802.3 HSSG 5 Criteria

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MEETING OF THE 802.3 HIGH SPEED STUDY GROUP (a.k.a. 10GbE)

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1. Broad Market Potential

Broad set(s) of applications
Multiple vendors, multiple users
Balanced cost, LAN vs. 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 802.3 HSSG indicating significant market opportunity.**

- **10 Gb/s 802.3 solution extends Ethernet capabilities providing higher bandwidth for multimedia, distributed processing, imaging, medical, CAD/ CAM, and pre-press applications by improving the performance of:**
  - **LAN Backbone and Server and Gateway Connectivity**
  - **Switch aggregation**
  - **the MAN, WAN, Regional Area Network (RAN), and Storage Area Network (SAN)**

- **140 participants attended the 10 Gigabit call-for-interest, representing at least 55 companies, indicate that they plan to participate in the standardization of 10 Gb/s 802.3. 139 Indicated that this is the right time to start. Attendance and interest has increased steadily since that time.**

- **This level of commitment indicates that a standard will be supported by a large group of vendors. This in turn will ensure that there will be a wide variety of equipment supporting a multitude of applications.**

- **Prior experience scaling 802.3 across the range of 1 to 1000 Mb/ s indicates that the cost balance between adapters, switches, and the infrastructure remains roughly constant. 10 Gb/s Ethernet should continue this trend.**

2. Compatibility with IEEE Standard 802.3

Conformance with CSMA/ CD MAC, PLS
Conformance with 802.2
Conformance with 802 FR

- **The proposed standard will conform to the full-duplex operating mode of the 802.3 MAC, appropriately adapted for 10 Gb/ s operation. Half-duplex (CSMA/CD) operation will not be supported at 10 Gb/s.**

- **As was the case in previous 802.3 standards, new physical layers will be defined for 10 Gb/s operation.**

- **The proposed standard will conform to the 802.3 MAC Client Interface, which supports 802.2 LLC.**

- **The proposed standard will conform to the 802.1 Architecture, Management and Interworking.**

- **The proposed standard will conform with the 802 Functional Requirements Document (with the possible exception of Hamming distance).**

- **The proposed standard will define a set of systems mangement objects which are compatible with OSI and SNMP system management standards.**

3. Distinct Identity

Substantially different from other 802.3 specs/ solutions
Unique solution for problem (not two alternatives/ problem)
Easy for document reader to select relevant spec

- **The proposed standard is an upgrade path for 802.3 users, based on the 802.3 MAC, running at 10 Gb/s.**

- **By adapting the existing 802.3 MAC protocol for use at 10 Gb/s, this proposed standard will maintain maximum compatibility with the installed base of over 600 million Ethernet nodes.**

- **The established benefits of the 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 10 Gb/s 802.3 will be extended in a manner consistent with the 802.3 MIB for 10 / 100 / 1000 Mb/s operation. Therefore, network managers, installers, and administrators will see a consistent management model across all operating speeds.**

- **Two PHY families will address two distinct application spaces, the LAN and the WAN.**

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

4. Technical Feasibility
Demonstrated feasibility; reports - - working models
Proven technology, reasonable testing
Confidence in reliability

- Technical presentations, given to 802.3, have demonstrated the feasibility of using the 802.3 in useful network topologies at a rate of 10 Gb/s.

- The principle of scaling the 802.3 MAC to higher speeds has been well established by previous work within 802.3. The 10 Gb/s work will build on this experience.

- The principle of building bridging equipment which performs rate adaptation between 802.3 networks operating at different speeds has been amply demonstrated by the broad set of product offerings that bridge between 10, 100, and 1000 Mb/s.

- Vendors of optical components and systems are building reliable products which operate at 10 Gb/s, and meet worldwide regulatory and operational requirements.

- Component vendors have presented research on the feasibility of physical layer signaling at a rate of 10 Gb/s on fiber optic media using a wide variety of innovative low cost technologies.

- 10 Gb/s Ethernet technology will be demonstrated during the course of the project, prior to the completion of the sponsor ballot.

5. Economic Feasibility

Cost factors known, reliable data
Reasonable cost for performance expected
Total Installation costs considered

- Cost factors are extrapolated from the OC-192 component supplier base and technology curves.

- A target cost increase of 3X of 1000BASE- X with a ten-fold increase in available bandwidth in the full duplex operating mode will result in an improvement in the cost- performance ratio by a factor of 3. This cost model has been validated during both the 100 and 1000 Mb/s Ethernet deployment.

- Customers will in some cases be able to re-use fiber that has been installed in accordance with ISO/ IEC 11801, and in other existing fiber facilities.

- 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, software, and structured cabling.