

IEEE 802.3 Criteria for Standards Development (CSD)

The IEEE 802 Criteria for Standards Development (CSD) are defined in Clause 14 of the IEEE 802 LAN/MAN Standards Committee (LMSC) Operations Manual. The criteria include project process requirements (“Managed Objects”) and 5 Criteria (5C) requirements. The 5C are supplemented by subclause 4.5 ‘Criteria for Standards Development’ of the ‘IEEE 802.3 Ethernet Working Group Operations Manual’.

The following are the CSD Responses in relation to the IEEE P802.3dh PAR

Items required by the IEEE 802 CSD are shown in Black text and supplementary items required by IEEE 802.3 are shown in blue text.

Managed Objects

Describe the plan for developing a definition of managed objects. The plan shall specify one of the following:

- a) The definitions will be part of this project.
 - b) The definitions will be part of a different project and provide the plan for that project or anticipated future project.
 - c) The definitions will not be developed and explain why such definitions are not needed.
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- The definition of protocol independent managed objects, to be included in Clause 30 of IEEE Std 802.3, will be part of this project.

Coexistence

A WG proposing a wireless project shall prepare a Coexistence Assessment (CA) document unless it is not applicable.

- a) Will the WG create a CA document as part of the WG balloting process as described in Clause 13? (yes/no)
 - b) If not, explain why the CA document is not applicable.
- No. A CA document is not applicable because the proposed project is not a wireless project.

Broad Market Potential

Each proposed IEEE 802 LMSC standard shall have broad market potential. At a minimum, address the following areas:

- a) **Broad sets of applicability.**
- b) **Multiple vendors and numerous users.**

Broad sets of applicability.

- Rapid growth of automotive Ethernet has placed high demand on the existing set of PHYs defined for the Automotive industry. Quantitative presentations have been made to the 802.3 OMEGA study group and 802.3cz task force indicating significant market opportunity.
- The increase of EMC issues due to the frequency increase of operation, and the galvanic isolation required in electrical vehicles is enabling the use of optical communications in the Automotive industry. Reaches of at least 15 m makes optical fiber a viable solution for an Automotive Ethernet link.
- Several uses cases within the Automotive industry have been presented in the 802.3 OMEGA Study Group and CFI.
- Other transport industries may benefit from these PHYs, for example trains, aircrafts, etc.

Multiple vendors and numerous users.

- There has been wide attendance and participation in the study group by subject matter experts familiar with the needs of end users, equipment manufacturers and component suppliers. It is anticipated that there will be sufficient participation to effectively complete the standardization process.
- More than 90 Million cars are produced world wide annually. Many of them would benefit from Multi Gigabit Ethernet connectivity. More than 700 Million annual ports is the market size addressable by the PHYs expected to be defined by this project.

Compatibility

Each proposed IEEE 802 LMSC standard should be in conformance with IEEE Std 802, IEEE 802.1AC, and IEEE 802.1Q. If any variances in conformance emerge, they shall be thoroughly disclosed and reviewed with IEEE 802.1 WG prior to submitting a PAR to the IEEE 802 LMSC.

- a) Will the proposed standard comply with IEEE Std 802, IEEE Std 802.1AC and IEEE Std 802.1Q?
 - b) If the answer to a) is “no”, supply the response from the IEEE 802.1 WG.
 - c) **Compatibility with IEEE Std 802.3**
 - d) **Conformance with the IEEE Std 802.3 MAC**
- As a PHY amendment to IEEE Std 802.3, the proposed project will remain in conformance with IEEE Std 802, IEEE Std 802.1AC, and IEEE Std 802.1Q.
 - The proposed amendment will conform to the IEEE 802.3 MAC.
 - As with other IEEE 802.3 projects, a number of new PHY types will be defined.

Distinct Identity

Each proposed IEEE 802 LMSC standard shall provide evidence of a distinct identity. Identify standards and standards projects with similar scopes and for each one describe why the proposed project is substantially different.

Substantially different from other IEEE 802.3 specifications/solutions.

- There is no IEEE 802.3 standard that supports optical Ethernet at rates greater than 1 Gb/s for the requirements of automotive applications.
- The project may define multiple PHYs, but will define only a single PHY for each rate and link reach using graded-index plastic optical fiber

Technical Feasibility

Each proposed IEEE 802 LMSC standard shall provide evidence that the project is technically feasible within the time frame of the project. At a minimum, address the following items to demonstrate technical feasibility:

- a) Demonstrated system feasibility.
 - b) Proven similar technology via testing, modeling, simulation, etc.
 - 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.
 - Full-duplex operation over different optical fibers has been proven in deployments at multi gigabit rates.
 - Optical communications is already being successfully used in the automotive industry.
 - 1 mm step-index plastic optical fiber has been used for data communications in automobiles for more than twenty years. It is expected that emerging graded-index plastic optical fiber will be similarly applicable to automotive networks. Reliability concerns have been covered by different analysis reported in the P802.3cz Task Force with a high degree of confidence.
 - Component, including PHY, fiber and systems subject matter experts have presented data on the feasibility of the necessary components for this project. Proposals which leverage existing technologies have been provided.
 - Study group presentations support link budgets that fulfill automotive requirements at acceptable cost.

Economic Feasibility

Each proposed IEEE 802 LMSC standard shall provide evidence of economic feasibility. Demonstrate, as far as can reasonably be estimated, the economic feasibility of the proposed project for its intended applications.

Among the areas that may be addressed in the cost for performance analysis are the following:

- a) Known cost factors.
 - b) Balanced cost factors.
 - c) Consideration of installation costs.
 - d) Consideration of operational costs (e.g., energy consumption).
 - e) Other areas, as appropriate.
- Ethernet interfaces in the target data rate range defined by this project will maintain a favorable cost-performance balance.
 - The balance of costs between infrastructure and attached stations is not applicable to the automotive environment.
 - The cost factors for Ethernet components and systems are well known. The proposed project may introduce new cost factors for automotive applications which can be quantified.
 - Prior experience in the development of other physical layer specifications for Ethernet indicates that the specifications developed by this project will result in a reasonable cost for the specified performance.
 - The reduction in the number of legacy networks requiring specialized components, expertise, and gateways in the targeted markets will result in a significant drop in both vehicle assembly (installation) and operational costs.
 - Overall costs are minimized by introducing Ethernet network architecture, management, and software into the automotive environment.
 - Zonal (centralized) architecture, connected car, and autonomous car, will allow consolidation of processing resources similar to what has been seen in enterprise networks.
 - The 802.3cz task force presentations support the possibility of technology leveraging of existing optical components for the automotive industry.