

Review Questions

1. Which part of a MAC address is unique to each manufacturer?
 - a. The network identifier
 - b. The OUI
 - c. The device identifier
 - d. The physical address

Answer: b. The OUI

Explanation: The first 24 bits of a MAC (Media Access Control) address are known as the **OUI (Organizationally Unique Identifier)**, which identifies the NIC's manufacturer. The last 24 bits make up the extension identifier or device ID and identify the device itself. The entire MAC address is also called a physical address. The first part of an IP address identifies the network.

2. What type of device does a computer turn to when attempting to connect with a host with a known IP address on another network?
 - a. Default gateway
 - b. DNS server
 - c. Root server
 - d. DHCP server

Answer: a. Default gateway

Explanation: The **default gateway** is the routing device that nodes on the network turn to for access to the outside world. A DNS (Domain Name Service) server helps to find the IP address when that information is not known. A root server is a type of DNS server. A DHCP (Dynamic Host Configuration Protocol) server manages the dynamic distribution of IP addresses to devices on a network.

3. What decimal number corresponds to the binary number 11111111?
 - a. 255
 - b. 256
 - c. 127
 - d. 11,111,111

Answer: a. 255

Explanation: The largest possible 8-bit number is 11111111, which is equal to **255** in decimal. When counting 00000000, there are 256 possible 8-bit values for each octet in an IPv4 address. An IPv4 loopback address can fall anywhere in the range of 127.0.0.1 through

127.255.255.254. The decimal number 11,111,111 is equal to 101010011000101011000111 in binary.

4. Suppose you send data to the 11111111 11111111 11111111 11111111 IP address on an IPv4 network. To which device(s) are you transmitting?
- a. All devices on the Internet
 - b. All devices on your local network
 - c. The one device that is configured with this IP address
 - d. No devices

Answer: b. All devices on your local network

Explanation: The largest possible IP address in decimal is 255.255.255.255. In binary, this number is written 11111111.11111111.11111111.11111111. The address 255.255.255.255 is used for broadcast messages by TCP/IP background processes, and a broadcast message is read by **all devices on your local network**.

5. When your computer first joins an IPv6 LAN, what is the prefix of the IPv6 address the computer first configures for itself?
- a. FF00::/8
 - b. ::1/128
 - c. 2000::/3
 - d. FE80::/64

Answer: d. FE80::/64

Explanation: During IPv6 autoconfiguration, the computer creates its IPv6 address and uses **FE80::/64** as the first 64 bits. FF00::/8 is the prefix for multicast addresses. Global unicast addresses begin with 2000::/3. The address ::1/128 is the loopback address and is used to test that an interface and supporting protocol stack is functioning properly.

6. If you are connected to a network that uses DHCP, and you need to terminate your Windows workstation's DHCP lease, which command would you use?
- a. ipconfig /release
 - b. ipconfig /renew
 - c. ifconfig /release
 - d. ifconfig /renew

Answer: a. ipconfig /release

Explanation: The command **ipconfig /release** releases the IP address when dynamic IP addressing is being used. The command **ipconfig /renew** leases a new IP address from a DHCP server. The **ifconfig** command is a Linux command. While you can use **ifconfig** to release an IP address, you don't accomplish this with the **/release** parameter.

7. Which of these commands has no parameters in Windows?

- a. ping
- b. ipconfig
- c. hostname
- d. nslookup

Answer: c. hostname

Explanation: The **hostname** command displays a device's host name, either in Windows, UNIX, or Linux systems. In Windows, hostname has no additional parameters. The ping, ipconfig, and nslookup commands offer many parameters and options in Windows.

8. Which DNS server offers the most current resolution to a DNS query?

- a. Primary DNS server
- b. Root DNS server
- c. Caching DNS server
- d. TLD DNS server

Answer: a. Primary DNS server

Explanation: A **primary DNS server** is the authoritative name server for the organization, which is the authority on computer names and their IP addresses for computers in their domains and always holds the most current records. All other DNS servers, such as caching DNS servers and forwarding DNS servers, can only offer aged information held in their caches. Thirteen clusters of root DNS servers hold information used to locate the TLD (top-level domain) servers. These TLD servers hold information about how to find the authoritative name servers owned by various organizations.

9. You have just brought online a new secondary DNS server and notice your network-monitoring software reports a significant increase in network traffic. Which two hosts on your network are likely to be causing the increased traffic and why?

- a. The caching and primary DNS servers because the caching server is requesting zone transfers from the primary server
- b. The secondary and primary DNS servers because the secondary server is requesting zone transfers from the primary server
- c. The root and primary DNS servers because the primary server is requesting zone transfers from the root server
- d. The web server and primary DNS server because the web server is requesting zone transfers from the primary DNS server

Answer: b. The secondary and primary DNS servers because the secondary server is requesting zone transfers from the primary server

Explanation: When a secondary DNS server needs to update its database or when it comes online for the first time, it makes the request to the primary server for the information. **The secondary and primary DNS servers then perform a zone transfer from the primary server to the secondary server.** A caching server adds information to its cache only as it encounters that information while resolving DNS queries. A root DNS server holds information used to locate the TLD (top-level domain) servers. A web server does not perform a zone transfer.

10. Which type of DNS record identifies an email server?

- a. AAAA record
- b. CNAME record
- c. MX record
- d. PTR record

Answer: c. MX record

Explanation: An **MX (mail exchanger)** record identifies an email server and is used for email traffic. AAAA (address) records (called a “quad-A record”) hold the name-to-address mapping for IPv6 addresses. CNAME (canonical name) records hold alternative names for a host. A PTR (pointer) record is used for a reverse lookup, also called rDNS (reverse DNS), which provides a host name when you know its IP address.

11. What is the range of addresses that might be assigned by APIPA?

Answer: 169.254.0.1 through 169.254.255.254

12. You are the network manager for a computer training center that allows students to bring their own laptops to class for learning and taking notes. Students need access to the Internet, so you have configured your network’s DHCP server to issue IP addresses automatically. Which DHCP option should you modify to make sure you are not wasting addresses used by students who have left for the day?

Answer: Lease time

13. You have decided to use SNAT and PAT on your small office network. At minimum, how many IP addresses must you obtain from your ISP for all five clients in your office to be able to access servers on the Internet?

Answer: 1

14. Explain how the bits of an IPv6 address are organized and describe IPv6 shorthand notation.

Answer: An IPv6 address has 128 bits that are written as eight blocks (also called quartets) of hexadecimal numbers separated by colons. Each block is 16 bits long. Leading zeroes in a four-character hex block can be eliminated. If blocks contain all zeroes, they can be eliminated and replaced by double colons (::). To avoid confusion, only one set of double colons is used in an IPv6 address.

15. FTP sometimes uses a random port for data transfer, but an FTP server always, unless programmed otherwise, listens to the same port for session requests from clients. What

port does an FTP server listen on?

Answer: 21

16. You issue a transmission from your workstation to the following socket on your LAN: 10.1.1.145:53. Assuming your network uses standard port designations, what application layer protocol handles your transmission?

Answer: DNS (Domain Name Service)

17. Suppose you want to change the default port for RDP as a security precaution. What port does RDP use by default, and from what range of numbers should you select a private port number?

Answer: 3389; 49152 through 65535

18. You have just set up a new wireless network at your house, and you want to determine whether your Linux laptop has connected to it and obtained a valid IP address. What command will give you the information you need?

Answer: ip address show or ifconfig -a

19. While troubleshooting a network connection problem for a coworker, you discover the computer is querying a nonexistent DNS server. What command-line utility can you use to assign the correct DNS server IP address?

Answer: nslookup (in interactive mode)

20. When running a scan on your computer, you find that a session has been established with a host at the address 208.85.40.44:443. Which application layer protocol is in use for this session? What command-line utility might you use to determine the domain name of the other computer?

Answer: Port 443 indicates this an HTTPS session.

Answer: nslookup can identify the domain name of the host at that IP address.