**IP ADDRESS**

Internet Protocol Address. There are 2 types,

1. IPv4 -32 bits
2. IPv6 -128 bits

**IPv4**

It is a 32 bit address that is used to identify a particular host in a particular network.

It is a fourth version of the internet protocol.

It works on Network Layer (Layer 3).

It is a numeric addressing method.

IPv4 uses 32 bit IP address. Ranges is 2^32 (or) more than 4 billion IPv4 address.

An IPv4 address has the format X.X.X.X. Where X is called octet and must be a decimal value b/w 0&255. It is usually represented in Dot-Decimal notation. Consisting of four decimal numbers each range from 0 and 255 separated by dots.

**Binary to Decimal Calculation**

Example for first octet :(8 bit=1 octet)

Total 8 bits, Value will be 0’s and 1’s

2^7 2^6 2^5 2^4 2^3 2^2 2^1 2^0

128 64 32 16 8 4 2 1

0 0 0 0 0 0 0 0 = 0

0 0 0 0 0 0 0 1 = 1

0 0 0 0 0 0 1 0 = 2

0 0 0 0 0 0 1 1 = 3

0 0 0 0 0 1 0 0 = 4

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1 1 1 1 1 1 1 1 = 255

1. 111111

It means, 128 64 32 16 8 4 2 1

0 0 1 1 1 1 1 1

When all bits are 1’s,

(2^n)-1 = (2^6)-1

= 64-1 = 63

1. 111011

When the number of 0’s are less. Consider 0’s also to be 1’s,

(2^6)-1 = 64-1

=63 -🡪 63-4 = 59 (4 = 0’s binary number)

**IPv4 Classes**

Class A - 1 to 127

Class B - 128 to 191

Class C - 192 to 223

Class D – 224 to 239

Class E – 240 to 255

🡪Class A,B,C are reserved by General use. (LAN & WAN)

🡪Class D are reserved for Multicasting.

🡪Class E are reserved for Experimental (or) Research use.

🡪127.0.0.0 to 127.255.255.255 is called Loopback Address. That is used to test the communication or transportation medium on a local network.

**Note :** Unicasting – One to One

Multicasting – One to Many

Broadcasting – One to All

**Types**

Private IP – LAN (Local Area Network)

Public IP – WAN (Wide Area Network)

**Private IP** – It is the IP address ranges reserved for private uses by internet standards groups. Private IP addresses are typically used on local networks including home, school and business LANs including airports and hotels.

**Public IP –** It is used by Internet servers including Web sites, DNS servers, Network Routers or any Computer connected directly to the Internet via a Modem.

**IP ADDRESS RANGES**

**Class A :** 1.0.0.0 - 127.255.255.255

**Private IP** : 10.0.0.0 – 10.255.255.255

**Public IP :** 1.0.0.0 – 9.255.255.255

11.0.0.0 – 127.255.255.255

**Class B :** 128.0.0.0 – 191.255.255.255

**Private IP :** 172.16.0.0 – 172.31.255.255

**Public IP :** 128.0.0.0 – 172.15.255.255

172.32.0.0 – 191.255.255.255

**Class C :** 192.0.0.0 – 223.255.255.255

**Private IP :** 192.168.0.0 – 192.168.255.255

**Public IP :** 192.169.0.0 – 223.255.255.255