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## MCSE Interview Questions and Answers

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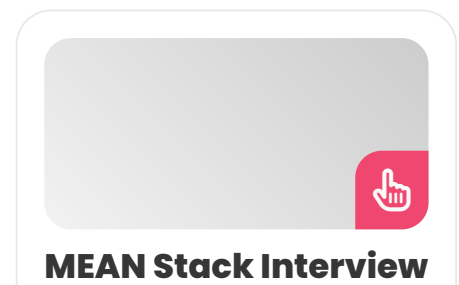


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## 1. Define IP Address

An IP (Internet Protocol) address is a unique address that is used by some electric devices for identifying and communicating with each other on a computer network.

It is assigned to a device of the network as a logical address and the current version of the IP address is IPv6. IP Address is a 128-bit address but it is not largely implemented.

IPv4 is the popular version of IP address that is a 32-bit address. An example of an IP address is 61.12.124.160. Internet Assigned Numbers Authority (IANA) is managing and creates IP addresses and it allocates super-blocks to Regional Internet Registries who then allocate smaller blocks to Internet Service Providers (ISPs) and enterprises.

## 2. Explain about Subnet Mask

A mask is used to define what subnet an IP address is related to and an IP address has two components namely the network address and the host address.

For instance, If the IP address 150.215.017.001 means, this is part of a Class B network, the first two numbers represent the Class B network address and the second two numbers denote the host on this network.

Class B Network

150.215 – Network Address

017.001 – Host Address

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### **3. Define ARP**

ARP is the short form of Address Resolution Protocol that is a network protocol that maps a network layer protocol address to a data link layer hardware address.

For instance, ARP is used to resolve IP Addresses to the related Ethernet Address.

### **4. In which OSI layer does ARP relate?**

ARP is related to the OSI Data Link Layer (Layer 2) and the ARP is implemented by the network protocol driver. Ethernet headers and transmitted encapsulate ARP packets.

### **5. Explain the usage of ARP**

A host in an Ethernet network can interact with another host by knowing the Ethernet Address (MAC Address) of that host.

The higher-level protocols like IP utilize various kinds of addressing schemes like IP Address from the lower-level hardware addressing scheme like MAC Address.

ARP is used to obtain the Ethernet address of a host from its IP Address and the ARP is used extensively by all the hosts in an Ethernet Network.

### **6. Why is an IP Address to be mapped with a MAC address?**

The length of a MAC address is 6 bytes whereas the length of an IP address is 4 bytes. An IP address should be mapped with the corresponding MAC address as the MAC address can't represent using an IP address.

### **7. How ARP is used in various networks like Ethernet?**

ARP is used in any type of broadcast network as it is a general protocol. The fields of ARP packets denote the type of the MAC address and the type of the

protocol address. It is used with most IEEE 802.x LAN Media. It is also used with FDDI, Fast Ethernet, Token Ring, etc in the same way as Ethernet.

## **8. Can ARP resolve an IP address to an Ethernet MAC address?**

Yes, when ARP requires to resolve a given IP address to an Ethernet address, it broadcasts an ARP request packet.

The ARP request packet consists of the source MAC address and the source IP address and the destination IP address.

Every host in the local network receives the ARP request packet and the host with the particular destination IP address sends an ARP reply packet to the originating host with its IP Address.

## **9. Define ARP Cache**

ARP cache is a memory of a table that maintains the mapping between a MAC address and an IP address. The entries in this table will be added or removed dynamically.

## **10. Which RFC denotes the requirement for ARP?**

The ARP packet format and other details will be specified by RFC 826.

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## **11. How can an IP address be represented in CIDR notation?**

IN CIDR notation, an IP address will be represented as A.B.C.D/n, where 'n' is known as the IP prefix or network prefix.

The IP prefix denotes the number of important bits used to denote a network.

For instance, 192.9.205.22/18 is the IP address, the

first 18 bits are used to denote the network and the remaining 14 bits are used to denote the hosts.

## **12. Explain the benefits of CIDR**

The major advantages of CIDR for IP addressing are,

- CIDR will be used to manage the available IP addressing space effectively
- CIDR is used to reduce the number of routing table entities.

## **13. How will be the two systems of an Ethernet network communicate?**

In an Ethernet network, a system broadcasts the data using Ethernet Frame. The destination system will be denoted in the Ethernet frame using its Ethernet address.

The Ethernet frame is listened to by all the systems of the network using the specified Ethernet Address.

Once the system receives an Ethernet frame with its Ethernet Address in it, it will start processing the frame and sends it to the higher layers like IP for further processing.

## **14. Define Collision**

In any instance, in an Ethernet network, only one system can transmit. If two systems transmit at the same instance, then the signals from both devices will collide and a 'collision' will occur.

When it occurs, the signals will get distorted and the frame will be failed. In an Ethernet network, collisions are very common.

## **15. How Ethernet network handles collision?**

Ethernet network uses the CSMA/CD that represents Carrier Sense Multiple Access with Collision Detection which is the media access control mechanism to detect and recover from a collision.

## **16. Define APIPA**

APIPA is the acronym for Automatic Private IP Addressing. When the user configures his computer to obtain the IP address automatically and if a DHCP server can't be connected, then the computer will assign an IP address from a specific range from 169.254.0.1 to 169.254.255.254 automatically.

Then this network will be separated from all networks as it has no default gateway and any other configuration parameters for it.

## **17. Explain the usage of Gratuitous ARP**

Gratuitous ARP is used in a properly configured network, there can't be an ARP reply for a gratuitous ARP request.

If another host in the network is configured with the same IP address as the source host, then the source host will receive an ARP reply.

A host can validate whether another host is also configured with its IP address in this way.

The MAC address to its IP address mapping is changed when the network interface card in a system is changed. It will send an ARP request packet for its IP address when the host is rebooted with this case.

All the hosts in the network will receive and process this packet at this broadcast packet and they will update the old mapping in the ARP cache with the new and updated mapping.

## **18. Explain the usage of the Proxy ARP**

Routers will respond with an ARP reply packet with their MAC address when routers receive ARP requests from one network for hosts on the network.

For instance, if host A is in one network, host B is in another network, and router C connects the two networks.

The router C receives the packet when host A sends an ARP request to resolve the IP address of host B. Host A sends all the packets defined for Host B to router C as router C sends an ARP reply with its MAC address.

Router C forwards the packets to Host B. Proxy ARP is used if a host in a network can't understand subnet addressing.

If host A and host B will be in two different subnets, then host A can't understand subnet addressing.

Then Host A will assume that host B is present in the same network. Proxy ARP to route packets between host A and host B in this manner to host C.

## **19. Differentiate Classful IP and Classless IP addressing**

The main difference between classful IP and classless IP addressing is in selecting the number of bits used for the network ID portion of an IP address.

In Classful IP addressing, the network portion will take only the predefined number of bits 8, 16, or 24. In Classless addressing, any number of bits will be assigned to the network ID.

## **20. How to assign a network ID to a CIDR IP address?**

The first 'n' bits of an IP address is assigned to determine the network and the remaining bits will be used to identify the host where the value of 'n' will be between 1 to 31 in CIDR IP addressing. The value of 'n' depends on the number of hosts in the network.

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## **21. What are the steps involved in CSMA/CD to recover from a collision?**

CSMA/CD is a media access control mechanism

used in Ethernet to avoid frame solutions. It contains the following steps to recover from a collision.

- **Step 1:** CSMA/CD listens to detect if another device is already transmitting a frame (carrier sense) before an ethernet device sends a frame on the Ethernet cable.
- **Step 2:** It will start transmitting the frame once the device detects other devices are not transmitting any frame. If two systems find the Ethernet cable is free at the same time, then both will start transmitting the frame and this will result in a collision.
- **Step 3:** Ethernet listens for the collision as well as transmits the frames. (Collision detect)
- **Step 4:** Both the devices stop transmitting the frames if they detect a collision (back off step)
- **Step 5:** They will retry transmitting the frames after a logarithmic time-out period. This process will be repeated till the frame is transmitted successfully and for a maximum of 16 times and it will be discarded after the 16th retry.

## **22. Explain about late collision**

An Ethernet device will find a collision while it is transmitting only if the collision arrives before it completes sending the entire frame.

After it is completed transmit the entire frame if the collision arrives at the transmitter. Then it will assume the collision occurred as some other frame and it is called 'late collision'.

If the length of the Ethernet network segment is greater than the standard allowed length, then a late collision will occur.

## **23. How to avoid 'late collision' in Ethernet?**

If the maximum length of the Ethernet network segment is restricted, then a late collision can be avoided. If a collision occurs, it will arrive at the



transmitter before it is completed transmitting the entire frame.

The minimum length of an Ethernet frame is 576 bits (72 bytes) and the maximum length of a single Ethernet network segment is 2.5 km in a typical 10mbps network.

## **24. Explain the limitations of IPv4 address classes**

The limitations of IPv4 address classes are that a large number of IP addresses are wasted as using IP address classes and the routing tables will become large.

A separate routing table entry is required for every network resulting in a large number of routing table entries.

## **25. Define RFC**

RFC stands for Request for Comments that a series of notes about the Internet that started in 1969 (when the internet was the ARPANET).

The Internet document will be submitted to the IETF by anyone but the IETF determines if the document becomes an RFC.

If it gains enough interest, it may evolve into an Internet standard. Every RFC is designated by an RFC number. An RFC will be never changed once it is published. Updates to an original RFC will be assigned a new RFC number.

## **26. Explain RFC 1918**

RFC 1918 that is published in 1996 defines the reservation of a Private IP address. Private networks will be segmented of IP address space reserved by IANA for use within an organization. They will be assigned by anyone without being assigned officially by a registry or an ISP.

The most popular blocks of RFC 1918 addresses are

192.168/16, 10/8, and 172.16/12. They are 10.0.0.0 – 10.255.255.255, 172.16.0.0 to 172.31.255.255, and 192.168.0.0 to 192.168.255.255. These addresses in the blocks are known as “private IP addresses” in the internet vernacular.

## **27. Explain subnet**

A subnet is a part of a network that is logically separated from other parts of the network and is usually divided by a router.

## **28. Explain default gateway**

A gateway is a device on a network that serves as an entrance to another network and in technical terms it says like, a gateway is a routing device that knows to pass traffic between different subnets and networks.

The computer system will know some routes but not the routes to every address on the internet. A gateway will not have the message either, but it will at least know the addresses of other gateways it can handle the traffic.

The default gateway is on the same subnet as your computer and it is the gateway the system relies on when it doesn't know how to route traffic. If the user doesn't have a gateway the network communication will have no issue.

## **29. Can a workstation be configured to browse the internet without a default gateway?**

No, the workstation computer system can browse the internet only if it has a default gateway.

## **30. Define Gratuitous ARP**

Gratuitous ARP is the thing that a host sends an ARP request to resolve its own IP address.

The source IP address and destination IP address are filled with the same source IP address in the ARP request packet. The destination MAC address is the

Ethernet broadcast address (FF:FF:FF:FF:FF: FF).

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### **31. Define Proxy ARP**

Proxy ARP is the process that which one system responds to the ARP request for another device. For instance, host A sends an ARP request to resolve the IP address of host B. Instead of Host B, the ARP request will be responded to by Host C.

### **32. Why does the hardware MAC address lie in both the Ethernet header and the ARP packet?**

The Ethernet header is presented by the data link driver and deleted from the packet. It requires knowing the hardware and protocol addresses to update the table when the ARP layer gets the packet. This is why the hardware MAC address lies in both the ARP packet and the Ethernet header.

### **33. What is the size of an ARP request and reply packet?**

The size of an ARP request and reply packet is 28 bytes.

### **34. In an ARP cache, when an entry will be removed?**

An entry in an ARP cache is deleted after a pre-determined timeout period (20 minutes).

### **35. When an entry will be added to the ARP cache?**

A new entry will be added to the ARP cache once an IP address is successfully mapped to a MAC address. These entries are dynamically added to the ARP cache and the static entries will also be added if it is necessary.

### **36. What will be the result if an ARP reply is not received for an ARP request?**

If an ARP reply is not received, then that IP address will not be resolved to an Ethernet address, and without an Ethernet address, the packets will not be transmitted.

### **37. How to know the IP address of a machine if a host is not able to get the MAC address of a host?**

A host will either use a static file like hosts or DNS protocol to gain the IP address of another host.

### **38. What will be the issue if host A updates its ARP cache on receiving any ARP request?**

If host A updates the ARP cache for any ARP request, the host will exhaust the ARP cache with a lot of unused ARP entries.

### **39. What will be the change in host A if it receives an ARP reply packet?**

The ARP reply packet is accepted by the host that transmitted the ARP request packet. The ARP module will add the Ethernet hardware address to the IP address where mapping is present in the ARP reply packet to the ARP cache.

### **40. What will happen if a host receives an ARP request packet?**

The ARP request is accepted and processed by all the hosts of the network when it starts a broadcasting packet. The following steps will be involved when an ARP request packet is received by a host.

- The ARP module sends an ARP reply packet with its Ethernet MAC address if the address is to be solved for its host
- The ARP module updates its ARP cache with the source Ethernet MAC address to the source IP address mapping present in the ARP request packet if the IP address is to be resolved for the host. It will be overwritten if the entry is already present in the ARP cache otherwise it will be

added to the ARP cache.

- The ARP module discards the ARP request packet if the IP address to be resolved is not for this host.

## Conclusion

We have prepared here the popular “**MCSE Interview Questions and Answers**” that provide you quick recap of the in-depth knowledge that you have gained through the MCSE Course in Chennai.

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