**MAC ADDRESSING**

# **INTRODUCTION OF MAC ADDRESS IN COMPUTER NETWORK**

# **MEDIA ACCESS CONTROL (MAC) ADDRESS**

MAC Addresses are unique **48-bits** hardware number of a computer, which is embedded into a network card (known as a **Network Interface Card**) during the time of manufacturing. MAC Address is also known as the **Physical Address** of a network device. In IEEE 802 standard, Data Link Layer is divided into two sublayers.

1. Logical Link Control(LLC) Sublayer
2. Media Access Control(MAC) Sublayer

MAC address is used by the Media Access Control (MAC) sublayer of the Data-Link Layer. MAC Address is worldwide unique since millions of network devices exist and we need to uniquely identify each.

### FORMAT OF MAC ADDRESS

MAC Address is a 12-digit hexadecimal number (6-Byte binary number), which is mostly represented by Colon-Hexadecimal notation. The First 6-digits (say 00:40:96) of MAC Address identifies the manufacturer, called OUI (**Organizational Unique Identifier**). IEEE [Registration Authority Committee](http://standards.ieee.org/develop/regauth/index.html) assigns these MAC prefixes to its registered vendors.

Here are [some OUI](http://standards-oui.ieee.org/oui/oui.txt) of well-known manufacturers :

Command for UNIX/Linux - *ifconfig -a*

*ip link list*

*ip address show*

Command forWindows OS -  *ipconfig /all*

MacOS -  *TCP/IP Control Panel*

### TYPES OF MAC ADDRESS

**1. UNICAST:**

A Unicast addressed frame is only sent out to the interface leading to a specific NIC. If the LSB (least significant bit) of the first octet of an address is set to zero, the frame is meant to reach only one receiving NIC. MAC Address of source machine is always Unicast.

**2. MULTICAST:**

The multicast address allows the source to send a frame to a group of devices. In Layer-2 (Ethernet) Multicast address, LSB (least significant bit) of the first octet of an address is set to one. IEEE has allocated the address block 01-80-C2-xx-xx-xx (01-80-C2-00-00-00 to 01-80-C2-FF-FF-FF) for group addresses for use by standard protocols.

**3.BROADCAST:**

Similar to Network Layer, Broadcast is also possible on the underlying layer (Data Link Layer). Ethernet frames with ones in all bits of the destination address (FF-FF-FF-FF-FF-FF) are referred to as the broadcast addresses. Frames that are destined with MAC address FF-FF-FF-FF-FF-FF will reach every computer belonging to that LAN segment.

### CHARACTERISTICS OF MAC ADDRESS:

Media Access Control address (MAC address) is a unique identifier assigned to most network adapters or network interface cards (NICs) by the manufacturer for identification and used in the Media Access Control protocol sub-layer.  
An Ethernet MAC address is a 48-bit binary value expressed as 12 hexadecimal digits (4 bits per hexadecimal digit). MAC addresses are in a flat structure and thus they are not routable on the Internet. Serial interfaces do not use MAC addresses. It does NOT contain a network and host portion with the address. It is used to deliver the frame to the destination device.