session

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Q & A

What we will cover next

- Wireless LAN Infrastructure Devices
- Access Points (AP)
- Autonomous Access Points
- Lightweight Access Points
- Mesh Access Points
- Wireless LAN Routers
- Wireless Bridges
- Wireless Repeaters
- Wireless LAN Controller/Switch