2 Pair PSE Revisited

IEEE 802.3at
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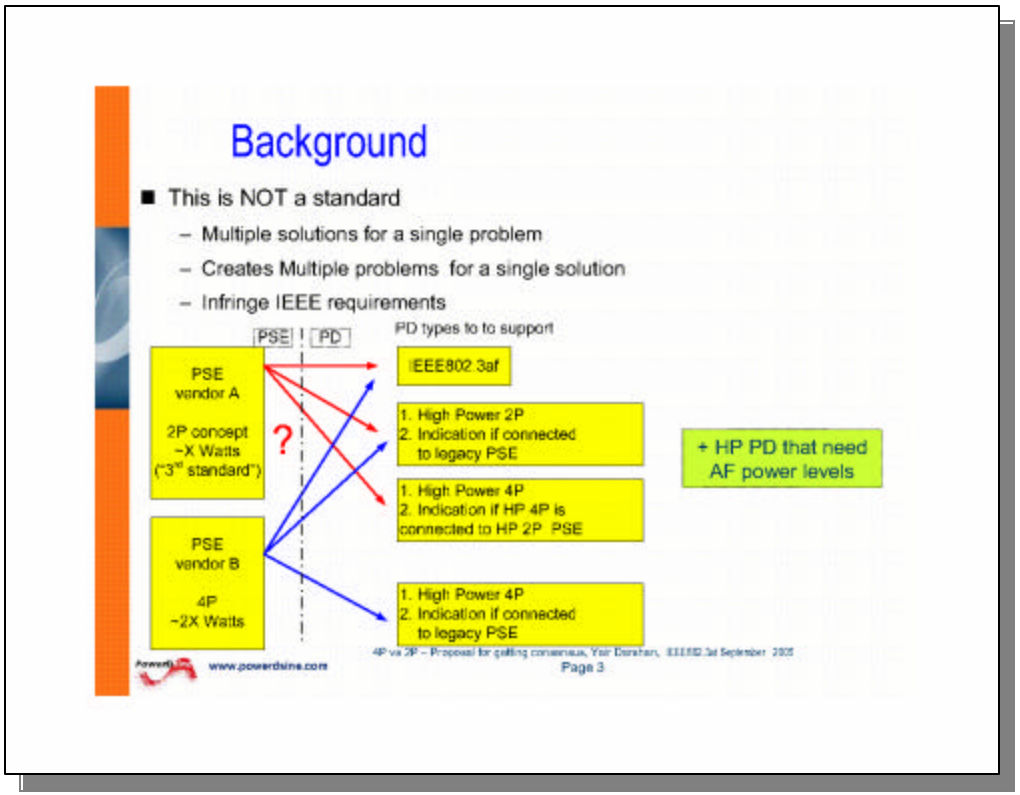
Is 2P/4P a Standard or Not?

- Yair's slide claims 2P/4P is "Not a standard"
- Not really true – "multiple solutions" are not preferred ***unless they are the best solution***
- For 802.3at, 2P/4P may be better than 4P only!



http://www.ieee802.org/3/poep_study/public/sep05/darshan_4_0905.pdf, page 3

“Multiple Solution” Examples

- **Examples from 802.3:**
  - **10BT NIC won’t work with 100BTX hub/switch**
    - **Optional auto-negotiation allows full interoperability**
      - **not common in early PHYs, near universal now**
    - **Parallel: 4P .atPD won’t have full functionality with any 2P PSE**
      - **optional feature (4P .atPSE) allows full interoperability**
  - **1000BT won’t work with 2P cable**
    - **Falls back to 10/100**
    - **Parallel: .atPD reduces capability, negotiates for lower power to work with 2P cable**
  - **Best standard is 100% interoperable, but…**
    - **Compromises are sometimes needed to add new functionality or to protect standard from competition**
    - **Hardly unknown in 802.3…**

Pros and Cons of 2-Pair PSEs

- **If All PSEs Must Be 4P**
  - Better if cabling limits 2P current to near-.af levels
  - Better if silicon cost << power supply cost
  - Every .atPSE port can power every .atPD
  - All PSEs bear 4P hotswap burden
  - ***Significant incentive to build non-standard 2P PSEs – standard is weaker***

- **If 2P-only PSEs allowed**
  - Better if cabling allows significant 2P current (=25W)
  - Better if silicon cost >> power supply cost
  - 2P "medium power" PSEs cannot power all .atPDs
  - 4P still required for max power
  - ***Removes incentive to build non-standard PSEs***

How much 2P current can we get?

- **More?**
  - Real cables carry >1A without failure in the lab
  - Non-standard installed base carrying ~750mA/conductor now (analog cameras)
  - Lab tests suggest ~400mA/conductor safe

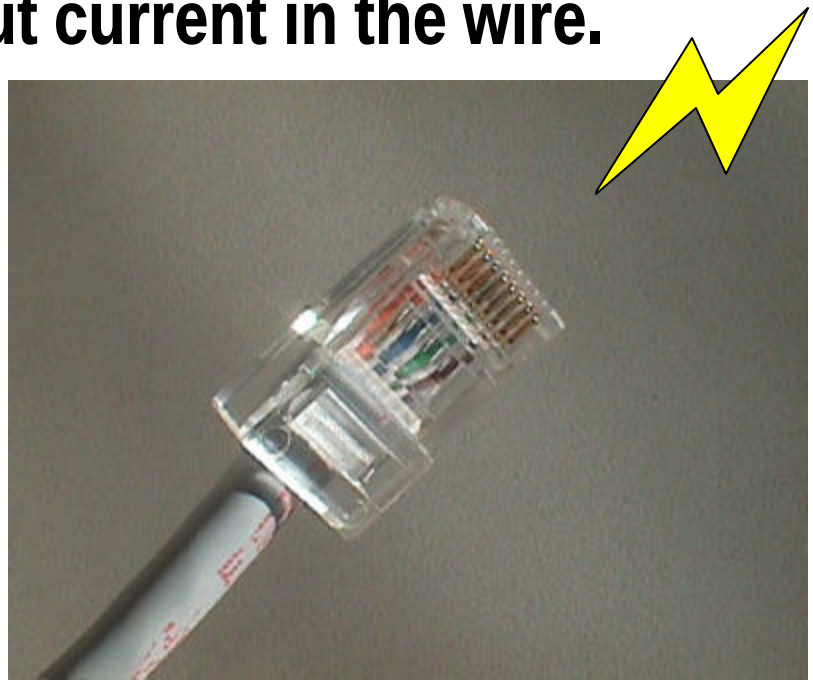
- **Less?**
  - Wire specs broadly agree that 175mA/conductor is the limit
  - 2× margin required without BWD
  - 2P must be ½ 4P to account for double-2P wiring configurations

Can 2P Deliver 25W?

- 25W is enough to power an 11n Access Point
  - 25W delivered = 51V @ 570mA with 12.5ohm cable
- If 2P supports =570mA, we should include it in the standard
- 2P high current is simple and easy – if 802.3at doesn't include it, 2P PSEs will flourish with or without a standard

At This Point…

- …it's all about current in the wire.



- More than just $$, decision also needs to consider the strength of the standard
- We can't make a 2P/4P decision until we know the capability of cable