# The Path Forward

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IEEE 802.3 100 Gb/s Wavelength Short Reach PHYs Study Group

January 2020 Geneva Interim

# Study Group Chartering Motion

Move that the IEEE 802.3 Ethernet Working Group authorizes the formation of a study group to develop a Project Authorization Request (PAR) and Criteria for Standards Development (CSD) responses for "Lower cost, short reach, optical PHYs using 100 Gb/s wavelengths."

# Overview of IEEE 802.3 Standards Process (1/5)- Study Group Phase
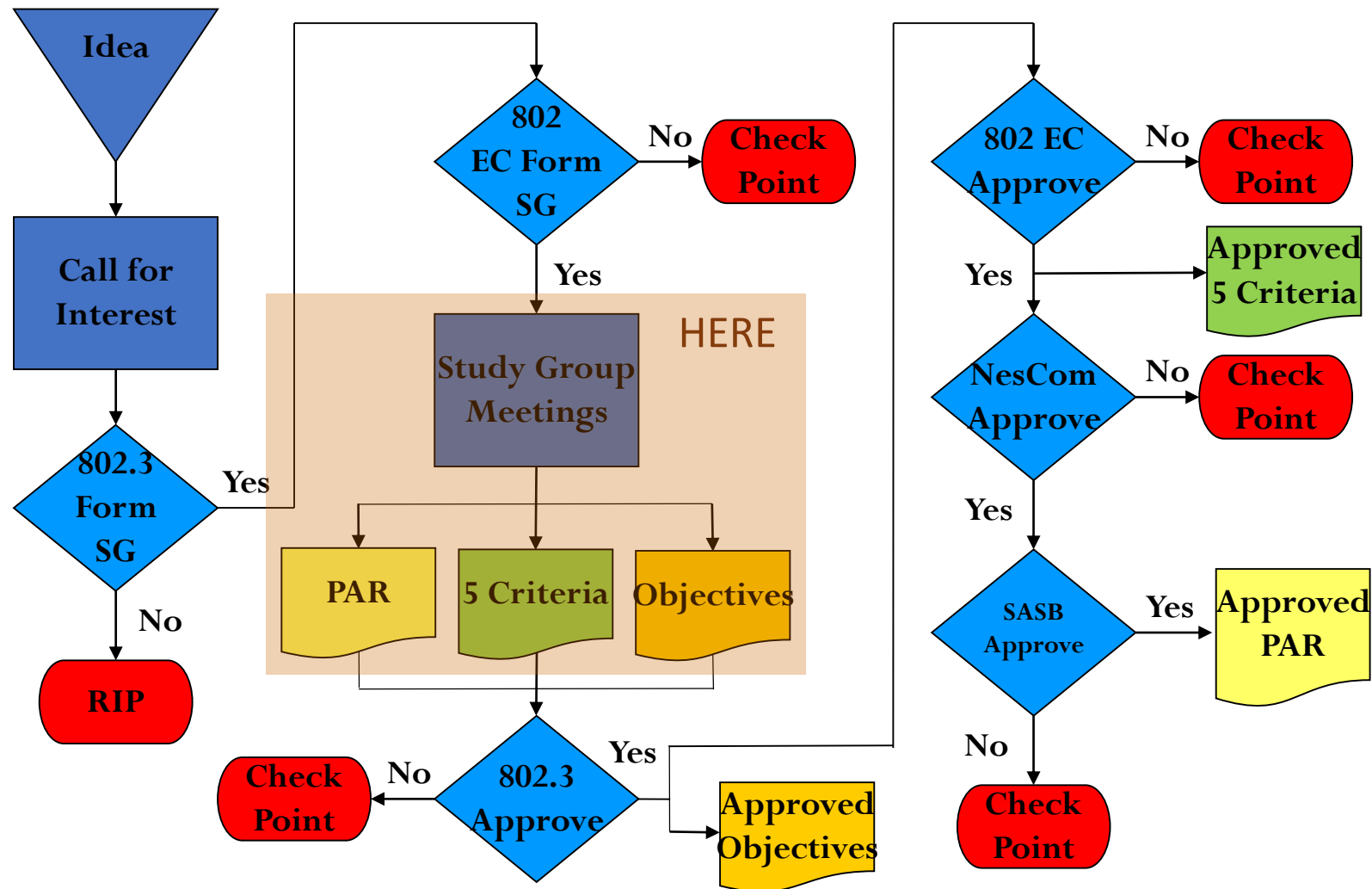


Note: At "Check Point", either the activity is ended, or there may be various options that would allow reconsideration of the approval.

# Crash course on Study Group goals

For useful overviews of Study Group activities please refer to:

Overview of the Process – Wael Diab

http://www.ieee802.org/3/400GSG/public/13_05/diab_400_01_0513.pdf


Review of the 5 Criteria – Howard Frazier, updated by George Zimmerman

http://ieee802.org/3/NGMMF/public/adhoc/zimmerman_ngmmf_01a_120517.pdf


Guidelines for Project Objectives – Howard Frazier

http://www.ieee802.org/3/400GSG/public/13_05/frazier_400_02_0513.pdf


**The following slides are taken from these presentations**

# What does the Study Group produce?

- 5 Criteria
  - Broad Market Potential, Compatibility, Distinct Identity, Technical Feasibility, Economic Feasibility
- PAR
  - Your "contract" with the IEEE-SA and "authorization" to develop a standard
  - Broadly focuses on what the standard is that group will work on including scope, purpose, broad timeline (not a project plan)
  - Good idea to look at examples of prior projects
- Objectives
  - Your "contract" with 802.3
  - At a high level it is what the group will work on (and what it will not)
  - Somewhat more specific than the scope in the PAR

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From:
Overview of the Process – Wael Diab
http://www.ieee802.org/3/400GSG/public/13_05/diab_400_01_0513.pdf

# Final Thoughts…

- Goal is to get to a Task Force
- To do that, focus on…
  - Producing the objectives
  - Producing the PAR
  - Producing the 5 criteria
  - Work on building consensus…
  - Leave the rest of it to the Task Force phase…
    - Plenty of time to work on solutions
    - Plenty of time to debate the text of the solutions

From:
Overview of the Process –
Wael Diab
http://www.ieee802.org/3/400GSG/public/13_05/diab_400_01_0513.pdf

# Audience

- The 5 criteria are drafted and approved by a study group

- They are reviewed and approved (individually) by the working group

- They are subject to review and approval by each and every other working group in IEEE 802®

- They are reviewed and approved by the IEEE 802 executive committee

From:
Review of the 5 Criteria – Frazier / Zimmerman
http://ieee802.org/3/NGMMF/public/adhoc/zimmerman_ngmmf_01a_120517.pdf

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# Purpose

- The 5 criteria are used to evaluate proposed projects

- They are used to filter out projects that are not appropriate for standardization in IEEE 802

- They are unique to IEEE 802

- They are one of the reasons why IEEE 802 standards are relatively successful

- They help perpetuate the "IEEE 802 culture"

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From:
Review of the 5 Criteria – Howard Frazier
http://www.ieee802.org/3/400GSG/public/13_05/frazier_400_01_0513.pdf

# The 5 Critters



Broad Market Potential    Compatibility    Distinct Identity    Technical Feasibility    Economic Feasibility

From:
Review of the 5 Criteria – Frazier / Zimmerman
http://ieee802.org/3/NGMMF/public/adhoc/zimmerman_ngmmf_01a_120517.pdf

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# Schedule possibilities

## Option 1 – adopt PAR/CSD in Geneva

- PAR/CSD must be submitted to EC 30 days in advance of Review at March Plenary

- Assume Objectives adopted in March by SG for WG review

- If both WG and EC authorize IEEE P802.3dB
  - TF **definitely** begins work at July Plenary
  - **Probably** begin meeting at May Interim

## Option 2 – adopt PAR/CSD in Atlanta

- PAR/CSD must be submitted to EC 30 days in advance of Review at July Plenary

- Objectives must be complete by July plenary for WG review

- If both WG and EC authorize IEEE P802.3dB

- TF **definitely** begins work at November Plenary

- This is a likely delay of 6 months

# A desirable timeline to consider

- January 2020 – <u>Approve PAR & CSD Responses</u> to pre-submit before the March Plenary.

- March 2020 – complete objectives & request permission for TF

- May 2020 – First TF meeting

- November 2020 – Baseline proposals in D1.0 and comments

- March 2021 – Generate D2.0 for WG ballot and comments

- November 2021 – Generate D3.0 for Sponsor ballot and comments

- June 2022 – Standard complete

# Some questions we need to answer

- From discussion during the NEA process, believe there is strong consensus for adopting objectives consistent with
  - 100GBASE-SR & 400GBASE-SR4, re-using 802.3bs/cd architectures
  - Feasibility of 50m reach over OM4 MMF at 850nm

- Sense some interest to include an objective for 200GBASE-SR2
  - There is a 200G-CR2 copper objective aimed at server attachment
  - 200G ports exist on mezzanine NIC cards now
  - 200GBASE-SR2 is a natural breakout partner for 400GBASE-SR4
  - This may trigger interest in adding a 200GBASE-DR2 objective

- Several have suggested it might be possible to develop a lowest cost short-reach PMD by removing / reducing capability in circuits and reducing reach to 10-15m.
  - Is that consistent with re-use of the 802.3bs/cd architectures? Does it require PHY work?

- It is suggested that a 940nm PMD should be developed for green field short-reach deployment, offering current and future advantages

- Can we write a PAR and CSD Responses at this meeting? (for pre-submittal) that accurately account for range of objectives under consideration?

# Foundational objectives

- These objectives are typically adopted for projects and are deemed relevant to this project, relating to Compatibility

- Recommend that we adopt these objectives
  1. Support full-duplex operation only
  2. Preserve the Ethernet frame format utilizing the Ethernet MAC
  3. Preserve the minimum and Maximum FrameSize of current Ethernet standard
  4. Support MAC data rates of 100 Gb/s(, 200 Gb/s,) and 400 Gb/s
  5. Provide appropriate support for OTN
  6. Specify optional Energy Efficient Ethernet (EEE) capability
  7. Support a BER of better than or equal to $10^{-12}$ at the MAC/PLS service interface (or the frame loss ratio equivalent) for 100 Gb/s operation
  8. Support a BER of better than or equal to $10^{-13}$ at the MAC/PLS service interface (or the frame loss ratio equivalent) for (200 Gb/s and) 400 Gb/s operation

# Possible objectives for this project

These seem to have consensus
- Define a physical layer specification that supports 100 Gb/s operation over 1 pair of MMF with lengths up to at least 50m over OM4 MMF
- Define a physical layer specification that supports 400 Gb/s operation over 4 pairs of MMF with lengths up to at least 50m over OM4 MMF
- (most probably assume 30m reach achievable over OM3 MMF as well)

These are straight-forward and require discussion
- Define a physical layer specification that supports 200 Gb/s operation over 2 pairs of MMF with lengths up to at least 50m over OM4 MMF
- Define a physical layer specification that supports 200 Gb/s operation over 2 pairs of SMF with lengths up to at least 500m

These are novel ideas that need to be fleshed out
- Define a 30m MMF PMD at 940nm for lowest cost & future capability?
- Define a 15m MMF PMD optimized for lowest cost?
- Translating lower loss budgets into cost reduction for SMF short-reach?