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**IP addressing and Class of network :**

IP stands for Internet Protocol and describes a set of standards and requirements for creating and transmitting data packets, or datagrams, across networks. The Internet Protocol (IP) is part of the Internet layer of the Internet protocol suite. In the OSI model, IP would be considered part of the network layer. IP is traditionally used in conjunction with a higher-level protocol, most notably TCP

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IP is designed to work over a dynamic network. This means that IP must work without a central directory or monitor, and that it cannot rely upon specific links or nodes existing. IP is a connectionless protocol that is datagram-oriented., so each packet must contain the source IP address, destination IP address, and other data in the header to be successfully delivered.

An IP address (*internet protocol address*) is a numerical representation that uniquely identifies a specific interface on the network.

Addresses in IPv4 are 32-bits long. This allows for a maximum of 4,294,967,296 ( $2^{32}$ ) unique addresses. Addresses in IPv6 are 128-bits, which allows for  $3.4 \times 10^{38}$  ( $2^{128}$ ) unique addresses.

The total usable address pool of both versions is reduced by various reserved addresses and other considerations.

or example, the address **168.212.226.204** represents the 32-bit binary number 10101000.11010100.11100010.11001100.

## Type of Network and class of network

For the better management of network and connected host in the internet , the address of the internet computers are classified in different types , known as class of network.

Some basic concept in class of network is

1. Netid and hostid :- in classful addressing , and IP in class A,B,C,D,E is divided into two address, known as netid and hosted. Here, netid represent the address of the network connected with internet and hosted is the address of the host connected in that network. These two id generally formed the IP address.
2. Mask :- the mask can help us to find the netid and hosted in IP address. For example , in Class A network → mask is / 8  
B Network → mask is /16  
C network → mask is /24

the mask notation is also known as slash notation or Classless Interdomain Routing(CIDR) notation.

3. Subnetting : In the classful IP addressing , An organization may divide the address into continuous group and can assign each group to smaller network called subnet .
4. Supernetting :- It is the technique to increase the network address in a particular class of network for an organization.

i.e in class C network the maximum number of host is 256 which is not satisfy for an organization then the maximum host size is increases by the technique of supernetting i.e combining the two IP address together to create larger network address.

### Class A

In a Class A network, the first eight bits, or the first dotted decimal, is the network part of the address, with the remaining part of the address being the host part of the address. There are 128 possible Class A networks.

0.0.0.0 to 127.0.0.0

However, any address that begins with 127. is considered a loopback address.

Example for a Class A IP address:

2.134.213.2

### Class B

In a Class B network, the first 16 bits are the network part of the address. All Class B networks have their first bit set to 1 and the second bit set to 0. In dotted decimal notation, that makes 128.0.0.0 to 191.255.0.0 as Class B networks. There are 16,384 possible Class B networks.

Example for a Class B IP address:

135.58.24.17

## Class C

In a Class C network, the first two bits are set to 1, and the third bit is set to 0. That makes the first 24 bits of the address the network address and the remainder as the host address. Class C network addresses range from 192.0.0.0 to 223.255.255.0. There are over 2 million possible Class C networks.

Example for a Class C IP address:

192.168.178.1

## Class D

Class D addresses are used for multicasting applications. Unlike the previous classes, the Class D is not used for "normal" networking operations. Class D addresses have their first three bits set to "1" and their fourth bit set to "0". Class D addresses are 32-bit network addresses, meaning that all the values within the range of 224.0.0.0 – 239.255.255.255 are used to uniquely identify multicast groups. There are no host addresses within the Class D address space, since all the hosts within a group share the group's IP address for receiver purposes.

Example for a Class D IP address:

227.21.6.173

## Class E

Class E networks are defined by having the first four network address bits as 1. That encompasses addresses from 240.0.0.0 to 255.255.255.255. While this class is reserved, its usage was never defined. As a result, most network implementations discard these addresses as illegal or undefined. The exception is 255.255.255.255, which is used as a broadcast address.

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