IEEE P802.3ae – 10 Gigabit Ethernet Minutes
Task Force Plenary Meeting
Nov 13th – 15th, 2001
Austin, TX.

Prepared by: Jeff Warren

Administrative

The meeting convened at 8:39 am, Nov 13th, 2001. Jonathan Thatcher, the 10 GE Task Force chairman, opened the meeting with a discussion of the agenda.

The agenda was reviewed and modified. A motion to approve the agenda passed by acclamation (Moved by Brad/Paul). Jonathan then reviewed all the administrative items such as reflector and web locations, membership, voting, future meeting locations, call for patents and sign-in rules.

The hot ticket items for this meeting are in Clause 52 "Serial PMD" where the majority of D3.1 ballot comments are focused. Additionally there are a few open TR comments on Technical Feasibility.

At this point (optimistically) the 10GbE standards effort is 88 % complete. This depends on a recirculation SB with no technical comments. More realistically there will be comments against the D4.1 SB re-circulation ballot, then a more realistic closure for the 10GE standard is on 6/11/02.

There were only two new participants for this meeting.

Some important links:

- Agenda = http://grouper.ieee.org/groups/802/3/ae/public/jul01/agenda_0701.pdf
- E-mail Reflector = http://grouper.ieee.org/groups/802/3/10G_study/email/thrd1.html
- Voting Rules = www.ieee802.org/3/rules/member.html
- Typical Plenary Meeting = www.ieee802.org/3/plenary.html
- 802.3ae 5 Criteria = www.ieee802.org/3/ae/criteria.pdf
- 802.3ae PAR = www.ieee802.org/3/rules/member.html
- 802.3 Presentation Policy = www.ieee802.org/3/public/presentproc.html
- Current 10GbE Draft Standard = http://www.ieee802.org/3/ae/private/index.html
  - 802.3 Patent Policy www.ieee802.org/3/patent.html

The P802.3ae 10-Gigabit Ethernet Task Force meeting was adjourned on Nov 15th, 2001 at approximately 11:35am.

Goals & Accomplishments for this Meeting

This meeting was dedicated to gaining unanimity within this IEEE802.3ae group to go forward with a Sponsor Ballot. This was goal was achieved, reference motion 4 below.

Outline for these Minutes

Future IEEE Meetings

Month	Days	Year	Meeting Type	City	State/Country
January	16 - 18	2002	Interim	Raleigh	NC
February	TBD	2002	Interim	TBD	TBD
March	11-15	2002	Plenary	St. Louis	MO.
May	TBD	2002	Interim	Edinburgh	
July	7-12	2002	Plenary	Vancouver	BC. Canada

There's a link to the next meeting location: http://www.ieee802.org/meeting/index.html This March plenary meeting shall be held at the Hyatt Regency St Louis, MO, USA during the week of March 11th.

IEEE P802.3ae Objectives

- Preserve the 802.3/Ethernet frame format at the MAC Client service interface.
- Meet 802 Functional Requirements, with the possible exception of Hamming Distance.
- Preserve minimum and maximum FrameSize of current 802.3 Std.
- Support full-duplex operation only.
- Support star-wired local area networks using point-to-point links and structured cabling topologies.
- Specify an optional Media Independent Interface (MII).
- Support proposed standard P802.3ad (Link Aggregation)
- Support a speed of 10.000 Gb/s at the MAC/PLS service interface

- Define two families of PHYs
  - A LAN PHY, operating at a data rate of 10.000 Gb/s
  - A WAN PHY, operating at a data rate compatible with the payload rate of OC-192c/SDH VC-4-64c
- Define a mechanism to adapt the MAC/PLS data rate to the data rate of the WAN PHY
- Provide Physical Layer specifications which support link distances of:
  - At least 65 meters over MMF**
  - At least 300 meters over installed MMF*
  - At least 2 km over SMF
  - At least 10 km over SMF
  - At least 40 km over SMF (must be engineered for 40km, otherwise 30km)

LEGEND:
* Installed = all MMF specified in 802.3z (62.5 micron 160/500 MHz*km FDDI-grade is the worst case).
** Implies that the solution is cost optimized for this distance.

- Support fiber media selected from the second edition of ISO/IEC 11801 (802.3 to work with SC25/WG3 to develop appropriate specifications for any new fiber media).

P802.3ae Contacts

- For the latest list of key P802.3ae contacts please reference the IEEE P802.3ae 10Gb/s Ethernet Task Force Chairs and Editors web page located at http://grouper.ieee.org/groups/802/3/contacts.html this web page is maintained by David Law.

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Membership Rules

Membership is by individual, not company.

To become a voter:

- Attend and sign the attendance book at least 75% of the sessions of two Working Group 802.3 Plenary meetings (within the last four).
- Full attendance at a two-day or more duly constituted Working Group 802.3 Interim Meeting can be substituted for attendance at one plenary.
- Have complete and current contact information recorded in the Working Group 802.3 database.
- Request to become a voter during a Working Group 802.3 Opening or Closing plenary meeting when additions to the voter list are solicited by the Chair from the "Potential Voter" list.

To remain a voter you must:

- Maintain current contact information in the Working Group 802.3 database.
- Have 75% attendance during at least two of the last four plenaries (Attendance at an interim can substitute for attendance at no more than 1 plenary).
  - Participate in Working Group ballots. You can be dropped for not returning or abstaining in two of the last three ballots.

Agenda

- 8:30 Welcome and Introductions, Jonathan Thatcher (15 min)
- 8:45 Review / Approve Agenda
- 8:50 Chairs Introductory Comments
  - Call for Patents
  - Schedule Review
  - Sponsor Ballot
  - Meeting Objectives
- 9:10 Editor's Report (Brad Booth)
- 9:20 Liaison Reports
  - 10GFC Liaison Report, Rich Taborek
  - TR-42, Chris Diminico (?)
- 9:30 Ad Hoc Reports
  - Piers Dawe: Serial PMD
    - Link Model Update (3.1.14 to 3.1.16)
- 9:40 Presentations
  - (9:40) David Kabal: 10GBASE-S Technical Feasibility
  - (10:15) Break (10:30) Juergen Rahn: 10GBASE-E Technical Feasibility(11:00) John Dallesasse: 10GBASE-LX4 Technical Feasibility(11:30) Vipul Bhatt: 10GBASE-L Technical Feasibility

- 12:00 Lunch

1:00 Breakouts

- Travis I (Radisson 40): Logic Tracks
  - 1:00 Cls 45
  - 1:30 Cls 46
  - 2:30 Cls 47
  - 3:30 Cls 48
  - 4:00 Cls 50
  - 5:00 Cls 51
  - 5:30 Done
- Travis II (Radisson 20): Cls 53
- Old Pecan (Radisson 30): Cls 52

8:30 Wednesday …. Breakouts

- Austin I (Radisson 35): Logic Tracks Overflow
- Austin III (Radisson 50): Cls 52

1:00 Wednesday …. Breakouts

- LBJ (Radisson): Editor Central
- Austin III (Radisson): Serial PMD Ad Hoc / ITU Letter

Thursday -- Closing Session 802.3ae

Convention Center: Ballroom B

- 8:30 Editor Reports
- 8:45 Track/Clause Reports & Motion Madness
  - Motion: Feasibility…
- New Business / Other Motions
- Approve Minutes Meeting
- Adjourn

Motions

Motion # 1 General Session Motion (Tuesday)

Description: Affirm that the serial PMD's (Clause 52) have met the objective for technical feasibility, as defined by the P802.3ae task force.
Motion Type: Technical 75 % required
Moved By: David Kabal
Seconded By: Tom Lindsay
Results: All Attendees Y 61 N 0 A 5 **100 %**

Time: 11:52am 11/13/01

P/F: **Passes**

It's time to move forward, the high bar for these serial PMD's has been achieved. Even though there may be some jitter measurement issues lingering this will not impact technical feasibility. The chairman stated that the technical feasibility goes far beyond what was shown during the previous 1GE standards time line. This technical feasibility has far exceeded his expectations. All four serial PMD chairs stood up and said that they have achieved technical feasibility.

Motion # 2 General Session Motion (Tuesday)

Description: Affirm that the 10Gbase-LX4 PMD (Clause 53) has met the objective for technical feasibility, as defined by the P802.3ae task force.
Motion Type: Technical 75 % required
Moved By: Eric Gram
Seconded By: John Dallesasse
Results: All Attendees Y 64 N 0 A 11 **100 %**

Time: 12:08pm 11/13/01

P/F: **Passes**

Motion # 3 General Session Motion (Tuesday)

Description: Move to modify the agenda to consider the above two motions dealing with technical feasibility.
Motion Type: Procedural 50 % required
Moved By: David Kabal
Seconded By: Pat Thaler
Results: All Attendees Y 42 N 9 A 23 **82 %**

Time: 11:46am 11/13/01

P/F: **Passes**

Taking the above motions now helps the group focus on work that is open and pending. Some felt that we should stick with the typical process, which is to take this motion on Thursday. This vote taken at this time does not impact any TR's that are open.

Motion # 4 General Session Motion

Description: P802.3ae requests the following: IEEE 802.3 requests that the Sponsor Executive Committee forward IEEE P802.3ae/D4.0 for Sponsor Ballot and recirculations conditional upon successful completion of Working Group ballot as per LMSC Operating Rules Procedure 10. Furthermore, IEEE 802.3 requests that the Sponsor Executive Committee grant conditional approval to forward IEEE P802.3/D4.1 to RevCom based on successful Sponsor ballot satisfying the conditions of LMSC Operating Rules Proceudre 10.

Motion Type: Technical 75 % required

Moved By: Brad Booth

Seconded By: Bob Grow

Results: All Attendees Y 45 N 0 A 2 **100 %**

Time: 9:22am 11/15/01

P/F: **Passes**

Motion # 5 General Session Motion

Description: Move that P802.3ae delegates the review and approval of the response to the ITU-T SG15 Question 16/15 to a subcommittee of interested parties for report and approval by 802.3 on November 15th, 2001.

Motion Type: Technical 75 % required

Moved By: Tom Dineen

Seconded By: Tom Lindsay

Results: All Attendees acclimation **100 %**

Time: 9:22am 11/15/01

P/F: **Passes**

General Presentations & Minutes

1. **Opening Business (Jonathan Thatcher)**
   http://grouper.ieee.org/groups/802/3/ae/public/nov01/intro_1101.pdf

This opening presentation included the typical introductory material, reference the above presentation for details. The optimistic 10GE time line schedule (3/02 completion) is still the plan of record. The more realistic schedule shows a three-month slip with a June 11th, 2002 standard completion date. The sponsor ballot pool has been forming; the cut off date for joining the Sponsor Pool Ballot is 11/13/01. Some individuals pointed out that they were having difficulties with changing their classifications. A representative from the IEEE office present in this meeting said that as of today the Sponsor Ballot Pool is balanced:

- 23 Users
- 21 General
- 11 Government
- 44 Manufacturing

The bulk of the comments against Draft 3.3 are editorial in Clause 52, however they are editorial. The TR's and T's are declining as is typical for a standard, which is ready for Sponsor Ballot. The unresolved TR's will close this week, three new TR's were received.

Hot Ticket items – Technical feasibility, PMD jitter measurement, XAUI return loss, XAUI random jitter, Loop back, and XGMII setup and hold

The 10GE Task Group split up into individual sub-groups (by clauses) covering comment resolution against Draft 3.2. Since a number of the clause editors resolved their comments prior to this meeting, all the logic track clauses shall be meeting in a serial fashion. Clauses 52 and 53 will be another serial track at this meeting. Reference the breakout details section above.

Highlights of Plan of Record schedule:

- Draft 3.4 distributed on 11/16/01.
- Draft 4.0 to IEEE Sponsor Ballot on 12/5/01, closes 12/11/01
- Draft 4.1 produced by 1/24/02 for re-circulation sponsor ballot
- Standard completed in March 2002.

Plan (optimistic)

- Nov. 13-15 Resolve Draft 3.3 Comments; Prepare D3.4
- Nov. 15-16 Conditional approval for SB and for submission to RevCom
- Nov. 16 (19) Distribute D3.4; announce WG recirc
- Dec. 1 (Dec. 4) D3.4 WG recirculation closes
- Dec. 1-5 (4-5) Validate SB contingency satisfied
- Dec. 5 D4.0 to IEEE Ballot Services

- Dec. 7 Distribution of D4.0; Sponsor ballot
- Jan. 11 Sponsor Ballot closes
- Jan. 16-18 802.3ae interim meeting
- Jan. 24 (28) Distribute D4.1; announce SB recirc
- Feb. 7 Presubmit D4.1 to RevCom
- Feb. 8 (Feb. 12) D4.1 SB recirculation closes
- Feb. 15 Validate RevCom contingency satisfied
- Mar. 19 Standards Board approval (Std!)

Plan (realistic)

- Nov. 13-15 Resolve Draft 3.3 Comments; Prepare D3.4
- Nov. 15-16 Conditional approval for sponsor ballot
- Nov. 16 (19) Distribute D3.4; announce WG recirc
- Dec. 1 (Dec. 4) D3.4 WG recirculation closes
- Dec. 1-5 (4-5) Validate contingency satisfied
- Dec. 5 D4.0 to IEEE Ballot Services
- Dec. 7 Distribution of D4.0; Sponsor ballot
- Jan. 11 Sponsor Ballot closes
- Jan. 16-18 802.3ae interim meeting
- Jan. 24 (28) Distribute D4.1; announce SB recirc
- Feb. 8 (Feb. 12) D4.1 SB recirculation closes
- Feb. 12-13(14-15) Interim 802.3ae meeting
- Feb. 19 Distribute D4.2; announce SB recirc.
- Mar. 6 D4.2 SB recirculation closes
- Mar. 11-16 802.3 & 802 approval
- Mar. 16 Submit D4.2 to RevCom
- Jun 11 Standards Board approval (Std!)

2. Editor's Report (Brad Booth)

http://grouper.ieee.org/groups/802/3/ae/public/nov01/bbooth_1_1101.pdf

TR's are changed to T's at this meeting if the Commenter is not a member of the WG Ballot Pool. Voter pool is 293, approvals going up. The return and approval rates were very high. Only thirteen individuals returned comments this time around. Only three new TR's. Coming into this meeting there are only 10 Technical Required comments.

The Hot ticket items with TR's open against them include:

- Technical Feasibility
- PMD Jitter Measurement
- XAUI Return Loss
- XAUI Random Jitter
- Loopback
- XGMII Setup and Hold Timing

Goal is to develop Draft D3.4 for a re-circulation from 11/16/01 – 12/1/01.

3. Report from Serial ad hoc (Piers Dawe)
http://grouper.ieee.org/groups/802/3/ae/public/oct01/dawe_1_1001.pdf

This group did a 2nd review of the new link model and they now have consensus. There still remains so key issues, they are: Open TR's such as feasibility reports on all PMD's, optical power spec and measurement in network operations and maintenance (need input from field people), ITU-T SG15 liaison letter is still open. The optical budget tables need to be reworked again, plus the jitter spec values and test procedures are not mature. Also will have to reconcile 1310nm serial link attenuation (is it 6 or 7 db?). W.R.T. Jitter we have new test procedures in place but we have to do more to convince ourselves that they are solid and work. Experimental testing is required, however SB is not jeopardy. Bottom line is that Clause 52 has stabilized and they expect more experimentation to come in prior to SB closure.

4. 10Gbase-S Technical Feasibility Recap (David Kabal)
http://grouper.ieee.org/groups/802/3/ae/public/nov01/kabal_1_1101.pdf

A number of the 10GE committee members have supported this presentation. Draft 3.3 was used for Tech Feasibility. They used the 10Gbase-SR transponders. A functional block diagram of the transponders was reviewed; see the referenced presentation for details. Both the PMA and the PMD were part of the interoperability testing. Both Cielo and PicoLight participated in this testing. IBM and Stratos will participate later. Excessive link lengths were used to stress the devices under test. Link distances from 26 to 300 meters were demonstrated. A block diagram of the test setup was shown. A question on the common reference clock was discussed. FGHI fibers are golden fibers with Modal BW's very close to the rated fibers. The 50um MMF 2000 MHz-km ran up to 450 meters, this is better than 150% of the rated fiber distance objective. Vendor A was compliant on all measurable TX and RX parameters. The tests were against multiple samples. Vendor B has a few areas to work on for compliance, e.g Trise/Tfall. It is fully expected that the non-compliance issues will be resolved with IC changes. This 10Gbase-S technology has been demonstrated in other forums, e.g. by IBM at 20Gbits/sec VCSELs and SiGe receivers. Bottom line is that the two vendors feel very confident with their go to market plans with this 10Gbase-S technology, they feel it's Technically Feasible and that the D3.3 spec does not need any changes. The bathtub curve shown was from PicoLight. Bill from Blaze asked about Encircled Flux Launch, specifically on which fiber types this applies to, Dave clarified this.

5. 10Gbase-LX4 (John Dallesasse)
http://grouper.ieee.org/groups/802/3/ae/public/nov01/dallesasse_1_1101.pdf

Three companies participated in this testing, they are: Molex, Blaze, and Pine Photonics. Bottom line, the parts used in testing are very solid and intra/inter vendor interoperability has been shown. Interoperability has been demonstrated and full compliance has been shown by at least one participant. The presentation is structure to show where the various

participants achieved compliance. The participants who were having difficulties have already resolved some of the areas where vendors were slightly out of spec. Golden receivers were not used. Bathtub curves for 5, 10 and 20 km were shown. The 20 km curve is a bonus! The measurements focused on the receiver side include: receiver sensitivity, stressed receiver sensitivity, 3dB BW, and receiver jitter tolerance. The stressed eye diagrams for SMF and MMF show that an extremely stresses eye still works properly. Jitter tolerance shows very good results. On SMF a 10km and up to 30km for a transceiver that is tuned is achieved. For MMF the link distance all vendors achieved objectives. There is a substantial amount of margin in these parts tested. Inter-Vendor testing was executed and the results look very good. All combinations of vendor A to B and B to A testing were successful. The other vendor combinations had similar results.

6. Multivendor Feasibility Trials of 1550nm PMD's (Juergen Ra)
http://grouper.ieee.org/groups/802/3/ae/public/oct01/tipper_1_1001.pdf

The test-bed outline was shown. The Chromatic Dispersion was tested using a 50 km fiber to represent a stressed 40km fiber link length. Intel, Lucent, and Nortel participated in this testing. TX Eye results were presented for all three vendors. A 3dB TDP Penalty is feasible. The transmit power was also measured. Receiver sensitivity measurements show an end of life –15.4 dBM Receiver OMA required by draft 3.2 is **NOT** feasible. This was fixed at the October meeting with changes to draft 3.3, so it is **a non-issue now**. System margins at the rate BER spec show a sufficient margin is available. All vendors demonstrated a high extinsion ratio. Both LAN and WAN rates were used to verify vendor interoperability. So in the end a 3 party multi-vendor interoperability to 11dB path loss was demonstrated. Against D3.3 the results are technical feasible, however the jitter measurements were not tested. Changes to the standard are probably likely after this testing is executed. In LA there was a straw poll stating additional work was required, a question from the floor was if a change to the spec is made with the additional work (testing) be required. Answer the additionally jitter testing was not accomplished. The limitations of current test equipment are a factor here. A new ITU fiber standard spec was shown. There is a portion of jitter specification that is different for 1550nm links as compared to the other 10GE link technology; this results in slightly different jitter test measurements for this 1550nm technology. Piers felt that all there wavelength PMDs should use the same Jitter measurements / techniques.

7. PMD 1310nm Serial, 10Gbase-L (Vipul Bhatt)
http://grouper.ieee.org/groups/802/3/ae/public/oct01/bhatt_1_1001.pdf

This is an exact replica of the 10Gbase-L pitch given during October's meeting – so for details please reference the minutes of that meeting posted to the IEEE 802.3ae public web page. No questions.

8. ITU Letter (Jonathan Thatcher)
Presentation not on the web

This ITU group would like our committee to coordinate each others standards. Jonathan drafted a response, which describes our process and the schedule we have. Basically the point is we are well beyond the point of drafting new features so thanks but no thanks. However this group has been invited to have a full time standing liaison to give the IEEE groups timely information on future drafts.

New optimistic schedule shows March 19th, 2002 for a Standards Board approval. The SB cycle for D4.0 would be 12/7/01 – 1/11/02.

The more realistic plan shows June 11th, 2002 for a Standards Board approval. This would require two SB recirculation ballots. In this case the last 10GE standards meeting is in February 2002, i.e.2/12-13 or 2/14-15. There would also be a January interim meeting on 1/16-18.

9. Week Summary (Brad Booth)
http://grouper.ieee.org/groups/802/3/ae/public/nov01/bbooth_2_1101.pdf

As of Thursday only 1 Disapproval from Howard Frazier remains open. The XAUI Random Jitter is what Howard has an issue with. Howard wants a maximum random jitter to be specified. The PMD group that dealt with these two TR's written against D3.1 was that they desire further investigation of an appropriate RJ limit. As of 11/15/01 the commenter has provided no new information during the last 5 months justifying a need for a change, and the committee is satisfied with the current specifications.

The two TR's in question are #99008 and 99009. The next steps include D3.4 11/16 – 12/1 ballot. If no new technical comments are received that result in a change to the document and if the group gets conditional SB approval then the document will go to SB in December 2001.