

1.what is hub?

Active Hub (or Hub with Repeater): These hubs regenerate and amplify the incoming electrical signals before broadcasting them to all connected devices. Active hubs can extend the reach of the network by overcoming signal degradation in long cables.

2.How does a hub handle collisions?

Hubs lack intelligence and broadcast data to all connected devices. Collisions occur when multiple devices try to transmit simultaneously. Hubs don't manage collisions; they simply amplify and broadcast signals.

3.What is the purpose of a switch's MAC address table?

A switch's MAC address table stores the mapping between MAC addresses and the corresponding switch ports. This allows the switch to intelligently forward frames only to the port where the destination device is located.

4.What is the role of a router in a network?

A router connects different networks, directing data between them based on IP addresses. It operates at Layer 3 (Network Layer) of the OSI model, making decisions about the optimal path for data to travel.

5.Differentiate between a router and a switch?

A router operates at Layer 3 and connects different networks, making decisions based on IP addresses. A switch operates at Layer 2 and connects devices within the same network using MAC addresses.

6.Explain the concept of routing in networking?

Routing involves determining the best path for data to travel between different networks. Routers use routing tables and protocols to make these decisions, ensuring efficient data transmission.

7.Explain the purpose of the OSI model?

The OSI model is a conceptual framework that standardizes the functions of a telecommunication or computing system into seven abstraction layers. It helps in understanding and designing network architectures.

8.What is the difference between a hub and a repeater?

A hub operates at Layer 1 (Physical Layer) and blindly broadcasts signals to all connected devices. A repeater amplifies signals but doesn't differentiate between devices.

9.Explain the role of a default gateway in networking?

A default gateway is the router a device uses to access networks outside its own. It serves as the exit point for traffic that doesn't have a specific route in the local network.

10.What is the purpose of an IP address in networking?

An IP address uniquely identifies a device on a network, allowing for proper addressing and routing of data packets.

11.Explain the difference between IPv4 and IPv6?

IPv4 uses 32-bit addresses, limiting the available unique addresses. IPv6, with 128-bit addresses, provides a vastly expanded address space to accommodate the growing number of devices on the internet.

12.Define the terms "network address" and "host address"?

The network address identifies the network portion of an IP address, while the host address identifies the specific device within that network.

13.How do you access the command-line interface (CLI) of a router?

Access the router's CLI through a terminal emulator, typically using protocols like Telnet or SSH.

14.Define Variable Length Subnet Masking (VLSM)?

VLSM allows the allocation of subnets with varying sizes, optimizing address space and reducing waste.

15.Explain the advantages of using VLSM in IP addressing?

VLSM enables efficient use of IP addresses by allowing subnetting with variable lengths, minimizing address space exhaustion.

16.What is a supernet, and how does it relate to VLSM?

A supernet is a combination of multiple smaller subnets into a larger one. VLSM facilitates the creation of supernets.

17. Define Fixed Length Subnet Masking (FLSM)?

FLSM uses a fixed subnet mask for all subnets within a network, which may lead to inefficient use of IP addresses.

18. What is the difference between VLSM and FLSM?

VLSM allows variable-sized subnets, optimizing address space. FLSM uses a fixed subnet size throughout the network.

19. Explain the difference between public and private IP addresses?

Public IP addresses are routable on the internet, while private IP addresses are used within private networks and are not globally reachable.

20. What is a Star Topology?

In a Star Topology, devices are connected to a central hub or switch, enhancing reliability and simplifying troubleshooting.

21. What are the advantages of using a Star Topology in a network?

Easy to manage, scalable, and if one link fails, it doesn't affect the entire network.

22. Define Mesh Topology and its types (Full Mesh vs. Partial Mesh)?

Mesh Topology involves every device connected to every other device. Full Mesh has all connections, while Partial Mesh has only some.

23. What is the primary advantage of a Mesh Topology when it comes to redundancy and fault tolerance?

High redundancy and fault tolerance since multiple paths are available for data transmission.

24. What is a Bus Topology, and how does it work?

In a Bus Topology, devices are connected to a single central cable, and data is transmitted along the cable.

25. What is the significance of terminators in a Bus Topology?

Terminators prevent signal reflections in a Bus Topology, ensuring smooth data transmission.

26. Discuss how collisions are handled in a Bus Topology?

Collisions are common in Bus Topology; they're handled using protocols like CSMA/CD, which detects collisions and initiates retransmission.

27. Define Hybrid Topology?

A Hybrid Topology combines two or more different types of topologies, providing the benefits of each.

28. Explain the management and troubleshooting aspects of a Hybrid Topology?

Managing a Hybrid Topology involves understanding and maintaining the different components of each topology present. Troubleshooting may require specific knowledge of the combined topologies.

29. What is classful routing?

Classful routing uses fixed-length subnet masks and doesn't consider subnetting within a network.

30. What are the default subnet masks for Class A, Class B, and Class C networks?

Class A: 255.0.0.0, Class B: 255.255.0.0, Class C: 255.255.255.0.

30. What is the purpose of the default route in classful routing?

The default route serves as a catch-all for packets with no specific route in the routing table.

31. What is classless routing?

Classless routing allows for variable-length subnet masks, accommodating subnetting within a network.

32. Describe the advantages and disadvantages of classless routing?

Advantages include efficient use of IP addresses; disadvantages include increased complexity.

33. How do you configure static routing on a router?

In static routing, manually enter routing information into the router's configuration.

34.What is the purpose of using VLSM in the context of routing?

VLSM allows routers to use subnets of varying sizes, optimizing routing table efficiency.

35.Explain the process of implementing Static Routing using VLSM?

Configure static routes with subnet information, allowing the router to route data based on varying subnet sizes.

36.What is RIP (Routing Information Protocol)?

RIP is a dynamic routing protocol that uses distance vector algorithms to determine the best path for data.

37.What are the advantages of using VLSM in RIP?

VLSM enables more efficient use of IP address space within the RIP routing domain.

38.What is FTP, and what is its primary purpose? Explain the difference between FTP and FTPS?

FTP (File Transfer Protocol) is used to transfer files between computers on a network. FTPS (FTP Secure) adds a layer of security through encryption, unlike standard FTP.

39.What are the default ports for FTP and FTPS?

FTP uses ports 20 (data) and 21 (control). FTPS typically uses port 990.

40.Define HTTP and its role in web communication. Differentiate between HTTP and HTTPS?

HTTP (Hypertext Transfer Protocol) is used for transmitting web pages. HTTPS (Hypertext Transfer Protocol Secure) adds a layer of security through encryption, ensuring secure data transmission.

41.What are the essential components involved in setting up an email server?

Components include Mail Transfer Agent (MTA), Mail Delivery Agent (MDA), and Mail User Agent (MUA).

42.Explain the difference between POP3 and IMAP protocols?

POP3 (Post Office Protocol) downloads emails to the client, removing them from the server. IMAP (Internet Message Access Protocol) allows emails to be stored on the server and

synchronized with multiple devices.

43.Explain the purpose of DNS (Domain Name System)?

DNS translates domain names into IP addresses, facilitating human-readable web addresses.

44.What is the significance of the TTL (Time to Live) value in DNS records?

TTL specifies how long a DNS record is considered valid and helps in efficient caching and record updates.

45.What is DHCP (Dynamic Host Configuration Protocol), and why is it important in a network?

DHCP automatically assigns IP addresses to devices in a network, simplifying network management and reducing the risk of address conflicts.

46.How does DHCP support IPv6 addressing?

DHCPv6 is used to allocate IPv6 addresses and other configuration information to devices in an IPv6 network.

47.Describe the components of a LAN (Local Area Network)?

Components include computers, switches, routers, cables, and other devices connected within a limited geographical area.

48.What is the purpose of firewalls in a LAN?

Firewalls control and monitor incoming and outgoing network traffic, protecting the LAN from unauthorized access and potential threats.

49.What is the use of IPv6?

IPv6 provides an expanded address space to accommodate the growing number of devices on the internet, overcoming the limitations of IPv4.

50.What is the significance of the EUI-64 process in SLAAC?

EUI-64 is used in Stateless Address Autoconfiguration (SLAAC) to derive an IPv6 interface identifier based on a device's MAC address.

51.What is Neighbor Discovery in IPv6, and how does it replace functions performed by ARP in IPv4?

Neighbor Discovery in IPv6 replaces ARP in IPv4 and performs tasks such as address resolution, router discovery, and neighbor reachability detection.

52. Define static routing in the context of IPv6. How does it differ from dynamic routing?

Static routing in IPv6 involves manually configuring routes. Dynamic routing protocols automatically adapt to changes in the network topology.

53. What is next hop address, and how does a router determine the next-hop address in a static route for IPv6?

The next-hop address is the IP address of the next router in the path. In a static route for IPv6, it is manually configured.

54. What are dynamic routing protocols, and why are they essential in IPv6 networks?

Dynamic routing protocols automatically exchange routing information between routers, adapting to changes in the network topology. They enhance scalability and flexibility in IPv6 networks.