DATA COMMUNICATIONS

CCA

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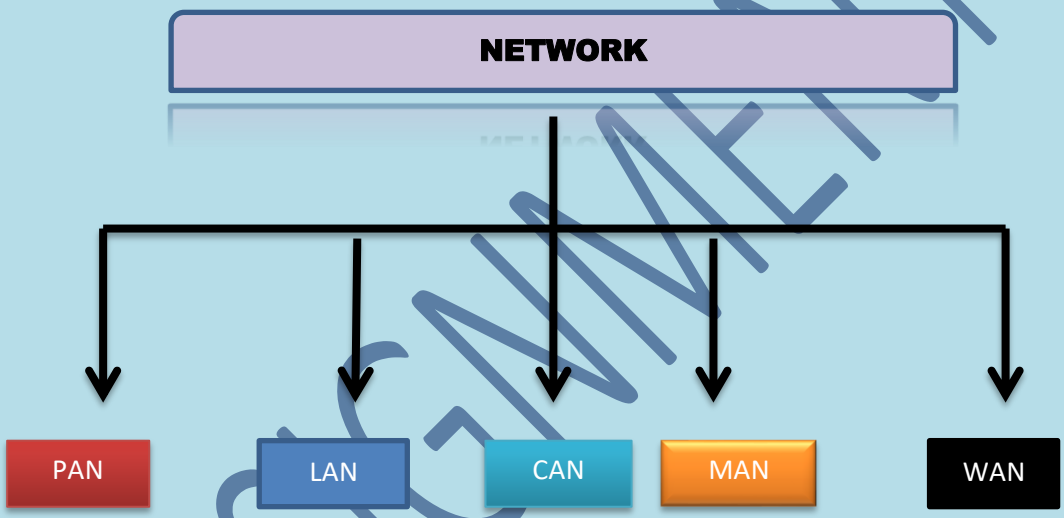
1. What are the different types of networks?

1. **Personal Area Network (PAN)**
2. **Local Area Network (LAN)**
3. **Campus Area Network(CAN)**
4. **Metropolitan Area Network(MAN)**
5. **Wide Area Network(WAN)**



Explain the shielded Twisted pair(STEP) AND Unshielded twisted Pair (UP)

UP:

UP is a type of twisted pair cable. It stands for unshielded twisted pair. Both Data and voice are transmitted through UP because its frequency range is suitable. In UP grounding cable is not necessary also inUTPmuch more maintenance is not needed therefore it is cost-effective.

FEATURES

- COST EFFECTIVE: **UP cables are relatively inexpensive compared to other types of network cables.**
- EASY TO INSTALL:**UTP cables are easy to install and terminate, which makes them a popularchoice for small and medium-sized networks.**
- VULNERABLE TO INTERFERENCE: **UTP cables are vulnerable to interference from nearby sources of electromagnetic radiation, such as power lines, motors and other electrical equipment. This can cause signal degradation and data loss.**
- LIMITED DISTANCE: **UT cables have a limited distance over which they can reliably transmit data, typically up to 100 meters.**

STEP is also the type of twisted pair which stands for shielded twisted pair. In STEP grounding cable is required but in Upgrading cable is not required. In shielded Twisted pair (STEP)much more maintenance is needed therefore it is costlier than unshielded twisted pair (UP).

FEATURES

- ENHANCED PROTECTION: **STEP cables are shielded with a layer of metal foil or braided copper mesh, which provides additional protection against electromagnetic interference.**
- BETTER PERFORMANCE: **STEP cables can transmit data over longer distance and at higher**
- MORE COMPLEX TO INSTALL: **STEP cables are more complex to install and terminate than UP cables, which can increase installation cost and require specialized skill.**
- MORE EXPENSIVE: **STEP cables are more expensive than UP cables due to the additional shielding and manufacturing costs involved.**

2. What is difference between baseband and broadband transmission?

BASEBAND TRANSMISSION

The information single is sent directly over the channel without modification. Baseband systems use digital signaling to send a single

digital signal over the entire bandwidth of the transmission medium. Baseband systems are generally less bandwidth than broadband systems.

BROADBAND TRANSMISSION

The information signal is modified by superimposing it on a high-frequency signal, called the carrier. Broadband transmission is commonly used for applications that needed to send multiple data types simultaneously, such as voice, video, and data.

3. What is the difference between a hub, modem, router and a switch?

HUB:

A HUB is just a connector that connects the wires coming from different sides. There is no signal processing or regeneration. It is an electronic device that operates only on physical layers of the OSIER model.

It is also known as a repeater as it transmits signal to every port except the port from where signal is received. Also, hubs are not that intelligent in communication and processing information for 2 ND and 3 rd. layer.

SWITCH

Switch is appoint to point communication device. It operates at the data link layer of OSLO model. It uses switching table to find out the correct destination.

Basically, it is a bridge that provides better connections. It is a kind of device that set up and stop the connections according to the requirements needed at that time. It comes up with many features such as fooling, filtering and frame transmission.

ROUTER

Routers are the multiport devices and more sophisticated as compared to repeaters and bridges. It contains a routing tables that enables it to make decision about the rout i.e. To determine which of several possible paths between the source and destination is the best for a particular transmission. It works on the network layer 3 and used in LANs, MANs and WANs. It stores Padres and maintains address on its own.

HUB	SWITCH	ROUTER
Hub is physical layer device i.e layer1.	Switch is a data link layer i.e layer2	Reuther is network layer device i.e. layer3
A hub work on the basis of broadcasting.	Switch works on the basis of MAC address.	A router on the basis of imp address.
A hub is a multiport repeater	A switch is a	A router the header of
In which a signal introduced at the input of any port appears at the output of the all available ports.	Telecommunication device which receives a message which receives a message from any device connected to it and then transits the message only to the device for which the message is intended.	Incoming packet and forward it to the port for which it is intended there by determines the route. It can also perform filtering and encapsulation.
HUB is not an intelligent device that many include amplifier on repeater.	A switch is an intelligent Device as it passes on the message to the selective device by inspecting the address.	A route is more sophisticated and intelligent devices as it can read IP address and direct the packets to anther network with specified IP address. Moreover routers can built address tables that helps in routing decisions.
At least single network is required to connect.	At least single network is required to connect.	Router needs at least two networks to connect.

HUB is cheaper as compared to switch and router.	Switch is an expensive device than hub.	Router is a relatively much more expensive device than hub and switch.
Speed of original hub 10Mbps and modern internet hub is 100Mbps.	Maximum speed is 10Mbps to 100Mbps.	Maximum speed for wireless is 1-10 Mbps and maximum speed for wired connection is100Mbps.
HUB is used in LANs.	Switch is used in LANs.	Routers are used in LANs MANs and WANs.

5.when you move the NIC cards from one PC, does theMACaddress gets transferred as well?

Yes, a MAC address is transferred when a network interface controller (NIC) card is moved from onePC to another.

EXPLANATION:

A MAC address is a unique is a unique 12-digit hexadecimal number that identifies a device connected to a network. It is attached to the NIC , which is the network adapter that allows a device to connect to a network. When a NIC card is moved, the MACaddress associated with it is also transferred.

MAC ADDRESS CHARACTERISTICS:

MAC address are assigned by the hardware manufacturer and never change. They're only used on the local network, while IP addresses are assigned by the network admin or ISP and identify network devices globally.

MULTIPLE MAC ADDRESSES

A device can have more than one MAC address. For example, a laptop with both an Ethernet cable port and built-in –Wi-Fi will have two MAC addresses.

When troubleshooting computer network problem, what common hardware- related problems can occur?

- HARDWARE LOAD AND UNAVAILABILITY**: These issues are often caused by device misconfigurations.**
- TEMPERATURE INCREASE**: An abrupt increase in temperature can cause hardware problems.**
- POOR BATTERY: **poor battery can cause hardware problems.**
- CABLE PROBLEM**: Damaged cables can cause connection failures.**
- CONFIGURATION ERROR**s: These can occur when transferring or applying an old configuration to new hardware.**
- SERVER HARDWARE FAILURE: **Faults in the hardware components can result in system crashes.**

7.In a network that contains two severs and twenty workstations, Where is the best place to install an Anti- virus program?

THE SEVER

In a network that contains two servers and twenty workstations, the best place to install an Anti-virus is on the server. This is because the server is the main port for all the network traffic, and so it is more important to ensure that server is free of and virus other security risks.

8 Define static Ip and Dynamic Ip? Discuss the difference between IPV4 and Ipv6.

STATIC IP ADDRESSES

The addresses are manually configured and remain the same untill the device is decommissioned or the network architecture changes. They are typically used for servers, routers, and punters, and are often more expensive.

DYNAMIC IP ADDRESSES

These addresses are temporarily assigned to a device by an internet service provider (ISP) using the Dynamic IP addresses provide a level of anonymity and

Security because it's more difficult to track a specific device or user. Most devices use dynamic IP addresses.

IPV4 and IPV6 are two versions of the internet protocol. The main differences between IPV4 and IPV6 are:

- ADDRESS SPACE: **IPV4 uses a 32-bit address space, While IPV6 uses a 128-bit address space.**
- ADDRESS REPRESENTATION: **IPV4 addresses are represented in decimal notation, While IPV6 addresses are represented in hexadecimal notation.**
- SPEED: **IPV6 has the potential to be faster than IPV4 due to features like larger packet sizes and more efficient packet forwarding.**

9 Discuss TCP/ IP model in detail.

The TCP/ IP Mosel is a fundamental framework for computer networking. It stands for Transmission
Control protocol (TCP)/ internet protocol (IP), which are the core protocols of the internet.
This model defines how data is transmitted over networks, ensuring reliable communication between devices. It consists of four layer, the link layer, the internet layer, the transport layer, and the application layer. Each layer has functions that help manage different aspects of network communication, making it essential for understanding and working with modern networks' TCP/IP was designed and developed by the Department of Defense (DOD) in the 1960 sand is based ion standard protocols. The TCP/ IP model is a concise version of the OSI model. It contains four layers, unlike the seven Layers in the OSI model. In this article, We are going to discuss the TCP/IP model in detail.

TCP/IP model was developed alongside the creation of the ARPANET, which later because the foundation of the modern internet. It was designed with a focus on the partial aspects of networking at the time. The lower- level hardware details and physical transmission medium were largely abstracted away in favor of higher- level networking protocols.

10 what is a Web browser (Browser)? Give some example of Browsers.

A web browser is a software applications that allows users to access and view websites on the internet. It displays websites on the user's device and allows them to interact with the contact by clicking on links or entering text.
Here are some examples of web browsers:

GOOGLE CHROME

Popular browser that can be used for Web development, HTMLediting, and more.

MOZILLA FIREFOX

An open-source browser that is popular among web developers due to its support for web standards

APPLE SAFARI

A browser that is built into several of apple's operating systems, including MACOS, IOS, and IPADOS

MICROSOFT EDGE

A browser built on the chromium engine, the same technology that powers chrome

VIVALDI

A browser with a user- friendly interface that offers a speed dial and a top button for quick navigation

BRAVE

An open- source browser that automatically blocks intrusive ads trackers.

11 What is a search engine? Give examples.

A search engine is a software programs that helps people find information's on the internet using keyword or phrases. When a user enters a search engine uses algorithms to produce a list of sites, with the most relevant websites at the top.

Here is some example of search engines:

Google, Bing, Yahoo, DuckdcapGo , Badu, Board reader, Brave search, creative commons search,

Eloisa and Koru cap

Search engine Work by:

- **Scanning the internet: Search engines use automated software applications called robots, bots,or spiders to travel the web following links forms page to page.**
- **Indexing: The spiders gather information and create a searchable index of the Web.**
- **Ranking: Search engines rank content based on factors like query meaning, relevance , quality, usability, and user data.**

12 What is the Internet& WWW? What are uses of internet in Our Daily life?

INTERNET:

The full form of internet is an interconnected network. The interconnected network is basically a combination of various computer nodes along with a mobile, computer, and various servers that are engaged together to complete a successful data- transmission. The internet was conceived by the Advanced research projects Agency (ARPAD) of protocols. Government in 1969. Internet is global network

K that connects billions of computers across the world with each other and to the Worldwide Web.

WWW:

WWW stands for World Wide Web, Which is a collection of public web pages that are accessible over the internet. It's a hypertext- based system that allows users to access information by clicking on words in a document that link to other documents with more information. The World Wide Web is one of many applications built on top of internet, but the two are not the same things. The internet is global network of connected computers, but the two are not the same things. The while the world wide web is the collection of web pages found on that network.

The world wide web was inverted by British scientist Tim Berners-Lee in 1989. It was originally developed to allow scientists to share information with each other. The first website was hosted on Berners- lee's NEXT at CERN.

some computers of the world wide web include:

- **Hypertext Markup Language (HTLM): A text- based way of describing how content is structured in an HTML file**
- **HTTP protocol: Governs how data is transferred between a server and a client**
- **URL(Uniform resources locator) or URI(Uniform Resource Identifier): A unique identifier that a client uses to access a web component**

13 What is an internet service Provider? Give some example of ISP in India.

An internet service provider (ISP) is any company that provider that internet access to consumers and businesses. The Internet is provider though a variety of channels. Including cables, DSL, fiber optics , dial-up, and wireless, with most ISPs offering all options.

JIO

As of January 2023, join was the top ISP in India by number of subscribers

AORTAL

As of January 2023, Airtel was the second- ranked ISP in india by number of subscribers

VI

As of January 2023, vi was the third-ranked ISP in India by number of subscribers

BSNL

As of January 2023, BSNLwas the fourth- ranked ISP in India by number of subscribers

14.Discuss the difference between MAC address, IP address and port address.

The main difference between MAC addresses is there purpose and hoe they are used:

MAC ADDRESS

A device's physical address that's used for local communication within a network, MAC addresses are usually fixed and assigned by the device's manufacturer.

IP address A device's logical address that's used communication within a network. IP addresses are used for routing and transmission of data packets over the internet. IP addresses can change when a device connects to a different network.

PORT ADDRESS

A number that completes the destinations or original address of a message. Specific port numbers are reserved for specific services.

Here are some other differences between MAC address and IP addresses:

HOW THEY ARE ASSIGNED

MAC addresses are integrated into the device's network interface card (NIC). IP addresses are supplied by the network administrator, DHCP(Dynamic Host Configuration Protocol), or the ISP (internet Service Provider).

How they are used

MAC addresses are used for local communication within a network. IP addresses are used for routing and transmission of data packets over the internet.

How they are visible

A third party can find out a device's MAC address, but the address stays hidden from display.

15 How do we view my internet browser's history?

History

1. **On your computer, open chrome.**
2. **In the address bar, enter history.**
3. **Press tab or space. You can also click search history. In the suggestions.**
4. **Enter keywords for the page you previously visited.**
5. **Select the page from the list.**