Computer Networks
Exp 11

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IPV6 Study Experiment

Address Structure:

An IPv6 address is made of 128 bits divided into eight 16-bits blocks. Each block is then converted into 4-digit Hexadecimal numbers separated by colon symbols.

For example, given below in a 128 bit IPV6 address represented in binary format and divided into eight 16-bit blocks.

0010000000000001

0010000000000001 0000000000000000 0011100100011000
0000000010000111 1101111111100001 0000000000000000
0000000000000000 1111111101111011

Each block is then converted into Hexadecimal and separated by ':' symbol:

2001:0000:3238:DFE1:0063:0000:0000:FFFB

Even after converting into Hexadecimal format, IPv6 address remains long. IPv6 provides some rules to shorten the address.

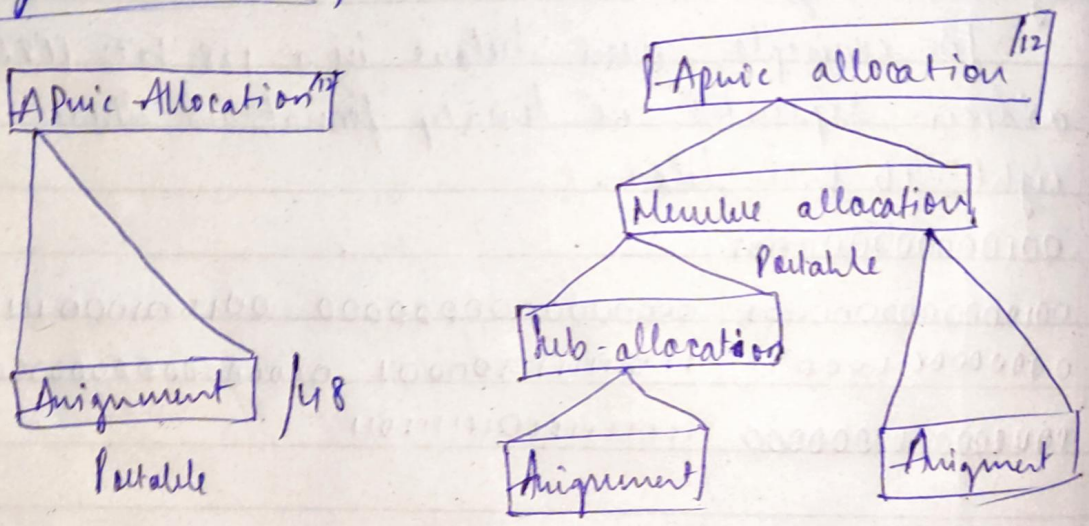
The rules are as follows:

! Discard leading zeros:
In blocks, the leading two or 0s can be omitted.

! If two or more blocks contain consecutive zeroes, omit them all and replace with double colon sign !!.
Consecutive blocks of zeros can be replaced and once by !! so if there are still blocks of zeros in the address, they can be shrunk down to a single zero.

2001:3238:DFE1:63:FEFB

Management Hierarchy



There are three major categories of IPv6 addresses:

- Unicast - For a single interface.
- Global Unicast address - A unique IPv6 address assigned to a host interface.
- Link-local IPv6 address - An IPv6 address that allows communication between neighboring hosts that reside on the same link.

- Multicast - for a set of interfaces on the same physical medium. A packet is sent to all interfaces associated with the address.
- Anycast - for a set of interfaces on different physical media.

Interface ID

Interface identifiers in IPv6 unicast addresses are used to identify interfaces on a link. They are required to be unique on that link.

EUI-64 (Extended Unique Identifier) is method, which can automatically configure IPv6 host addresses. An IPv6 device will use the MAC address of its interface to genrate a unique 64-bit interface ID.

Autoconfiguration —

The autoconfiguration process creates a link local address. The autoconfiguration process verifies its uniqueness on a link. The process also determines which information should be sent.

Subnetting in IPv6

IPv6 addresses are 128 bits to represent an address which includes bits to be used for subnetting. The second half of the address is always used for hosts only. Therefore, there is no compromise if we subnet the network.