### Module -7:  ====&Gt; Ccna - Network Fundamentals

1. Which of the following messages in the DHCP process are broadcasted? (Choose two)
2. Request
3. Offer
4. Discover
5. Acknowledge

**Ans.** Discover do process of broadcast message from client and Request process for broadcast messages to ip address offer by server.

1. Which command would you use to ensure that an ACL does not block web-based TCP traffic?
2. permit any
3. permit tcp any any eq 80
4. permit tcp any eq 80
5. permit any any eq tcp

**Ans.** permit tcp any any eq 80

1. Explain Network Topologies

**Ans.** Network Topologies means that arrange the devices in a structure with different elements like nodes, links and devices. It defines how various components of the network connected and shows the data flow between them. Here is some common topologies:

1. Bus Topology: In this all devices are connected to a single center cable.
2. Star Topology: In this all devices are connected to a center device it maybe hub or switch.
3. Ring Topology: It is a circular topology in which all devices are connected to each other in circular form and work as clock wise.
4. Mesh Topology: In this each and all devices are connected to other devices and create to many paths for data.
5. Tree Topology: This topology is seen in hybrid topology in which bus and start topology were been combine. In this the root node of tree is hub or switch, as multiple branches can be connected in it.
6. Hybrid Topology: It is a combination of two or more different types of topologies is know as hybrid topology, also we can say combination of all topologies is also known as hybrid topology.
7. Point-to-Point Topology: It is a direct connection between two devices.
8. Explain TCP/IP Networking Model

**Ans. TCP/Ip** model is more practical and simplified compared to the OSI (Open Systems Interconnection) model, which has seven layers.

The **Transport Layer** **(TCP and UDP)** manages end-to-end communication, while the Internet Layer **(IP)** ensures that packets can travel across diverse networks.

The **Application Layer** provides the necessary protocols for user applications to function over the network.

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1. Explain LAN and WAN Network

**Ans.**

* **LAN (Local Area Network)**

A Local Area Network (LAN) is a network of computers and devices that are connected within a limited area such as a home, office, or campus.

* **WAN (Wide Area Network)**

A Wide Area Network (WAN) is a large network that spans a broad geographical area, such as cities, countries, or even continents. WANs are used to connect multiple LANs or other smaller networks.

1. Explain Operation of Switch

**Ans.** A networking switch (often referred to as a switch) is a device used in computer networks to connect devices (like computers, printers, servers) and facilitate communication between them. A networking switch operates at a much higher level, managing the flow of data between devices on a local area network (LAN).

**Operation of Switch:**

* A networking switch receives data packets from devices connected to its ports.
* The switch maintains a **MAC (Media Access Control)** address table, which is a mapping of each device's unique MAC address to the switch's corresponding port. When the switch receives a packet, it reads the destination **MAC address** in the packet header to determine where the data should be sent.

1. Describe the purpose and functions of various network devices.

**Ans.** Network devices and Hardware components is use to connect and manage the communication within the network.

1. **Route**

* It directs the data packet between different network and select the best path for data.
* It connects multiple networks.
* Provides Network Address Translation (NAT) for IP management.

### ****Switch****

* Connects multiple devices with a single network such as computers, printers, servers and also do communications between them.
* It uses MAC address to forward data to the correct device.
* It supports VLANs for segmentation.

1. **Hub**

* It is also a basic device that connects multiple devices in network, typically in a start topology.
* It broadcasts data packets to all connected devices.
* It is an no intelligence and has largely been replaced by switches in modern networks.

1. **Modem**

* Modem connects a local network to the internet via an Internet Service Provider (ISP).
* Converts digital signals from the network.
* It modulates and demodulates signals for communications over telephone, cable or fiber lines.
* Connects to a router for distributing the internet connections within a network.

1. **Access Point**

* Enables wireless devices to connect to a wired network.
* Provide Wi-Fi Connectivity to wireless networks.
* It supports multiple devices and range within 50-100 meter indoors.

1. **Bridge**

* Connects and segments two or more LANs, often to reduce network traffic.
* Filters and forwards data based on MAC addresses.

1. **Gateway**

* Acts as a translator between different network protocols.
* Connects networks with differing protocols (e.g., IPv4 to IPv6).

1. **Repeater**

* Amplifies and retransmits signals to extend network range.
* Often used in large buildings or wide-area networks (WANs).

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

**Ans.**

**Media Types**

* **Copper (Twisted Pair):**
  + Common for short to medium distances.
  + Typically used in Ethernet networks.
* **Fiber Optic:**
  + Used for longer distances or high-speed requirements.
  + Supports higher bandwidth and is immune to electromagnetic interference (EMI)

**Cables**

**Copper Connections:**

* + **Cat5e Cable:**
    - Suitable for Gigabit Ethernet (up to 1 Gbps) up to 100 meters.
  + **Cat6/Cat6a Cable:**
    - Ideal for 10 Gbps Ethernet up to 55 meters (Cat6) or 100 meters (Cat6a).
  + **Cat7 Cable:**
    - Supports higher speeds and longer distances with better shielding.

**Fiber Optic Connections**:

* **Single-Mode Fiber (SMF)**:
  + For long-distance connections (up to 40 km or more).
* **Multi-Mode Fiber (MMF)**:
  + For short distances (up to 500 meters at 10 Gbps).

**Ports**

* **Copper Ports:**
  + RJ45 Ports:
    - Standard Ethernet ports used for twisted pair cables.

**Connectors**

* **Copper Connections**:
  + **RJ45** Connectors:
    - Commonly used with twisted pair cables.
* **Fiber Optic Connections**:
  + **LC** (Lucent Connector):
    - Compact connector often used in modern networks.
  + **SC** (Subscriber Connector):
    - Larger, older standard.
  + **ST** (Straight Tip):
    - Common in industrial and military applications.

1. Define Network devices and hosts

**Ans.**

**Network Devices:**

* Network devices are hardware components that facilitate the setup, management, and operation of a network.
* They ensure the smooth flow of data by connecting devices and directing traffic between them.
* Here are some network devices with short define:

 **Router:** Directs data between different networks.

** Switch:** Connects multiple devices within the same network.

 **Hub:** Broadcasts data to all connected devices.

 **Access Point (AP):** Provides wireless connectivity to a network

**Hosts:**

* Hosts are end-user devices or systems that communicate within a network.
* They act as the sources or destinations for data and are uniquely identifiable through IP or MAC addresses.
* Here are some host devices with short define:

** Computers:** Desktops, laptops, and servers.

** Mobile Devices**: Smartphones and tablets.

** Printers and Scanners**: Network-enabled peripherals.