Approved Minutes

IEEE 25 Gb/s Ethernet on a Single Lane Study Group

Interim Meeting

September 11-12, 2014

Kanata, Ontario, Canada

Prepared by Kent Lusted

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IEEE 25 GbE Study Group Meeting – 11 September 2014:

Prepared by Kent Lusted

IEEE 25 Gb/s Study Group interim meeting convened at 8:30 a.m., Thursday, 11 September 2014, by David Law, IEEE 802.3 Work Group Chair.

Mr. Law welcomes attendees to the 25 Gb/s Ethernet Study Group.

David Law reviews agenda in
http://www.ieee802.org/3/25GSG/public/Sept14/agenda_25GE_01_0914a.pdf

David Law appoints Kent Lusted as the recording secretary for the 25 GbE Study Group.

As announced at the July Plenary meeting, David Law intends to appoint Mark Nowell as the 25 Gb/s Ethernet Study Group chair.

Motion 1:
Move to confirm Mark Nowell as the IEEE 802.3 25 Gb/s Ethernet Study Group Chair

- Moved by: J. D'Ambrosia
- Second by: S Trowbridge
- Y: 26+36 = 62 , N: 0+0 A: 0
- Motion passes!

Introductions were made.

Chair reviewed the agenda.

Motion #2:
Move to approve the agenda:

- Moved by: Joel Goergen
- Second by: Adee Ran
- Pass by voice without opposition

Agenda & General Information
By – Mark Nowell
See -- http://www.ieee802.org/3/25GSG/public/Sept14/agenda_25GE_01_0914a.pdf

Call for members of the press. No one responded. Photography and recording not permitted.

Chair reminds participants to observe meeting decorum.

Goals for the meeting:

- Develop a set of objectives for the project
- Develop responses for the CSD (Criteria for Standards Development)
- Develop a PAR
- Review presentations substantiating the above
- Lay the ground work for the next meeting

Chair reviews the reflector and web information.

Chair reviews the ground rules for the meeting.

Chair reviews the IEEE structure.

Chair reviews the Bylaws and Rules slides in --
http://www.ieee802.org/3/25GSG/public/Sept14/agenda_25GE_01_0914a.pdf

Chair read the Guidelines for IEEE-SA meetings. No one responded.

Bob Grow noted that the pre-submittal date for the December Standard Boards meeting is October 22nd.

Chair reviews the purpose of the study group. Purpose is not to choose a solution but to complete the objectives, PAR and CSD.

Chair notes that Jonathan King ran the optical ad hoc and Matt Brown ran the architecture ad hoc to build consensus.

Chair reminds attendees to sign into the IEEE-SA Meeting Attendance Tool and to sign book. Update affiliation, if necessary.

Show of hands for Friday attendance:

- 70% leave Friday afternoon
- 50% take lunch on Friday
- Most here Friday morning

Chair notes that the presentation schedule is approximate and will likely change to ensure that most of the task force is present for discussion and motions.

Presentation #1:
Title: 25GE Study Group Architecture Ad-hoc report
By: Matt Brown
See: http://www.ieee802.org/3/25GSG/public/Sept14/brown_25GE_01_0914.pdf

Chair notes that the ad hoc meetings will continue after the interim meeting with a rolling agenda. John D'Ambrosia asks for coordination with the ad hoc meetings of the other projects. The 25 Gb Ethernet study group ad hoc will be announced over the reflector.

Presentation #2:
Title: 25G SG Architecture Ad Hoc Technical Feasibility Summary
By: Matt Brown
See: http://www.ieee802.org/3/25GSG/public/Sept14/brown_25GE_02_0914c.pdf

Presentation #3:
Title: Considerations for 25 GbE
By: John D'Ambrosia
See: http://www.ieee802.org/3/25GSG/public/Sept14/dambrosia_25GE_01_0914c.pdf
Discussion on 25G growth rate in adoption slide, MMF optical attach rate, distribution of twin-ax cable lengths, C2C and C2M objective text, and MII interfaces.
Adee Ran offers his support to the presentation.

Break at 10:30 a.m. Resume 10:53 a.m.

Presentation #4:
Title: 25GbE Server to Switch Architectures
By: Scott Kipp
See: http://www.ieee802.org/3/25GSG/public/Sept14/kipp_25GE_01_0914a.pdf
Clarifying questions were asked and answered.

Presentation #5:
Title: 25GE Study Group Optical Ad-hoc report
By: Jonathan King
See: http://www.ieee802.org/3/25GSG/public/Sept14/king_25GE_01_0914a.pdf

Presentation #6:
Title: Support for an objective of 25 Gb/s over MMF
By: Jonathan King
See: http://www.ieee802.org/3/25GSG/public/Sept14/king_25GE_02_0914a.pdf
Discussed relevance of optical PMD in the market, potential time impact of adding optical objective, and BASE-T.

Presentation #7:
Title: OTN Support for 25GbE
By: Steve Trowbridge
See: http://www.ieee802.org/3/25GSG/public/Sept14/trowbridge_25GE_01_0914.pdf

Strawpoll #1:
I would support adding an objective to provide appropriate support for OTN.

- Y: 45, N: 2 , Abstain: 29

Break at 12:06 p.m. Resume at 1:06 p.m.

Presentation #8:
Title: Error performance objective for 25GbE
By: Pete Anslow
See: http://www.ieee802.org/3/25GSG/public/Sept14/anslow_25GE_01_0914.pdf

Mark Nowell passes the chair responsibility to Kent Lusted.

Presentation #9:
Title: Foundational Objectives
By: Mark Nowell
See: http://www.ieee802.org/3/25GSG/public/Sept14/nowell_25GE_01_0914.pdf

Mark Nowell resumes the chair responsibility.

Motion #3 – 1:39 p.m.
Move to adopt the following objectives:

  - Support a MAC data rate of 25 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

- M: J D'Ambrosia
- S: B. Booth
- Technical (>= 75%)
- Y: 42+41 = 83 , N: 0 , A: 1
- Motion passes

Motion #4 – 1:42 p.m.
Move to adopt the following objective:

- Provide appropriate support for OTN
- M: S. Trowbridge
- S: Ed Sayre
- Technical (>= 75%),
- Y: 33+38 = 71 , N: 0 , A: 3+6 = 9
- Result: Motion Passes!

Mark Nowell passes the chair responsibility to Kent Lusted.

Presentation #10:
Title: "Strong Consensus" Objectives
By: Howard Frazier (partially presented by Mark Nowell)
See: http://www.ieee802.org/3/25GSG/public/Sept14/frazier_25GE_02_0914.pdf
Mark Nowell presented the initial slides on Howard's behalf and then Howard Frazier assumed the role of speaker for the remainder. Mark Nowell resumes the chair responsibility.
Discussion regarding objective wording as one or two PHYs, market need for the different cable lengths, and PHY type differentiation by an end user.

Straw poll #2 – 2:42 p.m.
I would support the objective in the form of:

- Like Option "A" (frazier_25GE_02_0914.pdf slide 10)
  - Define a single-lane 25 Gb/s PHY for operation over links consistent with copper twin axial cables, with lengths up to at least 3m
  - Define a single-lane 25 Gb/s PHY for operation over links consistent with copper twin axial cables, with lengths up to at least 5m
- Like Option "B" (frazier_25GE_02_0914.pdf slide 11)
  - Define a single-lane 25 Gb/s PHY including FEC, for operation over links consistent with copper twin axial cables, that re-uses the transmitter and receiver characteristics specified in IEEE Std 802.3bj-2014 Clause 93
  - Consider defining a mechanism to disable the generation and decoding of FEC
- Chicago rules
- A: 30+26 = 56 , B: 19+16 = 35 @ 3:00 p.m.
- Room count = 43+38 = 81

Straw poll #3 – 3:02 p.m.
I would oppose the objective in the form of:

- Like Option "A" (frazier_25GE_02_0914.pdf slide 10)
  - Define a single-lane 25 Gb/s PHY for operation over links consistent with copper twin axial cables, with lengths up to at least 3m
  - Define a single-lane 25 Gb/s PHY for operation over links consistent with copper twin axial cables, with lengths up to at least 5m
- Like Option "B" (frazier_25GE_02_0914.pdf slide 11)
  - Define a single-lane 25 Gb/s PHY including FEC, for operation over links consistent with copper twin axial cables, that re-uses the transmitter and receiver characteristics specified in IEEE Std 802.3bj-2014 Clause 93
  - Consider defining a mechanism to disable the generation and decoding of FEC

Chicago Rules
A: 6 , B: 20

Break at 3:05 p.m. Resume at 3:20 p.m.

Motion #5 – 3:23 p.m.
Move to adopt the following objectives:

- Define a single-lane 25 Gb/s PHY for operation over links consistent with copper twin axial cables, with lengths up to at least 3m
- Define a single-lane 25 Gb/s PHY for operation over links consistent with copper twin axial cables, with lengths up to at least 5m

M: Joel Goergen
S: B. Booth
Technical (>= 75%),
Y: 31+31 = 62 , N: 0 , A: 10+4 = 14
Result: Motion passes 3:29 p.m.

Motion #6 - 3:30 p.m.
Move to adopt the following objective:

- Define a single-lane 25 Gb/s PHY for operation over a printed circuit board backplane consistent with channels specified in IEEE Std 802.3bj-2014 Clause 93

M: Matt Brown
S: Howard Frazier
Technical (>= 75%),
Y: 37+37=74 , N: 0 , A: 3+0=3
Result: motion passes

Motion #7 – 3:35 p.m.
Move to adopt the following objective:

- Define a single-lane 25 Gb/s PHY for operation over MMF consistent with IEEE P802.3bm Clause 95

M: J. King
S: Adee Ran
Technical (>= 75%),
Y: 37+38= 75 , N: 0 , A: 2+1 = 3
Result: passes 3:39 p.m.

Chair asked if there were any more objectives. No one responded.

Presentation #11:
Title: In Support of BMP and Economic Feasibility
By: Brad Booth
See: http://www.ieee802.org/3/25GSG/public/Sept14/booth_25GE_01_0914.pdf

Motion 8 – 4:03 p.m.
Move to adopt the CSD "Broad Market Potential" response as:

- Ethernet is widely deployed for server to switch applications in data centers. An Ethernet data rate of 25 Gb/s enables a cost effective interconnect solution enabling 25 Gb/s server solutions and intersecting the 100Gb/s networking solutions based on 25 Gb/s SerDes technology.
- There will be a significant market potential for 25 Gb/s Ethernet interfaces on servers that optimize the total cost of ownership while meeting the necessary IO bandwidth requirements in data centers.
- 148 participants attended the "25 Gb/s Ethernet over a single lane for server interconnect " Call-For-Interest. 59 individuals representing at least 36 companies indicated that they would support the standardization process. It is anticipated that there will be sufficient participation to effectively complete the standardization process including representatives from end-users, equipment manufacturers and component suppliers.

- M: B. Booth
- S: H. Frazier
- Technical (>= 75%)
- Y: 38+34 = 72 , N: 0 , A: 0
- Result: passes 4:06 p.m.

Motion 9 – 4:14 p.m.
Move to adopt the CSD "Economic Feasibility" response as:

- The cost factors for Ethernet components and systems are well known.
- Prior experience in the development of 25 Gb/s technology for Ethernet establishes that the specifications developed by this project will entail a reasonable cost for the resulting performance.
- In consideration of installation costs, the project is expected to use proven and familiar media.
- Network design, installation and maintenance costs are minimized by preserving network architecture, management, and software.
- A 25 Gb/s Ethernet interface will maintain a favorable cost balance between the server and the switch.
- Energy Efficient Ethernet will reduce the operational costs and the environmental footprint.

- M: H. Frazier
- S: B. Booth
- Technical (>= 75%),
- Y: 36+35 = 71 , N: 0 , A: 0
- Result: passes 4:16 p.m.

Presentation #12:
Title: 25 Gb/s Ethernet Study Group CSD: Technical Feasibility
By: Joel Goergen
See: http://www.ieee802.org/3/25GSG/public/Sept14/goergen_25GE_01_0914b.pdf

Motion #10 – 4:37 p.m.
Move to adopt the CSD "Technical Feasibility" response as:

- Systems based upon 25 Gb/s technology have been deployed in operational networks.
- The proposed project will build on the array of Ethernet component and system design experience, and the broad knowledge base of Ethernet network operation.
- Component technology at 25 Gb/s, developed for both IEEE P802.3bj and IEEE P802.3bm, are available and in production.
- The reliability of components for 25 Gb/s Ethernet has been established in the target environments with a high degree of confidence.

- M: J. Goergen
- S: M. Brown
- Technical (>= 75%),
- Y: 36+39 = 75 , N: 0 , A: 0
- Result: passes 4:39 p.m.

Presentation #13:
Title: CSD responses for Managed Objects, Coexistence, Distinct Identity and Compatibility
By: Howard Frazier
See: http://www.ieee802.org/3/25GSG/public/Sept14/frazier_25GE_01_0914a.pdf

Motion 11 – 5:08 p.m.
Move to adopt the CSD "Managed Objects" response as written on slide 2 in "frazier_25GE_01_0914a.pdf"

- M: H. Frazier
- S: B. Holden
- Technical (>= 75%),
- Y: 32+31 = 63 , N: 0 , A: 0
- Result: passes 5:09 p.m.

Motion 12 – 5:09 p.m.
Move to adopt the CSD "Coexistence" response as written on slide 3 in "frazier_25GE_01_0914a.pdf"

- M: H. Frazier
- S: P. Anslow
- Technical (>= 75%),

- Y: 31+30 = 61 , N: 0 , A: 1
- Result: passes 5:11 p.m.

Motion 13 – 5:11 p.m.
Move to adopt the CSD "Compatibility" response as written on slide 4 in "frazier_25GE_01_0914a.pdf"

- M: H. Frazier
- S: S. Trowbridge
- Technical (>= 75%),
- Y: 31+31 = 62 , N: 0 , A: 0
- Result: passes 5:12 p.m.

Motion 14 – 5:13 p.m.
Move to adopt the CSD "Distinct Identity" response as written on slide 5 in "frazier_25GE_01_0914a.pdf"

- M: H. Frazier
- S: Adee Ran
- Technical (>= 75%),
- Y: 31+31 = 62 , N: 0 , A: 0
- Result: passes 5:14 p.m

Chair reviews the PAR form question template. (See: http://www.ieee802.org/3/25GSG/public/Sept14/25GE_PAR_v3.pdf) Content will be the input for the on-line PAR form.

Break at 5:28 p.m. Resume at 5:36 p.m.

David Law reviewed the proposed on-line PAR submission form.

Motion #15 – 5:48 p.m.
Move to adopt the responses to the PAR as shown in 25GE_PAR_final_110914.pdf

- M: H. Frazier
- S: B. Booth
- Technical (>= 75%),
- Y: 26+27 = 53 , N: 0 , A: 0
- Result: passes 5:50 p.m.

Chair discusses the plans for Friday.

Chair reviews the future meetings.

Future Meetings:

- Nov 2014 Plenary - Week of November 2
    - Grand Hyatt San Antonio, San Antonio, TX, USA
- Jan 2015 Interim - Week of Jan 12
    - Hyatt Regency, Atlanta, GA, USA
- Mar 2015 Plenary - Week of Mar 8
    - Estrel Hotel and Convention Center, Berlin, Germany

Chair notes that the PAR will be pre-submitted for the November 2014 Plenary meeting. The meeting will continue work as a study group.

Anyone interested in hosting a meeting should contact the Chair or Steve Carlson.

Attendance straw polls:
I will attend the IEEE 25 Gb/s meetings at the November plenary in San Antonio, TX, USA (week of November 3, 2014)
Y: 29 , Maybe Y: 9 , Maybe N: 3 , N: 3

I will attend the IEEE 25 Gb/s meetings at the January interim in Atlanta, GA, USA (week of January 12, 2015)
Y: 33 , Maybe Y: 12 , Maybe N: 2 , N: 0

Chair announces a start time of 9:30 a.m. on Friday to accommodate 802.3bm comment resolution.

Break for the day at 6:00 p.m.

IEEE 25 GbE Study Group Meeting – 12 September 2014:

Prepared by Kent Lusted

IEEE 25 Gb/s Ethernet Study Group interim meeting resumed at 9:30 a.m., Friday, 12 September 2014, by Mark Nowell, 25 Gb/s Ethernet Study Group chair.

Chair reminds attendees to sign into the IEEE-SA Meeting Attendance Tool and sign the book.

Chair reviews the plans for the day.

Presentation #14:
Title: Measurement Results of 3m 30AWG QSFP-to-4SFP Splitter Cable for Technical Feasibility of 25Gbps/lane Ethernet
By: Erdem Matoglu
See: http://www.ieee802.org/3/25GSG/public/Sept14/matoglu_25GE_01_0914a.pdf

Presentation #15:
Title: Data Showing Market Potential and Feasibility Impact of 5m and 3 Meter Objectives
By: Rich Mellitz
See: http://www.ieee802.org/3/25GSG/public/Sept14/mellitz_25GE_01_0914a.pdf

Agenda is complete.

Chair announces single, on-going weekly ad hoc meetings. Proposed time is 8:00-9:30 a.m. Pacific. Charter is to discuss topics towards supporting the developed objectives, PAR and CSD or for preparing the Task Force with contributions to help it prepare for future decisions. Matt Brown will chair the ad hoc.

Chair thanks Ericsson for hosting the interim meeting.

Motion #16:
Motion to Adjourn:

- M: M. Dudek
- S: Thananya Baldwin
- Pass by voice without opposition.

Meeting ends at 10:27 a.m.

Attendees

IEEE 25Gb/s Study Group, Sept 2014 Interim			11-Sep-14	12-Sep-14
Last Name	**First Name**	**Affiliation**	**Thursday**	**Friday**
Abbott	John	Corning	x	x
Abbott	Justin	Semtech	x	
Ali	Hassan	Texas Instruments	x	x
Anslow	Pete	Ciena Corporation	x	
Balasubramonian	Venugopal	Marvell	x	x
Baldwin	Thananya	Ixia	x	x
Brooks	Paul	JDSU	x	
Brown	David	Semtech	x	x
Brown	Matt	Applied Micro	x	x
Brown	Tom	Vitesse Semiconductors	x	x
Butter	Adrian	IBM	x	x
Calderon	Juan-Carlos	Cortina Systems	x	x
Chad	Erven	Semtech	x	
Chaing	Jerry	Foxconn	x	x
Chalupsky	David	Intel	x	x
Cheng	Eric	Lenovo	x	x
Choudhury	G. Mabud	Commscope		x
Dai	Eugene	Cox Comm.	x	
D'Ambrosia	John	Dell	x	
DiMinico	Christopher	MC Communications/Panduit	x	x
Donahue	Curtis	UNH - IOL		x
Dudek	Mike	QLogic	x	x
Flatman	Alan	LAN Technologies	x	
Frazier	Howard	Broadcom	x	
Garian	Sebastien	Ciena	x	
Goergen	Joel	Cisco	x	
Gong	Zhigang	O-net	x	x
Gorshe	Steve	PMC Sierra	x	
Green	Malcolm	BiwOptics	x	
Grow	Bob	RMG Consulting	x	
Hage	Ousama	Xilinx	x	
Hajduczenia	Marek	Bright House Networks	x	
Healey	Adam	Avago Technologies	x	x
Hirai	Riu	Hitachi	x	
Holden	Brian	Kandou Bus	x	
Horner	Rita	Synopsys	x	x
Horrmeyer	Bernd	Phoenix Contact	x	
Irwin	Scott	MoSys Inc.	x	x
Issenhuth	Tom	Microsoft	x	
Jackson	Ken	Sumitomo	x	x

IEEE 25Gb/s Study Group, Sept 2014 Interim			11-Sep-14	12-Sep-14
Last Name	**First Name**	**Affiliation**	**Thursday**	**Friday**
Jones	Peter	Cisco		x
Kabra	Lokesh	Synopsys	x	x
Kawamoto	Takashi	Hitachi	x	x
Kim	Yong	Broadcom	x	x
Kish	Paul	Belden	x	
Koehler	Daniel	More than IP	x	x
Law	David	HP	x	
LeCheminant	Greg	Agilent Technologies	x	
Lewis	Dave	JDSU	x	
Lewis	Jon	Dell	x	
Li	Silas	Precise ITC	x	
Lusted	Kent	Intel	x	x
Maki	Jeffery	Juniper Networks	x	x
Malkiman	Yonatan	Mellanox	x	x
Matoglu	Erdem	Amphenol	x	x
Mei	Richard	Commscope	x	
Mellitz	Richard	Intel	x	x
Mizuki	Shirao	Mitsubishi Electric	x	
Mooney	Paul	Spirent Communications	x	
Muir	Ron	JAE	x	x
Murray	Dale	Lightcounting	x	
Nicholl	Gary	Cisco	x	
Nicholl	Shawn	Xilinx	x	
Nikolich	Paul	independent	x	
Nowell	Mark	Cisco	x	x
Ofelt	David	Juniper Networks	x	x
Ogura	Ichiro	Petra	x	
Palkert	Tom	Luxtera	x	
Patel	Pravin	IBM	x	x
Pepper	Gerald	Ixia	x	x
Petrilla	John	Avago Technologies	x	
Ram	Rao	Oclaro	x	x
Ran	Adee	Intel	x	x
Roth	Christopher	Molex	x	
Rotolo	Salvatore	ST Microelectronics	x	x
Sakamoto	Hisaya	Fujitsu Optical Components	x	
Salunke	Vineet	Cisco Systems	x	
Sambasivan	Sam	AT&T	x	
Sayre	Edward	Sametc	x	
Sommers	Scott	Molex	x	
Sone	Yoshiaki	NTT	x	
Song	Xiaolu	Huawei	x	x

IEEE 25Gb/s Study Group, Sept 2014 Interim			11-Sep-14	12-Sep-14
Last Name	**First Name**	**Affiliation**	**Thursday**	**Friday**
Stone	Rob	Broadcom	x	
Takahata	Kiyoto	NTT	x	
Tooyserkani	Pirooz	Cisco	x	x
Toyoda	Hidehiro	Hitachi	x	x
Tracy	Nathan	TE Connectivity	x	
Tremblay	Francois	Semtech		x
Tretter	Albert	Siemens		x
Trowbridge	Steve	Alcatel-Lucent	x	
Twombly	Jeff	Credo	x	
Ulrichs	Ed	Source Photonics	x	
Valle	Stefano	ST Microelectronics	x	x
Vanderlaan	Paul	Nexans	x	
Wagner	Bob	Panduit Corp.	x	
Wang	Tongtong	Huawei	x	
Wang	Xinyuan	Huawei	x	
Wang	Zhongfeng	Broadcom	x	
Wertheim	Oded	Mellanox	x	x
Xu	Yu	Huawei	x	
Zambell	Andrew	FCI	x	x
Zortea	Tony	PMC Sierra	x	x