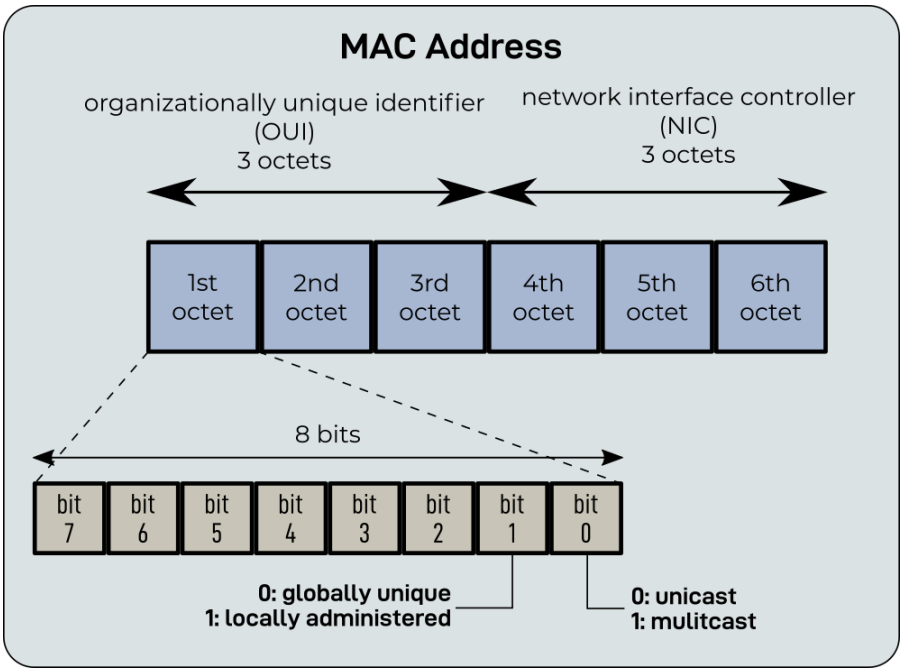
MAC Address Format

In order to make computer devices or hardware interfaces within the same local network to communicate with each other, a unique identifier is required so that each machine can recognize the other machine. This identifier is called the MAC address. This MAC address is assigned by the manufacturer of the device. If there is communication with remote network over internet, IP address is used instead. MAC address can't be changed as it is assigned by the manufacturer during production phase. IP address can be changes according to the operating network.

In order to make sure that no network device will have the same MAC address of other devices. IEEE is organizing global MAC address generation. If an organization wants to have MAC address for its products, it has to pay 550$ for IEEE Registration Authority to get a block of 4096 MAC addresses (IAB "Individual Address Block"), or pay 1650$ to get a block of 16 M MAC addresses (OUI "Organizationally Unique Identifier").

IEEE defined two standards for the format of MAC addresses, EUI-48 and EUI-64. The first one uses 48 bits for describing the MAC address, the other uses 64 bits. The format of EUI-48 can be shown in the figure.



This format consists of 6 octets. What is important to point out here is the first and second bits of the first octet are used for special purpose. The First bit is used for what is called group addressing. If there is a message that is needed to be sent to a set of Network Interface Controllers, the first bit will be set to 1 in this message. According to that all the specified NIC will accept this message. If the first bit is set to 0, this message will be accept by specific NIC.

The second bit is used to indicate if the MAC address is generated as a global identifier or used as a local identifier. Global identifiers are unique and depend on the manufacturer who produced the network device. Local identifier can be generated for local usage within some organizations.

For more details about this format, it is defined in the standard ISO/IEC 10039.