**Comments on 1-24-0045-00-Mntg**

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Comments:

All are related to Clause 3.1, page 22, lin 6:

|  |  |  |
| --- | --- | --- |
| CID | Comment | Suggested resolution |
| I-43 | If we're going to define one type of MAC frame we should have MAC frame defined. | Add:  medium access control (MAC) data frame: A data structure constructed by the MAC in accordance with a MAC protocol |
| I-42 | More technical information about how frames are formed rather than the meaning of the term. | change to: medium access control (MAC) data frame: A data structure consisting of fields in accordance with a MAC protocol,intended for the communication of data. |
| I-14 | Per 5.2.3, a MAC frame is a frame, and "frame" is already defined. So this definition is too complex; it's trying to define a frame again. Also, it's confusing because it says that a data frame can carry "user data and control information" and that "one of the fields contains a sequence of octets of user data." If a data frame can carry control information, it's a little hard to understand why we need such a term. Since the term does not seem to be used outside of the Definitions clause, maybe we do not. | Change to: "data frame: a frame containing user data”. Alternatively, delete the definition. |

A search through D2.0 for frame, yields the following:

1.1 Scope

“This standard contains descriptions of the IEEE 802® standards published by the IEEE for **frame**-based data networks as well as a reference model (RM) for protocol standards.”

Change: No change

Rationale: Text matches the scope

3.1 Definitions

**canonical format:** The format of a medium access control (MAC) data **frame** in which the octets of any 48-bit Extended Unique Identifiers (EUI-48s) or 64-bit Extended Unique Identifiers (EUI-64s) conveyed in the MAC user data field have the same bit ordering as in the hexadecimal representation.

Change: No change

Rationale: Deleted in the resolution of another comment.

**EtherType:** A 2-octet value assigned by the IEEE Registration Authority (RA) that provides data field context for **frame** interpretation (protocol identification).

Change: Change to “frame” to be “medium access control (MAC) frame”.

Rationale: The usage here is only for MAC frames.

**filtering:** A function in a bridge that is used to determine if a received **medium access control (MAC)** **frame** is to be forwarded or discarded on any given outbound port.

Change: No change

Rationale: This is the correct usage.

**forwarding:** A function in a bridge that transfers a received **medium access control (MAC)** **frame** to one or more outbound ports.

Change: No change:

Rationale: This is the correct usage.

**frame:** The unit of data transfer between peer medium access control (MAC) sublayer entities.

Either:

Change: Delete definition

Rationale: The MAC frame definition is the only one we need in this standard

“Frame” is not generally accepted as a generic term applicable at any layer. It is most commonly understood as a Layer 2 concept (sometimes Layer 1), and the draft should not contradict that understanding.

**medium access control (MAC) frame:** A data structure consisting of fields in accordance with a MAC protocol, for the communication of a unit of user data or control information in a network; one of the fields contains a sequence of octets of user data.

Change: No change

Rationale: This is definition we want to keep. We need to define the concept of “MAC frame” but do not need a definition of “MAC data frame”. {I personally prefer that the draft uses the term “frame” instead of “MAC frame” but can accept either.}

**noncanonical format:** The format of a medium access control (MAC) data frame in which the octets of 48-bit Extended Unique Identifiers (EUI-48s) or 64-bit Extended Unique Identifiers (EUI-64s) conveyed in the MAC user data field have the same bit ordering as in the bit-reversed representation.

Change: No change here.

Rationale: Deleted as part of another comment.

4.1 Key concepts

p26, l 5:

IEEE 802 networks use **frame**-based communications over a variety of media to connect various digital apparatus regardless of computer technology and data type.”

Change: No change

Rationale: The usage here is generic

p26, l 8:

The basic communications capabilities provided by all IEEE 802 standards are **frame** based with source and destination addressing and asynchronous timing of the **frames**13. In a **frame**-based system, the format is a variable-length sequence of data octets. By contrast, cell-based communication transmits data in fixed-length units in specified time intervals while isochronous communication transmits data as a steady stream of octets, or groups of octets, at equal time intervals. Some IEEE 802 networks can provide scheduled **frame** transmissions in addition to or alternatively to asynchronous **frame** transmissions.

13Some IEEE 802 standards have asynchronous symbol timing within a **frame**.

Change: No change

Rationale: The usage here is generic

5.5.2 LLC sublayer

p32, l 18:

1) IEEE Std 802.1AE™ provides MAC security with connectionless user data confidentiality, **frame** data integrity, and data origin authenticity by media access independent protocols and entities that operate transparently to MAC clients.

Change: Change to “frame” to be “medium access control (MAC) frame”.

Rationale: The usage here is only for MAC frames.

5.2.3 MAC sublayer

p26, l31:

The MAC sublayer provides a data transfer service to the LLC sublayer; a data unit received by the MAC sublayer from the LLC sublayer is transferred to a peer MAC sublayer for delivery to its LLC sublayer. The unit that carries the data for transfer between MAC sublayer entities is referred to as a MAC **frame** or simply a **frame**. In some MAC types, **frames** are also used to support other MAC sublayer functionality, such as the transfer of control or management information.

Change: Delete “or simply a frame” and change “frames” to be “MAC frames”

Rationale: We are using MAC frame to refer to the unit of data exchange between MACs, hence this should be the usage here.

The principal functions of the MAC sublayer comprise the following:

— **Frame** delimiting and recognition

— Addressing of destination stations (both as individual stations and as groups of stations)

— Conveyance of source-station addressing information

— Transparent data transfer of PDUs from the next higher sublayer

— Protection against errors, generally by means of generating and checking **frame** check sequences

— Control of access to the physical transmission medium

Change: Change “Frame delimiting” to be “MAC frame delimiting” and change “frame check sequences” to be “MAC frame check sequences”

Rationale: These are all MAC sublayer functions, hence MAC frame fits here.

Other functions of the MAC sublayer—applicable particularly when the supporting implementation includes interconnection devices such as bridges—include flow control between an end station and an interconnection device, as described in 5.3, and forwarding of **frames** according to their destination addresses to reduce the extent of propagation of **frames** in parts of an IEEE 802 network that do not contain communication paths leading to the intended destination end station(s).

Change: Change “frames” to be “MAC frame” in two locations.

Rationale: These are all MAC sublayer functions, hence MAC frame fits here.

The functions listed are those of the MAC sublayer as a whole. Responsibility for performing them is distributed across the transmitting and receiving end stations and any interconnection devices such as bridges. Devices with different roles, therefore, can behave differently in support of a given function. For example, the basic transmission of a **MAC** **frame** by a bridge is very similar to transmission by an end station, but not identical. Principally, the handling of source-station addressing is different.

The various MAC specifications all specify **MAC frame** formats in terms of a serial transmission model for the service provided by the supporting PHY. This model supports concepts such as “first bit (e.g., of a particular octet) to be transmitted” and a strict order of octet transmission in a uniform manner. However, the ways in which the model has been applied in different MAC specifications are not completely uniform with respect to bit-ordering within octets (see Clause 8, and particularly 8.6, for examples and explanation).The serial transmission model does not preclude current or future MAC specifications from using partly or wholly octet-oriented specifications of **frame** formats or of the interface to the PHY.

Change: Change “frame formats” to be “MAC frame formats”.

Rationale: This refers only to the MAC frames. Other usages of “MAC frame” are correct here.

5.2.4 PHY

p33, l22

Whereas the service offered to the MAC sublayer is expressed as the transfer of bits (in sequences representing **MAC frames**), the symbols that are encoded for transmission do not always represent individual bits.

Change: No change

Rationale: This is the correct usage.

5.3.2.2 Bridge relaying and filtering

A bridge processes protocols in the MAC sublayer and is functionally transparent to LLC sublayer and higher layer protocols. **MAC frames** are forwarded between access domains, or filtered (i.e., not forwarded to certain access domains), on the basis of addressing and protocol information contained in the **MAC frame**. Figure 6 shows the position of the bridging functions within the MAC sublayer; note particularly that relaying and filtering are considered to belong entirely within the MAC sublayer.

Filtering by bridges tends to confine traffic to only the parts of the bridged network

Change: No change

Rationale: This is the correct usage.

5.3.2.4 Transparent bridging

IEEE Std 802.1Q specifies transparent bridging operation, so called because the MAC bridging function does not require the **MAC user frames** transmitted and received to carry any additional information relating to the operation of the bridging functions; end-station operation is unchanged by the presence of bridges.

Change: Change “the MAC user frames transmitted and received” to be “MAC frames carrying data among end-station peers”

Rationale:

The statement applies to MAC data frames but not, e.g., to frames exchanged among bridges, such as BPDU frames. The statement is false if that limitation is lifted. This change covers the limitation without introducing a new term.

5.3.2.6 Time-Sensitive Networking (TSN)

c) **Frame** Preemption (IEEE Std 802.3-2022 [B8] Clause 99 and IEEE Std 802.1Q-2022, 5.26)

h) **Frame** Replication and Elimination for Reliability (IEEE Std 802.1CB-2017 [B5])

Change:. Change IEEE Std 802.1Q-2022, 5.26 to IEEE Std 802.1Q-2022, 6.7.2.

Rationale:The terminology should be consistent with that used in the references.

6.2 Error Ratios

The error performance of IEEE 802 networks is as follows:

a) For wired or optical fiber physical media: Within a single access domain, the probability that a transmitted **MAC frame** (excluding any preamble) is not reported correctly at the PHY service interface of an intended receiving peer MAC entity, due only to operation of the PHY, shall be less than 8 x 10-8 per octet of **MAC frame** length.

b) For wired physical media with **frames** shorter than 2048 octets: The probability that an MAC service data unit (MSDU) delivered at an MSAP contains an undetected error, due to operation of the MAC service provider, shall be less than 5 x 10-14 per octet of MSDU length.

c) For wireless physical media, the error performance within a single access domain is variable over time.

NOTE—For example, the worst-case probability of losing a maximum-length IEEE 802.3 **frame** at the PHY is to be less than 1.21 x 10-4, or approximately 1 in 8250. The worst-case probability that a similar **frame**, which contains an MSDU of 1500 octets, is delivered with an undetected error is to be less than 7.5 x 10-11, or approximately 1 in 13 300 000 000.

Change: Change “frames shorter” to be “MAC frame shorter” change “802.3 frame” to be “802.3 MAC frame” and “similar frame” to be “similar MAC frame”

Rationale: First usage of MAC frame is correct, make other usages consistent.

8.6 Bit-ordering and different MACs

p50, l 17:

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.

Change: No change.

Rationale: Usage is correct in this location.

P50, l 25

Some MAC standards have specified serial transmission of the bits of an octet LSB first (historically referred to as canonical order), and other MAC standards specifying transmission of the MSB first (historically referred to as bit-reversed order), but both specifying the I/G bit as being the first bit of a **frame** to be transmitted with bit serial transmission. Historically, this has created problems when MAC addresses occur within the information field of a **frame** (e.g., a management **frame**).

Change: Change “frame” to be “MAC frame” (3 locations).

Rationale: These are MAC frames, so use correct term.

N9.1 Introduction

P51, l 17 and l 23

NOTE 1—While every E-Type protocol identifier is an EtherType, not all EtherTypes are E-Type protocol identifiers. For example, some EtherType values are assigned to indicate specific Layer 2 functionality rather than a network-layer protocol; in these cases, a network-layer PDU is typically encapsulated and carried later in the **frame**.

P51, l 23

NOTE 2—While every L-Type protocol identifier is an LSAP address, not all LSAP addresses are L-Type protocol identifiers. For example, some LSAP address values are assigned to indicate specific Layer 2 functionality rather than a network-layer protocol; in these cases, a network-layer PDU is typically encapsulated and carried later in the **frame**.

Change: Change “frame” to be “MAC frame” (2 locations).

Rationale: These are MAC frames, so use correct term.

P53, l 31

While the contents of the PIF are sufficient to identify the protocol sufficiently for the HLPDE to direct the **frame** to the correct higher-layer protocol, the contents of the protocol subtype and protocol version identifier are intended to be used within the higher-layer protocol to direct the **frame** to the correct sub-protocol. The lengths of the protocol subtype and the protocol version identifier fields, as well as their order of appearance within the **frame**, are not constrained by this standard but are determined by the user. The IEEE 802 network has no visibility into this structure.

Change: Change “frame” to be “MAC frame” (3 locations).

Rationale: These are MAC frames, so use correct term.

9.2.4 Local Experimental EtherTypes

p 54, l 8

a) Since the format for protocols using the Local Experimental EtherTypes does not contain a means to

identify the administrative domain, it might not be possible to identify the protocol of a **frame** if

protocols developed within different administrative domains using Local Experimental EtherTypes

are used in the same network. Hence, the use of these EtherTypes to identify protocols can only be

achieved reliably if all uses of the EtherTypes are within the control of a single administrative

domain. Therefore, these EtherTypes shall not be used in protocols or products that are to be

released for use in the wider networking community, as freeware, shareware, or any part of a

company’s commercial product offering. Products shall be transitioned to a product EtherType

before it is deployed in an environment outside the developing organization’s administrative control,

for example, when deployed with a customer or any other connected environments for testing.

b) Local Experimental EtherType shall not be permanently assigned for use with a given protocol or

protocols.

c) End stations that bound any administrative domain should be configured to prevent **frames**

containing a Local Experimental EtherType from passing either into or out of a domain in which its

contents can be misinterpreted. For example, the default configuration of any firewall should be to

not pass this EtherType.

Change: Change “frame” to be “MAC frame” (3 locations).

Rationale: These are MAC frames, so use correct term.

9.5 PIF Encoding

p 55, l 17

If a bridge transforms the PIF encoding of a **frame** while relaying, the receiving end station is nevertheless be able to ascertain the destination protocol as long as it knows the final PIF encoding form.

Change: Change “frame” to be “MAC frame”.

Rationale: These are MAC frames, so use correct term.

9.5.2.2 Type 3 PIF encoding of an L-Type protocol identifier

The LLC Encapsulation EtherType does not support depadding of padded short **frames**. Likewise, Type 3 PIF encoding of an E-Type protocol identifier does not provide a Length for depadding. In either case, the higher-layer procotol might need to provide a depadding service for short **frames**. If the LLC service data unit is sufficiently long so that MAC padding is not added, then MAC uses neither the Length field nor the LLC Encapsulation EtherType as indicative of a Length value.

Change: Change “short frames” to be “short MAC frames” (2 locations).

Rationale: These are MAC frames, so use correct term.

B.3.1 IEEE 802.15.3TM RM

P71, l7

The **frame** convergence sublayer (FCSL) is used to allow multiple protocols to simultaneously access the services of an IEEE 802.15.3 PAN. IEEE Std 802.15.3 specifies an FCSL for connection to the ISO/IEC 8802-2 LPD.

Change: No change

Rationale: This is the term used in the standard.

C.2 Illustrative examples

p 80, l 1

- Noncanonical format: The bit-ordering of Figure C.3(b) is treated as a property of the EUI-48 rather

than of the MAC Address field as transmitted in **MAC frames**, and the EUI-48 octets are transmitted with the bit-ordering reversed compared with normal data octets. The noncanonical format is illustrated in Figure C.5.

p80 l 8

In Figure C.2, Figure C.3, Figure C.4, and Figure C.5, it can be seen that the interpretation of OUI bits as octet values is consistent. This reversal of the bit order applies only to all 6 octets (not just the OUI) of an EUI-48 placed in the MAC Information field of a **frame** by a protocol that uses the bit-reversed view of the EUI-48s derived from Figure C.3(b). **Frames** containing, or possibly containing, such EUI-48s are described as having noncanonical format. **Frames** that cannot contain such EUI-48s are described as having canonical format. Note that there is no way of knowing, from MAC layer information only, whether a particular **frame** is in canonical or noncanonical format. In general, this depends on which higher layer protocols are present in the **frame**.

Change: No change for this resolution.

Rationale: The contents of the Annex are being deleted.

Annex G

(informative)

Wake-on-LAN

p101, l 4

Wake-on-LAN (WoL) is a common protocol to wake up devices from a very low power mode. It can be implemented over IEEE 802 networks as a **frame** using the EtherType 08-42. WoL is not standardized in an IEEE 802 standard.

Change: Change “frame” to be “MAC frame”.

Rationale: The WoL frame as described here has an EtherType and is a MAC frame.