Approved Meeting Minutes:

IEEE 802.3 Improved PTP Timestamping Accuracy (ITSA) Study Group

January 24, 2020
Geneva, Switzerland

Prepared by Shawn Nicoll (Acting Secretary)

IEEE 802.3 Improving PTP Timestamping Accuracy Study Group meeting convened at 9:00 AM, Friday January 24, 2020 by Steve Gorshe, ITSA SG Chair.

Chair opened the meeting and started presenting *Agenda and General Information*.

Motion #1:
Motion to approve the agenda:

- Moved by: Bill Powell
- Second by: Clark Carty
- Passed by voice without opposition

Introductions were made.

The Chair then resumed presenting. The Chair noted that NESCOM has recommended its approval for ITSA to move to Task Force, and David Law, Chair IEEE 802.3 Ethernet Working Group, confirmed that shortly after February 13, 2020 he expects ITSA to move from Study Group to P802.3cx Task Force.

The Chair asked for volunteers to be IEEE P802.3cx editor, contingent upon the IEEE P802.3cx PAR being approved. Marek Hajduczenia volunteered, and the Chair announced that he was appointing Marek IEEE P802.3cx editor, contingent upon the IEEE P802.3cx PAR being approved.

Study Group Decorum - Chair reviewed slide.

Previous meeting minutes were reviewed with chair asking attendees if there were any questions, comments or changes requested. None were requested.

Chairs asked for motion to approve the previous meeting minutes.

Motion #2: Approve minutes from the previous meeting Meeting Minutes, **Nov. 13, 2019 Waikoloa, HI U.S.A.**

- Moved by: Marek Hajduczenia

- Second by: Steve Trowbridge

Approved by voice vote without objection (Procedural > 50%)

Goals for Meeting – Chair presented the goals for the meeting, which were to begin discussion of specific items that impact timestamping accuracy, and begin discussion of potential approaches to solving the issues. It was noted that no decisions or motions can be made until the March IEEE 802.3 meeting, when ITSA formally becomes the 802.3cx Task Force.

Big Ticket Items – Chair presented the following Big-Ticket items for this meeting:

- Initial identification of problems to be solved
- Initial discussion of potential solutions
- Lay the ground work for the next meeting

Reflector and Web – Chair presented the study groups reflector and web information. All in attendance were invited to subscribe for study group communications and updates. It was noted that the ITSA web site and email reflector will be updated for 802.3cx, so that no re-subscription will be required.

Ground Rules – Chair review the meeting ground rules based on IEEE 802.3 Rules.

IEEE Structure, bylaws & misc – Chair reviewed the IEEE SA structure including a review of how 802.3 WG and the study group is located within the structure. The important bylaws and rules were pointed out for all to refer if needed or of interest. Guidelines for IEEE SA meeting were reviewed with the chair reading out the top of page bullets on the slide. Chair invited study group to reference to links at bottom of slide for more information regarding the page's bullets. Chair also reviewed the IEEE 802 Participation slide reminding all in attendance that participation was on an individual basis, based on qualifications or experience. No comments were collected from those in attendance regarding any of this latter presented material.

Overview of IEEE802.3 Standards Process – Chair reviewed the standards process slides and reminded the study group where in the process this study group was (see You are here on slide 1 of 12).

The Study Group – Chair presented a high-level summary of an IEEE SA study group's purpose, duration and expectations.

Liaisons - The Chair moved to Liaisons and noted that there were no liaisons for the Study Group at this time.

Action Items - The Chair moved to Action Items and noted that there were no actions for the Study Group at this time.

Attendance - Chair advised the group of the IEEE meeting attendance tool and procedures, including both the attendance sheet and the web attendance tracking tool. Attendance is listed in Appendix A.

PRESENTATIONS
The Chair then moved to the presentations for the meeting.

Presentation list – The chair outlined the list of presentations to be review during the meeting. All presentations are available at January 2020, Geneva.

Presentation #1:
Title: Some questions proposed for 802.3cx (lv_itsa_01_0120.pdf)
Presenter: Jingfei Lv

- Slide 9: Discussion about the idea of a 1ns PHY delay
- General comment: Discussion about the range of permissible values in Clause 90 and a desire to tighten the range
- Slide 8: Discussion about cases where sublayers other than PMA/PMD are present in the module

Chair noted that there appeared to be support for improving the accuracy to better than 1ns. Chair encouraged more detailed conversations related to this topic.

Presentation #2:
Title: Timestamp Inaccuracy Due to Different Reference Points (tse_itsa_01_0120.pdf)
Presenter: Richard Tse

- Slide 10: Clarification that the timestamp point is indeed at the MDI
- Slide 15: Clarification about the impact of AM's
- Slide 15 discussion about whether the system implementer can take into account knowledge of the timestamp point that the 802.3 PHY is using and adjust the value to match the 1588/802.1AS timestamp point
- Slide 16 discussion about the use of a constant buffer delay concept to compensate for fixed FEC Tx+Rx
- Slide 16 discussion that, in contrast to RS-FEC, LDPC encoder+decoder delay may not be constant due to the iterative nature of LDPC algorithm
- Slide 16 discussion comment that P802.3ct 100GBASE-ZR has an asynchronous mapping concept that needs to be taken into consideration

Presentation #3:
Title: Timestamp Inaccuracy Due to Idle Insert/Delete for AMs (tse_itsa_02_0120.pdf)
Presenter: Richard Tse

- Presenter talked to Slide #12, #13

- Presented then moved to Slide #17 and presented up to Slide #19
- Discussion about whether ITSA should use the term markers in general, rather than specially referring to alignment markers; there are also codeword markers (CWM) for FEC on a single lane interface
- Comment about case of a PCS that may not have to do idle deletion to make room for alignment marker; contrast with 25G RS-FEC CWM case where the implementation might have to perform idle deletion
- Discussion about the separable 100G RS-FEC sublayer and comment that it does not suffer from similar issues as the 25G RS-FEC CWM; the Clause 91 FEC simply swaps PCS AM's for FEC AM's
- It was noted that the AM's and CWM might need to be treated differently

Presentation #4:

Title: Path delay variance from multi PCS lane distribution (tse_itsa_03a_0120.pdf)
Presenter: Richard Tse

- Presenter noted that Slide 13 was inserted compared with the tse_itsa_03_0120.pdf previous version of the slides
- Slide 10: Discussion that Multi-Lane Clause 90.7 already considers that prior to entering the multi-lane distribution of the transmitter and after leaving the multi-lane on the receiver, there is a constant delay. Discussion that the presentation discusses a different problem
- Slide15: There was discussion that for the multi-lane interface, if a given block encounters "N" delay on Tx, that it will be skewed in the Rx buffer by the same "N" delay; assuming both ends of the link pick the same fictional reference point
- Discussion that the receiver's behavior seems clear in the standard. Discussion that clarification is needed in the standard to ensure that the transmitters are behaving the same way.
- Discussion of the case of LAUI were there is another PMA layer in between the PCS and FEC layers and how this introduces more variation
- Discussion about the single "distribution point" from when the single stream of 66b blocks starts to distribute; to the single "join point" on the receiver after the 66b blocks have returned to a single stream; cannot delete bits along that path; that delay has to be constant
- Comment that the MLD case is similar to the FEC function and that perhaps we could follow a similar approach to define a "reference point" that is clearly defined (much like how the FEC function chose the start of the FEC block)

Presentation #5:
Title: Contribution to 802.3cx (parkholm_itsa_01_0120.pdf)

(http://www.ieee802.org/3/ITSA/public/jan20/parkholm_itsa_01_0120.pdf)
Presenter: Ulf Parkholm

- Slide 6: Comment that this issue is not specific to 25GMII and that all MII's would behave the same way
- Slide 13: Comment that this solution would be impractical as it would require changes to the RS layer, which is currently unaware of idle insertion/deletion
- Recognition that Clause 106 RS-FEC poses a problem due to CWM insertion since corresponding idle delete is not prescribed exactly how to do the idle delete
    - Idle delete can happen anywhere
    - Idle add on Rx can happen anywhere

Contrast with Clause 91 where just an in-place swap of PCS AM's for FEC AM's

General comments

- Discussion about existence of devices (eg. coherent modem) in the network, that upon reset, afterward the delays come up with different values compared with prior to the reset
- Discussion of historical note that during Clause 90 development there was intent to avoid making changes to every PHY clause in the standard. It would be good to keep that in mind during work of this group.

FUTURE MEETINGS

Chair reviewed future meetings locations from the agenda presentation and asked for a show of hands on potential study group attendance at those meetings.

March (Atlanta)
– I will attend the Study Group / Task Force meeting: 13
–I may attend the Study Group / Task Force meeting: 3
–I will not attend the Study Group / Task Force meeting: 2

March (Pasadena)
–I will attend the Study Group / Task Force meeting: 11
–I may attend the Study Group / Task Force meeting: 6
–I will not attend the Study Group / Task Force meeting: 3

Adjournment

Motion #3: To adjourn the meeting

- Moved by: David Ofelt
- Second by: Marek Hajduczenia

(Procedural > 50%)

Motion Passes by Voice without Opposition

Meeting ended at ~11:55am (CET)

Appendix A - Attendance

IEEE 802.3 Improving PTP Timestamping Accuracy SG IEEE 802.3 Interim January 2020				Day 1 Jan. 20	Day 2 Jan. 21	Day 3 Jan 22	Day 4 Jan 23	Day 5 Jan. 24
By choosing to attend and sign in to this meeting, you acknowledge and agree that your personal data will be documented for IEEE standards development purposes to comply with policies and procedures, legal and accreditation requirements, and evaluation of patent claims by patent offices. See Front Page for additional information.								
Last Name	First Name	Employer	Affiliations	Mon	Tues	Wed		Thurs
Aidan	Paul	Dolomite/	IET					x
Bordogna	Mark	Intel	Intel					x
Brillhart	Theo	Fluke	Fluke					x
Carty	Clark	Cisco	Cisco					x
Cummings	Rodney	National Instruments	National Instruments					x
Gorshe	Steve	Microchip	Microchip					x
Hajduczenia	Marek	Charter	Charter					x
He	Xiang	Huawei	Huawei					x
Kadry	Haysam	Ford	Ford					x
Law	David	HPE	HPE					x
Lv	Jingfei	Huawei	Huawei					x
Maniloff	Eric	Ciena	Ciena					x
Nataraja	Sriram	Cisco	Cisco					x
Nicholl	Shawn	Xilinx	Xilinx					x
Ofelt	David	Juniper Networks	Juniper					x
Parkholm	Ulf	Ericsson	Ericsson					x
Powell	Bill	Nokia	Nokia					x
Sambasivan	Sam	AT&T	AT&T					x
Sprague	Ted	Infinera	Infinera					x
Tartaglia	Antonio	Ericsson	Ericsson					x
Thompson	Geoff	**						x
Trowbridge	Steve	Nokia	Nokia					x
Tse	Richard	Microchip	Microchip					x
Weber	Karl	Beckhoff	Beckhoff					x