

Fixing EPD and LPD in IEEE Std 802-2014

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Source:

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Venue: 802.1 Maintenance TG, related to IEEE Std 802-2014

Abstract:

This document proposes maintenance corrections in the description of EtherType Protocol Discrimination (EPD) and LLC Protocol Discrimination (LPD) in IEEE Std 802-2014.

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Summary:

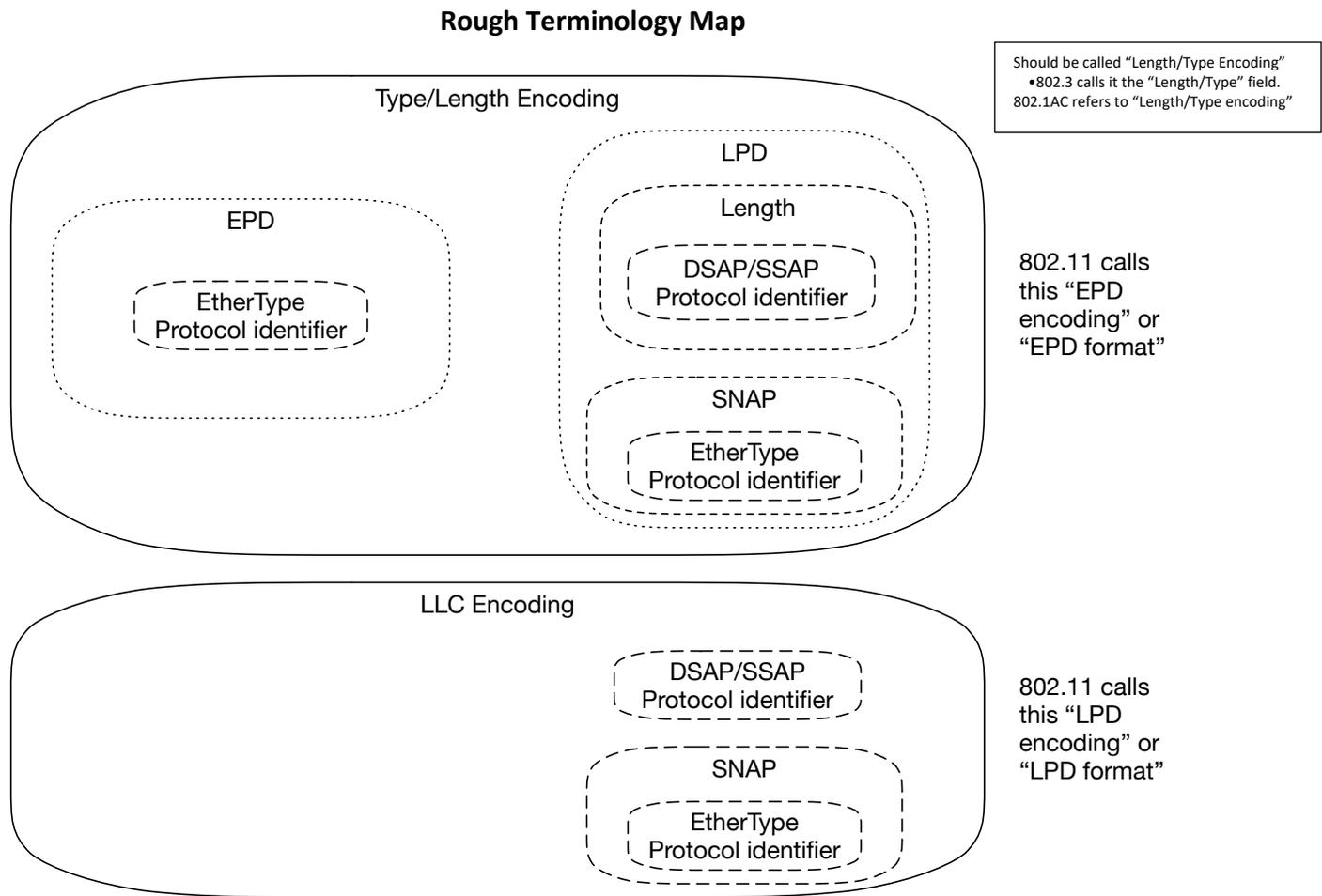
- EtherType protocol discrimination (EPD) and LLC protocol discrimination (LPD) are discussed in IEEE Std 802, IEEE Std 802.1AC, and IEEE Std 802.1Q; IEEE Std 802.11 too.
- Overall, the descriptions are imprecise, inconsistent, and confusing.
- This contribution proposes, as a first step, making some changes to IEEE Std 802-2014 within an amendment (such as IEEE P802f). Efforts are being made to align IEEE 802.11.
- Larger updates to IEEE Std 802 could be addressed in a followup revision.
- IEEE Std 802.1Q and 802.1AC will be addressed next.

Background Contributions:

- R. Marks, “What are EPD and LPD?”
[maint-Marks-epd-lpd-0719-v02.pdf](#)
- N Finn, “Why the EPD/LPD information in IEEE 802, IEEE 802.1AC, and 802.1Q must be fixed”
[maint-finn-epd-lpd-errors-0919-v02.pdf](#)
- R. Marks and N. Finn, “Clarifying EPD and LPD”
[maint-Marks-Finn-hlpde-1119-copyright](#)
- R. Marks, “EPD and LPD Terminology Misalignment in IEEE Std 802.1 and 802.11,” 2020-01-15

[IEEE 802.11-20-0174-01-0arc](#)

Figure from IEEE 802.11-20-0174-01-0arc:



Discussed by IEEE 802.11 Architecture Standing Committee (ARC) week of 2020-01-13; inclination of some participants is to propose to rename "EPD Encoding" and "LPD Encoding" during current development of 802.11 Revision ("REVmd").

ARC Reported (2020-01-16):

- **Clarifying EPD/LPD**
 - Reviewed: [11-20/0174r0](#)
 - Will continue to monitor 802.1's work on this
 - We may consider updates to 802.11
 - Author (Roger Marks) will work off-line based on comments, and target something for REVmd's ad hoc in Feb.

Proposed changes to IEEE Std 802-2014

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5.2.2 LLC sublayer

The LLC sublayer contains a variety of entities, as illustrated in Figure 6.

The higher layer protocol discrimination entity (HLPDE) is used by the LLC sublayer to determine the higher layer protocol to which to deliver an LLC sublayer protocol data unit (PDU). Discrimination is on the basis of the EtherType, the LLC addresses specified ISO/IEC 8802-2, or a user-specified value as discriminator. Two methods may be used in the HLPDE. The two methods are:

1) EtherType protocol discrimination (EPD), which ~~uses the EtherType value made available to the LLC sublayer through the MSAP~~ provides discrimination on the basis of the EtherType value (see subclause 9.2) made available to the LLC sublayer through the MSAP, or uses a specified EtherType value to indicate the presence of a user-specified protocol identifier

2) LLC protocol discrimination (LPD), which either uses the LLC addresses ~~defined in ISO/IEC 8802-2, as protocol identifiers or, in including~~ the Subnetwork Access Protocol (SNAP) format, uses a specified LLC value to encode an EtherType that serves as a protocol identifier or to indicate the presence of a user-specified protocol identifier

LLC encoding uses only LPD and supports discrimination by EtherType, LLC addresses, and user-specified protocol identifiers.

Standards that support EPD shall also support LPD in order to enable support for discrimination on the basis of LLC addresses. In this case, the HLDPE method is reflected in the format of the frame, and the standard specifies an encoding allowing EPD or LPD frames to be differentiated and thus freely intermixed.

Some IEEE Std 802™ standards specify Length/Type (LT) encoding in which the HLPDE method is designated using the value of a Length/Type field in the frame. For example, IEEE Std 802.3™ uses LT encoding indicating LPD when the Length/Type field is less than 1501 and EPD when it is greater than 1535. Since 2018, IEEE Std 802.11™ supports the same form of LT encoding. IEEE Std 802.11 formerly supported only LPD, and the standard specifies how the receiver can determine whether LT or LLC encoding is used in each link.

~~IEEE Std 802.3™ is capable of natively representing the EtherType within its MAC frame format, which is used to support EPD. IEEE Std 802.3 also natively supports ISO/IEC 8802-2 LPD (over a limited range of frame sizes). In other IEEE 802 networks, such as for IEEE Std 802.11™, LPD is also achieved using SNAP, as described in Clause 9. In either of these techniques, the EtherType is effectively being used as a means of identifying an LSAP that provides LLC sublayer service to~~

~~the protocol concerned. New IEEE 802 standards shall support protocol discrimination in the LLC sublayer using EPD.~~

New IEEE 802 standards shall support both EPD and LPD, using either LT encoding or some other means of distinguishing EPD from LPD frames [, and shall use only EPD to encode an EtherType serving as a protocol identifier].

9.2.1 Format, function, and administration

~~Protocol discrimination performed by the EPD method is based on EtherTypes. For example, the value of the Type/Length field in the IEEE 802.3 MAC frame format directs the protocol parser into the LPD HLPDE if the value is less than 1536. This allows frames of both formats to be freely intermixed on a given IEEE 802 network and at a given station.~~

9.4 Encapsulation of ~~Ethernet-EPD~~ frames with LPD

This subclause specifies the standard method for conveying ~~Ethernet-EPD~~ frames across IEEE 802 networks that ~~offer only the LPD function and not the EPD function in the LLC sublayer~~use LLC encoding.

An ~~Ethernet-EPD~~ frame conveyed on an ~~LPD-only~~ IEEE 802 network using LLC encoding shall be encapsulated in a SNAP data unit contained in an LPD PDU of type UI, as follows:

- a) The Protocol Identification field of the SNAP data unit shall contain a SNAP identifier in which
 - 1) The three OUI octets each take the value zero.
 - 2) The two remaining octets take the values, in the same order, of the 2 octets of the ~~Ethernet-EPD~~ frame's EtherType.
- b) The Protocol Data field of the SNAP data unit shall contain the user data octets, in order, of the ~~Ethernet-EPD~~ frame.
- c) The values of the Destination MAC Address field and Source MAC Address field of the ~~Ethernet-EPD~~ frame shall be used in the Destination MAC Address field and Source MAC Address field, respectively, of the MAC frame in which the SNAP data unit is conveyed.