MAC Address in Computer Networks

Media Access Control (MAC) Address

Media Access Control (MAC) address is a physical address that works at the data link layer of the OSI model.

- A MAC address is a 48 or 64-bit address associated with a network adapter.
- MAC addresses are linked to the hardware of the network adapters, hence they are also known as the "hardware address" or "physical address."
- MAC addresses uniquely identify the adapter on the LAN.
- MAC addresses are expressed in hexadecimal notation. For example, "01-23-45-67-89-AB" in a 48-bit address or "01-23-45-67-89-AB-CD-EF" in a 64-bit address. Sometimes, colons (:) are used instead of dashes (-).
- MAC addresses are often considered permanent, but in some conditions, they can be changed.

Types of MAC Addresses

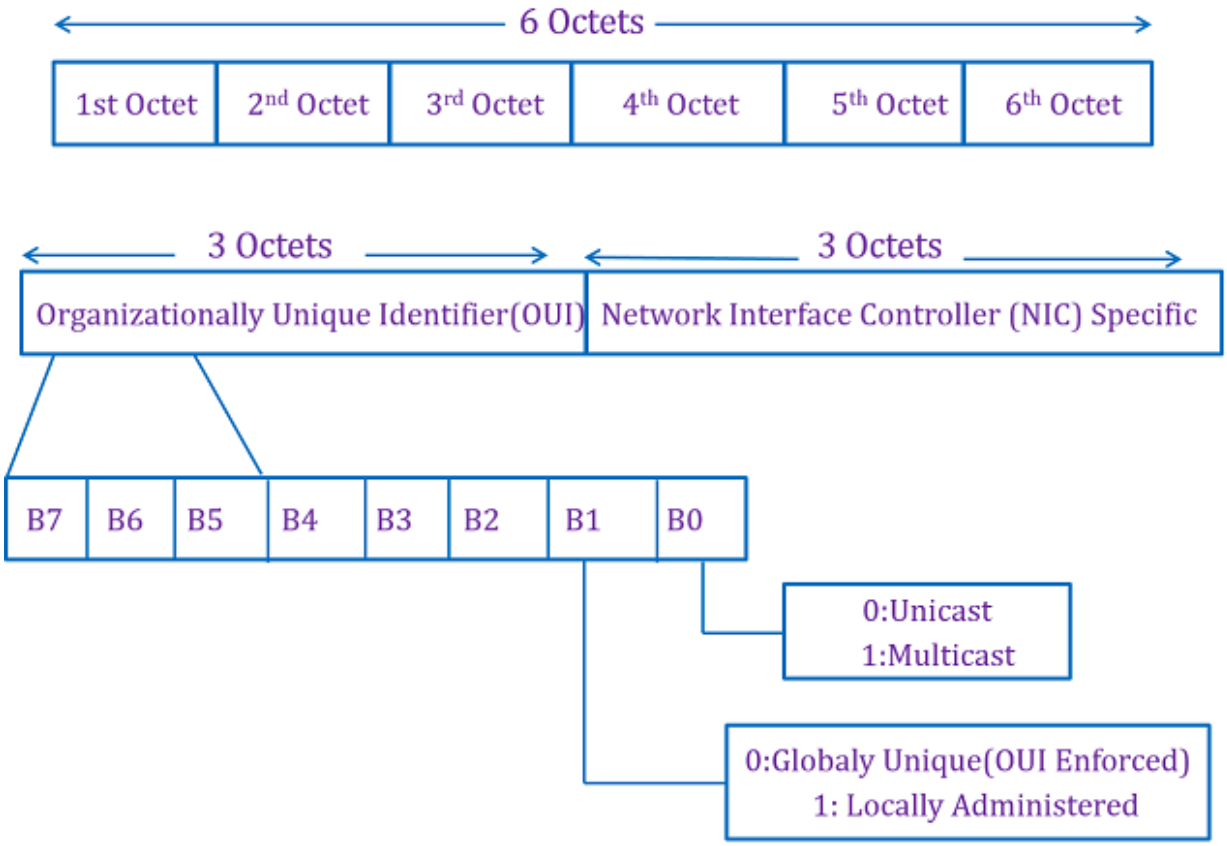
There are three types of MAC addresses –

- Unicast MAC Address
- Multicast MAC address
- Broadcast MAC address

MAC Address Format

A 48-bit MAC address is represented as a string of six octets, "MM:MM:MM:SS:SS:SS".

- The first half (24 bits) of the MAC address contains the ID number of the adapter manufacturer. These IDs are regulated by an Internet standards organization.
- The second half (24 more bits) of the MAC address represents the serial number assigned to the adapter by the manufacturer.



As shown in the above diagram, MAC addresses are 12-digit hexadecimalnumbers (48 bits in length or 6-byte binary number). For example, let's take a network adapter with the MAC address "00-A0-C9-14-C8-29." The OUI (Organizational Unique Identifier) for the manufacture of this router is the first three octets ("00-A0-C9") is Intel corporation and the rightmost six digits represent the Network Interface Controller.

OUIs of some well-known manufacturers –

- "00-14-22" – Dell
- "00-04-DC" – Nortel
- "3C:5A: B4" – Google, Inc.