IEEE 802.3
Call for Interest
200 Gb/s per wavelength
Multimode Fiber (MMF) optical PHYs
Closing Report

Mabud Choudhury, Lightera

IEEE 802.3 WG Closing Plenary

Madrid, Spain, 31 July 2025

CFI Announcement Made at 802.3 Opening Plenary, 28 July 2025: 200 Gb/s per wavelength MMF optical PHYs

Links comprising multimode fiber (MMF) cable and VCSEL-based transceivers have played a key role in implementing multiple generations of Ethernet data rates in data centers for short reach. Ethernet has a proven track record of reusing and leveraging technology to enable new cost-optimized solutions for broad market adoption in these short-reach applications. IEEE 802.3db and IEEE 802.3df Ethernet projects defined specifications for 100 Gb/s, 200 Gb/s, 400 Gb/s, and 800 Gb/s operation over MMF using 100 Gb/s signaling. These Ethernet standards have gained market adoption in high bandwidth, high growth artificial intelligence (AI) back-end networks, as well as front-end networks for server-attachment, due to their lower power and lower cost than other optical technologies and their longer reaches than copper technologies. The continual growth of bandwidth demand has driven the evolution of even higher Ethernet speeds, most recently with 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet using 200 Gb/s signaling specifications being developed by the P802.3dj project. Now, the technology for 200 Gb/s per wavelength VCSEL-MMF links has reached a level that suggests the time is right to study an interoperable Ethernet MMF specification that will have broad market adoption.

This is a call for interest to initiate a Study Group to explore the potential market requirements and feasibility of addressing AI/Data Center networks, and to develop a PAR and CSD for 200 Gb/s per wavelength MMF optical PHYs.

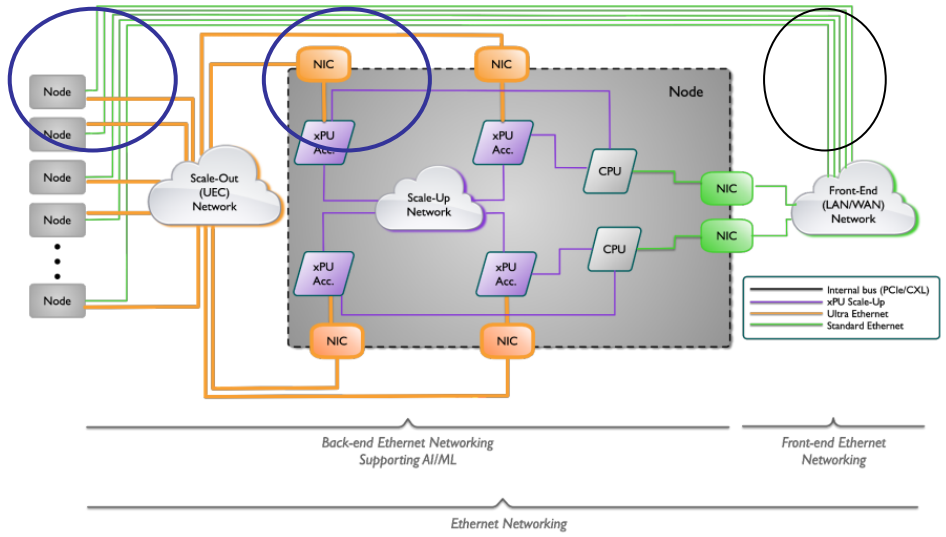
Overview: Motivation

- The introduction of artificial intelligence (AI) networks has led to increased deployment of low cost, low power, short reach optical links in back-end networks
- These back-end links are an addition to front end networks for server-attachment
- This proposed study group will look at short reach (TBD) MMF PHYs using 200G per wavelength to match emerging 200G SerDes
- The motivation is to leverage multimode technology including advanced packaging and volume manufacturing in sensing applications to address the ongoing cost and power consumption pressures on optical interconnects in the web-scale and AI datacenter market
- Adding 200G/lane capabilities enables higher port densities and lower cost per bit

What are we talking about?

What are AI Networks?

General Purpose vs. Scale-Up versus Scale-Out (UEC) Networks



Source: Ultra Ethernet Consortium

Used with permission from J Metz, UEC

- The author is aware that there are different representations of different implementations of AI Networks.
- The key takeaway is there are three types of networks for AI:
  - Front-end / traditional Ethernet
  - Back-end networks
    - Scale-up
    - Scale-out

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Applications for early adoption of short-reach 200G PHYs include Scale-Out & Scale-Up Networks in AI clusters. Applications can also include the Front-End Network/traditional Ethernet.

Why Now?

- Multiple industry experts are identifying a market need for 200G/lane short reach optical links for AI back-end compute clusters and for front-end/traditional Ethernet networks. These networks prioritize power and cost for short reach applications. All key value propositions for VCSEL-MMF links.
- The technology for 200 Gb/s per wavelength VCSEL-MMF links has reached a level that suggests the time is right to study an interoperable Ethernet specification that will have broad market adoption.
- Seek to initiate a Study Group to explore the potential market requirements and feasibility of, and to develop a PAR and CSD for 200 Gb/s per wavelength MMF optical PHYs.
- Leverage developments in P802.3dj in that effort.

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CFI Consensus Presentation

- A consensus building presentation was held in the New Ethernet Applications (NEA) Ad Hoc teleconference on Thursday, 17 July 2025
  - CFI Consensus Presentation: 200G/wavelength MMF Optical PHYs CFI
  - Number of attendees: 65 (per IMAT)
- Panel
  - Speakers
    - Mabud Choudhury, Lightera
    - Earl Parsons, CommScope
  - Additional Panelists
    - Guangcan Mi, Huawei
    - Ernest Muhigana, Lumentum
    - Ramana Murty, Broadcom
    - Roberto Rodes, Coherent
- The NEA Ad Hoc process continues to be very helpful in building consensus for new projects

Contributors

33 contributors with 20 different affiliations

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Al Yuen, Picojool
George Zimmerman, CME Consulting
Pavel Zivny, MultiLane

Straw Poll Questions

1. Should a study group be formed to develop a PAR, CSD responses, and objectives for “200G/wavelength MMF optical PHYs”?
   - ❑Yes: 63
   - ❑No: 0
   - ❑Abstain: 2

2. If formed, will you participate in this Study Group?[11]
   - ❑Yes: 51 individuals, 36 affiliations

Study Group Chartering WG Motion

- Move that the IEEE 802.3 Working Group request the formation of a Study Group to explore the potential market requirements and feasibility of addressing AI/Data Center networks, and to develop a Project Authorization Request (PAR) and Criteria for Standards Development (CSD) responses for 200 Gb/s per wavelength MMF optical PHYs
- M: Mabud Choudhury
- S: Earl Parsons

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Questions?

Thank you