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| **NAME**  **:** PRAVEENKUMAR V  **REG.NO :** 2021506064 | **Network Assignment** |

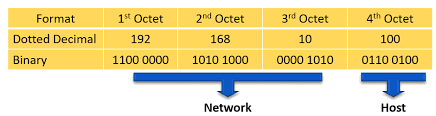
**ASSIGNMENT – 01**

**IPV4:**

IPv4 stands for **Internet Protocol version 4**, is the fourth iteration of the Internet Protocol. It is the most used version of IP and is responsible for routing most of the internet traffic today. IPv4 is a set of rules for routing data packets across a network.

These are **32 bit** integers in the form of four sets of numbers (Octets) separated by dots. Each set can be a value between **0 and 255.**

*EXAMPLE FORMAT:*



IPv4 uses 32-bit addresses for Ethernet communication in five classes: **A, B, C, D and E**. Classes A, B and C have a different bit length for addressing the network host. Class D addresses are reserved for multicasting, while class E addresses are reserved for military purposes.

Generally IPv4 refers to an address assigned to a device which request a data from a server. These addresses are assigned by Internet service provider. Then the data from the server reaches to the particular device by identifying using IPv4 address.

IPv4 packets consist of a header section and a payload section. The header contains information necessary for routing and delivery, including source and destination IP addresses, protocol information, and packet sequencing.

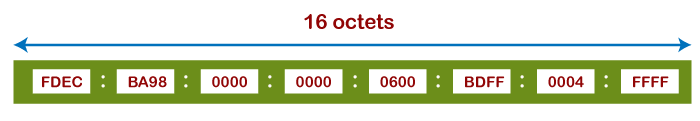
It produces about 4.3 billion unique addresses but we are using more devices than that. However, its limited number of addresses is a major limitation, and it is gradually being replaced by IPv6.

**IPv6:**

IPv6 stands for Internet Protocol version 6, is the latest version of the Internet Protocol. It provides a larger address space to support the growing number of devices connected to the internet and was introduced to address the limitations of IPv4.

IPv6 addresses are much larger than IPv4 addresses. They are 128 bits long and represents 16 bits, which means that there are a total of 2^128 possible addresses. This is a staggering number, and it is enough to ensure that there will never be a shortage of IPv6 addresses.

IPv6 provides an enormous address space, capable of accommodating around 340 undecillion (3.4 x 10^38) unique addresses.



IPv6 addresses are consist of 8 different sections, each section has a 16-bit hexadecimal values separated by colon (:).In addition to its larger address space, IPv6 also has a number of other advantages over IPv4. For example, IPv6 packets are more efficient, which can improve network performance.

IPv6 also supports a number of new features, such as improved security and mobility. It incorporates IPsec (IP Security) as a standard part of the protocol suite, providing secure communication over the internet.

**IP Addressing schemes:**

IP address is an address that is used to uniquely identify a device on an IP network. IP address is made up of 32 binary bits. These binary bits can be further divided into network portion and host portion with the help of a **subnet mask**.

**IP ADDRESSING SCHEME IN IP v4**

**CLASS A:**

**These** address uses only first higher order octet (byte) to identify the network prefix, and remaining three octets (bytes) are used to define the individual host addresses. The class A address ranges between 0.0.0.0 to 127.255.255.255. The first bit of the first octet is always set to 0 (zero), and next 7 bits determine network address, and the remaining 24 bits determine host address. So the first octet ranges from 0 to 127 (00000000 to 01111111).

**CLASS B:**

**These** addresses use the initial two octets (two bytes) to identify the network prefix, and the remaining two octets (two bytes) define host addresses. The class B addresses are range between 128.0.0.0 to 191.255.255.255. The first two bits of the first higher octet is always set to 10 (one and zero bit), and next 14 bits determines the network address and remaining 16 bits determines the host address. So the first octet ranges from 128 to 191 (10000000 to 10111111).

**CLASS C:**

**These** addresses use the first three octets (three bytes) to identify the network prefix, and the remaining last octet (one byte) defines the host address. The class C address ranges between 192.0.0.0 to 223.255.255.255. The first three bit of the first octet is always set to 110, and next 21 bits specify network address and remaining 8 bits specify the host address. Its first octet ranges from 192 to 223 (11000000 to 11011111).

**CLASS D:**

**These** IP address is reserved for multicast addresses. Its first four bits of the first octet are always set to 1110, and the remaining bits determine the host address in any IP address. The first higher octet bits are always set to 1110, and the remaining bits specify the host address. The class D address ranges between 224.0.0.0 to 239.255.255.255. In multicasting, data is not assigned to any particular host machine, so it is not require to find the host address from the IP address, and also, there is no subnet mask present in class D.

**CLASS E:**

**These** IP address is reserved for experimental purposes and future use. The first higher octet bits are always set to 1111, and next remaining bits specify the host address. Class E address ranges between 240.0.0.0 to 255.255.255.255.

**RESERVED PORTS:**

A *port* is an endpoint for communication between applications, generally referring to a logical connection. A port provides queues for sending and receiving data. Each port has a port number for identification.

* Port numbers 0 - 1023 are used for well-known ports.
* Port numbers 1024 - 65535 are available for the following user applications:
  + Port numbers 1024 - 49151 are reserved for user server applications.
  + Port numbers 49152 - 65535 are reserved for clients.

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| **Port Number —** | **Description** |
| 1 | [TCP](https://www.webopedia.com/definitions/tcp/) Port Service Multiplexer (TCPMUX) |
| 5 | Remote Job Entry (RJE) |
| 7 | ECHO |
| 18 | Message Send Protocol (MSP) |
| 20 | [FTP](https://www.webopedia.com/definitions/ftp/) — Data |
| 21 | FTP — Control |
| 22 | [SSH](https://www.webopedia.com/definitions/ssh/) Remote Login Protocol |
| 23 | [Telnet](https://www.webopedia.com/definitions/telnet/) |
| 25 | [Simple Mail Transfer Protocol](https://www.webopedia.com/definitions/smtp/) (SMTP) |
| 29 | MSG ICP |
| 37 | Time |
| 42 | Host Name Server (Nameserv) |
| 43 | WhoIs |
| 49 | Login Host Protocol (Login) |
| 53 | [Domain Name System](https://www.webopedia.com/definitions/dns/) (DNS) |
| 69 | [Trivial File Transfer Protocol](https://www.webopedia.com/definitions/tftp/) (TFTP) |
| 70 | [Gopher](https://www.webopedia.com/definitions/gopher/) Services |
| 79 | [Finger](https://www.webopedia.com/definitions/finger/) |
| 80 | [HTTP](https://www.webopedia.com/definitions/http/) |
| 103 | [X.400](https://www.webopedia.com/definitions/x-400/) Standard |
| 108 | SNA Gateway Access Server |
| 109 | POP2 |
| 110 | [POP3](https://www.webopedia.com/definitions/pop/) |
| 115 | Simple File Transfer Protocol (SFTP) |
| 118 | [SQL](https://www.webopedia.com/definitions/sql/) Services |
| 119 | Newsgroup ([NNTP](https://www.webopedia.com/definitions/nntp/)) |
| 137 | [NetBIOS](https://www.webopedia.com/definitions/netbios/) Name Service |
| 139 | NetBIOS Datagram Service |
| 143 | Interim Mail Access Protocol (IMAP) |
| 150 | NetBIOS Session Service |
| 156 | [SQL Server](https://www.webopedia.com/definitions/sql-server/) |
| 161 | [SNMP](https://www.webopedia.com/definitions/snmp/) |
| 179 | [Border Gateway Protocol](https://www.webopedia.com/definitions/bgp/) (BGP) |
| 190 | Gateway Access Control Protocol (GACP) |
| 194 | [Internet Relay Chat](https://www.webopedia.com/definitions/irc/) (IRC) |
| 197 | Directory Location Service (DLS) |
| 389 | [Lightweight Directory Access Protocol](https://www.webopedia.com/definitions/ldap/) (LDAP) |
| 396 | Novell Netware over IP |
| 443 | [HTTPS](https://www.webopedia.com/definitions/ssl/) |
| 444 | Simple Network Paging Protocol (SNPP) |
| 445 | Microsoft-DS |
| 458 | Apple [QuickTime](https://www.webopedia.com/definitions/quicktime/) |
| 546 | [DHCP](https://www.webopedia.com/definitions/dhcp/) Client |
| 547 | DHCP Server |
| 563 | SNEWS |
| 569 | MSN |
| 1080 | Socks |