Link **L**ayer **D**iscovery **P**rotocol
LLDP

Fred Schindler, Seen Simply

Supporters:
Yair Darshan, Microsemi; Lennart Yseboodt, and Matthias Wendt, Philips;
v0.5

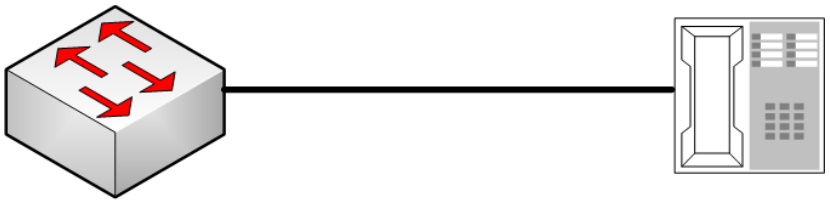
Purpose

To extend the existing PoE TLV to encompass IEEE 802.3BT additions.

What does LLDP Accomplish?

Devices on both side of an Ethernet connection advertise their features.

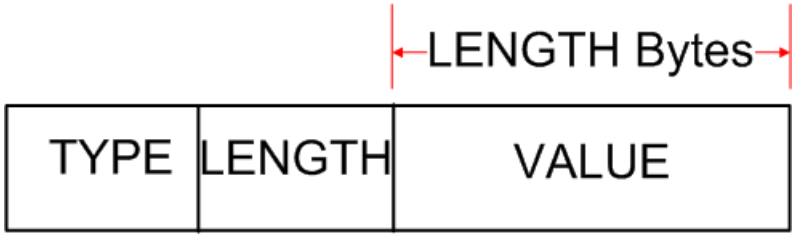
Receivers can decide to use this information or discard it. Receivers do not forward the information.



How is LLDP Information Transferred?

LLDP Ethernet frame structure

Preamble	Destination MAC	Source MAC	Ethertype	Chassis ID TLV	Port ID TLV	Time to live TLV	Optional TLVs	End of LLDPDU TLV	Frame check sequence
	01:80:c2:00:00:0e, or 01:80:c2:00:00:03, or 01:80:c2:00:00:00	Station's address	0x88CC	Type=1	Type=2	Type=3	Zero or more complete TLVs	Type=0, Length=0	



TYPE, Identify the information type.

LENGTH, How many **value** bytes there are.

VALUE, The information being transferred.

Note that LLDP Type is not a PoE Type. LLDP Frame diagram from Wikipedia.org.

What is LLDP?

Link **L**ayer **D**iscovery **P**rotocol is defined in
IEEE 802.3ab-2009, but optional TLVs are now covered in **Clause 79.**

Four mandatory TLVs

Chassis ID, Type = 1; Subtype = 4,
MAC Address of agent

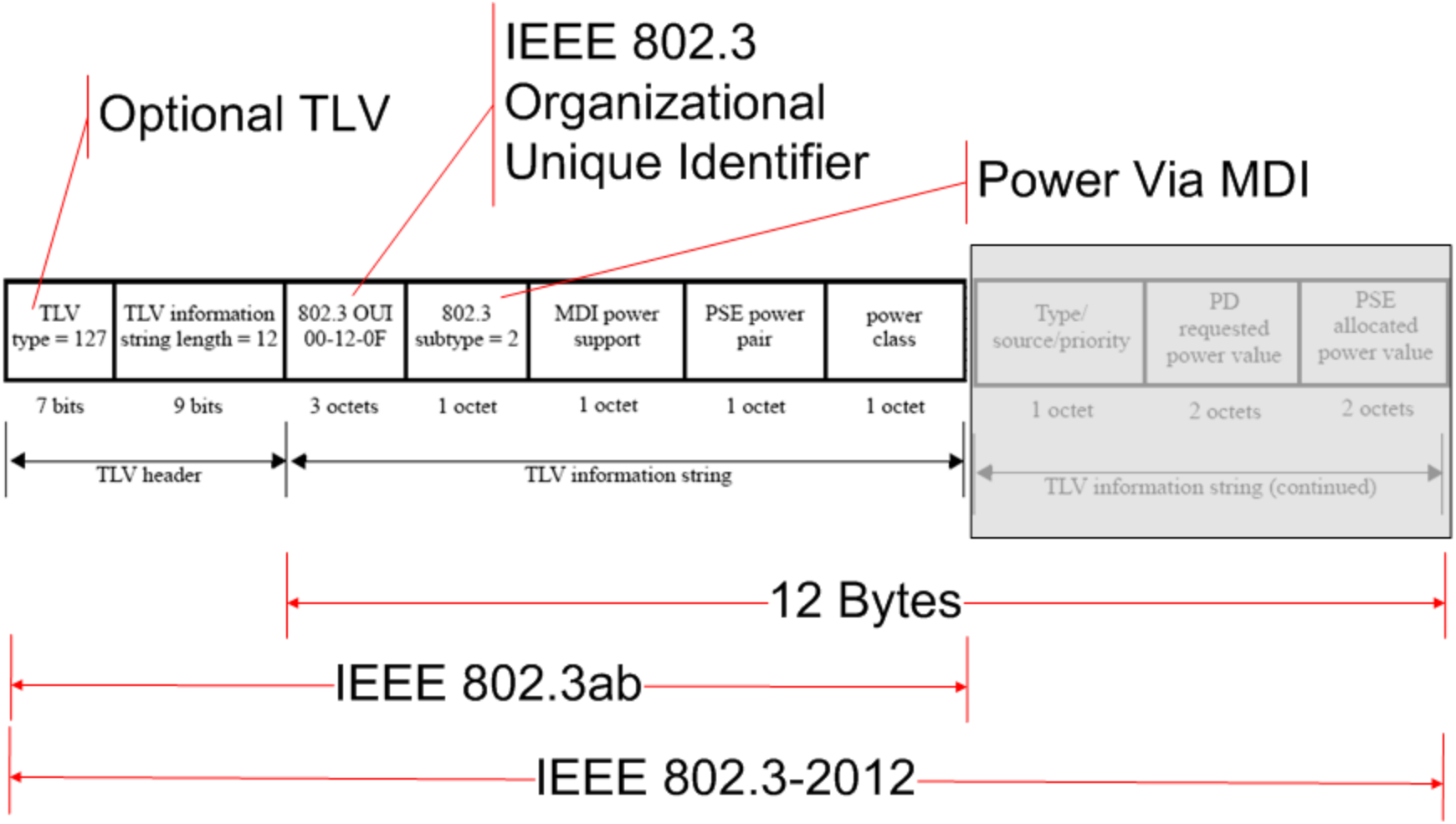
Port ID, Type = 2; Subtype = 5, ifName RFC2863,
1/3

Time to live, Type = 3,
120 seconds

End of LLDPDU, Type = 0

Optional TLVs, Type = 127

How does PoE use LLDP?



How does PoE use LLDP?

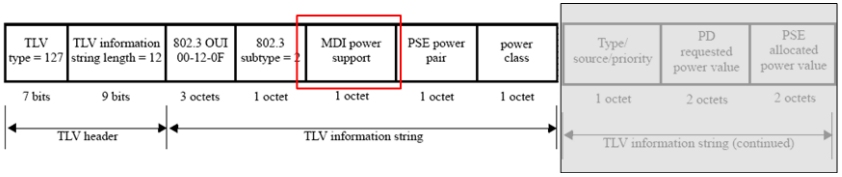
Table F.3—MDI power capabilities/status

Bit	Function	Value/meaning	IETF RFC 3621 object reference
0	Port class	1 = PSE 0 = PD	See Note 1
1	Power Sourcing Equipment (PSE) MDI power support	1 = supported 0 = not supported	See Note 2 and Note 3
2	PSE MDI power state	1 = enabled 0 = disabled	pethPsePortAdminEnable
3	PSE pairs control ability	1 = pair selection can be controlled 0 = pair selection can not be controlled	pethPsePortPowerPairContolAbility
4–7	reserved for future standardization	—	—

NOTE 1—Port class information is implied by the support of the PSE or Powered Device (PD) groups.

NOTE 2—MDI power support information is implied by support of IETF RFC 3621.

NOTE 3—If bit 1 is zero, bit 2 has no meaning.



Note that LLDP Port class is not a PoE class.

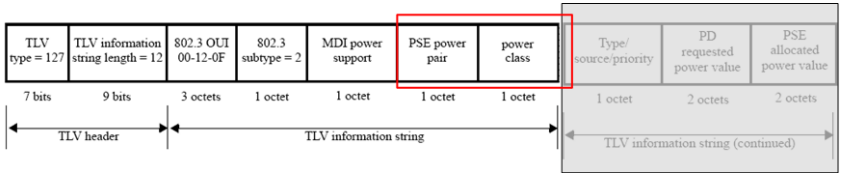
How does PoE use LLDP?

RFC 3621 covers the next two values.

These reference 30.9.x the IEEE 802.3 Management clause.

```
pethPsePortPowerPairs OBJECT-TYPE
SYNTAX INTEGER    {
            signal(1),
            spare(2)
 }
```

```
pethPsePortPowerClassifications OBJECT-TYPE
  SYNTAX INTEGER    {
            class0(1),
            class1(2),
            class2(3),
            class3(4),
            class4(5)
  }
```

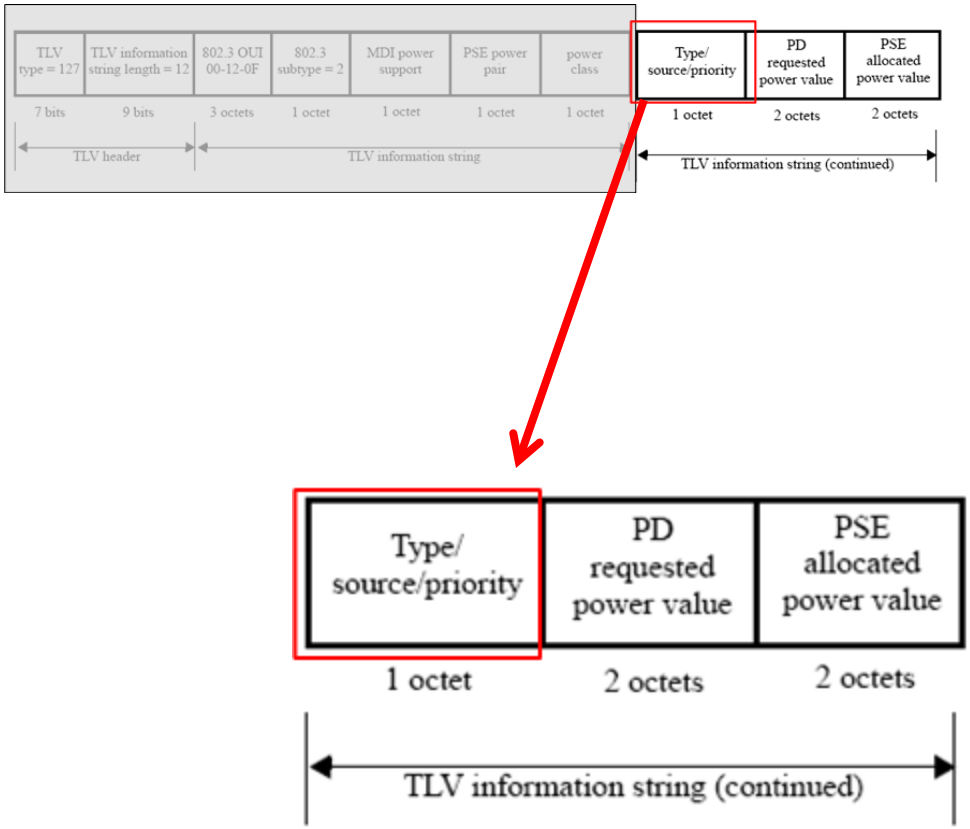


Note that LLDP class here is a PoE class.

How does PoE use LLDP?

Table 79–4—Power type/source/priority field

Bit	Function	Value/meaning
7:6	power type	7 6 1 1 = Type 1 PD 1 0 = Type 1 PSE 0 1 = Type 2 PD 0 0 = Type 2 PSE
5:4	power source	Where power type = PD 5 4 1 1 = PSE and local 1 0 = Reserved 0 1 = PSE 0 0 = Unknown Where power type = PSE 5 4 1 1 = Reserved 1 0 = Backup source 0 1 = Primary power source 0 0 = Unknown
3:2	Reserved	Transmit as zero, ignore on receive
1:0	power priority	1 0 1 1 = low 1 0 = high 0 1 = critical 0 0 = unknown (default)



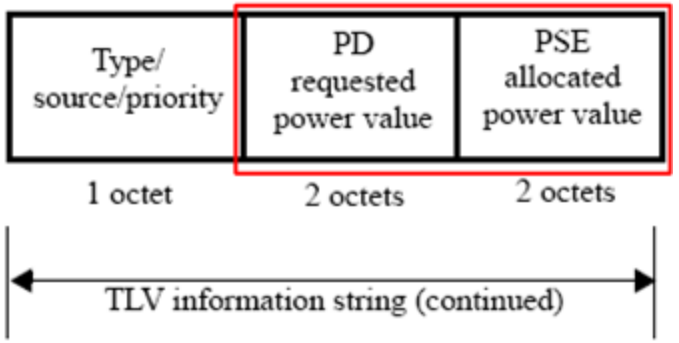
How does PoE use LLDP?

Table 79–5—PD requested power value field

Bit	Function	Value/meaning
15:0	PD requested power value	Power = 0.1 × (decimal value of bits) Watts. Valid values for these bits are decimal 1 through 255.

PSEs and PDs use the same

Power = 0.1 x (dec. value) W



How do we extend a TLV?

Define new values and increase the length of the existing TLV.

Legacy systems process the legacy values and ignore the new values. Unrecognized TLVs and value-fields are dropped.

Systems may process both legacy and new values.

What IEEE 802.3BT values are required?

Extend power reporting ability from 25.5W to (TBD max value).

Add Types, 3, 4.

Unclaimed cable loss owner, PSE, PD.

PSE alternatives powered, A, B, Either, Both.

4P-ID, capable, not capable.

MPS, .3AT, .3BT enhancement

What IEEE 802.3BT values are required?

PD, single, dual, other?

What else is required?

New TLV Implications

1. Existing PDs that support LLDP may provide a firmware update to enable IEEE 802.3BT abilities. New PDs are updated when they are manufactured.
2. Management clause 30 needs to be updated.
3. Data Link Layer classification clause 33.6 needs to be updated.
4. IEEE 802.3 LLDP clause 79 needs to be update.

Next Step

Collect feedback

Due 4-weeks before the next meeting.

Create Baseline Text

Conclusion

Extending the Power via MDI TLV allows,

New features to be utilized

Legacy devices to be updated to enable IEEE 802.3BT features

Seen Simply

Turning complexity into understanding.