***Fixing EPD and LPD in IEEE Std 802-2014* Date:** 2020-01-20

**Source:**

Roger B. Marks Voice: +1 802 227 2253

EthAirNet Associates E-mail: roger@ethair.net

**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.

**Copyright:**

Portions of this document are Copyright © IEEE.

Per IEEE copyright policy:

* this document is “Previously Published”
* the contributor is fulfilling his responsibility to immediately inform the WG Chair that the contribution requires permission from copyright owner(s) and cannot be presented or included in the draft until that permission is granted, and offering to assist the WG Chair in requesting the permission, if possible
* the WG Chair is responsible to use the IEEE-SA Permission Request and Response Form Templates to request permission (http://standards.ieee.org/develop/stdsreview.html)

**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 802.11-20-0174-00-0arc

**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 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 as protocol identifiers or, in 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.

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**

**9.4 Encapsulation of EPD frames with LPD**

This subclause specifies the standard method for conveying EPD frames across IEEE 802 networks that use LLC encoding.

An EPD frame conveyed on an 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 EPD frame’s EtherType.

b) The Protocol Data field of the SNAP data unit shall contain the user data octets, in order, of the EPD frame.

c) The values of the Destination MAC Address field and Source MAC Address field of the 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.