

Comments #288, 289
EEE Support for 100GBASE-CR10, 40GBASE-
CR4, & 40GBASE-KR4

IEEE P802.3bj
100 Gb/s Backplane and Copper Cable
Task Force

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Submitted Comments

- **Comment # 288**

Bit 7.60.9 calls out EEE for 100GBASE-CR10. However, EEE for 100GBASE-CR10 is not within the scope of this project –

The scope of the PAR for IEEE P802.3bj is as follows:

The scope of this project is to specify additions to and appropriate modifications of IEEE Std 802.3 to add 100 Gb/s 4 lane Physical Layer (PHY) specifications and management parameters for operation on backplanes and twinaxial copper cables.

100GBASE-CR10 is a 10 lane PHY specification

- **Comment # 289**

EEE support is being developed for 100GBASE-nR4 PHY specifications. Backwards capability is always desirable, but adding EEE support for 40GBASE-CR4 and 40GBASE-KR4 is not within scope of this project. This will impact all instances that refers to 100GBASE-CR10 throughout the amendment.

The scope of the PAR for IEEE P802.3bj is as follows:

The scope of this project is to specify additions to and appropriate modifications of IEEE Std 802.3 to add 100 Gb/s 4 lane Physical Layer (PHY) specifications and management parameters for operation on backplanes and twinaxial copper cables.

Straw Poll History

- September 2011

- **Straw Poll #3:** Do you support doing the work to specify EEE for 40G Cu and Backplane IEEE P802.3ba interfaces in addition to the 100G Cu and Backplane IEEE P802.3bj interfaces?
 - Results (yes/no/unsure): 14/0/24
- **Straw Poll #4:** Do you support doing the work to specify EEE for 40G Cu and Backplane IEEE P802.3ba interfaces in addition to the 100G Cu and Backplane IEEE P802.3bj interfaces?
 - Results: (yes/no/unsure): 8/9/23

- May 2012

- **Straw Poll #7:** I support adding EEE functionality for 100GBASE-CR10
 - Results (y/n/a): 25/2/23
- **Straw Poll #8:** I support adding EEE functionality for 40GBASE-CR4
 - Results (y/n/a): 25/0/25
- **Straw Poll #9:** I support adding EEE functionality for 40GBASE-KR4
 - Results (y/n/a): 26/1/22

PAR

- Title:
 - Physical Layer Specifications and Management Parameters for 100 Gb/s Operation Over Backplanes and Copper Cables
- Scope
 - The scope of this project is to specify additions to and appropriate modifications of IEEE Std 802.3 to add 100 Gb/s 4 lane Physical Layer (PHY) specifications and management parameters for operation on backplanes and twinaxial copper cables.

EEE PHY Support: Scope Summary

- In scope
 - 100GBASE-CR4
 - 100GBASE-KP4
 - 100GBASE-KR4
- Not In Scope
 - 100GBASE-CR10
 - 40GBASE-CR4
 - 40GBASE-KR4

PAR – Proposed Changes

- Title:
 - Physical Layer Specifications and Management Parameters for 100 Gb/s Operation Over Backplanes and Copper Cables
- Scope
 - The scope of this project is to specify additions to and appropriate modifications of IEEE Std 802.3 to add 100 Gb/s 4 lane Physical Layer (PHY) specifications and management parameters for operation on backplanes and twinaxial copper cables, **and specify optional Energy Efficient Ethernet (EEE) for 40 Gb/s and 100Gb/s operation over backplanes and copper cables.**

Objectives: Proposed Changes

- No Changes to Current Defined Energy Efficient Ethernet Objective
 - To define optional Energy-Efficient Ethernet operation for 100G Backplane and Twinaxial cable PHYs specified in P802.3bj
- Add Following Objectives:
 - **To define optional Energy-Efficient Ethernet operation for 100GBASE-CR10**
 - **To define optional Energy-Efficient Ethernet operation for 40GBASE-CR4 and 40GBASE-KR4**

Changes to Critters?

- Implementing EEE
 - Broad Market Potential
 - Distinct Identity
 - Compatibility
- Let's do our homework.
- Here are some possible changes – does the Task Force feel they are necessary?

Broad Market Potential

a) Broad sets of applicability.

b) Multiple vendors and numerous users.

c) Balanced costs (LAN versus attached stations).

- Ethernet has become widely deployed as a preferred backplane solution. Examples include Modular Servers and Enterprise and Telecom Network Equipment. Ethernet is also widely deployed over twinaxial copper cables for both intra-rack and inter-rack connections.
- Internet, cloud, and higher performance computing applications, along with advances in processors, server virtualization and converged networking, are driving the need for higher bandwidth blade and rack server connections. Increasing the backplane data rate to 100 Gb/s and providing cost effective 100 Gb/s rack server solutions are required to maintain pace with new demands.
- 120 participants attended the “100 Gb/s Ethernet Electrical Backplane and Twinaxial Copper Cable Assemblies” Call-For-Interest, representing at least 43 companies. This level of interest indicates that a standard will be developed by a large group of vendors and users.
- A 100 Gb/s Ethernet interface will maintain a favorable cost balance for backplane and twinaxial copper cable applications.
- **Energy Efficient Ethernet will reduce the operational costs and the environmental footprint of Ethernet Systems.**

Distinct Identity

- a) **Substantially different from other IEEE 802 standards.**
 - b) **One unique solution per problem (not two solutions to a problem).**
 - c) **Easy for the document reader to select the relevant specification.**
 - d) **Substantially different from other IEEE 802.3 specifications/solutions.**
- There is no standard that supports Ethernet on backplane media at operating speeds of 100 Gb/s. While IEEE Std 802.3ba-2010 does include a specification for 100 Gb/s Ethernet on twinaxial copper cables (100GBASE-CR10) the cables are bulky and relatively costly due to the fact that they are constructed with twenty twinaxial wire pairs.
 - The standard will define at most one PHY for each medium.
 - The proposed amendment to the existing IEEE 802.3 standard will be formatted as a collection of new clauses, making it easy for the reader to select the relevant specification.
 - **IEEE Std 802.3 does not define Energy Efficient Ethernet for 40 Gb/s or 100 Gb/s operation**

Compatibility

- **IEEE 802 defines a family of standards. All standards should be in conformance with the IEEE 802.1 Architecture, Management, and Interworking documents as follows: IEEE 802. Overview and Architecture, IEEE 802.1D, IEEE 802.1Q, and parts of IEEE 802.1F. If any variances in conformance emerge, they shall be thoroughly disclosed and reviewed with IEEE 802.1.**
- **Each standard in the IEEE 802 family of standards shall include a definition of managed objects that are compatible with systems management standards.**
- **Compatibility with IEEE Std 802.3**
- **Conformance with the IEEE Std 802.3 MAC**
- **Managed object definitions compatible with SNMP**
- As an amendment to IEEE Std 802.3, as amended by IEEE Std 802.3ba-2010, the proposed project will remain in conformance with the IEEE 802 Overview and Architecture, the bridging standards IEEE Std 802.1D and IEEE Std 802.1Q, and clause 80 introduced by IEEE Std 802.3ba-2010.
- The proposed amendment will conform to the full-duplex operating mode of the IEEE 802.3 MAC.
- The proposed amendment will conform to **the 40 Gb/s and 100 Gb/s Media Independent Interfaces (XLGMII, CGMII) specified by IEEE Std 802.3ba-2010 with optional additions for Energy Efficient Ethernet.**
- The project will include a protocol independent specification of managed objects with SNMP management capability to be provided in the future by an amendment to or revision of IEEE P802.3.1.

Suggested Remedy

- Task Force must determine
 - Modify PAR?
 - Modify Objectives?
 - Modify Critters?
- Follow required procedures
 - Task Force Approval – July
 - WG Approval – July / Nov?
 - EC Approval – Nov
 - SASB Approval - Dec
- Add appropriate note to draft pending approval by Task Force –
 - “As the Task Force has approved PAR changes to allow for legacy .3ba interfaces to have EEE, to minimize future editorial efforts, a note excluding them has been added. Should the PAR modification be approved by the IEEE SASB, the statement will be removed. Should the PAR modification not be approved, the additional diagrams will be deleted.”