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 P802.3ds 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.

- 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:
  - Electrical signaling data rates on both switches and compute devices are moving to 200 Gb/s per lane.
  - Presentations have been submitted to the study group illustrating that short reach, lower cost Vertical Cavity Surface Emitting Laser (VCSEL)-Multimode Fiber (MMF) links using 200 Gb/s signaling can serve as low-cost interconnects between switch and compute devices over tens of meters in artificial intelligence AI/machine learning clusters, cloud data centers, high-performance computing applications, and in large enterprise and carrier data centers.
  - The trend in building AI clusters favors architectures with many short reach interconnects between switch and/or compute devices which can require longer reaches (10's of meters) than can be supported by passive copper cables (~1m)
  - VCSEL-MMF links using 200 Gb/s signaling can also serve as low-cost interconnects for a significant portion of switch-to-switch links in cloud data centers
- Multiple vendors and numerous users:
  - At the Call For Interest, 51 individuals from 36 companies indicated participation in this project.
  - It is anticipated that there will be sufficient participation to effectively complete the standardization process including participants from end-users, equipment manufacturers and component suppliers.

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 Standards Committee.

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 an amendment to IEEE Std 802.3 the proposed project shall comply with IEEE Std 802, IEEE Std 802.1AC and IEEE Std 802.1Q.
- As was the case in previous IEEE Std 802.3 amendments, new physical layers will be defined for Media Access Control (MAC) data rates of 200 Gb/s and greater using 200 Gb/s signaling per lane operation.
- As an amendment to IEEE Std 802.3, the proposed project will conform to the full-duplex operating mode of the IEEE 802.3 MAC.
- By utilizing the existing IEEE Std 802.3 MAC protocol, this proposed amendment will maintain compatibility with the installed base of Ethernet nodes.
- The definition of protocol independent managed objects, to be included in Clause 30 of IEEE Std 802.3, will be part of this project.

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.

- The proposed amendment will be the first IEEE 802.3 standard defining operation over multimode fiber using 200 Gb/s signaling per lane.

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.

- IEEE 802.3 has already established 200 Gb/s, 400 Gb/s, 800 Gb/s and 1.6Tb/s MAC specifications suitable for 200 Gb/s per lane Physical Layer (PHY) operation in previous IEEE 802.3 projects.
- The principle of supporting different Physical Medium Dependent (PMD) types from a common MAC specification has been amply demonstrated in IEEE 802.3. The principle of building equipment that supports IEEE 802.3 networks operating at different Ethernet rates has been amply demonstrated by a broad set of product offerings.
- The proposed project will build on the array of Ethernet component and system design experience, and the broad knowledge base of Ethernet network operation
  - Individuals affiliated with component vendors have presented data on the technical feasibility of the necessary components for 200 Gb/s VCSEL-based multimode links. Supporting material, which either leverages existing technologies or employs new technologies, has been provided.
- The reliability of Ethernet components and systems is understood and can be projected in the target environments with a high degree of confidence.

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.

- The cost factors for Ethernet components and systems are well known. Re-use of common technologies from prior Ethernet projects will allow economies of scale to reduce cost.
- In consideration of installation costs, the project is expected to use proven and enhanced MMF media.
- The historical low cost and low power advantages associated with VCSEL-MMF links are expected to be preserved when increasing the optical lane rate from 100Gb/s to 200Gb/s.
- Higher speed 200 Gb/s signaling over MMF will lead to reduced lane counts to support the same Ethernet MAC rate, reduced fiber and component counts, reduced complexity, and lower cost than previously standardized PMDs based on 100 Gb/s signaling per lane. One example is replacing 800GBASE-SR8 for 800Gb/s Ethernet PMD with a four-lane PMD.
- Use of transceivers developed for this project will promote re-use of the installed base of MMF cabling.
- Network design, installation and maintenance costs are minimized by preserving network architecture, management, and software.