

802.3_4PPOE

LLDP Power Price

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Proposal

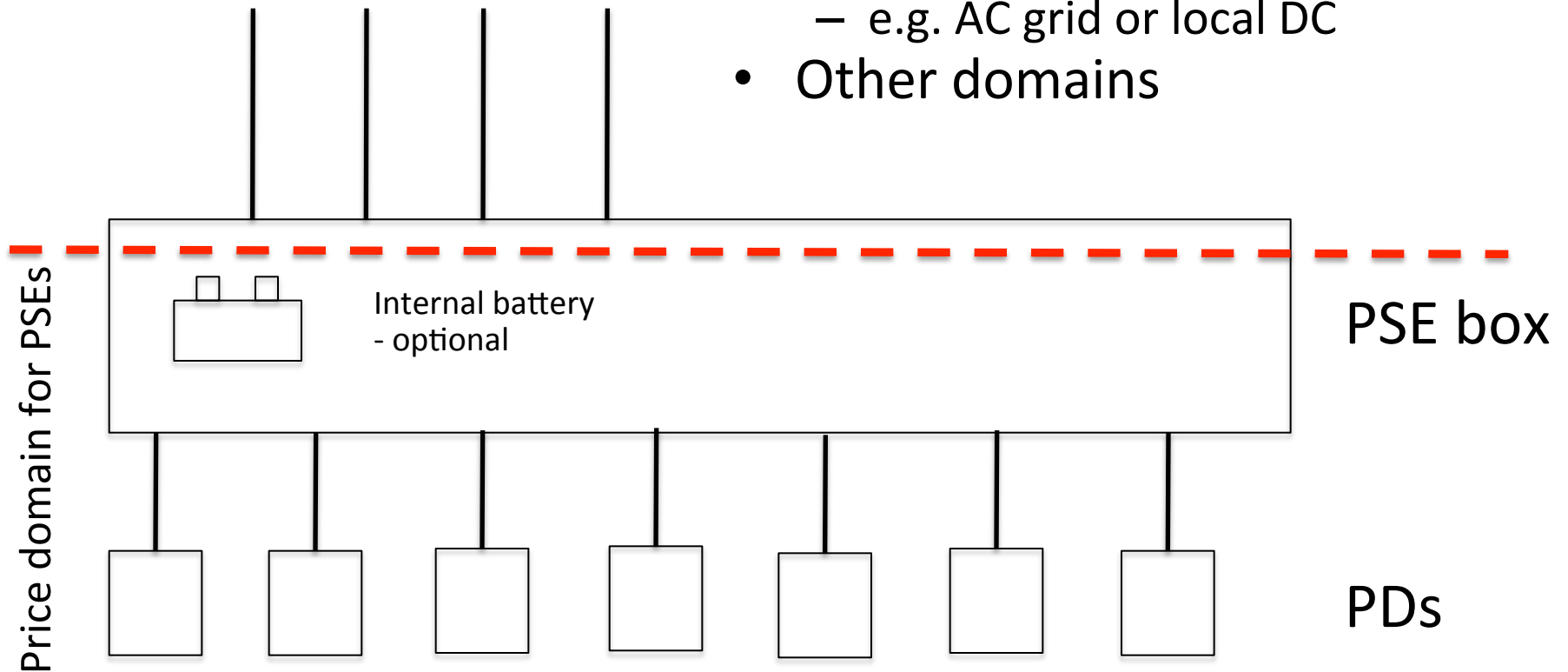
- **TLV PowerPriceIndex** (16 bit unsigned integer)
 - Nominal value = 1000
 - Indicator of how available power is to the PSE
 - from external sources or internal battery
 - Higher value means power is less available
 - Zero value means no price index defined
- Is set only by PSE
 - usually the same for all ports on a box; not required to be
- Used in conjunction with PDs requesting power allocation through existing mechanisms

Proposal, notes

- Algorithms for how PSEs set PowerPriceIndex or how PDs use it do **NOT** need to be standardized and are out of scope for this standard
- End-use devices are shipped with default behaviors
 - Can be adjusted by installer or user as needed
- Example uses
 - PoE light begins to dim when PowerPriceIndex exceeds some threshold and turns off entirely when a second threshold is reached.
 - Total demand by PDs nears PSE power capacity so PSE increases PowerPriceIndex to stay under limit (and later decreases when capacity used drops)

Power domains

- Links to sources (or sinks) of power
 - e.g. AC grid or local DC
- Other domains



- **Key point: price in PSE-PD domain is local**
 - Usually different from price in other power domains incl. utility grid

Related Information

- Following slides provide context for how a price index can be used in future
 - They do **not** affect the content of the standard
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- For further information on Local Power Distribution
 - Bruce Nordman, bnordman@lbl.gov, <http://nordman.lbl.gov>

Background

- **Traditional view:** Electricity always equally available across location and time
 - Utility tariffs were flat
 - Everything (almost) part of the same power domain
 - No (well, few) capacity constraints
 - So, no need to communicate about availability
- **Future:** Power availability varies – space and time
 - Dynamic utility rates
 - Local generation and storage; off-grid operation
 - **Local Power Distribution** – networked (within/between buildings); like local area networking

Batteries for building-scale rely on this for value

Power Price

- **Nanogrid:** Single domain of power; single voltage, capacity, reliability, administration, scarcity-index
 - PoE Switch is a nanogrid controller
- Nanogrid controllers may contain storage (battery)
 - Storage makes possible network models; comm. & power
- Nanogrid controllers will negotiate with other controllers and local generation to exchange power
- Power Price Index is how entities know value of power
 - How to produce power, manage storage, exchange, consume
 - Eventually will include (non-binding) forecast, but for now just current state
 - Local to each nanogrid

Other Issues

- Prices are expressed in currencies and units of energy (usually kWh). Some other mechanism may be needed to convey what currency and price corresponds to nominal value (1000). This would be constant for a given link establishment.
- Ideally there would be a price and a (non-binding) forecast of future prices, with time expressed in seconds relative to 'now'. Such a series of pairs of values may be more data than is reasonable to put into LLDP.

Scaling structure: communications and power

