

IEEE 802.3 Five Criteria

The IEEE 802 Criteria for Standards Development (Five Criteria) are defined in subclause 12.5 of the 'IEEE project 802 LAN/MAN Standards Committee (LMSC) operations manual'. These are supplemented by subclause 7.2 'Five Criteria' of the 'Operating Rules of IEEE Project 802 Working Group 802.3, CSMA/CD LANs'.

The following are the Five Criteria Responses in relation to the IEEE P802.3bt PAR:

Items required by the IEEE 802 five criteria are shown in Black text, supplementary items required by IEEE 802.3 are shown in Blue text.

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

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.

Readers will find the specification for 2-pair PoE in Clause 33 and the specification for 4-pair PoE in Clause 145.

~~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

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

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.