IPv4 and IPv6

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- What is IP address ?

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  - Class C
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❖ **What is IP address ?**

- An IP address is an identifier for a particular machine on a particular network. It is part of a scheme to identify computers on the internet.

- IP address are also referred to as IP number and internet address.

- The network portion of the IP address is allocated to internet service provider(ISP) by the InterNIC, under authority of the internet assigned number authority(IANA).

- ISPs then assign the host portion of the IP address to the machines on the networks that they operate.

- Which section of the IP address represent the network & which sections represent the machine will depend on what "class" of IP address is assigned to a network.

❖ <u>IPv4</u>

◉ It is 32 bit number represented in 4 decimal number where each decimal number is of 8 bit (octet) is separated by a dot(.).

◉ Thus representation known as doted decimal representation.

◉ IP address consists of 2 components the network id and the host id.

❖ <u>IPv4 cont…</u>

- Network id:-it is the number assigned to a network in the internet.

  Host id:- it represents the id assigned to a host in the network.

- IPv4 allows 2^{32} (4294967296) unique address which section of IP address show the network id & which section show the machine or host id depend on the class network.

❖ <u>IPv4 cont…</u>

- There are five classes of IP addresses:-
  - Class A
  - Class B
  - Class C
  - Class D
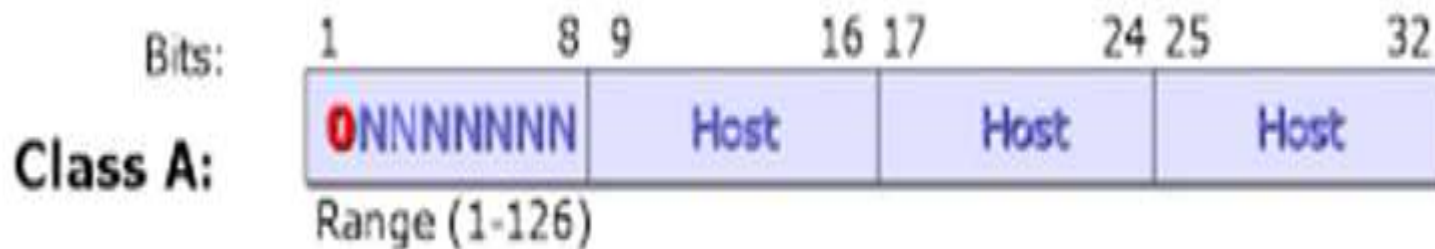 - Class E

❖ **IPv4 cont...**

Class A:-

- The first byte is a network id (8 bits) & the last 3 bytes are for host id (24 bits).

- The first bit is '0'.

- Range of network number-1.0.0.0 to 126.0.0.0

- Number of possible networks-127(1-126 usable, 127 is reserved)

❖ **IPv4 cont…**

Class A:-

- Number of possible values in the host portion-16,777,216

- It is used for large network.
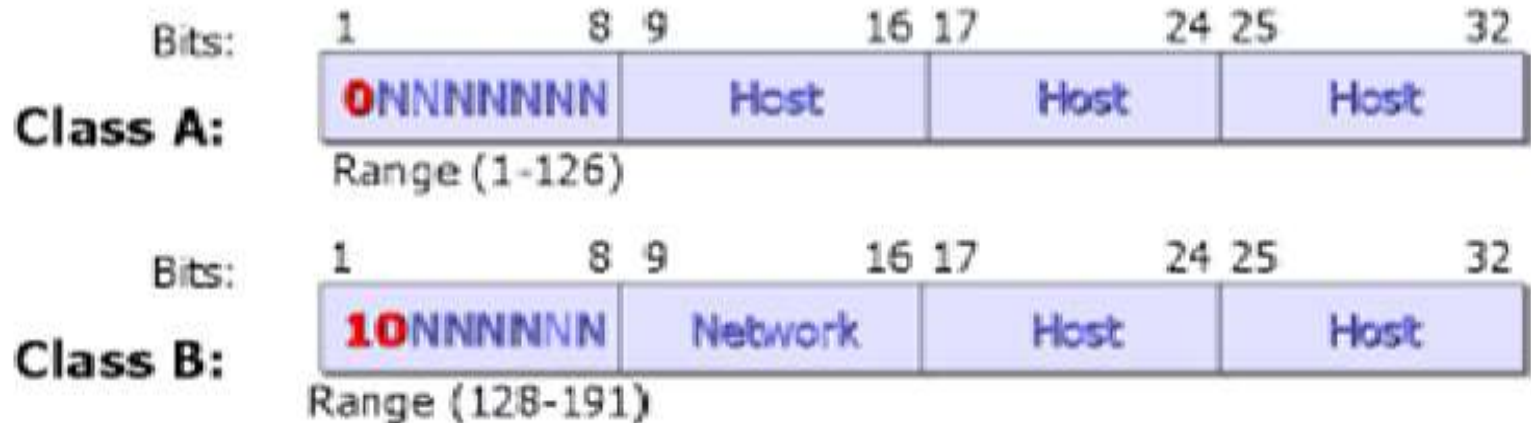
❖ **IPv4 cont…**

Class B:-

- The first 2 bytes are a network id (16 bits) & the last 2 bytes are for host id (16 bits).

- The first 2 bits are '10'.

- Range of network number- 128.0.0.0 to 191.255.0.0

- Number of possible networks- 16,384

❖ **IPv4 cont...**

Class B:-

- Number of possible values in the host portion- 65536

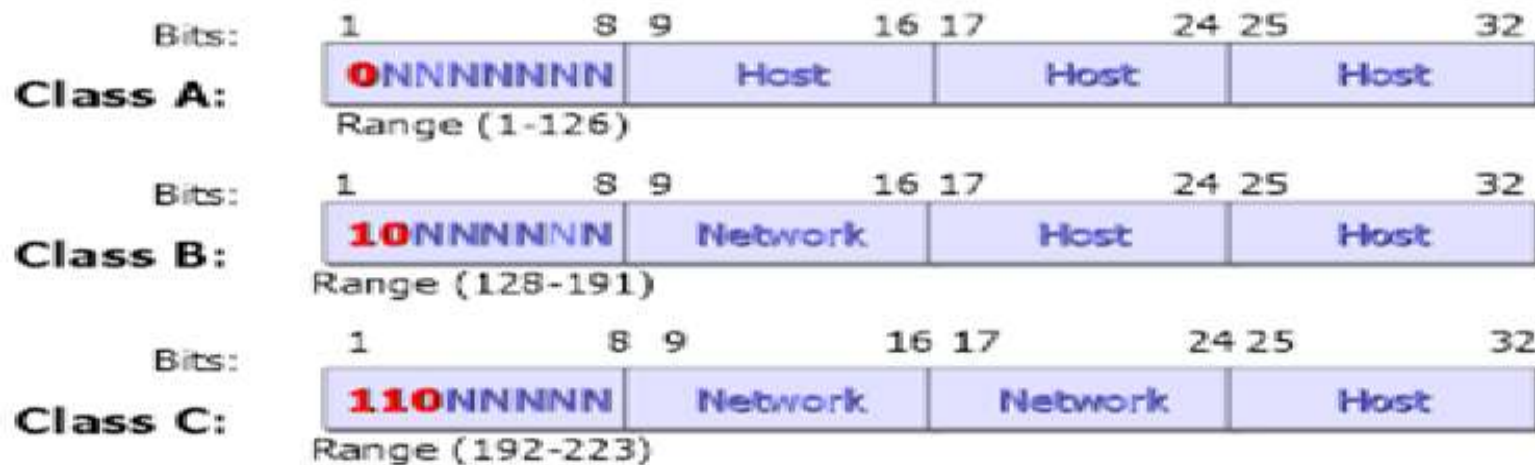- Used for medium size network.

❖ **IPv4 cont…**

Class C:-

- The first 3 bytes are a network id (24 bits) & the last 1 byte are for host id (8 bit).

- The first 3 bits are '110'.

- Range of network number- 192.0.0.0 to 223.255.255.0

- Number of possible networks- 2,097,152

❖ **IPv4 cont…**

Class C:-

- Number of possible values in the host portion- 256

- Used in local area network(LAN).

Bits:	1	8 9	16 17	24 25	32
Class A:	**0**NNNNNNN	Host	Host	Host	

Range (1-126)

Bits:	1	8 9	16 17	24 25	32
Class B:	**10**NNNNNN	Network	Host	Host	

Range (128-191)

Bits:	1	8 9	16 17	24 25	32
Class C:	**110**NNNNN	Network	Network	Host	

Range (192-223)
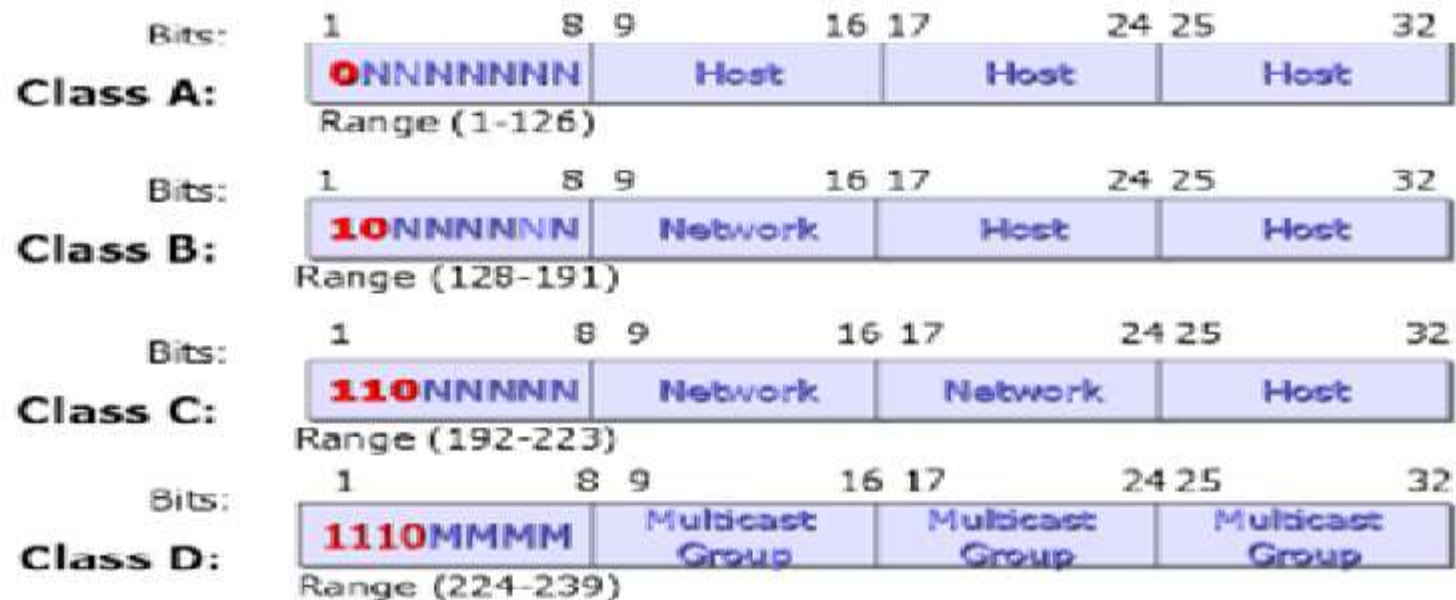
❖ <u>IPv4 cont...</u>

<u>Class D:-</u>

- An IP address which belong to class D has the first octet has its 4bit set to '1110'.

- Range of network number- 224.0.0.0 to 239.255.255.255

❖ **IPv4 cont…**

Class D:-

- Used for multicasting

❖ <u>**IPv4 cont…**</u>

<u>Class E:-</u>

- It reserved for experimental & for future testing purpose.

- Range of network number- 240.0.0.0 to 255.255.255.254

❖ __define IPv6__

- IPv6 will make use of 128 bit IP address.

- An IPv6 address is represented as 8 groups of 4 hexadecimal digits, each group representing 16 bits (2 octets). The groups are separated by colons(:).

- E.g.- 2001:0db8.85a3:0000:0000:8a2e:0370:7334

❖ <u>difference between IPv4 and IPv6</u>

S.N	IPv4	IPv6
1.	Addresses are 32 bits (4 bytes) long.	Addresses are 128 bits (416 bytes) long.
2.	Both routers & sending host fragment the packets.	Routers don't fragment the packets but sending host fragment the packets.
3.	Header includes a checksum.	Header doesn't includes a checksum.

❖ difference between IPv4 and IPv6 cont...

S.N	IPv4	IPv6
4.	Classes of addressing are A, B, C, D, E.	Classes of addressing are unicast, anycast, multicast.
5.	Configure either manually or through DHCP.	Doesn't require manual configuration.
6.	Must support a 576 byte packet size.	Must support 1208 byte packet size.

❖ difference between IPv4 and IPv6 cont...

S.N	IPv4	IPv6
7.	IPv4 address uses the dot-decimal notation.	IPv6 address are represented in a hexadecimal, colon-separated notation.
8.	Not suitable for mobile networks.	IPv6 is better suited to mobile networks.
9.	Address space is small (232).	Larger address space (2128).

❖ difference between IPv4 and IPv6 cont...

S.N	IPv4	IPv6
10.	Internet protocol security(IPSec) is mandatory in this.	IPSec is optional.
11.	An IP address is made up of 4 bytes of information expressed as 4 number between 0 & 255 shown separated by periods. e.g.- 238.17.159.4	An IPv6 address is represented by 8 group of 16 bit hexadecimal values separated by colons (:). e.g.- 2001:0db8:85a3:0000:0000:8a2e:0370:7334

THANK YOU

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