IEEE 802.3 25G SMF Study Group Closing Report

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Lumentum

Macau, China

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IEEE 802.3 25G SMF Study Group
Study Group information

Study Group Organization

David Lewis, Lumentum, SG Chair

Kohichi Tamura, SG Recording Secretary

Study Group charter

Develop a PAR and CSD for: “25 Gigabit/s Ethernet PMD(s) for single mode fiber”

Study Group web and reflector information

Reflector information: http://www.ieee802.org/3/25GSMF/reflector.html

Home page: http://ieee802.org/3/25GSMF/index.html

Activities this week

Met on Monday 14th March and again on Wednesday 16th March, 2016

Major items discussed, decisions made and actions

Heard 2 presentations on approach to specification:

Kohichi Tamura	Oclaro	An approach to 25 GbE SMF 10km specification
Kohichi Tamura	Oclaro	An approach to 25 GbE SMF 40km specification

Discussed status of project documentation

David Lewis	Lumentum	Review of comments on project documentation

Current status

Updated draft objectives, PAR and CSD responses.

PAR: http://www.ieee802.org/3/25GSMF/P802_3cc_PAR_160316.pdf

CSD|*5C*]: http://www.ieee802.org/3/25GSMF/P802_3cc_CSD_160316.pdf

Objectives: http://www.ieee802.org/3/25GSMF/P802_3cc_Objectives_160316.pdf

Adopted Objectives

- Support a MAC data rate of 25 Gb/s
- Support full-duplex operation only
- Preserve the Ethernet frame format utilizing the Ethernet MAC
- Preserve minimum and maximum Frame Size of current IEEE 802.3 standard
- Support a BER of better than or equal to 10^{-12} at the MAC/PLS service interface (or the frame loss ratio equivalent)
- Support optional Energy-Efficient Ethernet operation
- Provide physical layer specification which support 25 Gb/s operation over at least 10 km on SMF.
- Provide physical layer specification which support 25 Gb/s operation over at least 40 km on SMF.
- Provide appropriate support for OTN

Updated P802.3cc PAR

P802.3cc
Submitter Email: david_law@ieee.org
Type of Project: Amendment to IEEE Standard 802.3-2015
PAR Request Date: 18-Jan-2016
PAR Approval Date:
PAR Expiration Date:
Status: Unapproved PAR, PAR for an Amendment to an existing IEEE Standard
1.1 Project Number: P802.3cc
1.2 Type of Document: Standard
1.3 Life Cycle: Full Use
2.1 Title: Standard for Ethernet
Amendment: Physical Layer and Management Parameters for Serial 25 Gb/s Ethernet Operation Over Single-Mode Fiber
3.1 Working Group: Ethernet Working Group (C/LM/WG802.3)
Contact Information for Working Group Chair
Name: David Law
Email Address: david_law@ieee.org
Phone: +44 1631 563729
Contact Information for Working Group Vice-Chair
Name: Adam Healey
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Phone: 6107123508

Updated P802.3cc PAR (continued)

3.2 Sponsoring Society and Committee: IEEE Computer Society/LAN/MAN Standards Committee (C/LM)
Contact Information for Sponsor Chair
Name: Paul Nikolich
Email Address: p.nikolich@ieee.org
Phone: 8572050050
Contact Information for Standards Representative
Name: James Gilb
Email Address: gilb@ieee.org
Phone: 858-229-4822
4.1 Type of Ballot: Individual
4.2 Expected Date of submission of draft to the IEEE-SA for Initial Sponsor Ballot: 01/2018
4.3 Projected Completion Date for Submittal to RevCom: 08/2018
5.1 Approximate number of people expected to be actively involved in the development of this project: 25

Updated P802.3cc PAR (continued)

5.2.a. Scope of the complete standard: This standard defines Ethernet local area, access and metropolitan area networks. Ethernet is specified at selected speeds of operation; and uses a common media access control (MAC) specification and management information base (MIB). The Carrier Sense Multiple Access with Collision Detection (CSMA/CD) MAC protocol specifies shared medium (half duplex) operation, as well as full duplex operation. Speed specific Media Independent Interfaces (MIIs) provide an architectural and optional implementation interface to selected Physical Layer entities (PHY). The Physical Layer encodes frames for transmission and decodes received frames with the modulation specified for the speed of operation, transmission medium and supported link length. Other specified capabilities include: control and management protocols, and the provision of power over selected twisted pair PHY types.

5.2.b. Scope of the project: The scope of this project is to add point-to-point single-mode fiber Physical Medium Dependent (PMD) options for serial 25 Gb/s operation at reaches greater than 100 m by specifying additions to, and appropriate modifications of, IEEE Std 802.3.

5.3 Is the completion of this standard dependent upon the completion of another standard: Yes

If yes please explain: This project is dependent on IEEE P802.3by and will use the MAC and Physical Coding Sublayer (PCS) from that amendment.

5.4 Purpose: This document will not include a purpose clause.

Updated P802.3cc PAR (continued)

5.5 Need for the Project: The project is needed to provide multiple system operators and telecommunications operators with an IEEE 802.3 25 Gb/s Ethernet serial interconnect solution at reaches greater than 100 meters using single-mode fiber (SMF) for application areas including enterprise campus, carrier metro and other similar areas.
5.6 Stakeholders for the Standard: Users and producers of systems and components for enterprise campus and carrier metro Ethernet networks.
Intellectual Property
6.1.a. Is the Sponsor aware of any copyright permissions needed for this project?: No
6.1.b. Is the Sponsor aware of possible registration activity related to this project?: No
7.1 Are there other standards or projects with a similar scope?: No
7.2 Joint Development
Is it the intent to develop this document jointly with another organization?: No
8.1 Additional Explanatory Notes (Item Number and Explanation): Item #5.2: The full title of IEEE Std 802.3 is IEEE Standard for Ethernet. Item #5.3: The full title of IEEE P802.3by is Draft Standard for Ethernet Amendment: Media Access Control Parameters, Physical Layers and Management Parameters for 25 Gb/s Operation

Updated CSD Responses

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.
- In addition it is expected that the definition of Simple Network Management Protocol (SNMP) managed objects, written using the Structure of Management Information version 2 (SMIv2), and making reference to the protocol independent managed objects provided by this project, will be added in a future amendment to, or revision of, IEEE Std 802.3.1 IEEE Standard for Management Information Base (MIB) Definitions for Ethernet.

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

N/A since this 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 for access switch to switch applications in enterprise applications. As access switch downlink speeds increase from 1 Gb/s to 2.5 Gb/s the corresponding uplink speeds will increase from 10 Gb/s to 25 Gb/s. This higher speed is needed throughout the enterprise campus network, including for reaches greater than those developed in P802.3by.

10 km reach addresses the needs of enterprise campus and other adjacent applications.

10 km and 40 km reaches address the needs of metro and other adjacent applications.

In metropolitan networks the core operates at 100 Gb/s and requires tributary feeds at rates higher than 10 Gb/s. The natural next step is 25 Gb/s, which matches the per-lane rate of several 100 Gb/s PMDs used for these networks.

113 participants attended the “25 Gb/s SMF Ethernet PMD” Call-For-Interest. 66 individuals representing at least 48 companies indicated that they would support the standardization process. It is anticipated that there will be sufficient participation to effectively complete the standardization process including representatives 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

e) Managed object definitions compatible with SNMP

As an amendment to IEEE Std 802.3 as amended by the IEEE P802.3by project, 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 105 introduced by IEEE P802.3by.

As an amendment to IEEE Std 802.3 as amended by the IEEE P802.3by project, the proposed project will follow the existing format and structure of IEEE 802.3 MIB definitions by providing a protocol-independent specification of managed objects.

Utilizing the 25GBASE-R MAC, PCS, and PMA the new PMD(s) maintain the same relationship to IEEE Std 802.3 as IEEE P802.3by 25 Gb/s PMDs.

The proposed amendment will conform to the full-duplex operating mode of the IEEE 802.3 MAC.

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 Std. 802.3.1.

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.

There is no standard or project developing a standard that supports point-to-point Ethernet at 25 Gb/s for reaches greater than 100 m.

There is no standard or project developing a standard that supports point-to-point Ethernet over single-mode fiber cabling at a data rate of 25 Gb/s.

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.

The initial 25 Gb/s Ethernet specifications are nearing completion and 100 Gb/s Ethernet systems based on 25 Gb/s technologies are already shipping.

Component vendors are currently delivering 100 Gb/s PMDs organized as 25 Gb/s per lane including: 100GBASE-LR4 and 100GBASE-ER4. Subcomponents from these PMDs can be re-used for the proposed 25 Gb/s single-mode PMD(s).

Other standards bodies including ITU-T is standardizing 100 Gb/s applications based on 25 Gb/s lane rates including reaches up to 40 km. Subcomponents from those applications can be re-used for 25 Gb/s PMDs.

Fibre Channel has standardized a 10 km SMF optical transceiver for 32GFC with similar characteristics to those required by this project.

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.

Prior experience in the development of 100 Gb/s specifications for Ethernet and 32G Fibre Channel establishes that the new specifications developed by this project will entail a reasonable cost for the resulting performance.

In consideration of installation costs, the project is expected to use proven and familiar media.

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

Energy Efficient Ethernet will reduce the operational costs and the environmental footprint.

Motions

Motion

Move that the IEEE 802.3 Working Group approve the IEEE P802.3cc 25 Gb/s Ethernet over single-mode fiber objectives, as per 0316_25G_SMF_close_report.pdf

M:

S:

Technical (≥75%)

Y: N: A:

Motion

Move that the IEEE 802.3 Working Group approve the IEEE P802.3cc 25 Gb/s Ethernet over single-mode fiber CSD "Managed Objects", "Coexistence", "Broad Market Potential", "Compatibility", "Distinct Identity", "Technical Feasibility", and "Economic Feasibility" responses, as per 0316_25G_SMF_close_report.pdf

M:

S:

Technical (≥75%)

Y: N: A:

Motion

Move that the IEEE 802.3 Working Group approve the IEEE P802.3cc 25 Gb/s Ethernet over single-mode fiber PAR, in http://www.ieee802.org/3/25GSMF/P802_3cc_PAR_160316.pdf

M:

S:

Technical (≥75%)

Y: N: A:

Motion

Move that the IEEE 802.3 Working Group request the extension of the 25 Gb/s Ethernet over single-mode fiber Study Group.

M:

S:

>50%

Y: N: A:

Next Steps

- Continue Ad Hoc CC calls
  - Next call potentially on 30th March. Time TBA.
- If PAR is approved, the Task Force to hold its first meeting at 802.3 May Interim:
  - Dates: Week of May 23, 2016
  - Place: Fairmont Chateau Whistler (hosted 802 Interim)
  - Whistler, BC, Canada
- Else, will meet as the study group

Questions?

Thank you!