10km Duplex SMF Objectives Proposal

IEEE P802.3dj Plenary Session

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Chris Cole, Quintessent

Contributors & Supporters

- Vipul Bhatt, Coherent
- Frank Chang, Sourcephotonics
- Greg Le Cheminant, Keysight
- Weiqiang Cheng, China Mobile
- John DeAndrea, Independent
- Mike Dudek, Marvell
- David Estes, Spirent
- Arash Farhoodfar, Marvell
- Vince Ferretti, Corning
- Ali Ghiasi, Ghiasi Quantum
- Ed Harstead, Nokia
- Tom Huber, Nokia
- Kenneth Jackson, Sumitomo
- John Johnson, Broadcom
- Nobuhiko Kikuchi, Hitachi
- Mark Kimber, Semtech
- Cedric Lam, Google

- Mike Peng Li, Intel
- Xiang Liu, Huawei
- Jeffery Maki, Juniper
- Eric Maniloff, Ciena
- Andy Moorwood, Keysight
- Jianwei Mu, Hisense
- Ernest Muhigana, Lumentum
- Edward Nakamoto, Spirent
- Gary Nicholl, Cisco
- Earl Parsons, CommScope
- Lenin Patra, Marvell
- Sridhar Ramesh, Maxlinear
- Roberto Rodes, Coherent
- Sam Sambasivian, ATT
- Scott Schube, Intel
- Shen Shikui, China Unicom
- Mark Sikkink, HPE

- Mike Sluyski, Cisco
- Massimo Sorbara, GlobalFoundries
- Peter Stassar, Huawei
- Shigehisa Tanaka, Lumentum
- Jim Theodoras, HGGenuine
- Pirooz Tooyserkani, Cisco
- Nathan Tracy, TE
- Rangchen Yu, Sifotonics
- Ed Ulrichs, Intel
- Christian Urricariet, Intel
- Liming Wang, Google
- Xi Wang, Marvell
- Brian Welch, Cisco
- Jun Shan Wey, Verizon
- Phil Sun, Credosemi
- Tom Williams, Cisco
- Xin Wu, Color-chip

800G 10km Duplex SMF Objective Status (courtesy Mark Nowell)

- Multiple technical proposals arguing different approaches to create a 10km baseline

- At root of debate is that there are two quite distinct market use-cases that would use a 10km PMD

- Recently a proposal was made to the B400G reflector suggesting a path forward by revisiting the project's objectives

  - https://www.ieee802.org/3/B400G/email/msg00671.html

  - Received positive support from multiple individuals on reflector

- To address the 10km objective we currently have 3 concepts raised (not all are full baseline proposals in P802.3dj yet):

  - IMDD based: rodes_3df_01a_2211.pdf

  - Coherent based (oFEC based): williams_3dj_01a_230206.pdf

  - Coherent based (OIF 800LR based): maniloff_3dj_01a_230206.pdf

February 22, 2023, Optics Ad Hoc

- Two presentations in favor of proposal for two objectives, followed by discussion
  - [P802.3dj: A path forward for 10km SMF](#), Mark Nowel, John D'Ambrosia
  - [Proposal for 10km over Duplex SMF Objectives](#), Chris Cole
- Straw Poll

  I would support the proposal to make the following changes to P802.3dj objectives:

  Replace the following objective:

  Define a physical layer specification that supports 800 Gb/s operation:
  - over a single SMF in each direction with lengths up to at least 10 km,

  with the following objectives:

  Define a physical layer specification that supports 800 Gb/s operation:
  - over 1 wavelength over a single SMF in each direction with lengths up to at least 10 km,
  - over 4 wavelengths over a single SMF in each direction with lengths up to at least 10 km.

  Yes: 56 / No: 4 / Needs More information: 13

10km Duplex SMF Distinct Market Use-cases

- IMDD LR4
    - Low-cost (leverages high-volume DR4/FR4 DSP)
    - Standard 10km reach link budget
    - < 10km links
- Coherent LR1
    - High-performance
    - 10km reach link budget with additional insertion loss
    - <10m links with additional loss, ex. optical switching
    - >10km links
    - legacy fiber links

Proposal (courtesy John D'Ambrosia)

- Propose that the 802.3dj Task Force replace the following objective:

  Define a physical layer specification that supports 800 Gb/s operation:

  - over a single SMF in each direction with lengths up to at least 10 km,

  with the following two objectives:

  Define a physical layer specification that supports 800 Gb/s operation:

  - over 1 wavelength over a single SMF in each direction with lengths up to at least 10 km,

  - over 4 wavelengths over a single SMF in each direction with lengths up to at least 10 km.

- These two objectives are distinctly different, and examples can be found in prior projects, as well in 802.3dj itself, which has objectives targeting 800 GbE 2km operation over either 4 parallel fibers or 4 wavelengths.

IEEE 802 & 802.3 Distinct Identity (courtesy John D'Ambrosia)

IEEE 802 LMSC Operations Manual (https://mentor.ieee.org/802-ec/dcn/17/ec-17-0090-25-0PNP-ieee-802-lmsc-operations-manual.pdf)

14.2.3 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.

IEEE 802.3 Operations Manual (https://www.ieee802.org/3/rules/P802_3_rules.pdf)

4.5.1 Five Criteria (5C) requirements

Distinct Identity - Substantially different from other IEEE 802.3 specifications/solutions.

Past Project Objectives have been distinct by:

- Different media
- Different reaches
- Different number of either duplex fibers or differential pairs of the same media
- Different number of optical wavelengths

10km Duplex SMF Objectives Proposal

Thank you

Appendix: Proposed Motion Language (courtesy Matt Brown)

Move to:

Replace the following objective:

> Define a physical layer specification that supports 800 Gb/s operation over a single SMF in each direction with lengths up to at least 10 km

with the following two objectives:

> Define a physical layer specification that supports 800 Gb/s operation over 1 wavelength over a single SMF in each direction with lengths up to at least 10 km
>
> Define a physical layer specification that supports 800 Gb/s operation over 4 wavelengths over a single SMF in each direction with lengths up to at least 10 km

M:

S:

Technical (>=75%) / Procedural (>50%) (802.3 voters only)

(The supporters listed on page 2 have not reviewed this language and therefore their position on it is unknown.)