**Types, Features and Classes of IP Address**

The IP address is a familiar term for most computer users. An IP address is the unique numerical address of a device in a computer network that uses Internet Protocol for communication. The IP address allow you to pinpoint a particular device from the billions of devices on the Internet. To send you a letter, someone needs your mailing address. In the same sense, one computer needs the IP address of another computer to communicate with it.

An IP address consists of four numbers; each can contain one to three digits. These numbers are separated with a single dot (.). These four numbers can range from 0 to 255.

**Types of IP addresses**

The IP addresses can be classified into two. They are listed below.

1) Static IP addresses

2) Dynamic IP addresses

Let us see each type in detail.

**Static IP Addresses**

As the name indicates, the static IP addresses usually never change but they may be changed as a result of network administration. They serve as a permanent Internet address and provide a simple and reliable way for the communication. From the static IP address of a system, we can get many details such as the continent, country, region and city in which a computer is located, The Internet Service Provider (ISP) that serves that particular computer and non-technical information such as precise latitude and longitude of the country,  and the locale of the computer. There are many websites providing IP address lookups. You can find out your IP addresses at <http://whatismyip.org/>.

**Dynamic IP Addresses**

Dynamic IP address are the second category. These are temporary IP addresses. These IP addresses are assigned to a computer when they get connected to the Internet each time. They are actually borrowed from a pool of IP addresses, shared over various computers. Since limited number of static IP addresses are available, ISPs usually reserve the portion of their assigned addresses for sharing among their subscribers in this way.

Static IP addresses are considered as less secure than dynamic IP addresses because they are easier to track.

**IP Version 4 and IP Version 6**

The two versions of IP addresses currently running are IP versions 4 (IPv4) and IP versions 6 (IPv6). There are many features with these two versions.

**IP Version 6**

The IPv6 is the most recent version of Internet Protocol. As the Internet is growing rapidly, there is a global shortage for IPv4. IPv6 was developed by the Internet Engineering Task Force (IETF). IPv6 is intended to replace the IPv4. IPv6 uses a 128-bit address and it allows 2128 i.e. approximately 3.4×1038 addresses. The actual number is slightly smaller as some ranges are reserved for special use or not used. The IPv6 addresses are represented by 8 groups of four hexadecimal digits with the groups being supported by colons. An example is given below:

Eg: 2001:0db8:0000:0042:0000:8a2e:0370:7334

**The features of IPv6**

The main features of the IPv6 are listed below.

1) IPv6 provides better end-to-end connectivity than IPv4.

2) Comparatively faster routing.

3) IPv6 offers ease of administration than IPv4.

4) More security for applications and networks.

5) It provides better Multicast and Anycast abilities.

6) Better mobility features than IPv4.

7) IPv6 follows the key design principles of IPv4 and so that the transition from IPv4 to IPv6 is smoother.

These are the key features of the IPv6 when compared to the IPv4. However, IPv6 has not become popular as IPv4.

**IP Version 4**

IP Version 4 (IPv4) was defined in 1981. It has not undergone much changes from that time. Unfortunately, there is a need of IP addresses more than IPv4 could supply.

IPv4 uses 32-bit IP address. So the maximum number of IP address is 232—or 4,294,967,296.

This is a little more than four billion IP addresses. An IPv4 address is typically formatted as four 8-bit fields. Each 8-bit field represents a byte of the IPv4 address. As we have seen earlier, each fields will be separated with dots. This method of representing the byte of an IPv4 address is referred to as the dotted-decimal format. The bytes of the IPv4 is further classified into two parts. The network part and the host part.

**Network Part**

This part specifies the unique number assigned to your network. It also identifies the class of network assigned. The network part takes two bytes of the IPv4 address.

**Host Part**

This is the part of the IPv4 address that you can assign to each host. It uniquely identifies this machine on your network. For all hosts on your network, the network part of the IP address will be the same and host part will be changing.

**IP address and classes**

The IP hierarchy contains many classes of the IP addresses. Broadly, the IPv4 addressing system is divided into five classes of IP address. All the five classes are identified by the first octet of the IP address.

**The classes of IPv4 addresses**

The different classes of the IPv4 address are the following:

1) Class A address

2) Class B address

3) Class C address

4) Class D address

5) Class E address

**Class A Address**

The first bit of the first octet is always set to zero. So that the first octet ranges from 1 – 127. The class A address only include IP starting from 1.x.x.x to 126.x.x.x. The IP range 127.x.x.x is reserved for loop back IP addresses. The default subnet mask for class A IP address is 255.0.0.0. This means it can have 126 networks (27-2) and 16777214 hosts (224-2). Class A IP address format is thus: **0NNNNNNN**.HHHHHHHH.HHHHHHHH.HHHHHHHH.

**Class B Address**

Here the first two bits in the first two bits is set to zero. Class B IP Addresses range from 128.0.x.x to 191.255.x.x. The default subnet mask for Class B is 255.255.x.x. Class B has 16384 (214) Network addresses and 65534 (216-2) Host addresses. Class B IP address format is: **10NNNNNN.NNNNNNNN**.HHHHHHHH.HHHHHHHH

**Class C Address**

The first octet of this class has its first 3 bits set to 110. Class C IP addresses range from 192.0.0.x to 223.255.255.x. The default subnet mask for Class C is 255.255.255.x. Class C gives 2097152 (221) Network addresses and 254 (28-2) Host addresses. Class C IP address format is: **110NNNNN.NNNNNNNN.NNNNNNNN**.HHHHHHHH

**Class D Address**

The first four bits of the first octet in class D IP address are set to 1110. Class D has IP address rage from 224.0.0.0 to 239.255.255.255. Class D is reserved for Multicasting. In multicasting data is not intended for a particular host, but multiple ones. That is why there is no need to extract host address from the class D IP addresses. The Class D does not have any subnet mask.

**Class E Address**

The class E IP addresses are reserved for experimental purpose only for R&D or study. IP addresses in the class E ranges from 240.0.0.0 to 255.255.255.254. This class too is not equipped with any subnet mask.