

# Nomenclature: The Joy of PMD names

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# Supporters and Contributors

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# Nomenclature

- Goal: Align on the nomenclature to enable effective communication during foundational discussions in the 3df Task Force



# Key Assumptions

- #1: It is assumed that the TF wants to preserve the BASE-R PCS names and the naming conventions from the 1/2/4-lane versions of the PHYs in IEEE Std. 802.3-202x, P802.3ck, P802.3db
- #2: It is assumed baseline proposals for  $\leq 2$ km reaches (optical and copper) will use effective lane rates of 100 Gb/s or 200 Gb/s
  - The exact signaling rate per physical layer specification will be determined by the Task Force.
  - Over 2km, pending TF discussion.
- #3: There may be a need to define more versions of the AUIs for new use cases (e.g. CPO, NPO), as noted in [lusted b400g 01 210517](#)
  - Discussion of cases is beyond the scope of this specific presentation.
- #4: No names are proposed at this time for all the 500m & 2km SMF, 10km and 40km solutions, pending TF discussion on various aspects of these objectives
  - Talk to Kent offline if you have thoughts

# Adopted P802.3df Physical Layer Objectives

← Name now → ← Name later →

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		

[https://www.ieee802.org/3/B400G/proj\\_doc/objectives\\_b400g\\_210826.pdf](https://www.ieee802.org/3/B400G/proj_doc/objectives_b400g_210826.pdf)

# Rates and Lanes for Consideration

- There are two new Ethernet rates in the project
  - 800 GbE
  - 1.6 TbE
- The project amends two existing Ethernet rates
  - 200 GbE
  - 400 GbE
- There are multiple lane widths in the project to address all of these Ethernet rates
  - 1/2/4/8/16 lanes

100 Gb/s Lane Rate Based

# 800 GbE

- Some 800 GbE PMD names exist outside of the IEEE 802.3 realm (e.g., Ethernet Technology Consortium)
  - 800G-ETC-KR8, 800G-ETC-CR8
- 800 GbE will have at least two different lane rates:
  - 100 Gb/s/lane
  - 200 Gb/s/lane
  - TBD for the 10km and 40 km SMF objectives
- Let's start with the 100 Gb/s/lane terms for the AUIs, copper cable, backplane, and optical PHYs

# 800 GbE using 100 Gb/s/lane

Propose to use the following:

- AUI: 800GAUI-8 C2M, 800GAUI-8 C2C
  - Copper cable: 800GBASE-CR8
  - Backplane: 800GBASE-KR8
  - MMF (~50m reach): 800GBASE-VR8
  - MMF (~100m reach): 800GBASE-SR8
- 
- SMF will be discussed in a later presentation

200 Gb/s Lane Rate Based

# AUIs for 200 Gb/s/lane ( $\leq$ 800 GbE)

- Optional 200 Gb/s/lane AUI objectives exist for chip-to-module (C2M) and chip-to-chip (C2C)
  - Possible new AUI use cases for CPO and NPO were called out in [lusted b400g 01 210517](#) and are not addressed in this presentation
  - The terms “short/lower-loss” and “long/higher-loss” are not yet comprehended in the following nomenclature proposals, although it could be easily adapted, if such differentiation becomes required
- Propose:
  - 200GAUI-1 C2M and 200GAUI-1 C2C
  - 400GAUI-2 C2M and 400GAUI-2 C2C
  - 800GAUI-4 C2M and 800GAUI-4 C2C

# Non-controversial 200 Gb/s/lane Physical Layer names ( $\leq 800$ GbE)

Propose:

- Copper cable: 200GBASE-CR1, 400GBASE-CR2, 800GBASE-CR4

# The New Rate

# Denotation of the next Ethernet rate

- Nomenclature to specify the next Ethernet rate is less clear. How does the Task Force want to represent this new rate?
  - 1600GBASE-xx
  - 1.6TBASE-xx
  - Something else?
- First, let's look at two styles for how it could be written:
  - Option A: 1600GBASE-CR8, 1600GAUI-16 C2x and 1600GAUI-8 C2x
  - Option B: 1.6TBASE-CR8, 1.6TAUI-16 C2x and 1.6TAUI-8 C2x

## Example Definition – 1600 Gb/s vs. 1.6 Tb/s

Option A

- **“1600 Gb/s Attachment Unit Interface (1600GAUI-n):** A physical instantiation of the PMA service interface to extend the connection between 1600 Gb/s capable PMAs over n lanes, used for chip-to-chip or chip-to-module interconnections. For chip-to-module interconnections and for chip-to-chip interconnections, two widths of 1600GAUI-n are defined: a sixteen-lane version (1600GAUI-16) and an eight-lane version (1600GAUI-8)”

Option B

- **“1.6 Tb/s Attachment Unit Interface (1.6TAUI-n):** A physical instantiation of the PMA service interface to extend the connection between 1.6 Tb/s capable PMAs over n lanes, used for chip-to-chip or chip-to-module interconnections. For chip-to-module interconnections and for chip-to-chip interconnections, two widths of 1.6TAUI-n are defined: a sixteen-lane version (1.6TAUI-16) and an eight-lane version (1.6TAUI-8)”

# Example Table – 1600 Gb/s vs. 1.6 Tb/s

Option A

PHY type	Clause <sup>1</sup>							
	78	TBD	TBD	TBD	TBD	TBD	TBD	TBD
1600GBASE-CR8	EEE	RS	1600GMII	1600GMII Extender	1600GBASE-R PCS	1600GBASE-R PMA	1600GAUI-8 C2C	1600GBASE-CR8
	-	M	M	M	M	M	M	M

Option B

PHY type	Clause <sup>2</sup>							
	78	TBD	TBD	TBD	TBD	TBD	TBD	TBD
1.6TBASE-CR8	EEE	RS	1.6TMII	1.6T MII Extender	1.6T BASE-R PCS	1.6T BASE-R PMA	1.6T AUI-8 C2C	1.6T BASE-CR8 PMD
	-	M	M	M	M	M	M	M

## Example text - 1600 Gb/s vs. 1.6 Tb/s

Option A

- The interfaces for the inputs of the 800GBASE-R and 1600GBASE-R PMAs are defined.... For 800GBASE-R PMAs, electrical interfaces connecting PMA sublayers, known as 800GAUI-n, are defined in Annex TBD or Annex TBD. For 1600GBASE-R PMAs, electrical interfaces connecting PMA sublayers, known as 1600GAUI-n, are defined in Annex TBD or Annex TBD....
- ...Each 200GAUI-1, 400GAUI-2, 800GAUI-4, and 1600GAUI-8 C2M data path contains one, two, four, or eight differential lanes....

Option B

- The interfaces for the inputs of the 800GBASE-R and 1.6TBASE-R PMAs are defined.... For 800GBASE-R PMAs, electrical interfaces connecting PMA sublayers, known as 800GAUI-n, are defined in Annex TBD or Annex TBD. For 1.6TBASE-R PMAs, electrical interfaces connecting PMA sublayers, known as 1.6TAUI-n, are defined in Annex TBD or Annex TBD....
- ...Each 200GAUI-1, 400GAUI-2, 800GAUI-4, and 1.6TAUI-8 C2M data path contains one, two, four, or eight differential lanes....

# Rounding Out the Objectives List

- Depending on the style selected for the new rate (1600G vs. 1.6T), the AUI C2M, AUI C2C and copper cable names would take on the form of:
  - xxAUI-8 C2M
  - xxAUI-8 C2C
  - xxAUI-16 C2M
  - xxAUI-16 C2C
  - xxBASE-CR8

# Straw Polls

# Potential Straw Poll #1

- For the next Ethernet rate, I prefer nomenclature in the style of:
  - Option A: 1600G (e.g., 1600GBASE-CR8, 1600GAUI-16 C2x and 1600GAUI-8 C2x)
  - Option B: 1.6T (e.g., 1.6TBASE-CR8, 1.6TAUI-16 C2x and 1.6TAUI-8 C2x)

# Potential Straw Poll #2

- I support using the nomenclature in the AUI, BP, Cu cable, MMF 50m and MMF 100m columns of lusted\_3df\_xx\_0122, slide 24?25?
  - Yes
  - No
  - Abstain

# The Full Table

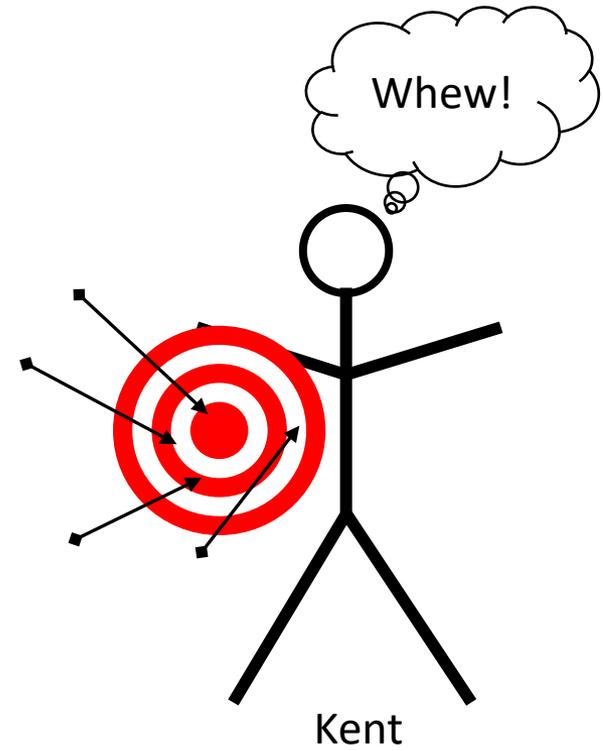
To be named later



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	1 lane = AUI-1		1 pair = CR1			1 pair = TBD	1 pair = TBD		
400 Gb/s	200 Gb/s	2 lane = AUI-2		2 pair = CR2			2 pair = TBD			
800 Gb/s	100 Gb/s	8 lane = AUI-8	8 lane = KR8	8 pair = CR8	8 pair = VR8	8 pair = SR8	8 pair = TBD	8 pair = TBD		
	200 Gb/s	4 lane = AUI-4		4 pair = CR4			4 pair = TBD	1) Over 4 pairs = TBD 2) Over 4 λ's = TBD		
	TBD								TBD	TBD
1.6 Tb/s	100 Gb/s	16 lane = AUI-16								
	200 Gb/s	8 lane = AUI-8		8 pair = CR8			8 pair = TBD	8 pair = TBD		

Note: Rate part of the name omitted for brevity

THANKS!



# The Full Table – 1600G

To be named later



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	200GAUI-1		200GBASE-CR1			1 pair = TBD	1 pair = TBD		
400 Gb/s	200 Gb/s	400GAUI-2		400GBASE-CR2			2 pair = TBD			
800 Gb/s	100 Gb/s	800GAUI-8	800GBASE-KR8	800GBASE-CR8	800GBASE-VR8	800GBASE-SR8	8 pair = TBD	8 pair = TBD		
	200 Gb/s	800GAUI-4		800GBASE-CR4			4 pair = TBD	1) Over 4 pairs = TBD 2) Over 4 λ's = TBD		
	TBD								TBD	TBD
1.6 Tb/s	100 Gb/s	1600GAUI-16								
	200 Gb/s	1600GAUI-8		1600GBASE-CR8			8 pair = TBD	8 pair = TBD		

# The Full Table – 1.6T

To be named later



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	200GAUI-1		200GBASE-CR1			1 pair = TBD	1 pair = TBD		
400 Gb/s	200 Gb/s	400GAUI-2		400GBASE-CR2			2 pair = TBD			
800 Gb/s	100 Gb/s	800GAUI-8	800GBASE-KR8	800GBASE-CR8	800GBASE-VR8	800GBASE-SR8	8 pair = TBD	8 pair = TBD		
	200 Gb/s	800GAUI-4		800GBASE-CR4			4 pair = TBD	1) Over 4 pairs = TBD 2) Over 4 λ's = TBD		
	TBD								TBD	TBD
1.6 Tb/s	100 Gb/s	1.6TAUI-16								
	200 Gb/s	1.6TAUI-8		1.6TBASE-CR8			8 pair = TBD	8 pair = TBD		