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**Assignment Module -7: Term - 2 ====&Gt; CCNA - Network Fundamentals**

**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 and C) Discover

**Explanation:** These messages are broadcasted because they need to know and reach all devices on the network to find the DHCP server (Dynamic Host Control Protocol) in the case of the discover message and to inform the server and probably other devices in the case the Request message that the client intends to use the offered IP address.

**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

**Explanation:** To ensure that an Access Control List (ACL) does not block web-based TCP traffic which typically use pot 80 and this command allows TCP traffic from any source to any destination which is the standard port for HTTP web traffic.

**3. Explain Network Topologies**

**Ans:** Network topology is the arrangement of the various elements like nodes of a computer network. Essentially it is the topological structure of a network and my be depicted physically or logically.

1. **Bus Topology:** All devices are connected to single central cable known as the backbone cable.

**Advantages:** 1- Easy to set up and extend.

2- It requires less cable to other topologies.

**Disadvantages**: 1- if the central cable fails or damage the entire network goes down.

2- this network cannot be used as a stand-alone solution in a large building.

1. **Star Topology**: In this network all devices are connected to a central hub or switch with separated cable. Here the central node or hub acts like the main server and the other nodes which are connected to the central node, act like client devices.

**Advantages:** 1- If one connection fails, it doesn’t affect the rest of the network.

2- Easy to manage and troubleshoot.

**Disadvantages:** 1- Requires more cable than bus topology.

2- if the central hub or switch fails, the entire network goes down.

1. **Ring Topology:** When each device is serially connected in a closed ring pattern with a single cable then the network system is called ring topology.

**Advantages:** 1- the network does not do anything without order. Its need to access the token and the opportunity to transmit.

2- In this network each and every node has equal access to resources.

**Disadvantages:** 1- In this network if any node breaks down then the entire network system stops working.

2- The speed of transferring data is slower than any other topologies just because a packet of data passes through all the nodes sender and receiver node.

1. **Mesh Topology**: In this configuration every single system connected with more than one node at a time.

**Advantages:** 1- Adding or removing nodes in this network could be done easily without interrupting the other nodes and the network.

2- Here the transmission of data is very easy because it transfers data from different nodes simultaneously.

3- In this configuration transfer of data does not get affected by any peripherals because of one node fails there is always an alternative one.

**Disadvantages:** 1- It is very hard to configure the network and also very difficult to maintain.

2- Mesh topology is comparatively expensive when compared with other topologies like star topology.

1. **Tree Topology:** A hybrid topology that combines elements of star and bus topologies. Devices are grouped in star formations connected to a central bus.

**Advantages:** 1- Scalable and easy to manage.

2- if one group fails, others remain unaffected.

**Disadvantages:** 1- if the backbone (bus) fails, it can bring down the entire network.

2- Requires more cabling.

1. **Hybrid Topology:** Hybrid topology is the combination of two or more different network topologies. This network is a mixture of both peer-to-peer and client server network. It can be either wired or wireless network.

**Advantages:** 1- it is flexible in size and scalable

2- it can be tailored to meet specific needs.

**Disadvantages:** 1- It is very hard to configure and complex to design and manages.

2- it is too expensive.

**4. Explain TCP/IP Networking Model.**

**Ans:** The TCP/IP networking model explains how data travels across networks, like the internet. Its made up of four layers:

1. Application Layer: this is where apps like web browsers and email work to creating interface from user to server. Using this application HTTP, FTP, SMTP, DNS.
2. Transport Layer: this layer makes sure data gets from one place to another correctly. It uses TCP for reliable communication and UDP no acknowledgment, no reliable but it fast.
3. Internet layer: This layer handles best route decide through this layer using this protocol IP, ARP, ICMP, IGMP.
4. Network Access Layer: This bottom layer, which deals with the physical connection between devices, like using Ethernet cables or wi-fi to send data.

These layers work together to get data from one computer to another to another, ensuring it arrives in the right place and in the right order.

**5. Explain LAN and WAN Network**

**Ans:** LAN (Local Area Network) and WAN (Wide Area Network) are two types of networks that connect computers and devices, but they differ in scale, purpose and technology.

**LAN:**

**Scope:** Covers a small, localized area like a single building, office, or home.

**Purpose:** Connects devices (like computers, printers, and servers) within a limited area to share resources and information.

**Speed:** Typically high-speed, ranging from 100Mbps to several Gbps.

**Technology:** Uses Ethernet cables, Wi-Fi, or fiber optics. Common equipment includes switches, routers, and access points.

**Example:** The network in your home or office that connects all your devices to each other and to the internet.

**WAN:**

**Scope:** Covers a broad geographic area, such as cities, countries, or even continents.

**Purpose:** Connects multiple LANs together, enabling communication between different locations. Often used by businesses to link offices in different cities or countries.

**Speed:** Generally slower than LANs, but speeds can vary widely depending on the technology used.

**Technology:**  Applied Technologies include leased lines, satellite links, and public internet connections. Standard equipment includes Routers, modems and WAN switches.

**Example:** The internet itself is the largest WAN, connecting millions of LANs globally. Another example is a company’s network that links offices in different cities.

**6. Explain Operation of Switch**

**Ans:** A switch is like a simple on/off button. When you turn it on, it lets electricity flow, and things like lights or machines work. When you turn it off, it stops the electricity, so everything connected to it stops working. There are different types of switches, like the ones you push, flip, or press, but they all do the same job-starting or stopping the flow of electricity.

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

**Ans:** Network devices are hardware components that connect computers and other devices to create a network. They help to manage and control all the communication within the network.

1. Router: Sends data between different networks, like your home and the internet.
2. Switch: Connects devices in the same network and directs data to the right place.
3. Hub: Simple device that connects multiple devices, but it sends data to everyone.
4. Modem: Lets your home connect to the internet by converting signals.
5. Access Point (AP): Allows wireless devices to join a wired traffic.
6. Firewall: Protects your network by blocking unwanted traffic.
7. NIC (Network Interface Card): Lets your device connect to a network, either wired or wireless.
8. Repeater: Boosts the network single to cover longer distances.
9. Bridge: Connects two different network segments and controls traffic between them.
10. Gateway: Acts as a bridge between different networks, like connecting your home network to the internet.

These all the devices are all work together to keep your network running smoothly.

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

**Ans: 1.** **Media:** Twisted Pair Cable (Ethernet) common for most networks.

Fiber Optic Cable is so fast and cover long distance connections.

Coaxial Cable used in older setups.

**2. Cables:** Cat5e/Cat6 Ethernet Cable are standard cables for connecting switches.

Fiber Optic cable also used for high speed and also for long-distance.

Coaxial cable sometimes used in older networks.

**3. Ports:** RJ45 this port usually used for Ethernet cables.

SFP/SFP+ port for fiber or copper connections, depending on the adapter.

QSFP/QSFP+ port for very fast optic connections

**4. Connectors:** RJ45 connector connects use of ethernet cables to RJ45 ports.

LC connector used for fiber optic cables.

SC connector another type of fiber connector.

BNC connector for coaxial cables, but not used much anymore.

**9. Define Network devices and hosts**

**Ans:** **Network devices:** These are physical devices which connect with a computer and other network capable nodes to the shared medium of LAN. They can control, handle and mange the information exchange between them. Some of them have been routers, switches, hubs and access points.

**Hosts:** Devices that are part of a network and utilizing, or in a position to access resources on the network. This could be a computer, smartphone, server or printer it is anything that has an IP address. Hosts are the final devices in a network which communicate with each other.