Terminology for EPD and LPD encoding in IEEE Std 802

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Abstract

Inconsistencies in EPD and LPD Terminology between IEEE Std 802.1 and IEEE Std 802.11 are highlighted. Terminology for EPD and LPD encoding in IEEE Std 802 is proposed.

Summary

EtherType protocol discrimination (EPD) and LLC protocol discrimination (LPD) are discussed in IEEE Std 802, IEEE Std 802.1AC, IEEE Std 802.1Q, and IEEE Std 802.11.

Overall, the descriptions are imprecise, inconsistent, and confusing.

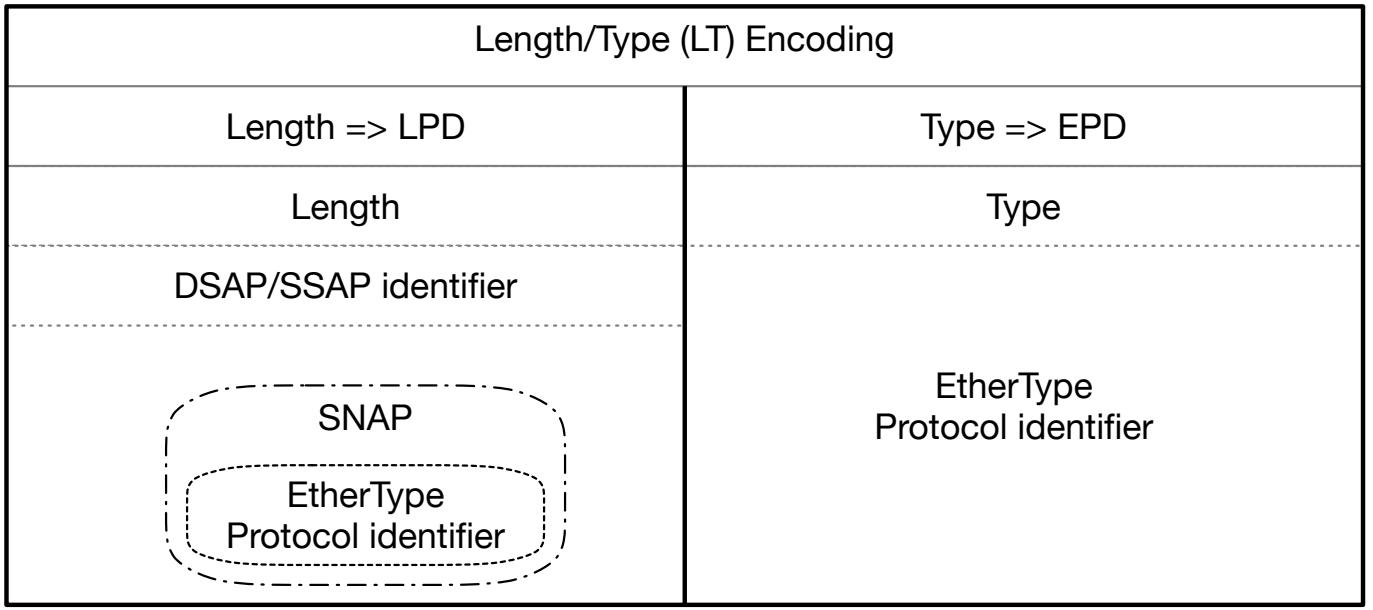
It's a problem for various reasons, particularly because new standards are supposed to support EPD, but we don't really know what that means.

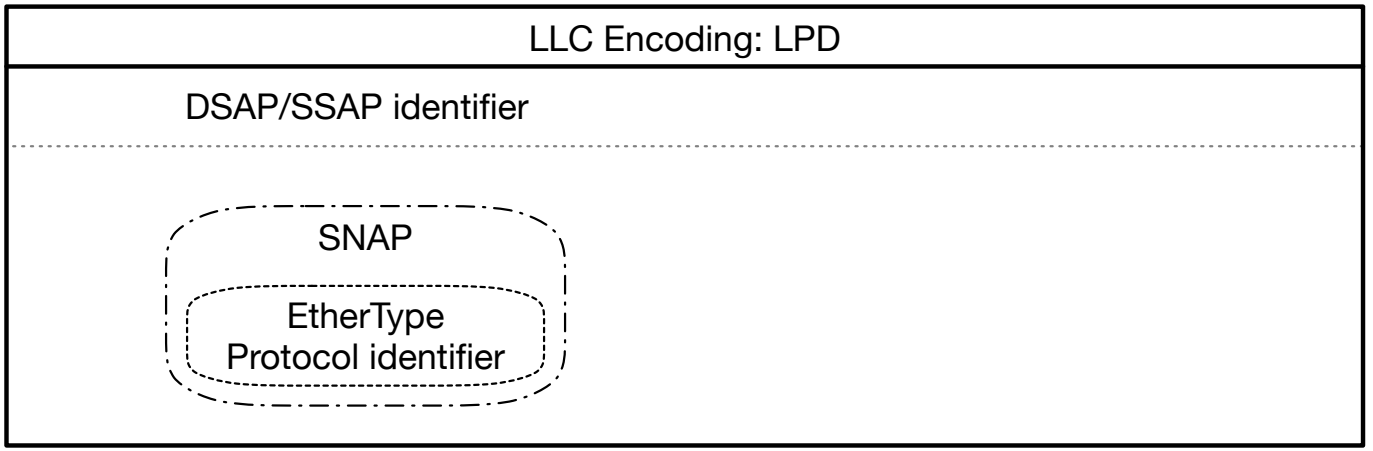
The conflict in definitions should be resolved.

EPD and LPD, per P802-REVc/D1.0

- EPD and LPD were (to my knowledge) originally specified in IEEE Std 802-2014.
- *EPD… uses the EtherType value made available to the LLC sublayer through the MSAP*
- *LPD… uses the addresses defined in ISO/IEC 8802-2, including the Subnetwork Access Protocol (SNAP) format*
  - LLC using DSAP/SSAP is LPD
  - SNAP carrying an EtherType is also LPD (uses 802.2 addresses)
  - P802-REVc/D1.0 specifically refers to SNAP as "LPD-based SNAP identifier mechanism"
- *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 natively supports ISO/IEC 8802-2 LPD (over a limited range of frame sizes)*
  - If the Type/Length field is <1501, then it represents a Length <1501 and we have LPD; this can include SNAP carrying an EtherType
- *In other IEEE 802 networks, such as for IEEE Std 802.11™, LPD with SNAP is used"*
- **Ethernet-like Type/Length coding is <u>not</u> EPD; it is a system to make allow support for both EPD & LPD**
- **LPD can use, as the actual protocol identifier, either the DSAP/SSAP or (via SNAP) the EtherType.**

Rough Terminology Map





MAC Requirements

- MAC needs to support LLC (DSAP/SSAP) identifiers
  - EPD does not support these
  - therefore MAC must support LPD

- MAC needs to support EtherType identifiers
  - It can do this with LPD
  - It can optionally support EPD too

- Per P802-REVc/D1.0, “New IEEE 802 standards shall support protocol discrimination in the LLC sublayer using EPD.” This means:
  - Enabled to carry both EPD and LPD frames.
  - Enabled to differentiate EPD and LPD frames.

- Ethernet does differentiation by Type/Length field encoding
  - Perhaps other standards can use alternative differentiation

Conflicting aspects of P802.11-REVme/D3.0 (Apr 23)

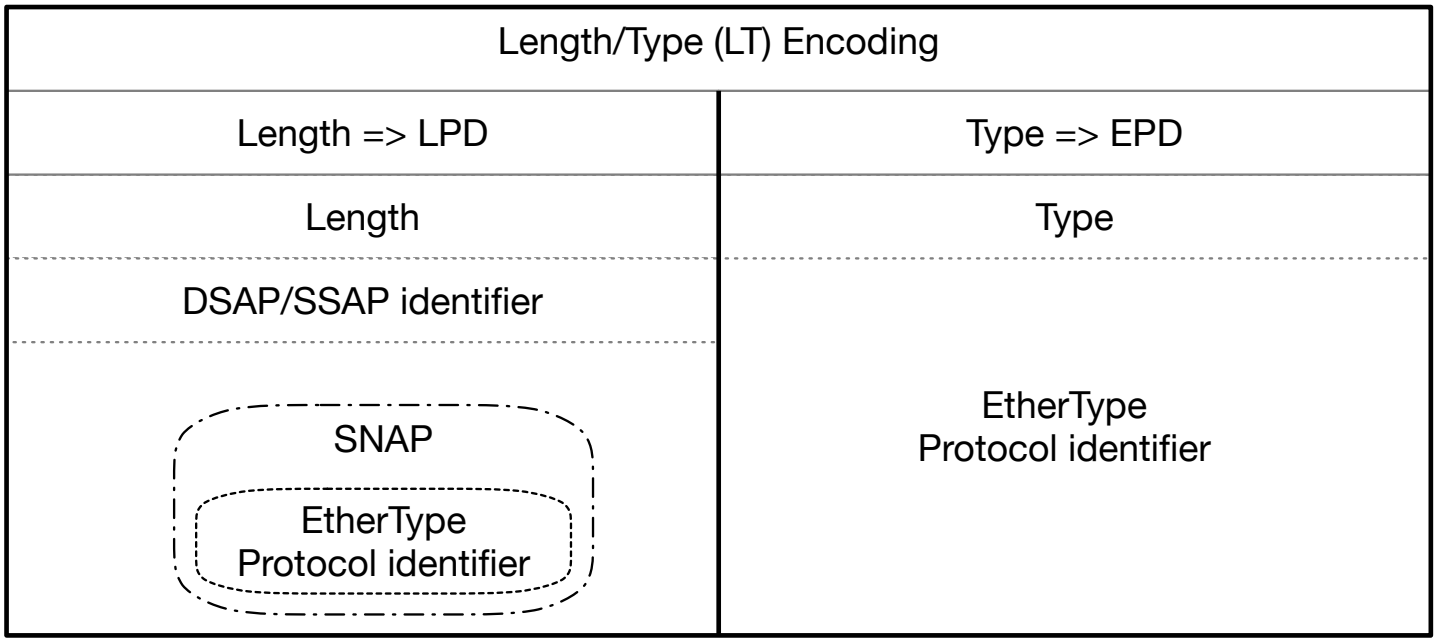
"There are two LLC sublayer protocols used (see IEEE Std 802); LLC Protocol Discrimination (LPD) (see ISO/IEC 8802-2:1998) and EtherType Protocol Discrimination (EPD) (see IEEE Std 802.3-2018)."

- ➢ But IEEE Std 802.3 does not refer to EPD or LPD.
  - o Minor issue

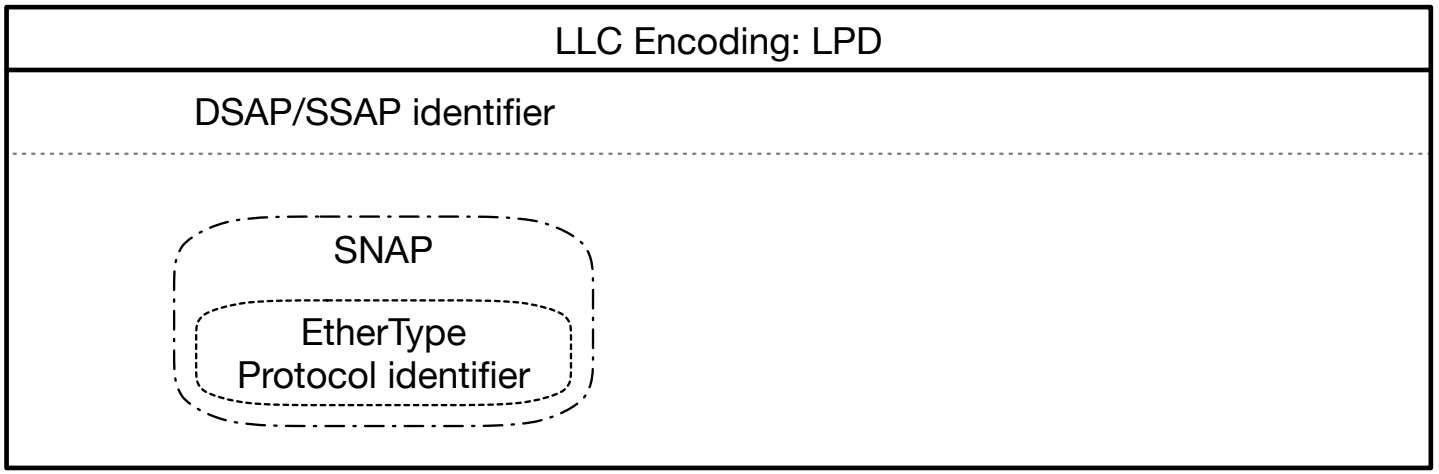
Annex M (informative): "As specified in IEEE Std 802, EPD encoding always starts with a Length/Type field that is either a 2-octet length or a 2-octet EtherType while LPD encoding always starts with an LSAP octet. There is no indication in a Data frame as to whether EPD or LPD MSDU encoding is in use."

- ➢ But IEEE Std 802 doesn't say that Length/Type encoding is EPD; it says that Ethernet uses Length/Type coding to support LPD (Length) and EPD (Type).
  - o Major issue, reflected throughout IEEE Std 802.11.

Rough Terminology Map



P802.11-REVme/D3.0 calls this "EPD encoding" or "EPD format"



P802.11-REVme/D3.0 calls this "LPD encoding" or "LPD format"

Proposed Way Forward

Leave the definitions of EPD and LPD basically as is within IEEE Std 802.

Add definitions of “LLC encoding” and “Length/Type (L/T) encoding”

802.11 can be revised by replacing:

LPD encoding => LLC encoding

EPD encoding => L/T encoding

Proposal: see

https://www.ieee802.org/1/files/public/docs2020/maint-Marks-802-epd-lpd-fix-0120-v02.pdf

With the following exception: change the title of 9.4 to:

9.4 Encapsulation of Ethernet EPD frames with LLC encoding