

10GBASE-CX4

5 Criteria

Interim Meeting
Roseville, California
December 16-17, 2002

Broad Market Potential

Broad set(s) of applications

Multiple vendors, multiple users

Balanced cost, LAN Vs. attached stations

- As customers move to 1000BASE-T attached desktops, the demand for a very low-cost 10Gbps link to interconnect switches gains demand. 10GBASE-CX4 meets that demand.
- A 10 Gb/s 802.3 copper PMD solution extends Ethernet capabilities providing higher bandwidth for multimedia, distributed processing, imaging, medical, CAD/CAM, and pre-press applications by lowering the cost of high performance 10Gbps network links for:
 - LAN Backbone, server and gateways in Data Centers
 - Switch aggregation
 - Storage Area Network (SAN)
- 35 participants attended the 10 Gigabit Copper study group and indicate that they plan to participate in the standardization of 10 Gb/s 802.3.
- 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.
- 10GBASE-CX4 helps bring a cost sensitive solution to this performance space.

Compatibility with IEEE Std 802.3

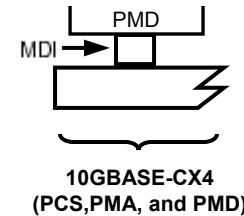
Conformance with CSMA/ CD MAC, PLS

Conformance with 802.2

Conformance with 802

- The proposed standard will conform to the full-duplex operating mode of the 802.3 MAC, appropriately adapted for 10 Gb/s operation.
- As was the case in previous 802.3 standards, a new physical layer 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 define a set of systems management objects which are compatible with OSI and SNMP system management standards.

Compatibility with IEEE Std 802.3



MDI=MEDIUM DEPENDENT INTERFACE
PCS=PHYSICAL CODING SUBLAYER
PHY=PHYSICAL LAYER DEVICE

PMA=PHYSICAL MEDIUM ATTACHMENT
PMD=PHYSICAL MEDIUM DEPENDENT
XGMII=10GIGABIT MEDIA INDEPENDENT INTERFACE

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 current 802.3 10Gb/s specification includes only fiber-optic media types for interconnection of devices. There are no copper media types .**
- **The specification will be done in a format consistent with the IEEE document requirements thus making it easy for implementers to understand and design to.**
- **The proposed specification will use copper media similar to other high speed networking technologies (FibreChannel, IB4X) but does so with the IEEE 802.3 MAC as the over-riding layer which will result in higher compatibility and lower cost for Ethernet systems.**

Technical Feasibility

Demonstrated feasibility; simulations, reports - - working models

Proven technology, reasonable testing

Confidence in reliability

- Technical presentations, given to 802.3, have demonstrated the feasibility of using the copper media in useful network topologies at a rate of 10 Gb/s.
Other technologies like Infiniband 4x are deployed with similar media and baud rates.
- The principle of extending higher speeds to copper media has been well established by previous work within 802.3. The 10 Gb/s work will build on this experience.
- Vendors of CMOS components and systems are building reliable products which operate at 10 Gb/s on copper media, 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 copper media using a wide variety of innovative low cost technologies.

Economic Feasibility

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

- **Cost factors are extrapolated from the XAUI component supplier base and technology curves.**
- **Cost for a copper 10GBASE-CX4 implementation is expected to be 1/20 to 1/10 that of 10GBASE-optical solutions.**
- **Costs for assemblies based on established standards (IB4X) are well known and reasonable.**
- **Network design, installation and maintenance costs are minimized by preserving network architecture, management, and software.**