IP Address

An IP address, or Internet Protocol address, is a numerical label assigned to each device participating in a computer network that uses the Internet Protocol for communication.

It serves two main purposes:
host or network interface identification and location addressing.

IPv4 vs. IPv6

IPv4 (Internet Protocol version 4):
This is the most widely used IP version. It consists of four sets of numbers separated by dots,
for example, 192.168.0.1.

IPv6 (Internet Protocol version 6):
This newer version was introduced to address the exhaustion of IPv4 addresses. IPv6 uses a longer address format, composed of eight groups of four hexadecimal digits, separated by colons, like 2001:0db8:85a3:0000:0000:8a2e:0370:7334.

Public vs. Private IP Addresses

Public IP Address:
This is the address assigned to a device by the Internet Service Provider (ISP) and is visible on the Internet.

Private IP Address:
These are used within a private network and are not directly accessible from the Internet. Common private IP address ranges include 192.168.x.x, 172.16.x.x to 172.31.x.x, and 10.x.x.x.

IP Address Classes (0nly IPv4)

IP addresses are classified into five classes: A, B, C, D, and E. These classes are based on the range of IP addresses they include and the number of hosts they can support. Here's a brief overview of each class:

Class A (1.0.0.0 to 126.255.255.255)

- The first octet represents the network address, and the remaining three octets represent host addresses.
- Supports a large number of hosts (2^24 - 2 hosts).
- Typically used for large networks.

Class B (128.0.0.0 to 191.255.255.255)

- The first two octets represent the network address, and the remaining two octets represent host addresses.
- Supports a moderate number of hosts (2^16 - 2 hosts).
- Suitable for medium-sized networks.

Class C (192.0.0.0 to 223.255.255.255)

- The first three octets represent the network address, and the last octet represents host addresses.
- Supports a smaller number of hosts (2^8 - 2 hosts).
- Commonly used for small networks.

Class D (224.0.0.0 to 239.255.255.255)

Reserved for multicast groups.
Intended for group communication.

Class E (240.0.0.0 to 255.255.255.255)

Reserved for experimental purposes.

IP Addresses in AWS

IPv4 – Internet Protocol version 4 (4.3 Billion Addresses)
• Public IPv4 – can be used on the Internet
• EC2 instance gets a new a public IP address every time you stop then start it (default)
• Private IPv4 – can be used on private networks (LAN) such as internal AWS
networking (e.g., 192.168.1.1)
• Private IPv4 is fixed for EC2 Instances even if you start/stop them

IPv6 – Internet Protocol version 6

• Every IP address is public (no private range)
• Example: 2001:db8:3333:4444:cccc:dddd:eeee:ffff