Resolving EPD/LPD inconsistency

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Abstract

High-level discussion of the concepts behind the terms EPD and LPD in P802-REVc and other IEEE 802 standards, along with suggested directions toward consistency.

Background

- **Prior contributions highlighted EPD/LPD inconsistency; e.g.:**
  - maint-Marks-epd-lpd-0719-v02 (“What are EPD and LPD?”)
  - maint-finn-epd-lpd-errors-0919-v02 (“Why the EPD/LPD information in IEEE 802, IEEE 802.1AC, and 802.1Q must be fixed”)
  - maint-Marks-Finn-epd-lpd-1119-copyright (“Clarifying EPD and LPD”)
  - 802.11-20-0174-01-0arc (“EPD and LPD Terminology Misalignment in IEEE Std 802.1 and 802.11”)
  - 802.11-20-0245-02-000m (“Corrections to EPD and LPD Terminology”)
  - 802.11-21-0092-01-0arc (“LLC Theory and Protocol Discrimination”)
- **Since then:**
  - EPD and LPD have been stricken from 802.1Q (in 802.1Q-2022)
  - EPD/LPD have been discussed in ballot of IEEE Std 802 revision (P802-REVc)
    - Changes in IEEE P802.11-REVme/D4.1 are now in recirc
- **EPD and LPD are also used extensively in 802.11 and in 802.1AC**
  - 802.1AC: mainly in Clauses 12. (Protocol discrimination and media), 13.2 (Wireless LAN convergence function), and B.1.5 (IEEE 802.11 parameter mapping)

Status

Currently, P802-REVc describes (5.2.2) two methods "used by the LLC sublayer to determine the protocol identifier designating the higher layer protocol to which to deliver an LLC sublayer protocol data unit":

a) EPD: *EtherType protocol discrimination (EPD), which uses, as the protocol identifier, the EtherType value made available to the LLC sublayer through the MSAP*

b) LPD: *LLC protocol discrimination (LPD), which uses, as the protocol identifier the LLC address as specified in ISO/IEC 8802-2 or, using a particular form (described in 9.4) of the Subnetwork Access Protocol (SNAP) format, an EtherType*

These definitions are confusing. One major point of confusion:

- Since the draft distinguishes two "methods," many readers understand them to be non-overlapping alternative methods. However, they are not:
  - e.g., a protocol carrying an EtherType identifier within SNAP is both EPD [per (a)] and LPD [per (b)].

Example of Inconsistency with 802.11

- P802-REVc-d1.2 says 802.3 “uses the value of a Length/Type field to distinguish between EPD and LPD.”
  - 802-2014 says “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.”
  - Both cases indicate that Ethernet supports both EPD and LPD
    - EPD when the Length/Type field is a Type
    - LPD when the Length/Type field is a Length [but may be EPD as well as LPD?]
- IEEE Std 802.11-REVme/d4.1 says “As specified in IEEE Std 802, EPD encoding always starts with a Length/Type field that is either a 2-octet length or a 2-octet EtherType”
  - In other words, Ethernet uses only EPD, for any value of the Length/Type field

Two key concepts

Two concepts are essential to the problem:

1) **What is the protocol identifier? (EtherType; an LSAP address; …)**
   - Each has an IEEE RA registry globally-unique assignment (links above)
   - Each is used to distinguish the "higher-layer" protocol that is being carried in the data, and are intended to (in the LLC) demultiplex the data payload to the appropriate higher-layer entity for further processing per its protocol definition
   - Note: IEEE Std 802 also specifies a third type of protocol identifier: a private protocol identifier based on an OUI
2) **How is the protocol identifier encoded?**
   1) "802.3 style", using a "Length/Type" field [called "Length/Type encoding in P802-REVc-d1.2]
   2) "802.2 style", with no "Length/Type" field [called "LSAPencoding in P802-REVc-d1.2]

Concepts (1) and (2) are orthogonal. Either encoding is enabled to carry any type of protocol identifier.

The definitions of EPD and LPD currently in P802-REVc do not make a distinction based on either (1) or (2).

Proposed Direction

- P802-REVc should clearly identify the two key concepts and state that they are orthogonal.
  - Most of the needed material was added in P802-REVc-d1.2
- The concepts of EPD and LPD are unnecessary
  - should be deleted
  - or could be retained without being used for differentiation
- 802.11 is already written based on the understanding that EPD and LPD are encoding types.
  - fairly easy to revise 802.11 so that EPD and LPD are replaced by encoding types
- 802.1AC should be aligned
  - alignment would be imperative if EPD and LPD are deleted from IEEE Std 802