New Objectives & 802.3cd PAR / CSD

IEEE P802.3cd Task Force

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From May 2016 Interim

- Motion #7:
  - Move to adopt the following objective for 100 Gb/s Ethernet PHYs: – Define a one-lane 100 Gb/s PHY for operation over SMF with lengths up to at least 500m
  - Results: Y/N/A 35/23/29 •
  - Motion Fails
- Motion #8:
  - Move to adopt the following objective for 100 Gb/s Ethernet PHYs: – Define a 100 Gb/s PHY for operation over SMF with lengths up to at least 2 km
  - Results: Y/N/A 48/9/32
  - Motion Passes

From: http://www.ieee802.org/3/cd/public/May16/minutes_3cd_0516_unapproved.pdf

Presentation Focus

- Concern was expressed at the May Interim regarding use of other than 50Gb/s signaling per lane for this project
- This presentation reviews
  - CFI
  - PAR
  - CSD

CFI

From: http://www.ieee802.org/3/minutes/nov15/1115_50_100_200_open_report.pdf

- Slide #2 - CFI Request - Ethernet has a successful track record of reusing technology in order to enable new cost-optimized solutions for broad market adoption. Recently, the IEEE 802.3bs 400 Gb/s Ethernet project has begun development of new higher rate optical and electrical signaling technologies beyond 25 Gb/s. Hyper-scale data centers, being aggressive adopters of cost effective solutions for both switch and server applications, are looking to enable the next generation of higher speed solutions, such as new 50 Gb/s Ethernet, a new 200 Gb/s Ethernet, and a denser 100 Gb/s Ethernet solutions.

  Two areas of study exist. One to study single lane 50 Gb/s Ethernet applications, and one to study 100 Gb/s and 200 Gb/s Ethernet applications. This Call For Interest is a request for the formation of these two study groups to jointly study the market requirements to address these server and switch applications and to provide the appropriate Ethernet specifications. It is expected that the study groups will work together to generate the appropriate project documentation to address market needs.

- Slide #3 - Motivation: Leverage 50 Gb/s electrical IO signaling technology to develop cost optimized single-lane solutions and higher speed multilane solutions.

From CFI Consensus Deck: http://www.ieee802.org/3/cfi/1115_1/CFI_01_1115.pdf

- Emphasis is on 50Gb/s I/O SerDes Technology throughout presentation

From: http://www.ieee802.org/3/minutes/nov15/1115_50_100_200_close_report.pdf

- Study Group Chartering Motion - Move that the IEEE 802.3 Working Group request the formation of two Study Groups to develop Project Authorization Requests (PAR) and Criteria for Standards Development (CSD) responses for: • 50 Gigabit/s Ethernet over a single lane • Next Generation 100 Gb/s Ethernet & 200 Gigabit/s Ethernet

My observation – Emphasis is on leveraging 50Gb/s I/O, but nothing in chartering motion precludes use of any lane rates

PAR

- 5.2.b. Scope of the project: Define Ethernet Media Access Control (MAC) parameters, Physical Layer specifications, and management parameters for the transfer of Ethernet format frames at 50 Gb/s over copper and optical media. Define additional Physical Layer specifications and management parameters at 100 Gb/s over copper and optical media. Define additional Physical Layer specifications and management parameters at 200 Gb/s over copper and multimode fiber physical media.
- 5.5 Need for the Project: Rapid growth of server, network, and internet traffic is driving the need for higher data rates, higher density and lower cost solutions. Advances in 50 Gb/s signaling technologies can be leveraged to create optimized solutions based on single instance or multiple instances in parallel. IEEE Std 802.3 does not currently define 50 Gb/s Ethernet rates nor define 100 Gb/s or 200 Gb/s Ethernet solutions based on these new technologies.
- My Observation – the scope does not restrict lane rate solutions, but “need” is in conflict, where defining solutions based on “50Gb/s signaling technologies” is cited.

CSD: BMP Criteria

- Ethernet is widely deployed for server and switch applications in data centers. Ethernet data rates of 50 Gb/s, 100 Gb/s and 200 Gb/s enable a variety of cost effective interconnect solutions for server and switch solutions ***based on 50 Gb/s serial I/O technology***.
- Internet, cloud, and higher performance computing applications, along with advances in processors, server virtualization and converged networking, are driving the need for higher bandwidth switch connections e.g., in data centers, enterprises and campus networks. ***Increasing the signaling data rate to 50 Gb/s*** provides cost effective 50 Gb/s, 100 Gb/s and 200 Gb/s Ethernet solutions that are required to maintain pace with new demands.

CSD: Distinct Identity

- The proposed 100 Gb/s PHY(s), based on ***two 50 Gb/s electrical or optical signals*** in each direction, are not currently defined in IEEE Std 802.3

CSD: Technical Feasibility

- Component technology at ***50 Gb/s serial rates***, are already either under development for other Ethernet projects (IEEE P802.3bs) or working implementations have been demonstrated.

CSD: Economic Feasibility

- Experience in the development of ***50 Gb/s technology*** for Ethernet establishes that the new specifications developed by this project will entail a reasonable cost for the resulting performance.

My CSD Observations

- Ethernet rates and signaling rates are not the same
- CSD responses based on building Ethernet rate solutions on 50Gb/s electrical or optical signaling

Observations

- PAR does not constrain scope of project to solutions based on 50 Gb/s signaling / lane rates, but
- CSD responses based on 50 Gb/s signaling / lane rates

CSD Process

Per IEEE 802 LMSC Operations Manual

Subclause 10.2 IEEE 802 LMSC Approval

The CSD statement shall be reviewed and approved by the WG and the Sponsor as part of the approval process for the following:

- Forwarding the PAR to NesCom
- As part of the WG ballot to assure the draft is consistent with the 5C
- Forwarding the draft to Sponsor ballot
- Forwarding the draft to RevCom

Going Forward

- There may or may not be an issue depending on decisions made by 802.3cd Task Force
  - Objectives / solutions based on 50Gb/s lane rates – no observed issue other than PAR does NOT limit consideration of such objectives / solutions
  - Objectives / solutions not based on 50 Gb/s rates – CSD responses would need to be revisited to make consistent with non 50 Gb/s signaling rates based solutions
    - Changes would require approval by 802.3 WG and 802 EC