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IPv6 - Addressing

An IPv6 address is a 128 bit alphanumeric value that identifies an endpoint device in an internet protocol version 6 (IPv6) network. It is the successor to a previous addressing infrastructure IPv4 which had limitations IPv6 was designed to overcome. Notably IPv6 has drastically increased address space compared to IPv4.

The internet Protocol (IP) is a method in which data sent to different computers over the internet. Each network interface, or computer, on the internet will have at least one IP address that is used to uniquely identify that computer.

* Format of an IPv6 address:-

In precise terms an IPv6 address is 128 bits long and is arranged in eight groups each of which is 16 bits. Each group is expressed as four hexadecimal digits and the groups are separated by colons.

Ex:- FE80:CD00:0000:0CDE:1257:0000:211E:729C

An IPv6 address is split into two parts: a network and a node component. The network component is the first 64 bits of the address and is used for routing. The node component is the later 64 bits and is used to identify the address of the interface.

Types of IPV6 addresses:-

- Global unicast:- These addresses are routable on the internet and start with "2001" as the prefix group
- unicast address:- used to identify the interface of an individual node.
- Anycast address:-
- Multicast address:-
- Link local address:-
- unique local address:-

* Advantages of IPV6 address:-

- More efficient routing with similar routing tables and aggregation of prefixes.
- Simplified packet processing due to more streamlined packet headers.
- Support of multicast packet flows.
- Hosts can generate their own IP addresses.

IPv6 Subnetting:

IPv6 subnetting is easier than IPv4. It's also different. Want to divide or combine a subnet. All that is needed is to add or chop off digits and adjust the prefix length by a multiple of four. No longer is there a need to calculate subnet start/end addresses, usable address the null route or the broadcast address.

IPv6 doesn't have a subnet mask but instead calls it a prefix often shortened to prefix. Prefix length and CIDR masking work similarly; the prefix length denotes how many bits of the address define the network in which it exists. Most commonly the prefixes used with IPv6 are multiple of four.

Using prefix lengths in multiple of four makes it easier for humans to distinguish IPv6 subnets. All that is required to design a larger or smaller subnet is to adjust the prefix by multiple of four.

