

00-C0-4F-CD-B9-0E

MAC
(Media Access Control)
Address

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In computer networking a Media Access Control Address (**MAC Address**) is a unique identifier attached to most forms of networking equipment.

MAC addresses are also known as **Hardware Addresses** or **Physical Addresses**.

Most layer 2 network protocols use one of three numbering spaces managed by the IEEE:

MAC-48

EUI-48

EUI-64

which are designed to be globally unique. Not all communications protocols use MAC addresses, and not all protocols require these globally unique identifiers.

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The IEEE claims trademarks on the names "EUI-48" and "EUI-64". (The "EUI" stands for Extended Unique Identifier.) The original IEEE 802 MAC address, now officially called "MAC-48", comes from the Ethernet specification. Since the original designers of Ethernet had the foresight to use a 12-digit hexadecimal numbers 48 bits in length address space, there are potentially 2^{48} or 281,474,976,710,656 possible MAC addresses.

Printed Format

The standard format for printing MAC-48 addresses in human-readable media is three groups of four hexadecimal digits, separated by dots (.), in transmission order; e.g., 0123.4567.89ab. Very few products do this.

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The most common format is six groups of two hexadecimal digits, separated by colons (:) or hyphens (-), still in transmission order, as in

01:23:45:67:89:ab or 01-23-45-67-89-ab; this form is also commonly used for EUI-64. By convention, MAC addresses are usually written in one of the following two formats:

MM:MM:MM:SS:SS:SS OR MM-MM-MM-SS-SS-SS

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The first half of a MAC address contains the ID number of the Device Manufacturer. These IDs are regulated by an Internet standards body. The second half of a MAC address represents the serial number assigned to the adapter by the manufacturer.

In the example,

00:A0:C9:14:C8:29

The prefix

00A0C9

indicates the manufacturer is Intel Corporation.

Why MAC Addresses?

Networking Architectures generally adopt the OSI model.

In this model, network functionality is subdivided into layers.

MAC addresses function at the **Data Link Layer** (layer 2 in the OSI model).

They allow computers to uniquely identify themselves on a network at this relatively low level.

MAC vs. IP Addressing

Whereas MAC addressing works at the data link layer, IP addressing functions at the network layer (layer 3). It's a slight oversimplification, but one can think of IP addressing as supporting the software implementation and MAC addresses as supporting the hardware implementation of the network stack.

The MAC address generally remains fixed and follows the network device, but the IP address changes as the network device moves from one network to another.

How can we see MAC Address?

If TCP/IP are installed on a system, then execute following command from a Command Prompt window.

click **Start**, then **Run**, then type **cmd** in the text box.

Type in the Command Prompt Windows.

ipconfig/all

The 12-digit Physical Address is the same as MAC address.

The LAN card will accept only 3 types of MAC address:

Unicast, Frames with destination to the exact MAC address .

Broadcast, Has all 48 bits set to binary 1 (or Hex FF FF FF FF FF FF). This type of frame is used when the sender does not know the destination MAC address it tries to communicate , so we broadcast to all .

Multicast, Addressing to groups of LAN cards that are related in some way. The LAN cards have to be configured to know they are part of a multicast group .

