Subnetting

- In subnetting, a class A or class B block is divided into several subnets.
- Each subnet has a larger prefix length than the original network.
- For example, if a network in class A is divided into four subnets, each subnet has a prefix of nsub = 10.
- At the same time, if all of the addresses in a network are not used, subnetting allows the addresses to be divided among several organizations.

IPV6

FEATURES OF IPV6

- *Better header format*
- *Allowance for extension*
- *Support for resource allocation*

Additional Features

- Need to accommodate scalable routing and addressing
- Support for real-time services
- Security support
- Enhanced routing functionality, including support for mobile hosts

ADDRESS SPACE ALLOCATION OF IPV6

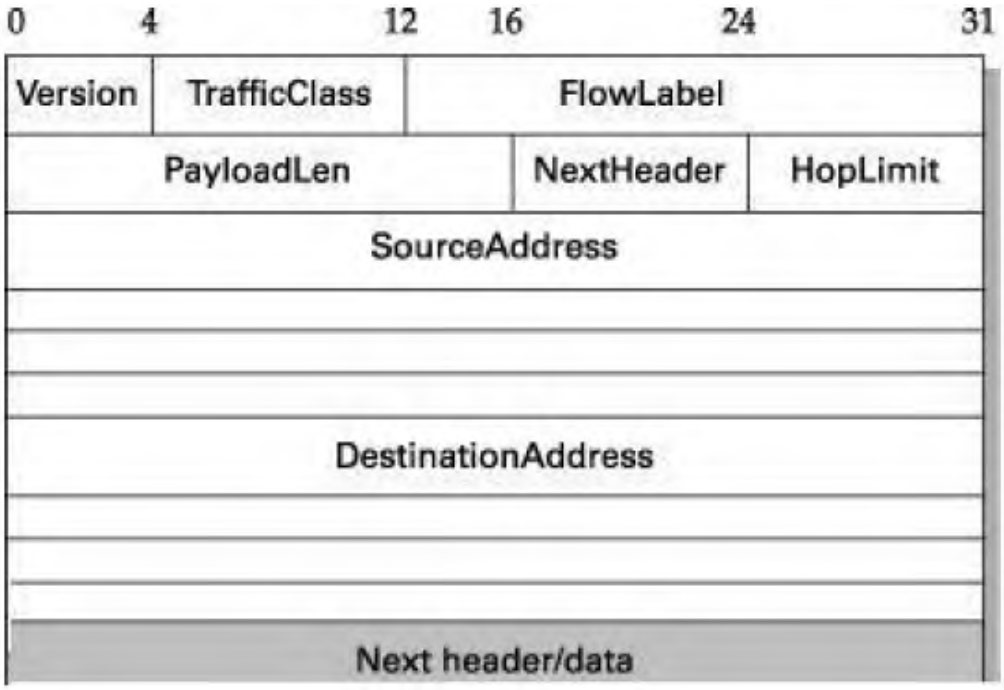
- IPv6 provides a 128-bit address space to handle up to 3.4 × 10 38 nodes.
- IPv6 uses *classless* addressing, but classification is based on MSBs.
- The address space is subdivided in various ways based on the leading bits.

ADDRESS NOTATION OF IPV6

- Standard representation of IPv6 address is ***x*** **:** ***x*** **:** ***x*** **:** ***x*** **:** ***x*** **:** ***x*** **:** ***x*** **:** ***x*** where *x* is a 16-bit hexadecimal address separated by colon (:).
- For example, 47CD **:** 1234 **:** 4422 **:** ACO2 **:** 0022 **:** 1234 **:** A456 **:** 0124

PACKET FORMAT OF IPV6

- IPv6 base header is 40 bytes long.



- ***Version*** — specifies the IP version, i.e., 6.
- ***Traffic Class*** — defines priority of the packet with respect to traffic congestion. It is either congestion-controlled or non-congestion controlled
- ***Flow Label*** — provides special handling for a particular flow of data. Router handles different flows with the help of a flow table.
- ***Payload Len*** — gives length of the packet, excluding IPv6 header.

- ***Next Heade***r — Options are specified as a header following IP header.
- NextHeader contains a pointer to optional headers.
- ***Hop Limit*** — Gives the TTL value of a packet.
- ***Source Address / Destination Address*** — 16-byte addresses of source and destination host
- **Auto Configuration** — Auto or stateless configuration of IP address to hosts without the need for a DHCP server, i.e., plug and play.
- **Advanced Routing** — Enhanced routing support for mobile hosts is provided.
- **Additional Functions —** Enhanced routing functionality with support for mobile hosts.
- **Security —** Encryption and authentication options provide confidentiality and integrity.
- **Resource allocation —** Flow label enables the source to request special handling of real-time audio and video packets

ADVANTAGES OF IPV6

- *Address space* **—** IPv6 uses 128-bit address whereas IPv4 uses 32-bit address. Hence IPv6 has huge address space whereas IPv4 faces address shortage problem.

- *Header format* — Unlike IPv4, optional headers are separated from base header in IPv6. Each router thus need not process unwanted addition information.
- *Extensible* — Unassigned IPv6 addresses can accommodate needs of future technologies.