

IEEE 802.3 HSSG 5 Criteria Strawman

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Introduction

- Uses current IEEE 802 LMSC Criteria
 - Also answers unique concerns for IEEE 802.3
- Assumes one PAR
 - Based on objectives adopted Nov 2006
- Presented as a strawman
 - Check we've studied the problem
 - Are assertions supported by presentation material

Broad Market Potential

Broad sets of applications

Multiple vendors and numerous users

Balanced cost (LAN versus attached stations)

- Rapid growth of network and internet traffic has placed high demand on the existing infrastructure motivating the development of higher performance links. Quantitative presentations have been made to the IEEE 802.3 HSSG indicating significant market requirements.
- 100 Gb/s IEEE 802.3 provides a solution for applications that have been demonstrated to need bandwidth beyond existing capabilities. These include data center, internet exchanges, high performance computing, video on demand, disaster recovery, and service provider peering points.
- 220 participants attended the Higher Speed Ethernet call-for-interest. 147 indicated that this is the right time to start the standardization of Higher Speed Ethernet IEEE 802.3. 108 participants, representing at least 76 companies, indicated that they plan to participate in the standardization process.
- There has been wide attendance and participation across end users, equipment manufacturers and component suppliers.
- Prior experience scaling IEEE 802.3 across the range of 1 to 10000 Mb/s indicates that the cost balance between routers, switches, and the infrastructure remains roughly constant. 100 Gb/s Ethernet should continue this trend in the intended higher end application space.

Compatibility

IEEE 802 defines a family of standards. All standards shall be in conformance with the IEEE 802.1 Architecture, Management, and Interworking documents as follows: 802. Overview and Architecture, 802.1D, 802.1Q, and parts of 802.1f. If any variances in conformance emerge, they shall be thoroughly disclosed and reviewed with 802. Each standard in the IEEE 802 family of standards shall include a definition of managed objects that are compatible with systems management standards.

- **As an amendment to IEEE Std 802.3, the proposed project will remain in conformance with the IEEE 802 Overview and Architecture as well as the Bridging standards IEEE Std 802.1D and IEEE Std 802.1Q.**
- **As an amendment to IEEE Std 802.3, the proposed project will follow the existing format and structure of IEEE 802.3 MIB definitions providing a protocol independent specification of managed objects (IEEE Std 802.1F).**
- **The proposed standard will conform to the full-duplex operating mode of the IEEE 802.3 MAC, appropriately adapted for 100 Gb/s operation.**
- **As was the case in previous IEEE 802.3 standards, new physical layers will be defined for 100 Gb/s operation.**

Distinct Identity

Substantially different from other IEEE 802 standards

One unique solution per problem (not two solutions to a problem)

Easy for the document reader to select the relevant specification

- The proposed standard is an upgrade path for IEEE 802.3 users, based on the IEEE 802.3 MAC, running at 100 Gb/s.
- By adapting the existing IEEE 802.3 MAC protocol for use at 100 Gb/s, this proposed standard will maintain maximum compatibility with the installed base of Ethernet nodes.
- The established benefits of the IEEE 802.3 MAC include:
 - Deterministic, highly efficient full-duplex operation mode
 - Well-characterized and understood operating behavior
 - Broad base of expertise in suppliers and customers
 - Straightforward bridging between networks at different data rates
- The Management Information Base (MIB) for 100 Gb/s IEEE 802.3 will be extended in a manner consistent with the IEEE 802.3 MIB for 10 / 100 / 1000 / 10000 Mb/s operation. Therefore, network managers, installers, and administrators will see a consistent management model across all operating speeds.
- The proposed standard will be an amendment to the existing IEEE 802.3 standard, formatted as a collection of new clauses, making it easy for the reader to select the relevant specification.

Technical Feasibility

Demonstrated system feasibility
Proven technology, reasonable testing
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.
- The principle of scaling the IEEE 802.3 MAC to higher speeds has been well established by previous work within IEEE 802.3. The 100 Gb/s work will build on this experience.
- The principle of building bridging equipment which performs rate adaptation between IEEE 802.3 networks operating at different speeds has been amply demonstrated by the broad set of product offerings that bridge between 10, 100, 1000, and 10000 Mb/s.
- Component vendors have presented data on the feasibility of the necessary components for 100 Gb/s Ethernet. Proposals, which either leveraged existing technologies or employed new innovative technologies, have been provided.
- The reliability of Ethernet components and systems can be extrapolated in the target environments with a high degree of confidence. Presentations demonstrating this have been provided.

Economic Feasibility

Know cost factors, reliable data
Reasonable cost for performance
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.**
- **Ethernet consistently demonstrates the most attractive cost/performance ratio of any networking technology, at any operating speed. Representations from component and equipment suppliers and their customers indicate that Ethernet at 100 Gb/s will offer better value and lower cost than rival technologies available for early adopters.**
- **Customers will be able to use the SMF fiber and at least 100 m of OM3 that has been installed in accordance with ISO/IEC 11801 and / or ANSI/TIA-942.**
- **Installation costs for new fiber runs based on established standards are well known and reasonable.**
- **Network design, installation and maintenance costs are minimized by preserving network architecture, management, and software.**