Revisiting Nomenclature - 200GBASE-FR1 (Support of Comment #311)

IEEE P802.3dj Task Force
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Introduction

Comment #XXX

With the adoption of the objective to do 500m over 4 WDM lanes on a single mode fiber and its nomenclature 800GBASE-FR4-500, "FR" is no longer limited to just represent 2km (e.g. FR-500). This introduces an inconsistency for 200GBASE-FR1 and 200GBASE-DR1 (DR1 is not FR1-500). In addition, when looking at 2km for 1,2,4,8 fibers- a confusing "family" of PHYs emerges (200GBASE-FR1, 400GBASE-DR2-2, 800GBASE-DR4-2, and 1.6TBASE-DR8-2)

Proposed Remedy: Rename 200GBASE-FR1 to 200GBASE-DR1-2

Historical Overview

- **14 April 2022 - Initial Proposal - https://www.ieee802.org/3/df/public/adhoc/optics/0422_OPTX/lusted_3df_optx_01_220414.pdf**
  - **Summary of 500m / 2km SMF objectives (Page 3 of noted proposal above, shown next slide)**
  - **"Quandry" discussed @ 14 Apr 2022 Optical Ad Hoc**
    - **For some people, "DR" means 500m. For others, "DR" means parallel fiber solutions**
    - **For some people, "FR" means 2km. For others, "FR" means duplex solutions**
  - **Straw Poll #1 I would support the proposed nomenclature for parallel 500m and duplex 2km SMF listed on lusted_3df_optx_01_220414, slide 8**
    Results: Y: 64 N: 0
  - **Straw Poll #2 For the 2km parallel SMF nomenclature, I would support the direction of: A. use "DR", such as shown in Example A listed on lusted_3df_optx_01_220414, slide 11 B. use "FR", such as shown in Example B listed on lusted_3df_optx_01_220414, slide 11**
    Results: A: 44 B: 12
  - **Straw Poll #3 For the length ("LEN") representation for the "DR" PMDs shown on lusted_3df_optx_01_220414, slide 11, I prefer the format: A. units in meters, e.g. "2000" B. units in km, e.g. "2" C. units in km plus showing units, e.g. "2km"**
    Results: A: 5 B: 36 C: 22
- **28 April 2022 - Follow-up Proposal – https://www.ieee802.org/3/df/public/adhoc/optics/0422_OPTX/lusted_3df_optx_01a_220428.pdf**
  - **Straw Poll #1 •I would support the proposed nomenclature for the 500m and 2km SMF solutions listed on lusted_3df_optx_01_220428, slide 3**
    Results: Y: 41 N: 8

Influence of Objectives on Nomenclature ?

Proposal for 500m and 2km SMF

Ethernet Rate	Assumed Signaling Rate	SMF 500m	SMF 2km
200 Gb/s	200 Gb/s	Over 1 Pair: 200GBASE-DR1	Over 1 Pair: 200GBASE-FR1
400 Gb/s	100 Gb/s		Over 4 Pair: 400GBASE-DR4-2
	200 Gb/s	Over 2 Pair: 400GBASE-DR2	
800 Gb/s	100 Gb/s	Over 8 Pair: 800GBASE-DR8	Over 8 Pair: 800GBASE-DR8-2
	200 Gb/s	Over 4 Pair: 800GBASE-DR4	1) Over 4 pairs = 800GBASE-DR4-2 2) Over 4 λ's = 800GBASE-FR4
	TBD		
1.6 Tb/s	100 Gb/s		
	200 Gb/s	Over 8 Pair: 1.6TBASE-DR8	Over 8 Pair: 1.6TBASE-DR8-2

At the time of TF decision – there was no 800GBASE-FR4-500

https://www.ieee802.org/3/df/public/adhoc/optics/0422_OPTX/lusted_3df_optx_01_220414.pdf

Consideration with Updated [200Gb/s based] Objectives

Ethernet Rate	AUI	Backplane	Cu Cable	SMF 500m	SMF 2km	SMF 10km	SMF 20km	SMF 40km
200 Gb/s	200GAUI-1 C2C C2M	200GBASE-KR1	200GBASE-CR1	200GBASE-DR1	200GBASE-FR1			
400 Gb/s	400GAUI-2 C2C C2M	400GBASE-KR2	400GBASE-CR2	400GBASE-DR2	400GBASE-DR2-2			
800 Gb/s	800GAUI-4 C2C C2M	800GBASE-KR4	800GBASE-CR4	1.800GBASE-DR4 2.800GBASE-FR4-500	1. 800GBASE-DR4-2 2. 800GBASE-FR4	800GBASE-LR4		
						800GBASE-LR1	800GBASE-ER1-20	800GBASE-ER1
1.6 Tb/s	1.6TAUI-8 C2C C2M	1.6TBASE-KR8	1.6TBASE-CR8	1.6TBASE-DR8	1.6TBASE-DR8-2			

800GBASE-FR4-500 added @ Nov 2023 Plenary

Review of IEEE P802.3dj D1.0 (Just some examples)

Clause 182 Title –

182. Physical Medium Dependent (PMD) sublayer and medium, type 200GBASE-FR1, 400GBASE-DR2-2, 800GBASE-DR4-2, and 1.6TBASE-DR8-2

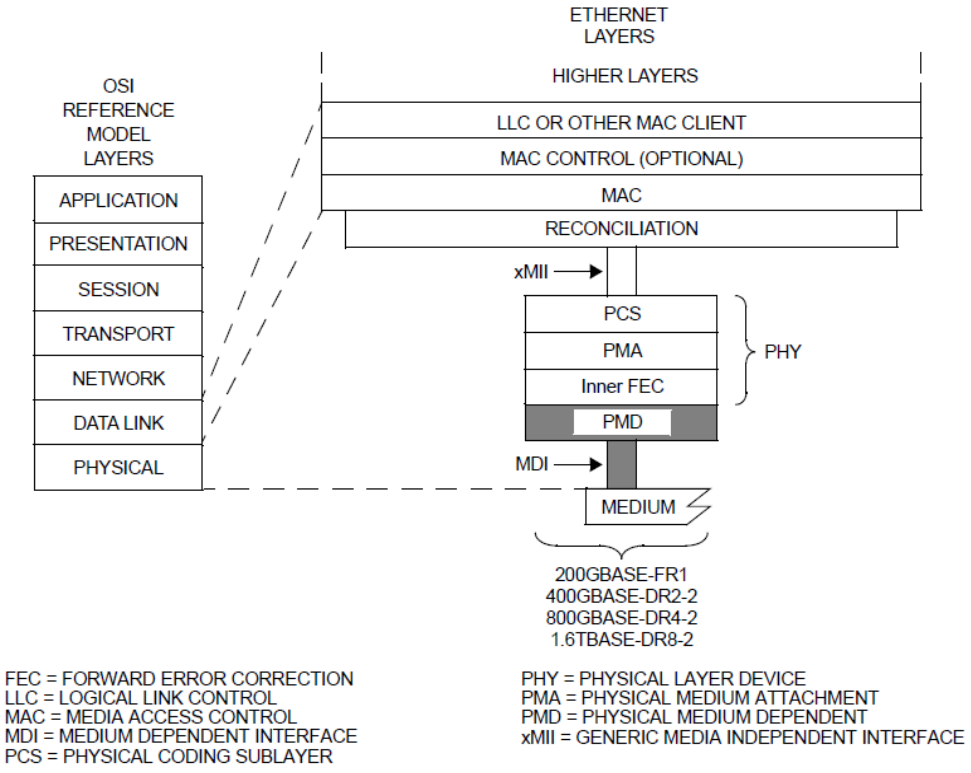

Figure 182–1—200GBASE-FR1, 400GBASE-DR2-2, 800GBASE-DR4-2, and 1.6TBASE-DR8-2 PMD relationship to the ISO/IEC Open Systems Interconnection (OSI) reference model and IEEE 802.3 Ethernet model

Summary

- Adding a “Reach” suffix in nomenclature is now common
  - DRx and DRx-2
  - FR4 and FR4-500
- With the adoption of 800GBASE -FR4-500 the originally adopted nomenclature for the 500m/2km objectives is not consistent
- IEEE P802.3dj D1.0 aligns 200GBASE-FR1 with the “-DR” family – not the “FR” family.

- Recommendation - Rename 200GBASE-FR1 to 200GBASE-DR1-2

Summary of Relevant Observations

- **While discussing nomenclature and seeking support for this presentation, an interesting thread emerged between individuals going beyond the original comment, but still relevant.**
  - **8 parallel fibers, each 2km, means a module implementation can support**
    - **1x1.6TBASE-DR8-2,**
    - **2x800GBASE-DR4-2,**
    - **4x400GBASE-DR2-2,**
    - **or 8x200GBASE-FR1**
  - **Specifications between DRn-2 and FR1 are different, and the implementation needs to consider this pending what mode it is supporting**
- **We are writing a standard that should be implementation independent – we need to figure out the minimal amount of additional text necessary to address this [and other?] scenarios**
- **There may be aspects to the standard where additional text may be helpful, but implementation is beyond the scope the standard**