IEEE 802-1-24-0034-01-Mntg

**Proposal to revise bit-ordering material in P802REVc D2.0**

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**Comment: (p21 l15 §3.1)**

The definition of "canonical format" is problematic. It specifies the order in which the bits are "conveyed" as "the same bit ordering as in the hexadecimal representation." However, the hexadecimal representation is NOT an indication of bit ordering at all. Hexadecimal representation (per 8.1) specifies how a bit string in represented in a string of hexadecimal digits. That doesn't limit the order in which bits may be transmitted. 8.6 describes the bits of an octet being transmitted either LSB-first or MSB-first; that's a separate issue from how the set of bits is transcribed in hexadecimal characters. Furthermore, 8.6 confuses issues by referring to LSB as "canonical order"; here the intent seems to be that "canonical order" may represent a different concept from "canonical format", but readers are likely to be confused. Likewise, the draft refers to both "bit-reversed representation" and bit-reversed order"; with some confusion. And, yet furthermore, the relevance of some of this "bit-reversed" material is obsolete; consider, for example, this note in 8.1: "The bit-reversed representation is of historical interest only and is no longer applicable to any active IEEE 802 standard." It is appropriate to review the entire draft, unifying the language and removing obsolete material, considering also Annex C ("Examples of bit ordering for addresses").

**Suggested remedy:**

Adopt remedies in "Proposal to revise bit-ordering material in P802REVc D2.0" <https://mentor.ieee.org/802.1/documents?is_dcn=0034&is_group=Mntg&is_year=2024>

1. **Hexadecimal and bit-reversedrepresentation**

***In 8.1, before p 41 line 23, insert a second note:***

*NOTE–Many representations of MAC addresses outside of IEEE 802 standards use hexadecimal digits ordered as in the hexadecimal representation but with colons separating octet numerals.*

* {Rationale: This colon-separated notation is very common in products and product documentation. The note lets the standard recognize that reality and may aid readers to more easily interpret industrial materials. The remainder of the material on hexadecimal and bit-reversed notation is self-consistent and unrelated to separate discussions about bit ordering in bit-serial transmissions.}

1. **Bit-order transmission**
2. *Replace the contents of Annex C with “This annex was deleted during the development of IEEE Std 802-202x.”*

* {Rationale: As explained in the introduction to Annex C, “This annex illustrates the various bit- and octet-transmission scenarios that can occur, and it is intended as a basis for clarifying the issue of bit-ordering for EUI-48s across different MACs.” It proceeds to describe and contrast canonical and noncanonical formats.However, the concept of canonical format is rendered obsolete by this sentence in 8.6: “However, if MSB (bit-reversed) serial transmission order is used, the standard shall assure that a MAC address will be the same at the MSAP whether it is a MAC address field or an address appearing in the information field.” This specifies the bit order as mandatory. If only one ordering is allowed, there is no point in describing others. Therefore, Annex C is obsolete and should be deleted. This contribution proposes to significantly revise 8.6 and delete that sentence. However, the revision nevertheless leaves Annex C obsolete.}

1. *In §3.1, delete the definitions of “canonical format” and “noncanonical format”.*

* {Rationale: (a) These definitions confuse bit ordering with hexadecimal representation [which does not indicate bit order]. (b) The definitions diverge from the description of the same terms in Annex C. (c) The concept of canonical format is used only in Annex C, which is obsolete and should be deleted, leaving no purpose for defining the terms.}

1. *Revise §8.6 as follows:*

**§8.6 Bit-ordering within octets**

Clause 5 describes the reference models for IEEE Std 802 networks. Regarding interoperability at the MAC Service Access Point (MSAP), IEEE Std 802 network standards specify how octets from the LLC are transmitted and received. Though most IEEE 802 network Physical Layers encode multiple bits or multiple octets of the MAC frame for transmission on the medium, a few IEEE 802 network Physical Layers have a one-to-one mapping of a bit in the MAC frame to an encoded bit on the medium.

In this case of bit-serial transmission, some MAC standards have specified serial transmission of the bits of an octet LSB first, and other MAC standards specify transmission of the MSB first.

For frames transmitted in bit-serial fashion, IEEE 802 standards shall specify LSB-first transmission for each octet of a source or destination address field. For frames transmitted in bit-serial fashion, IEEE 802 standards should specify LSB-first transmission for each octet of the frame.

* {Reasoning: The draft is softly implying that bit-serial address fields are always sent LSB-first. However, it suggests that only for the very first bit (“the I/G bit as being the first bit of a frame to be transmitted with bit serial transmission”); the reader needs to generalize that to the entire first octet and to the other octets of the address.}
* {Reasoning for deletion of last sentence: It’s not clear what standard is “the standard” and how that standard can solve the problem. For example, if it’s a MAC standard, how can a MAC standard assure the bit order of data received (at the MSAP) from the LLC? If it’s a higher-layer protocol standard, how can such a standard assure the bit order of data received (at the MSAP) from the MAC?