

Five Criteria Responses

APPROVED- 802.3 WG (November 15, 2012) and
802 EC (November 16, 2012)

Reduced Twisted Pair Gigabit Ethernet PHY
Study Group

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'.

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).

Broad Sets of Applications

- 1Gb/s Automotive Ethernet will be a new market, driven by two factors:
 - New bandwidth-consuming in-car applications (cameras, collision avoidance, infotainment, etc.)
 - Consolidation of legacy in-car networks into the new homogenous Electronic Architecture
- Other applications include
 - Transportation (e.g. trains, busses, airplane cabins, traffic control systems, etc.) and similar applications
 - Industrial automation solutions using Ethernet for factory automation and process automation.

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Multiple vendors and numerous users

- At the Call for Interest, 65 individuals from 42 companies indicated they would support this project. These included automotive companies, automotive OEMs, silicon and cabling vendors, (among others)
 - In 2012 approximately 82 million cars and light trucks will be produced
 - 12 million premium segment cars and 45 million middle segment cars
 - The prediction for 2019 is 115 million total with 15 million premium and 60 million middle segment.
- Data presented indicates hundreds of millions ports/year for Ethernet in automotive by 2018-22.
- The Industrial Automation solutions currently have about 100 million installed Ethernet nodes on the market, with a growth of about 43% per year. A transition from fieldbus communication networks to Ethernet is on the way and new applications in industrial automation are expected.

Balanced Cost (LAN versus attached solutions)

- The Reduced Twisted Pair Gigabit Ethernet interface will maintain a favorable cost balance for in-vehicle applications operating over twisted pair copper cables.

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**
- As an amendment to IEEE Std 802.3, the proposed project will remain in conformance with the IEEE 802 Overview and Architecture, the bridging standards IEEE Std 802.1D and IEEE Std 802.1Q.
- The proposed amendment will conform to the full-duplex operating mode of the IEEE 802.3 MAC.
- The proposed amendment will conform to the Gigabit Media Independent Interface (GMII).
- 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 P802.3.1

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.
- There is no standard that supports Ethernet over fewer than four twisted copper wire pairs at an operating speed of 1 Gb/s.
 - The standard will define one PHY.
 - The proposed amendment to the existing IEEE 802.3 standard will be formatted as a collection of new clauses, making it easy for the reader to select the relevant specification.

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.**

- The proposed project will build on the array of Ethernet component and system design experience, and the broad knowledge base of Ethernet network operation.
- Component vendors have presented data on the feasibility of the necessary components for this project. Proposals which leverage existing 1000BASE-T technologies have been provided.
- The reliability of Ethernet components and systems can be projected in the target environments with a high degree of confidence.

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.
- The cost factors for Ethernet components and systems are well known. The proposed project may introduce new cost factors which can be quantified.
 - Prior experience in the development of other twisted pair copper physical layer specifications for Ethernet indicates that the specifications developed by this project will entail a reasonable cost for the resulting performance.
 - The reduction in the number of pairs and resulting weight reduction for the targeted markets will result in a significant drop in overall costs. The improved ease of installation will likely reduce costs.