Study Group Objectives Discussion

Mark Nowell - Cisco
Acting Study Group Chair

Ad hoc meeting 12/16/15

Topics

- Study Group Work
- Potential Objectives

Study Group Work

- Goal of a Study Group is to study the problem and develop the following:
  - Objectives
  - Responses to The Criteria for Standard Development (CSD) – aka 5 Criteria
  - PAR
- Solving the problem, developing solutions, writing specifications are all Task Force activities

Partitioning of work

- We currently have 2 Study Groups with 2 specific charters:
  - **50 Gigabit/s Ethernet over a single lane**
  - **Next Generation 100 Gb/s Ethernet & 200 Gigabit/s Ethernet**
- Discussions happening on how the work could be partitioned into different TFs (existing or new) e.g. anslow_120915_50GE_NGOATH_adhoc.pdf
- Procedural options available to support different partitioning approaches but nothing can be done if we don't know what objectives we are likely to support
- Focus of this presentation is on objectives – only!

One slide on procedural considerations

- The challenge we potentially have ahead is that the possible objectives developed in the NGOATH Study group may fall into two groups:
  - One that leverages existing PMD work underway in 802.3bs
  - One that leverages the new single-lane work coming out of the 50Gb/s Ethernet single-lane study group
- Procedurally we have options to address but again, much easier to do once we know what objectives will be selected

Potential Objectives

- 50 Gb/s Ethernet Single-lane
  - Clear set of potential objectives emerging.
  - Justification (CSD) still needed
- 200 Gb/s Ethernet
  - Clear that two sets of potential objectives exist
  - Justification (CSD) still needed
- 100 Gb/s Ethernet
  - Unclear whether consensus exists around objectives yet
  - Backwards compatibility topics raised
  - Proposals and justification needed

50 Gb/s Ethernet

50 Gb/s Ethernet Draft Objectives (Foundational)

- Support a MAC data rate of 50 Gb/s
- 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 a BER of better than or equal to 10^{-12} at the MAC/PLS service interface (or the frame loss ratio equivalent)
- Support optional Energy-Efficient Ethernet operation
- Provide appropriate support for OTN

50 Gb/s Ethernet Potential Objectives

- Define a single-lane 50 Gb/s PHY for operation over a printed circuit board backplane consistent with a total channel insertion loss of <= 32 dB at 12.9 GHz
- Provide physical layer specifications which support 50 Gb/s operation link distances of:
  - At least 3 m over Twinax Cable
  - At least 100 m over MMF
  - At least 2 km over duplex SMF
  - At least 10 km over duplex SMF

Proposals needed including
Technical Feasibility
Economic Feasibility
Broad Market Potential

Other potential 50 Gb/s Ethernet Draft Objectives

- Provide appropriate consideration for multi-lane implementations for copper PHYs
  - If the work for 50G Twinax and Backplane objectives were to happen in a single-lane only Task Force, such an objective would allow the TF to consider the multi-lane considerations (e.g. crosstalk) that would be relevant in some probable implementations. This may be irrelevant if a TF is formed which includes these multi-lane objectives

- Define a single-lane 50 Gb/s PHY for operation over SMF with lengths up to at least 40 km
  - Discussed in stassar_120915_50GE_NGOATH_adhoc.pdf

200 Gb/s Ethernet

200 Gb/s Ethernet Draft Objectives (Foundational)

- Support a MAC data rate of 200 Gb/s
- 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 a BER of better than or equal to 10^{-13} at the MAC/PLS service interface (or the frame loss ratio equivalent)
- Support optional Energy-Efficient Ethernet operation
- Provide appropriate support for OTN

200Gb/s Potential Ethernet Draft Objectives

Proposals needed including
Technical Feasibility
Economic Feasibility
Broad Market Potential

- Define a four-lane 200 Gb/s PHY for operation over a printed circuit board backplane consistent with a total channel insertion loss of <= 32 dB at 12.9 GHz
- Provide physical layer specifications which support 200 Gb/s operation link distances of:
  - At least 3m over Twinax Cable
  - At least 100 m over MMF

Multi-lane variants of work consistent with 802.3bs 50 Gb/s per lane work

Multi-lane variants of work consistent with 50 Gb/s single lane work

- Provide physical layer specifications which support 200 Gb/s operation link distances of:
  - At least 500 m over Parallel SMF
  - At least 2 km over duplex SMF
  - At least 10 km over duplex SMF

200 Gb/s Ethernet Potential Ethernet Draft Objectives

Areas of scrutiny

- Is there a market need for 200 Gb/s Ethernet twinax PMD?
- For objectives which are 4-lane variants of work consistent with 802.3bs 50 Gb/s per lane work, how much incremental work do they represent vs. the 8-lane

Proposals needed including:

- Technical Feasibility
- Economic Feasibility
- Broad Market Potential

100 Gb/s Ethernet

100 Gb/s Ethernet Draft Objectives (Foundational)

- 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 a BER of better than or equal to 10^{-12} at the MAC/PLS service interface (or the frame loss ratio equivalent)
- Support optional Energy-Efficient Ethernet operation
- Provide appropriate support for OTN

100 Gb/s Potential Ethernet Draft Objectives

Proposals needed including
Technical Feasibility
Economic Feasibility
Broad Market Potential

- Define a two-lane 100 Gb/s PHY for operation over a printed circuit board backplane consistent with a total channel insertion loss of <= 32 dB at 12.9 GHz
- Provide physical layer specifications which support 100 Gb/s operation link distances of:
  - At least 3m over Twinax Cable
  - At least 100 m over MMF

Multi-lane variants of work consistent with 802.3bs 50Gb/s per lane work

Multi-lane variants of work consistent with 50Gb/s single lane work

- Provide physical layer specifications which support 100 Gb/s operation link distances of:
  - At least 2 km over duplex SMF
  - At least 10 km over duplex SMF

100 Gb/s Ethernet Potential Ethernet Draft Objectives

Areas of scrutiny

- Backwards compatibility discussions around existing 100 Gb/s Ethernet ports using KR4(528 RS-FEC) vs. leveraging (544 RS-FEC) which would maximize 50 Gb/s lane based PMD performance
- Electrical objectives (Twinax, backplane)
  - Electrical objectives would leverage multi-lane variants of work consistent with 50Gb/s single lane work
  - Backplane/server applications
- Optical objectives (SMF, MMF)
  - Schedule impact concerns
  - Dynamic MSA space

Proposals needed including

- Technical Feasibility
- Economic Feasibility
- Broad Market Potential

Next Steps

Requesting contributions/proposals

Interest in Survey Monkey poll to gauge interest in various potential objectives?