



802.3df

Proposal for additional optical objective

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Supporters

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- David Lewis, Lumentum
- Ed Ulrichs, Intel
- John Johnson, Broadcom
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- Kohichi Tamura, CI&G
- Jeffery Maki, Juniper
- Paul Brooks, Viavi
- Flavio Marques, Furukawa
- David Ofelt, Juniper Networks

802.3df Adopted Objectives

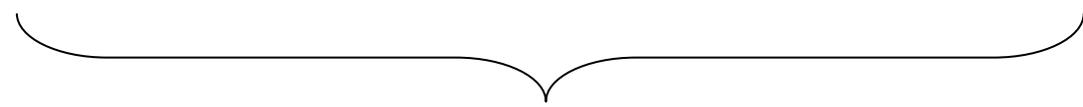
Ethernet Rate	Assumed Signaling Rate	AUI	BP	Cu Cable	MMF 50m	MMF 100m	SMF 500m	SMF 2km	SMF 10km	SMF 40km
200 Gb/s	200 Gb/s	Over 1 lane		Over 1 pair			Over 1 Pair	Over 1 Pair		
400 Gb/s	200 Gb/s	Over 2 lanes		Over 2 pairs			Over 2 Pair			
800 Gb/s	100 Gb/s	Over 8 lanes	Over 8 lanes	Over 8 pairs						
	200 Gb/s	Over 4 lanes		Over 4 pairs			Over 4 pairs	1) Over 4 pairs 2) Over 4 λ 's		
	TBD								Over single SMF in each direction	Over single SMF in each direction
1.6 Tb/s	100 Gb/s	Over 16 lanes								
	200 Gb/s	Over 8 lanes		Over 8 pairs			Over 8 pairs	Over 8 pairs		

Leverage existing or work-in-progress 100 Gb/s per lane (e.g. 3cu, 3ck, 3db) to higher lane counts

Develop 200 Gb/s per lane electrical signaling for 1/2/4/8 lane variants of AUIs and electrical PMDs

Develop 200 Gb/s per optical fiber for 1/2/4/8 fiber based optical PMDs and 4 lambda WDM optical PMD

Potential for either direct detect and / or coherent signaling technology



13 Optical PMD Objectives

Potential new objective

- Originally raised in nowell_3df_01_011822
- 400 Gb/s objective with extended reach to 2km for parallel SMF
- Subset of the already adopted 800 GbE baseline (8x100Gb/s 2km parallel SMF)
 - No additional technical work
 - But some editorial work
- Industry demand exists for, and is already deploying, “400G-DR4+” in an ad hoc way. Numerous network operator RFQ’s call for this interface
- IEEE P802.3df adoption of an objective for this would be codifying an ad hoc spec that exists in the industry.

What is being proposed?

Ethernet Rate	Assumed Signaling Rate	AUI	SMF 500m	SMF 2km
200 Gb/s	200 Gb/s	Over 1 lane	Over 1 Pair	Over 1 Pair
400 Gb/s	100 Gb/s	802.3ck <input checked="" type="checkbox"/>	802.3bs/cd <input checked="" type="checkbox"/>	Over 4 pair
	200 Gb/s	Over 2 lanes	Over 2 Pair	
800 Gb/s	100 Gb/s	Over 8 lanes	Over 8 pairs	Over 8 pairs
	200 Gb/s	Over 4 lanes	Over 4 pairs	1) Over 4 pairs 2) Over 4 λ 's
	TBD			
1.6 Tb/s	100 Gb/s	Over 16 lanes		
	200 Gb/s	Over 8 lanes	Over 8 pairs	Over 8 pairs



- Proposed objective highlighted (green square)
- Supporting specs in flight (AUI)
- Technical/Editorial work of proposed objective is a subset of adopted 800 Gb/s objective (green arrow)

Market support:

- Current market analysts do not call out the different reach split for “400G-DR4” even though 500m/2km variants are shipping today.

Interest in adding an objective was tested

Straw Poll #2

I support the adoption of the following objective

- **Define a physical layer specification that supports 400 Gb/s operation:**
 - **over 4 pairs of SMF with lengths up to at least 2 km**

▪ **Results**

- **Yes** **45**
- **No** **1**
- **Need more information** **17**
- **Abstain** **7**

From Feb 22, 2022 meeting

Procedural considerations

Step 1) Confirm that adding objective is within project scope and aligns with current adopted CSD

- PAR: https://www.ieee802.org/3/df/proj_doc/IEEE_P802.3df_PAR_11122021.pdf
- CSD: <https://mentor.ieee.org/802-ec/dcn/21/ec-21-0306-00-ACSD-p802-3df.pdf>

Step 2) Adopt objective in Task Force

Step 3) Adopt objective in 802.3 Working Group

Step 4) back to work in Task Force...

PAR and CSD

PAR

- **5.2.b Scope of the project:** Define Ethernet MAC parameters, physical layer specifications, and management parameters for the transfer of Ethernet format frames at 800 Gb/s and 1.6 Tb/s over copper, multi-mode fiber, and single-mode fiber, and use this work to define derivative physical layer specifications and management parameters for the transfer of Ethernet format frames at 200 Gb/s and 400 Gb/s.

CSD

- No identified impact to current responses. Some highlights:
- Technical Feasibility: *The proposed project will build on the array of Ethernet component and system design experience, and the broad knowledge base of Ethernet network operation.*
 - *...For example, some combination of the following approaches could be used to address 800 Gb/s and 1.6 Tb/s Ethernet, as well as to address reduced lane count solutions for 200 Gb/s and 400 Gb/s Ethernet: pulse-amplitude modulation, parallel transmission techniques,...*
- Economic Feasibility: *“The deployment of 800 Gb/s and 1.6 Tb/s Ethernet standards and derivatives at 200 Gb/s and 400 Gb/s will allow economies of scale to reduce cost for all solutions.”*

No identified issues for adding this objective found with our existing PAR and CSD language

Proposed Motion

Move to adopt the following objective:

- Define a physical layer specification that supports 400 Gb/s operation over 4 pairs of SMF with lengths up to at least 2 km



Thanks