

IEEE 802.3  
4-Pair Power over Ethernet  
(4PPoE) Study Group  
Closing Report  
14 July 2013,  
Dallas, TX

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# Reflector and Web

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- To subscribe to the 4PPoE reflector, send an email to:

[ListServ@ieee.org](mailto:ListServ@ieee.org)

with the following in the body of the message (do not include “<>”):

*subscribe* stds-802-3-4PPOE <yourfirstname> <yourlastname>  
*end*

- Send 4PPoE reflector messages to:

[stds-802-3-4PPOE@listserv.ieee.org](mailto:stds-802-3-4PPOE@listserv.ieee.org)

- Study Group web page URL:

<http://www.ieee802.org/3/4PPOE/>

# Progress this week

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- Joint 1PPoDL/4PPoE sessions on Tues, Thurs
- 9 presentations
- 1 comment on 5 Criteria
- Motion to request a study group extension
- Motion to direct chair to request formation of 802.3bt

# Draft Objectives (1 of 2)

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- The project will amend IEEE Std 802.3-2012 by amending Clause 33
- IEEE Std 802.3 will comply to the limited power source and SELV requirements as defined in ISO/IEC 60950
- Specify Mutual Identification to address four pair operation
- The standard shall not preclude the ability to meet FCC/CISPR/EN Class A, Class B, Performance Criteria A and Performance Criteria B with data for all supported PHYs
- Support for operation over the following channels that have DC loop resistance of no greater than 25 ohms:
  - Class D or better 4-pair copper medium from ISO / IEC 11801:2002, including Amendments 1 & 2
  - Class D or better media from ISO / IEC 11801:1995
  - Category 5e or better cable and components as specified in ANSI/TIA-568-C.2
  - Category 5 cable and components as specified in ANSI/TIA/EIA-568-A

*Adopted by the IEEE 802.3 4PPoE Study Group May 2013*

## Draft Objectives (2 of 2)

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- Support operation with 10GBASE-T
- The project shall support a minimum of 49 Watts at the PD PI.
- Define parameters to limit maximum pair-to-pair current imbalance.
- 4PPoE PDs which operate at power levels consistent with IEEE 802.3-2012 PDs will interoperate with IEEE 802.3-2012 PSEs.
- 4PPoE PSEs will be backwards compatible with IEEE 802.3-2012 PDs.
- Update management parameters

*Adopted by the IEEE 802.3 4PPoE Study Group July 2013*

# Broad Market Potential

A standards project authorized by IEEE 802 LMSC shall have a broad market potential.

Specifically, it shall have the potential for:

a) Broad sets of applicability.

b) Multiple vendors and numerous users.

c) **Balanced costs (LAN versus attached stations). [Removed from IEEE 802 5 criteria 11/12]**

As of 2012, market forecasts showed that by 2017 the 4 Pair PoE market size will exceed 125M ports. There is a demonstrated need for more power to support applications like Pan/Tilt/Zoom security cameras, IP videophones, kiosks, POS terminals, thin client, 802 multiband wireless nodes and access points, laptop computers, RFID readers and building management. 4 Pair PoE can also be used to increase the efficiency of PoE systems. The proposed increase in the supplied power and increased efficiency will result in substantial additions to the PoE market.

At the Call for Interest, 57 individuals from 42 companies supported this initiative, and 33 organizations stated an intention to work on the development of such a standard and Study Group participation has been consistent with this. There are existing proprietary solutions in the market demonstrating an active demand. The goal of the standard is to reduce the issue of interoperability in the powered LAN market.

For some markets, the cost of providing AC power is a barrier to the use of a LAN solution. Increasing the power available at the MDI will increase the market potential and station functionality.

# Compatibility

- **IEEE 802 LMSC defines a family of standards. All standards should be in conformance : IEEE Std 802, IEEE 802.1D, and IEEE 802.1Q. If any variances in conformance emerge, they shall be thoroughly disclosed and reviewed with IEEE 802.1 Working Group. In order to demonstrate compatibility with this criterion, the Five Criteria statement must answer the following questions. Each standard in the IEEE 802 family of standards shall include a definition of managed objects that are compatible with systems management standards.**
  - a) **Does the PAR mandate that the standard shall comply with IEEE Std 802, IEEE Std 802.1D and IEEE Std 802.1Q?**
  - b) **If not, how will the Working Group ensure that the resulting draft standard is compliant, or if not, receives appropriate review from the IEEE 802.1 Working Group**
- **Compatibility with IEEE Std 802.3**
- **Conformance with the IEEE Std 802.3 MAC**
- **Managed object definitions compatible with SNMP**

All enhancements will be backward compatible with IEEE Std 802.3-2012 Clause 33

These enhancements will be compatible with 10BASE-T, 100BASE-TX, 1000BASE-T and 10GBASE-T with no changes to these interfaces.

There will be no changes to any data interface

The proposed standard will conform to the 802.1D, 802.1Q and 802. This is not mandated in the PAR. This standard is a power standard, not a MAC/PHY standard and this requirement is not relevant.

The project will include a protocol independent specification of managed objects with SNMP management capability to be provided in the future by an amendment to or revision of IEEE Std 802.3.1.

# Distinct Identity

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Each IEEE 802 LMSC standard shall have a distinct identity. To achieve this, each authorized project shall be:

- a) Substantially different from other IEEE 802 standards.
- b) One unique solution per problem (not two solutions to a problem).
- c) Easy for the document reader to select the relevant specification.
- d) Substantially different from other IEEE 802.3 specifications/solutions.

The project will increase the maximum PD power available beyond current 802.3 standards by utilizing all four pairs in the structured wiring plant, which represents a substantial change to the capabilities of Ethernet. The power classification information exchanged during negotiation will be extended to allow meaningful power management capability. Together these enhancements will make the project substantially different from existing IEEE 802 standards.

The project will enhance Clause 33, the only DTE Power via MDI (PoE) clause in IEEE Std 802.3-2012 and will maintain compatibility with IEEE Std 802.3-2012 compliant devices. The enhancements will solve the problem of higher power and more efficient power delivery systems.

As Clause 33 will remain the only PoE clause within 802.3, it will be easy for a reader to find the relevant specification within the 802.3 document. Further, a summary of IEEE Std 802.3-2012 capabilities and new capabilities introduced by this amendment will appear in the Clause.



# Technical Feasibility

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**For a project to be authorized, it shall be able to show its technical feasibility. At a minimum, the proposed project shall show:**

- a) Demonstrated system feasibility.**
- b) Proven technology, reasonable testing.**
- c) Confidence in reliability.**

There are numerous system and silicon vendors shipping products, based on proprietary 4-pair powering technology, which exceed the power limits in IEEE Std 802.3-2012.

4-pair technology has been used in the industry for many years and has been reasonably tested and proven reliable.

# Economic Feasibility

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For a project to be authorized, it shall be able to show economic feasibility (so far as can reasonably be estimated) for its intended applications. At a minimum, the proposed project shall show:

- a) Known cost factors, reliable data.
- b) Reasonable cost for performance.
- c) Consideration of installation costs.

Extrapolation from the experience of over a decade of installed devices provides a reliable baseline. The power supply industry is well established and has many years of practice. The cost factors are well known.

In the expected range of increased power capability, there is a declining curve of cost per watt. Additionally, increased power efficiency by moving to a 4-pair system and intelligent power management will reduce operational expenses (OpEx) for PoE systems.

PoE installation costs have been demonstrated to be significantly lower in most cases when compared to traditional powering methods that rely on a separate power distribution systems. The utilization of the additional wire pairs to carry power increases efficiency and power delivery at no additional cabling cost.

# Draft PAR (IEEE P802.3bt)

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<http://www.ieee802.org/3/4PPoE/P802.3bt.pdf>

# Motion #1

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Approve the IEEE P802.3bt 4PPoE Project Objectives

Move: C. Jones

Second: K. Balasubramanian

Technical ( $\geq 75\%$ )

Passes by voice without opposition

## Motion #2

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Approve the IEEE P802.3bt 4PPoE Project response to the Broad Market Potential criterion

Move: C. Jones

Second: D. Abramson

Technical ( $\geq 75\%$ )

Y: 76    N: 0    A: 2

Motion passes

## Motion #3

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Approve the IEEE P802.3bt 4PPoE Project response to the Compatibility criterion

Move: C. Jones

Second: L. Yseboodt

Technical ( $\geq 75\%$ )

Y: 76    N: 0    A: 2

Motion passes

## Motion #4

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Approve the IEEE P802.3bt 4PPoE Project response to the Distinct Identity criterion

Move: C. Jones

Second: P. Brownlee

Technical ( $\geq 75\%$ )

Y: 71    N: 0    A: 2

Motion passes

# Motion #5

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Approve the IEEE P802.3bt 4PPoE Project response to the Technical Feasibility criterion

Move: C. Jones

Second: F. Schindler

Technical ( $\geq 75\%$ )

Y: 75    N: 0    A: 2

Motion passes



# Motion #6

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Approve the IEEE P802.3bt 4PPoE Project response to the Economic Feasibility criterion

Move: C. Jones

Second: J. Heath

Technical ( $\geq 75\%$ )

Y: 76    N: 0    A: 2

Motion passes

# Motion #7

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Approve the IEEE P802.3bt 4PPoE PAR

Move: C. Jones

Second: C. Beia

Technical ( $\geq 75\%$ )

Y: 75    N: 0    A: 3

Motion passes

## Motion #8

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Extend the 4PPoE Study Group until the next plenary session

Moved by Chad Jones on behalf of the Study Group

(> 50%)

Y: 78    N: 0    A: 0

# Future Work

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- Meet at the January 2014 Interim, week of Jan 20 in Indian Wells, CA
- Continue to review presentations for proposals to solutions for the objectives
- Start adopting baselines
- Assign Editor
- Assign Comment Editor



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THANK YOU