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SUBJECT: CYBER SECURITY

Assignment

Module -7: Network fundamental

1- Which of the following messages in the DHCP process are broadcasted? (choose two)

A. Request
B. Offer
C. Discover
D. Acknowledge

Ans: A. Request
C. Discover

2- Which command would you use to ensure that an ACL does not block web-based TCP traffic?

A. permit any
B. permit tcp any any eq 80
C. permit tcp any eq 80
D. permit any any eq tcp

Ans: B. permit tcp any any eq 80

3-Explain Network Topologies

Ans: Network topology refers to the physical or logical arrangement of devices (computers, switches, routers) in a network and how data flows between them.

1. Bus Topology

In a bus topology, all devices are connected to a single main cable called the backbone. Data is sent along this cable, and every device on the network receives the signal.

2. Star Topology

In a star topology, each device is connected to a central device, usually a switch or hub. All communication between devices passes through this central point.

3. Ring Topology

In a ring topology, devices are connected in a circular form. Data travels from one device to the next until it reaches its destination.

4. Mesh Topology

In a mesh topology, devices are connected to each other with multiple links. This topology can be full mesh or partial mesh, depending on how many connections each device has.

5. Tree (Hierarchical) Topology

A tree topology uses a hierarchical structure where networks are arranged in levels. It is a combination of star and bus topologies.

6. Hybrid Topology

A hybrid topology is created by combining two or more different topologies into one network design.

4-Explain TCP/IP Networking Model

Ans: The TCP/IP networking model is a four-layer model used to describe how data is transmitted over a network and the Internet. It is the foundation of modern networking.

Layers of TCP/IP Model

1. Application Layer

This layer provides network services to user applications. It allows software applications to communicate over the network.

Examples of protocols:

- ❿ HTTP
- ❿ FTP
- ❿ SMTP

➀ DNS

2. Transport Layer

The transport layer is responsible for end-to-end communication between devices. It ensures data is delivered to the correct application.

Main protocols:

- TCP (Transmission Control Protocol)

- UDP (User Datagram Protocol)

3. Internet Layer

This layer handles logical addressing and routing of data packets across different networks.

Main protocols:

➀ IP (IPv4 / IPv6)

➀ ICMP

➀ ARP

4. Network Access Layer

This layer defines how data is physically transmitted over the network. It includes hardware addressing and media access.

Examples:

➀ Ethernet

➀ Wi-Fi

➀ MAC addressing

5-Explain LAN and WAN Network

Ans: 1. LAN (Local Area Network)

A LAN is a network that covers a small geographical area, such as a home,office, school, or building. Devices in a LAN are connected to share data, resources, and services.

LAN typically uses Ethernet or Wi-Fi technology and is managed by a single organization.

2. WAN (Wide Area Network)

A WAN is a network that covers a large geographical area, such as a city, country, or even the whole world. It connects multiple LANs together over long distances.

WAN uses technologies like leased lines, MPLS, satellite links, or the Internet, and is often managed by service providers (ISPs).

6-Explain Operation of Switch

Ans: A network switch is a Layer 2 device that is used to connect devices within a LAN and forward data efficiently.

How a Switch Works

1. Frame Reception
   When a device sends data, the switch receives it in the form of a frame on one of its ports.

2. MAC Address Learning
   The switch reads the source MAC address of the frame and stores it in the MAC address table along with the incoming port number.

3. Frame Forwarding

   - If the destination MAC address is found in the MAC table, the switch forwards the frame only to the correct port.

   - If the destination MAC address is unknown, the switch floods the frame to all ports except the incoming port.

4. Filtering
   If the source and destination MAC addresses are on the same port, the switch does not forward the frame.

7-Describe the purpose and functions of various network devices

Ans: Network devices are used to connect computers and networks, control data flow, and ensure proper communication.

1. Hub

A hub is a basic networking device that connects multiple computers in a network. It sends incoming data to all connected devices without checking the destination.

2. Switch

A switch connects devices within a LAN and forwards data based on MAC addresses. It sends data only to the intended device.

3. Router

A router connects different networks and forwards data based on IP addresses. It selects the best path for data to reach its destination.

4. Bridge

A bridge is used to connect or divide network segments. It works using MAC addresses to reduce traffic.

5. Modem

A modem converts digital signals to analog and analog to digital. It allows computers to connect to the Internet through an ISP.

6. Access Point (AP)

An access point allows wireless devices to connect to a wired network using Wi-Fi.

7. Firewall

A firewall is a security device that monitors and controls incoming and outgoing traffic based on security rules.

8. Repeater

A repeater regenerates and boosts signals to extend network distance.

8-Make list of the appropriate media, cables, ports, and connectors to connect switches to other

Ans: Media, Cables, Ports, and Connectors Used to Connect Switches to Other Devices

Below is a clear exam-oriented list showing how switches are connected to different devices.

1. Switch to Switch

Switches can be connected using copper or fiber media.
For copper connections, Ethernet cables are used. Modern switches support auto-MDI/MDIX, so straight-through cables work. Older switches may require a crossover cable.
Ports used are Ethernet ports or SFP ports, and connectors are RJ-45 (copper) or LC/SC (fiber).

2. Switch to Router

A switch is connected to a router using copper Ethernet media.
A straight-through Ethernet cable is commonly used.
The connection is made through Ethernet ports with RJ-45 connectors.

3. Switch to PC or Server

PCs and servers connect to switches using copper Ethernet cables.
A straight-through cable is used between the switch port and the NIC port of the PC/server.
RJ-45 connectors are used on both ends.

4. Switch to Access Point

Access points are connected to switches using Ethernet cable.
The cable is usually a straight-through cable, and in many cases, PoE (Power over Ethernet) is used.
Ports are Ethernet ports, and connectors are RJ-45.

5. Switch to ISP or WAN Device

For long-distance connections, fiber optic media is commonly used.
Fiber optic cables connect through SFP ports on the switch.
Fiber connectors are usually LC or SC.

9-Define Network devices and host

Ans: 1. Network Devices

Network devices are hardware components that are used to connect, manage, control, and direct data traffic between different devices or networks.

Examples of network devices include switches, routers, hubs, access points, firewalls, and modems.
They help in forwarding data, selecting paths, and providing network connectivity.

2. Hosts

Hosts are end devices in a network that send or receive data.
They are the source or destination of communication and usually have an IP address.

Examples of hosts include computers, laptops, servers, printers, smartphones, and IP phones.

Simple Difference (One Line)

- Network devices → Connect and control communication

- Hosts → Generate and use data