

Standard Group MAC Addresses: A Tutorial Guide

Introduction

The Standards for Local Area Networks (LANs) generally comprise the physical layer, the medium access control (MAC) sublayer, and the logical link control (LLC) sublayer. In OSI terminology, the MAC and LLC sublayers are considered to be sublayers of the OSI Data Link layer. Both the MAC and LLC sublayers contain fields for addressing.

A Universally Administered Address Block has been allocated for the assignment of Group MAC Addresses for use in Standards. This tutorial material contains a description of the MAC addressing conventions, the criteria that will be used when consideration for an assignment is made.

Scope

This tutorial material provides:

- a) A description of the Binary and Hexadecimal Representation of IEEE 802 LAN MAC addresses.
- b) A description of the sub-division of the Universally Administered Standard Group MAC Address Block into: IEEE 802.1D MAC Bridge Filtered MAC Group Addresses and Standard MAC Group Addresses.

Binary and Hexadecimal Representation of LAN MAC Addresses

The Hexadecimal (in hexadecimal) Representation of LAN MAC addresses have been defined in ISO/IEC 10039 (LAN MAC Service Definition) and are used throughout this document.

Figure 1 illustrates an example of a 48-bit LAN MAC address in both Binary and Hexadecimal Representations.

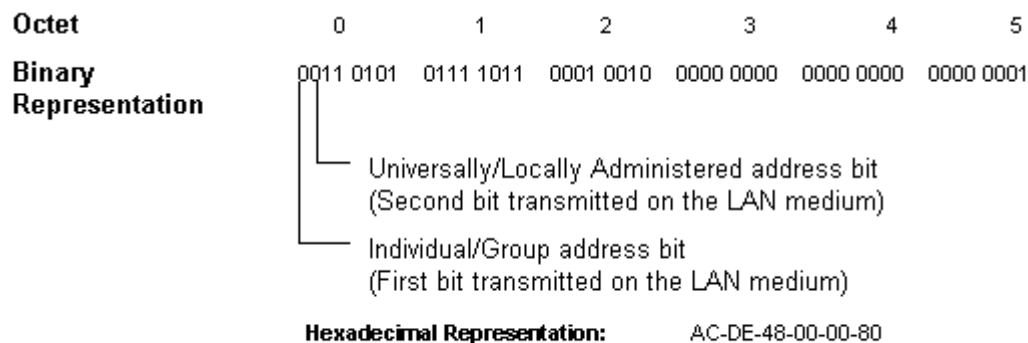


Figure 1 - Representation of LAN MAC Addresses

Standard Group MAC Addresses

Figure 1 - Representation of LAN MAC Addresses

The 48-bit address (universal or local) is represented as a string of six octets. The octets are displayed from left to right, in the order that they are transmitted on the LAN medium, separated by hyphens. Each octet of the address is displayed as two hexadecimal digits. The bits within the octets are transmitted on the LAN medium from left to right. In the Binary Representation the first bit transmitted, of each octet, on the LAN medium is the least significant bit of that octet. The Individual/Group address bit is the least significant bit. The left-most bit of the Binary Representation (Individual/Group address bit) of a MAC address distinguishes individual from group addresses. The Universally/Locally administered address bit is the next bit following the Individual/Group address bit. The U/L bit indicates whether the MAC address has been universally or locally assigned.

For the previous example, the first octet transmitted is AC and the last octet transmitted is 80. The first bit transmitted is the low order bit of AC, a zero. The last bit transmitted is the high order bit of 80, a one.

Standard Group MAC Addresses

General

All MAC protocol data units contain addressing information. The addressing information consists of two fields: the destination MAC address and the source MAC address. Both of these address fields are 48-bit fields; the structure and semantics of the address field are defined in ISO/IEC 10039.

Standard Group MAC Addresses are MAC addresses that have been allocated for use by standard protocols and consist of the following four sets of MAC Group Addresses:

- IEEE 802.1D MAC Bridge Filtered MAC Group Addresses,
- Standard MAC Group Addresses,
- MAC Group Addresses used in ISO 9542, and
- Token Ring LAN Functional Addresses.

These four sets of MAC Group Addresses are described below.

IEEE 802.1D MAC Bridge Filtered MAC Group Addresses and Standard MAC Group Addresses

The following 48-Bit Universal Address Block has been allocated for use by standard protocols:

0X-80-C2-00-00-00 to 0X-80-C2-FF-FF-FF

where X has the hexadecimal value:

0 for individual addresses, and

Standard Group MAC Addresses

1 for group addresses.

The group address block has been divided into two categories:

- IEEE 802.1D MAC Bridge Filtered MAC Group Addresses: 01-80-C2-00-00-00 to 01-80-C2-00-00-0F; MAC frames that have a destination MAC address within this range are not relayed by MAC bridges conforming to IEEE 802.1D.
- Standard MAC Group Addresses: 01-80-C2-00-00-10 to 01-80-C2-FF-FF-FF; MAC frames that have a destination MAC address within this range may be relayed by MAC bridges conforming to IEEE 802.1D.

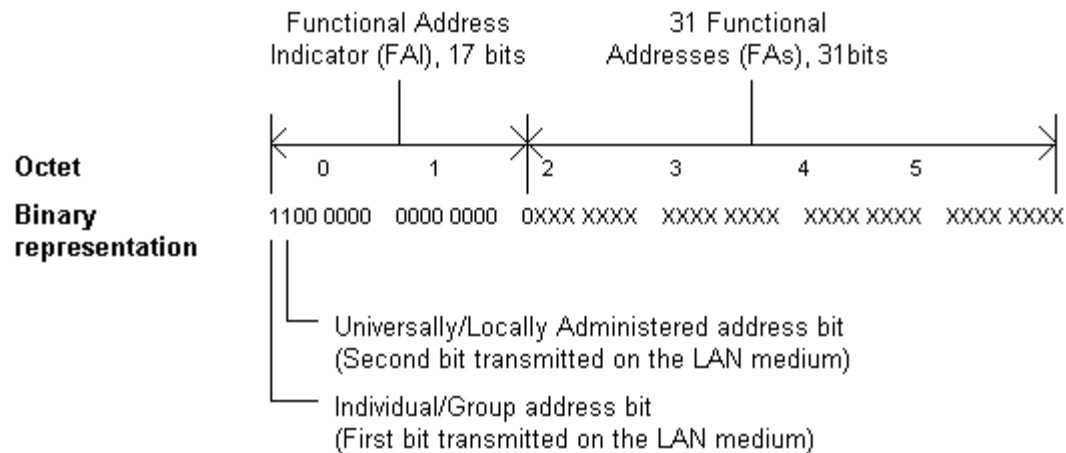
MAC Group Addresses used in ISO 9542

Prior to the allocation of a 48-Bit Universal Address for use by standard protocols the following two Group MAC Address values were assigned, in perpetuity to ISO, for use in ISO 9542

MAC Group Addresses used in ISO 9542:
09-00-2B-00-00-04 and 09-00-2B-00-00-05

Token Ring LAN Functional Addresses

Due to limitations in existing intermediate systems and end systems that implement IEEE 802.5 it is necessary to allocate several "functional addresses", (see figure 2), that correspond to Standard Group MAC Addresses for use with ISO 9542 when operating on an IEEE 802.5 LAN. Potential users of these addresses should be aware that, since these addresses are derived from the locally administered address space, there are no guarantees that the addresses will be used only for the listed purposes.



Note: Functional Addresses are defined in ISO /IEC 8802-5.

Figure 2 - Representation of Token Ring LAN Functional Addresses

Criteria for assignment of Standard Group MAC Addresses

Standard Group MAC Addresses

General considerations

Unlike LLC reserved addresses Standard Group MAC Addresses are not a scarce resource. However, out of the range of Standard Group MAC Addresses only 16 addresses have been reserved that are not relayed by MAC Bridges. Therefore these 16 values are considered a scarce resource.

Assignment of Standard Group MAC Addresses are made in perpetuity.

A case-by-case review against the criteria for assignment is made before assignment of a Standard Group MAC Address to a standard protocol.

Specific considerations

A need for a protocol to be assigned a reserved value and included in clause 6 is brought to the attention of the IEEE-RA. A copy of the protocol standard must accompany a request for a reserved value.

The proposed protocol should be one which:

- is a standard published by a standards organization whose publications are made following consultation for its technical development and are generally available;
- has a potentially large field of application.

Group MAC addresses for vendor specific proprietary protocols should be assigned out of the vendor's Universally Administered Address Block.