GlobalInternet(Areas,BGP, IPv6)

IPv6:

IPaddressis yourdigitalidentity.It'sanetworkaddressfor yourcomputersotheInternetknowswhere to send you emails, data, etc.

IP address determines who and where you are in the network of billions of digital devices that are connected to the Internet.

IPv6or InternetProtocol Version6isanetworklayerprotocolthatallows communicationtotakeplace over the network. IPv6 was designed by Internet Engineering Task Force (IETF) in December 1998 with the purpose of superseding the IPv4 due to the global exponentially growing internet users.

IPv4vsIPv6

The common type of IP address (is known as IPv4, for "version 4"). Here's an example of what an IP address might look like:

25.59.209.224

- An IPv4 address consists of four numbers, each of which contains one to three digits, with a singledot (.)separatingeachnumberorset ofdigits.Eachofthefournumberscan rangefrom 0 to 255.
- This group of separated numbers creates the addresses that let you and everyone around the globe to send and retrieve data over our Internet connections.
- The IPv4 uses a 32-bit address scheme allowing to store 2^32 addresses which is more than 4 billion addresses.
- Todate,itisconsidered theprimaryInternetProtocolandcarries94%of Internet traffic.
- Initially, it was assumed it would never run out of addresses but the present situation paves a new way to IPv6, let's see why? An IPv6 address consists of eight groups of four hexadecimal digits. Here's an example IPv6 address:

3001:0da8:75a3:0000:0000:8a2e:0370:7334

- ThisnewIPaddressversionisbeingdeployedtofulfiltheneedformore Internetaddresses.
- ItwasaimedtoresolveissueswhichareassociatedwithIPv4.
- With128-bitaddressspace,it allows340undecillionuniqueaddress space.
- IPv6alsocalled IPng(InternetProtocolnextgeneration).

IPv6supportatheoreticalmaximumof340,282,366,920,938,463,463,374,607,431,768,211, 456.Tokeepitstraightforward,wewillneverrunoutof IPaddressesagain.

Typesof IPv6Address

Nowthatweknow aboutwhatis IPv6addresslet'stakealookatitsdifferenttypes.

- **Unicast addresses** It identifies a unique node on a network and usuallyrefers to a single sender or a single receiver.
- **Multicast addresses** It represents a group of IP devices and can only be used as the destination of a datagram.
- **Anycastaddresses**Itisassignedtoasetofinterfacesthattypicallybelongtodifferentnodes.

AdvantagesofIPv6

- Reliability
- **Faster Speeds:** IPv6 supports multicast rather than broadcast in IPv4.This feature allows bandwidth-intensive packet flows (like multimedia streams) to be sent to multiple destinations all at once.
- **Stronger Security:** IPSecurity, which provides confidentiality, and data integrity, is embedded into IPv6.
- Routingefficiency
- Mostimportantlyit'sthe final solution forgrowingnodesin Global-network.

Disadvantagesof IPv6

- **Conversion:** Due to widespread present usage of IPv4 it will take a long period to completelyshift to IPv6.
- **Communication:** IPv4 and IPv6 machines cannot communicate directly with each other. They need an intermediate technology to make that possible.

TheuseofIPaddressestypicallyhappensbehindthe scenes.Theprocessworkslike this:

1. Your device indirectly connects to the internet by connecting at first to a network connected to the internet, which then grants your device access to the internet.
2. When you are ~~at~~ home, that network will probably be your Internet Service Provider (ISP). At work, it will be your company network.
3. YourIP addressisassignedtoyourdevicebyyour ISP.
4. Yourinternetactivitygoesthroughthe ISP,and theyrouteitbackto you, using your IP address. Since they are giving you access to the internet, it is their role to assign an IP address to your device.
5. However, your IPaddresscanchange. Forexample,turning yourmodemorrouteronor off can change it. Or you can contact your ISP, and they can change it for you.
6. When you areout and about – for example, traveling – and you take your device with you, your home IP address does not come with you. This is because you will be using another network (Wi-Fi at a hotel, airport, or coffee shop, etc.) to access the internet and will be usinga different (and temporary) IP address, assigned to you by the ISP of the hotel, airport or coffee shop.