**Chapter-7(IP Addressing)**

**1. IP Terminology.**

**Ans:**

**Bit** = A bit is one digit, either a 1 or a 0.

**Byte =** A *byte* is 7 or 8 bits, this chapter always assume a byte is 8 bits.

**Octet** = An octet, made up of 8 bits, is just an ordinary 8-bit binary number.

**Network address:** This is the designation used in routing to send packets to a remote  
network. For example- 10.0.0.0, 172.16.0.0, and 192.168.10.0 etc.

**Broadcast address:** The *broadcast address* is used by applications and hosts to send  
information to all hosts on a network. Examples include- 255.255.255.255.

**2. Write the types methods of IP Address?**

**Ans:** IP address using one of three methods:

* Dotted-decimal, as in 172.16.30.56
* Binary, as in 10101100.00010000.00011110.00111000
* Hexadecimal, as in AC.10.1E.38

**3. Network Addressing?**

**Ans:** The network address—also called the network number—uniquely identifies each network.

Every machine on the same network shares that network address as part of its IP address.

In the IP address 172.16.30.56, for example, 172.16 is the network address.

**4. Class A Addresses.**

**Ans:** In a Class A network address, the first byte is assigned to the network address, and the three remaining bytes are used for the host addresses.

The Class A format is as follows: **network.host.host.host**

For example, in the IP address 49.22.102.70,

The 49 is the network address and 22.102.70 is the host address.

Class A range of network addresses:

00000000 = 0

01111111 = 127

**5.** **Class B Addresses?**

**Ans:** In a Class B network address, the fist 2 bytes are assigned to the network address and the remaining 2 bytes are used for host addresses.

The format is as follows: **network.network.host.host**

For example, in the IP address 172.16.30.56,

The network address is 172.16 and the host address is 30.56.

The range for a Class B network:

10000000 = 128

10111111 = 191

**6.** **Class C Addresses?**

**Ans:** The first 3 bytes of a Class C network address are dedicated to the network portion of the address, with only 1 measly byte remaining for the host address.

Here’s the format: **network.network.network.host**

The example IP address 192.168.100.102,

The network address is 192.168.100 and the host address is 102.

The range for a Class C network:

11000000 = 192

11011111 = 223

**7. Class D and E Addresses?**

**Ans:** The addresses 224 to 255 are reserved for Class D and E networks.

Class D (224–239) is used for multicast addresses and Class E (240–255) for scientific purposes. The multicast range is from 224.0.0.0 through 239.255.255.255.

**8.** **Private IP Addresses?**

**Ans:** Private IP Addresses can be used on a private network, but they’re not routable through the Internet. This is designed for the purpose of creating a measure of much needed security, but it also conveniently saves valuable IP address space.

Reserved/Private IP address space:

**Class A**- 10.0.0.0 through 10.255.255.255

**Class B**- 172.16.0.0 through 172.31.255.255

**Class C**- 192.168.0.0 through 192.168.255.255

**9. Write about APIPA?**

**Ans:** Automatic Private IP Addressing (APIPA) is a feature of Windows-based operating systems (included in Windows 98, ME, 2000, and XP) that enables a computer to automatically assign itself an IP address when there is no Dynamic Host Configuration Protocol (DHCP) server available to perform that function.

The IP address range for APIPA is 169.254.0.1 through 169.254.255.254. The client also configures itself with a default class B subnet mask of 255.255.0.0.

**10. IPv4 Address Types?**

**Ans:** Internet Protocol version 4 (IPv4) is the fourth version of the Internet Protocol (IP). It is one of the core protocols of standards-based internetworking methods in the Internet.

IPv4, which is only 32 bits long and represented in decimals.

Here are the four IPv4 address types:

**Layer 2 broadcasts:** These are sent to all nodes on a LAN.

**Broadcasts (Layer 3):** These are sent to all nodes on the network.

**Unicast Address:** This is an address for a single interface, and these are used to send packets to a single destination host.

**Multicast Address:** These are packets sent from a single source and transmitted to many devices on different networks. Referred to as *one-to-many*.

**11.** **IPv6 Address Types?**

**Ans:** Internet Protocol version 6 (IPv6) is the sixth version of the Internet Protocol (IP). IPv6 addressing is not like IPv4 addressing. IPv6 addressing has much more address space and is 128 bits long, represented in hexadecimal.

**12. Why we need IPv6?**

**Ans:** Without IPv6, the world would soon be depleted of IP addresses.

**13.** **IPv6 Address Types?**

**Ans:**

**Unicast:** Packets addressed to a unicast address are delivered to a single interface, same as in IPv4.

**Global unicast addresses:** These are typical publicly routable addresses, and they’re used the same way globally unique addresses are in IPv4.

**Link-local addresses:** Link-local is like an IPv4 private IP address, but it can’t be routed at all, not even in an organization.

**Unique local addresses:** Unique local address is like a private IP address in IPv4 and cannot be routed to the Internet. Unique local address can be routed within an organization or company.

**Multicast:** These are packets sent from a single source and transmitted to many devices on different networks. Referred to as *one-to-many*.

**Anycast:** An anycast address identifis multiple interfaces but The anycast packet is delivered to only one address. We could call them one-to-one-of-many addresses.

**14.** **Special Addresses of IPv6?**

**Ans:**

**2000::/3 -** The global unicast address range.  
**FC00::/7 -** The unique local unicast range.  
**FE80::/10 -** The link-local unicast range.  
**FF00::/8 -** The multicast range.  
**3FFF:FFFF::/32 -** Reserved for examples and documentation.  
**2001:0DB8::/32 -** Also reserved for examples and documentation.  
**2002::/16 -** Used with *6to4*, which is the transition system.

15. What are the benefits of IPv6?