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 7.2 'Five Criteria' of the 'Operating Rules of IEEE Project 802 Working Group 802.3, CSMA/CD LANs'.

The following are the CSD Responses in relation to the IEEE P802.3**xx** 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 demonstrate coexistence through the preparation of a Coexistence Assurance (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?**
   b) **If not, explain why the CA document is not applicable**

- 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.**

- Ethernet is widely deployed in telecom client interconnects and in switch-to-switch applications in hyperscale and enterprise data centers where these 100 Gb/s and 400 Gb/s interconnects are expected to be widely utilized.

- The opportunity to have common 100 Gb/s per wavelength technology building blocks across all required SMF reaches in these applications enables solutions with reduced component count, increased density, and lower costs.

- Alignment of optical interface signaling rates with the anticipated transition on electrical interface SERDES signaling rates being defined in the IEEE P802.3ck project will be required to support cost effective solutions for all SMF reaches

- 90 participants attended the "100 Gb/s Per Lane Optical PHYs for 2 km and 10 km for 100 GbE and 400 GbE" Call-For-Interest consensus presentation. 80 participants voted in favor of forming a Study Group. At least 55 individuals affiliated with at least 43 companies indicated that they would support the standardization process. It is anticipated that there will be sufficient participation to complete the standardization process including individuals affiliated 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 Sponsor.

    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 100 Gb/s and 400 Gb/s 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 maximum compatibility with the installed base of Ethernet nodes.

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.

- IEEE P802.3bs and P802.3cd projects defined PHYs based on 100 Gb/s per optical lane over 500 m of SMF. The proposed 100 Gb/s and 400 Gb/s PHYs are focused on longer reaches of 2 km and 10 km which are not currently defined in IEEE Std 802.3.

- The proposed amendment to the existing IEEE 802.3 standard will be formatted as a collection of new clauses and modifications to existing clauses, making it easy for the reader to select the relevant specification.

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 100 Gb/s and 400 Gb/s MAC specifications suitable for 100 Gb/s per wavelength PHY operation in IEEE Std 802.3bs-2017 and IEEE Std 802.3cd-2018.

- The principle of supporting different PMD types from a common MAC specification has been amply demonstrated in IEEE 802.3.

- 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 100 Gb/s and 400 Gb/s solutions. Supporting material, which either leverages existing technologies or employs new technologies, has been provided.

  - Component technology for 100 Gb/s optical serial rates, are already either under development for other Ethernet projects (IEEE P802.3bs & P802.3cd) or working implementations have been demonstrated.

- The reliability of Ethernet components and systems has been established 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) **Balanced costs (infrastructure versus attached stations).**
- b) **Known 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 and the 100 Gb/s and 400 Gb/s Ethernet interfaces will maintain a favorable cost balance for the targeted switch-to-switch applications

- Reasonable cost for the resulting performance will be achieved in this project as established by prior experience in the development of:

  - Ethernet optical specifications based on 100 Gb/s per wavelength PMDs including 400GBASE-DR4 and 100GBASE-DR.

  - Industry optical specifications for 2 km and 10 km SMF reaches at 100 Gb/s and 400 Gb/s.

  - Alignment of electrical and optical interface widths.

- In consideration of installation costs, the project is expected to use proven and familiar media consistent with industry deployments, namely single-mode fiber.

- Network design, installation and maintenance costs are minimized by preserving network architecture, management, and software.

- 100 Gb/s per wavelength PMDs reduce the number of optical transmit/receive components by up to 4 times compared to 25 Gb/s and 50 Gb/s per wavelength solutions leading to lowered overall network power consumption. For 100 Gb/s the elimination of the optical mux/demux components further reduces cost and power consumption of these PMDs.