6.7.2 IPv6 Facts

IP version 6 (IPv6) was developed to address the fact that IPv4 addresses have been exhausted. The IPv6 address is a 128-bit binary number. The following list describes the features of an IPv6 address:

- The address is made up of 32 hexadecimal numbers organized into 8 quartets (for example, 35BC:FA77:4898:DAFC:200C:FBBC:A007:8973).
- The quartets are separated by colons.
- Each quartet is represented as a hexadecimal number between 0 and FFFF. Each quartet represents 16 bits of data (FFFF = 1111 1111 1111 1111).
- Leading zeros can be omitted in each section. For example, the quartet 0284 could also be represented by 284.
- Addresses with consecutive zeros can be expressed more concisely by substituting a two colons for the group of zeros. For example:
  - FEC0:0:0:0:78CD:1283:F398:23AB
  - FEC0::78CD:1283:F398:23AB (concise form)
- If an address has more than one consecutive location where one or more quartets are all zeros, only one location can be abbreviated. For example, FEC2:0:0:0:78CA:0:0:23AB could be abbreviated as: FEC2::78CA:0:0:23AB or FEC2:0:0:0:78CA::23AB, but not FEC2::78CA::23AB
- The 128-bit address contains the following two parts:

Component	Description
Prefix	The first 64 bits are known as the prefix. ▪ The 64-bit prefix can be divided into various parts and each part has a specific meaning. Parts in the prefix can identify the geographic region, the ISP, the network, and the subnet. ▪ The prefix length identifies the number of bits in the relevant portion of the prefix. To indicate the prefix length, add a slash (/) followed by the prefix length number. Full quartets with trailing 0s in the prefix address can be omitted (for example, 2001:0DB8:4898:DAFC::**/**64). ▪ Because addresses are allocated based on physical location, the prefix generally identifies the location of the host. The 64-bit prefix is often referred to as the global routing prefix.
Interface ID	The last 64 bits are the interface ID. This is the unique address assigned to an interface. ▪ Addresses are assigned to interfaces (network connections), not to the host. Technically, the interface ID is not a host address. ▪ In most cases, individual interface IDs are not assigned by ISPs, but are rather generated automatically or managed by site administrators. ▪ Interface IDs must be unique within a subnet, but can be the same if the interface is on different subnets. ▪ On Ethernet networks, the interface ID can be automatically derived from the MAC address. Using the automatic host ID simplifies administration.