IEEE802.3at Task Force

Classification
Why we need it?
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IEEE802.3af: Why Classification?

- Without Classification
  - PSE need to supply Max Power=15.4W
  - All ports need N*15.4W= 370W for 24 ports or 740W for 48 ports!
- With 802.3af Classification:
- Assuming 20% of the loads = 4W, 50% =7W and 30%15.4W
- Average power per port is:0.2*4+0.5*7+0.3*15.4=8.9W
- Power Supply size=214W for 24 ports, 424W for 48 ports
- 58% Power Supply size compared to w/o classification.
- Note: Different power distribution gives different saving in PS size however in any case the impact is overwhelming

- Moreover, the actual unused power is higher due to the poor granularity and can be further improved as decided by 802.3objectives
- In addition, unused power due to PD dynamics affects significantly the unused power however it was out of scope at the 802.3af from the reasons that will be elaborate later.

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Why Layer 2 solutions were not used in 802.3af

■ It was discussed in 802.3af and it was acknowledged that it is not good enough:

– System may collapse at start up! Unless Power supply size is the max as per the case in previous slide.

– Or sequentially controlling to turn on which is OK if granularity is sufficient with out having ready statistic history. Statistic history needs time to build up.

– We need to know prior to startup what is the PD max power needs.

  ■ This is #1 reason why we need classification prior to startup.

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Can Layer 2 classification be used in 802.3at?

- ■ It can BUT the problem at startup is bigger now since there is much more power in 802.3at!

- ■ Now we will have PDs that need 20, 25W, 30W and more at startup! Who knows what future is planning for us?

- ■ <u>There are two options:</u>

1. Having more classes before startup

  - Layer 2 communication optional: giving better utilization of PSE Power Supply due to PD peak/average support

2. Mandate Layer 2 communication for PD operation at more than 12.95W levels

  - See next slide

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Why Layer 2 recommended to be optional?

- It is not cost effective and/or technically feasible to support(*)
  - Midspans
  - Patch Panel Midspans

- This was also one of the reasons why 802.3af used classification(**) at the common mode path (power path) and not over the data path.

- (*) So far no layer 2 proposals has been made to support layer 2 in Midspan which is technically and economically feasible.

- (**) other methods with statistics still needs classification to be compliant

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Should Classification be mandatory in 802.3at?

- **Yes** for the unique identification purpose which is orthogonal to the minimum number of classifications issue.

- **Yes** for min number of classes N1, to generate acceptable Power Supply utilization at startup for the max peak power

- **Yes** for minimum number of classes N2 to enhanced power supply utilization compared to 802.3af for solutions that don't want or need or can't used Layer 2 for the max peak power

- **No** for higher classification numbers, N3 that can be optionally done by layer 2 for the peak and average power

- What are those numbers N1, N2 and N3?
  - Obviously they are silicon + silicon tests + System tests cost dependent.
  - However it reduces Power Supply size and cost.

- See separate presentations that addresses the economical gain by using classification as function of the number of classes

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Summary and Recommendations

- **Classification function need to be sufficiently granular for supporting PDs during startup with Power Supply sized to lower then maximum required by all ports**
  - 50% minimum reduction in power supply and system costs

- **Enhanced classification should support both Midspans and Endpoint due too similar rational as in 802.3af**

- **Layer 2 should be optional and further improve Power Supply utilization by finer classification levels and supplying peak and average power data**
  - May be part of the MIB ad-hoc group

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