IEEE 802.3cx Improved PTP Timestamping Accuracy (ITSA) Task Force Meeting Minutes

October 20, 2020, Virtual Ad Hoc Meeting

- Minutes prepare by Steve Gorshe

Agenda and General Information Presentation by Steve Gorshe, ITSA Task Force Chair

- Steve Gorshe, meeting and task force chair, begins presenting the Agenda and General Information slides
- Chair asks all attendees to email him their name and affiliation for the meeting minutes attendees log.
- **Agenda** – Chair presents the agenda for the meeting and asked if anyone had comments, additions or objections for the meeting agenda. The agenda was approved without opposition.
- **Task Force Decorum** - Chair reviewed slide and noted that there should be no recording or photography without permission.
- **Goals for Meeting** – Chair presented the goals with no comment from attendees
- **Reflector and Web** – Chair presented the Task Force reflector and web information. All in attendance were invited to subscribe for Task Force communications and updates.
- **Task Force Private Area** – Chair reminded members of the Task Force Private Area, presented the URL to that private area and presented both the Username and Password to gain access to the URL. Chair also noted that the general IEEE 802.3 Username and Password can be used to access the URL.
- **Ground Rules** – Chair review the meeting ground rules based on IEEE 802.3 Rules.
- **IEEE 's Patent Policy** – Chair presented the IEEE patent policy summary slide and noted that the additional policy and report information could be found in the Additional Information slides at the end of agenda.
  - The chair provided an opportunity for participants to identify patent claim(s)/patent application claim(s) and/or the holder of patent claim(s)/patent application claim(s) of which the participant is personally aware and that may be essential for the use of this standard.
    - No such claims were bought to the chair's attention.
- Chair noted that general information on the following topics could also be found in the Additional Information slides at the end of the agenda, and would not be presented at this ad hoc meeting.
  - **IEEE Structure and Important Bylaws & Rules** –
  - **IEEE 's Patent Policy and IEEE WG Meeting Guidelines (Slides 12-16 or IEEE SA Slides 0-4)** –
  - **Participation in IEEE 802 Meetings** –
  - **Overview of IEEE802.3 Standard Process (5 slides)** –
  - **Task Force Approved Project Documents** – Note that Task Force project documents remain unchanged and links to the documents were provided.
  - **Task Force Objectives** –
  - **Task Force Timelines** –

- **Presentations** – In addition to this presentation (Agenda and General Information), 4 other presentations are on the agenda to be reviewed. Chair introduced the presentations for the day and started the presentation agenda item.

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Presentation #1 – Impact of MLD Path Delay Proposals on Timestamps, Denny Wong, Xilinx

- https://www.ieee802.org/3/cx/public/oct20/wong_3cx_01_1020.pdf
- Contribution showed how "Approach 1," which treats all PCS lanes the same under the assumption that any delay variance incurred at the transmitter is exactly compensated by the mirror operation at the receiver (a.k.a. Method 2 and Option C) could result in a finer timestamp granularity of one PCS block time than "Approach 2," (a.k.a. Method 1 and Option B) which takes into account the delay associated with the actual PCS lane carrying the message timestamp point and has a timestamp granularity of number of lanes × PCS block time.
- Note that during discussion and subsequent contributions, it was shown that Approach 1 and Approach 2 both have an intrinsic timestamp granularity limit of one bit time.
- It was noted during the discussion, with reference to he_3cx_01_1020.pdf, that the coarser timestamp granularity of Approach 2 does not cause any redundancy because only one PTP message timestamp point can appear on the multi-lane MDI at one time.
- It was also noted that even larger granularities can be acceptable as long as the timestamp granularity does not make any information redundant (e.g. redundancy occurs if the same timestamp is used for two PTP messages of the same type for the same PTP connection).

Presentation #2 – More Discussion on Multi-PCS Lane Distribution Path Delay Variance, Richard Tse, Microchip Technologies

- https://www.ieee802.org/3/cx/public/oct20/tse_3cx_01_1020.pdf
- Contribution follows up on a statement made at the September 802.3cx meeting about the approach (Method 1 with Option B) recommended by he_3cx_01_0920.pdf for handling the variable delay of the multi-PCS lane function being inconsistent with the approach that 802.3 has already specified for handling FEC delays. This contribution goes through each FEC function and analyzes the behavior of its delay.
- The contribution reviewed why the 64B/66B – 256B/257B block transcoding and FEC symbol distributions functions result in net constant delays between the transmitter and receiver MII due to the impact on timestamp delay variability introduced at the source being compensated by the mirror operation at the receiver.
- The FEC symbol distribution function is very similar to the multi-PCS lane block distribution function. The approach that 802.3 uses to handle the FEC symbol distribution delay is the same as that of "Method 2 with Option C" and, thus, is not consistent with that of "Method 1 with Option B", which was recommended by he_3cx_01_0920.pdf.
- Because of the above observations, the author recommends using an approach that is consistent with the one for FEC, i.e., the "Method 2 with Option C" approach. It was noted that it would be possible to describe this approach with edits to the clause 90.7 paragraph that addresses FEC delay.
- Contribution also noted that it would be possible to define a new register bit that could be used to identify whether a PHY implementation meets the P802.3cx requirements. This would be one way to

ensure that PHYs not conformant to P802.3cx are not regarded as non-compliant to IEEE 802.3. More discussion on this point is required and contributions are expected for the next 802.3cx meeting.

Presentation #3 – Timestamping Granularity for Multi-PCS Lane Interface, Xiang He, Huawei

- https://www.ieee802.org/3/cx/public/oct20/he_3cx_01_1020.pdf
- Contribution recommended interpreting timestamp granularity as the quantization steps between different PTP messages rather than between different PCS lanes.
- Contribution analyzes the granularity impacts associated with the approaches referred to in previous Tse contributions as "Option B + Method 1," Option A + Method 1," and "Option C + Method 2." The summary showed that since Option B + Method 1 compensates for the actual PCS lane latency, it could provide finer TS granularity.
- During discussion it was noted that while this is true at specific points along the path, there should be no practical difference in the granularity over the entire MII to MII path.
- During discussion it was also noted that IEEE 802.3 is an interface specification and not an implementation specification. In other words, it specifies the behavior that must be met by any implementation. Option B + Method 1 may be more difficult to specify in that context.
- During the discussion, it was also noted that "Option B + Method 1" requires the tracking of the message timestamp point through the variable delay of the PCS. Because of this, high accuracy cannot be achieved using the 802.3 TimeSync PCS transmit/receive path data delay registers, which can only record the static minimum and the maximum PCS delay values.

Presentation #4 – Timestamping with Transmitter Skew Follow-up, Andras Dekoos, Microchip Technologies

- https://www.ieee802.org/3/cx/public/oct20/dekoos_3cx_01_1020.pdf
- This contribution was a follow-up to dekoos_3cx_01_0920 at the last meeting. There was general support at that meeting to the proposed goal of minimizing transmitter lane skew. Since transmitter skew is typically uncorrelated with the media skew, it is not handled by the current clause 90.7 specifications.
- It was also noted that the Tx skew variance that is allowed by 802.3 is very small, 0.2ns for 100GE.
- While the goal should be stated as no transmitter skew, the contribution discussed addressing any skew that is actually present. It recommends that the mid-point of the Tx skew be used because this centers the time error resulting from the Tx skew.
- This contribution provided potential proposed P802.3cx text and clause 90.7 updates.

FUTURE MEETINGS

- Chair noted that the next meeting will be a virtual meeting on November 17, during the second week of the IEEE 802.3 virtual meeting.

Adjourn

- TF Chair announced the adjournment of the meeting. Since the agenda had been completed and the stated end time had been reached, per Robert's Rules, no formal adjournment motion was required for the ad hoc meeting.

Attendance

IEEE 802.3cx Improving PTP Timestamping Accuracy TF **IEEE 802.3cx Virtual Ad Hoc October 2020**				Day 1 Oct. 20				
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	Tues.				
Bordogna	Mark	Intel	Intel	x				
Carty	Clark	Cisco	Cisco	x				
de Koos	Andras	Microchip	Microchip	x				
Gorshe	Steve	Microchip	Microchip	x				
Gustlin	Mark	Cisco	Cisco	x				
Hajduczenia	Marek	Charter	Charter	x				
Han	Ruibo	China Mobile	China Mobile	x				
He	Xiang	Huawei	Huawei	x				
Kabra	Lokesh	Synopsys	Synopsys	x				
Law	David	HPE	HPE	x				
Lv	Jingfei	Huawei	Huawei	x				
McKeown	Shane	Calnex	Calnex	x				
Nicholl	Shawn	Xilinx	Xilinx	x				
Ofelt	David	Juniper Networks	Juniper	x				
Parkholm	Ulf	Ericsson	Ericsson	x				
Powell	Bill	Nokia	Nokia	x				
Rodrigues	Silvana	Huawei	Huawei	x				
Sambasivan	Sam	AT&T	AT&T	x				
Tse	Richard	Microchip	Microchip	x				
Wong	Denny	Xilinx	Xilinx	x				