50G and NGOATH Objectives Assessment

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Ad Hoc Chair

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- Adopted CSD responses
  - 50G/NGOATH: http://www.ieee802.org/3/50G/public/CSD_50G_NGOATH_01_0116.pdf
  - P802.3bs changes: http://www.ieee802.org/3/50G/public/NGAOTH_802d3bs_CSD_modification_0116.pdf
- Adopted PAR(s)
  - PAR modification for P802.3bs: http://www.ieee802.org/3/50G/public/NGAOTH_802d3bs_PAR_modification_0116.pdf
  - New PAR for remaining work (P802.3cd) http://www.ieee802.org/3/50G/public/50G_NGOATH_PAR_0116.pdf
- Adopted many PHY types

SG Re-chartering received EC approval

- Based on the decisions made in Atlanta, the Study Groups requested and the 802.3 WG approved the rechartering of the Study Groups. This aligns the adopted objectives and documentation (PAR, CSD) with charter (scope)
- EC approved 2/2/16
- New approved SG charters:
  - 50 Gb/s Ethernet over a single-lane, next generation 100 Gb/s and 200 Gb/s Ethernet Study Group
  - 200 Gb/s Ethernet single mode Study Group

Objectives 1 of 2

- Support full-duplex operation only
- Preserve the Ethernet frame format utilizing the Ethernet MAC
- Preserve minimum and maximum FrameSize of current IEEE 802.3 standard
- Support optional Energy-Efficient Ethernet operation
- Provide appropriate support for OTN
- Support a MAC data rate of 50 Gb/s and 100 Gb/s
- Support a BER of better than or equal to 10^{-12} at the MAC/PLS service interface (or the frame loss ratio equivalent) for 50 Gb/s and 100 Gb/s operation
- Support a MAC data rate of 200 Gb/s
- 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 operation

http://www.ieee802.org/3/50G/public/objectives_50G_NGOATH_01a_0116.pdf

Objectives 2 of 2

- Define single-lane 50 Gb/s PHYs for operation over
  - copper twinaxial cables.
  - printed circuit board backplane.
  - MMF with lengths up to at least 100m
  - SMF with lengths up to at least 2km
  - SMF with lengths up to at least 10km
- Define 200 Gb/s PHYs for operation over
  - copper twinaxial cables.
  - printed circuit board backplane.
  - MMF with lengths up to at least 100m
- Provide physical layer specifications which support 200 Gb/s operation over:
  - At least 2km of SMF
  - At least 10km of SMF
- Define a two-lane 100 Gb/s PHY for operation over copper twin-axial cables.
- Define a two-lane 100 Gb/s PHY for operation over a printed circuit board backplane.
- Define a two-fiber 100 Gb/s PHY for operation over MMF with lengths up to at least 100m

Note: Objectives in red have been proposed to be handled by the P802.3bs Task Force (400 Gb/s Ethernet).

http://www.ieee802.org/3/50G/public/objectives_50G_NGOATH_01a_0116.pdf

Modified objectives for P802.3bs

http://www.ieee802.org/3/50G/public/Jan16/dambrosia_50GE_NGOATH_01c_0116.pdf

- **Support a MAC data rate of 200 Gb/s**
- Support a MAC data rate of 400 Gb/s
- Support a BER of better than or equal to 10^{-13} at the MAC/PLS service interface (or the frame loss ratio equivalent)
- Support full-duplex operation only
- Preserve the Ethernet frame format utilizing the Ethernet MAC
- Preserve minimum and maximum FrameSize of current Ethernet standard
- Provide appropriate support for OTN
- **Provide physical layer specifications which support 200 Gb/s operation over:**
  - **At least 2 km of SMF**
  - **At least 10 km of SMF**
- Provide physical layer specifications which support **400 Gb/s operation over:** ~~link distances of:~~
  - At least 100 m **of** ~~over~~ MMF
  - At least 500 m **of** ~~over~~ SMF
  - At least 2 km **of** ~~over~~ SMF
  - At least 10 km **of** ~~over~~ SMF
- Specify optional Energy Efficient Ethernet (EEE) capability ~~for 400 Gb/s PHYs~~
- Support optional ~~400 Gb/s~~ Attachment Unit Interfaces for chip-to-chip and chip-to-module applications

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Ad Hoc Chair Assessment

- For each objective, the SG must provide sufficient evidence to support the project documentation.
  - Specifically, the Technical Feasibility, Economic Feasibility, and Broad Market Potential
- The objectives are subject to Working Group approval in March
  - Those items without support are not likely to be approved
- Several gaps exist after mapping the adopted PHY objectives to the CSDs
- Assume AUI C2M will be defined, where appropriate. Not clear on the AUI C2C objective interest.

Areas of work needed ahead of March Plenary approval

50G	TF	EF	BMP	Comments
Twinax	n	n	n	Need target objective to be decided with supporting evidence
Backplane	n	n	n	Need target objective to be decided with supporting evidence
100m MMF	y	y	y	
2km SMF	y	y	y	
10km SMF	y	y	y	

100G	TF	EF	BMP	Comments
Twinax	n	n	n	Need target objective to be decided with supporting evidence
Backplane	n	n	n	Need target objective to be decided with supporting evidence
2 fiber 100m MMF	y	~	n	

200G	TF	EF	BMP	Comments
Twinax	n	n	n	Need target objective to be decided with supporting evidence
Backplane	n	n	n	Need target objective to be decided with supporting evidence
100m MMF	y	y	~	
2km SMF	y	y	~	
10km SMF	y	y	~	

Other potential objectives	TF	EF	BMP	Comments
200G 500m SMF	n	n	n	Needs proposal
Low latency	n	n	n	Needs proposal
100G Compatibility	n	n	n	Needs proposal

Discussion

Objectives are not “approved” until the 802.3 WG approves them (in March hopefully)

- Some objectives in current form will not get approval
  - Work needed to update
- Some objectives may still attract scrutiny without supporting evidence to back them up
  - Work needed to provide supporting evidence
- New objectives can be added by Study Groups in March ahead of going for 802.3 WG approval (with appropriate CSD and PAR changes if necessary)
- Use ad hoc meeting time to share contributions towards these goals

Thanks!