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| <p style="text-align: center;">Meeting of the IEC/IEEE 60802 Joint Project 2019-05-24</p> |
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INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)

TC65: Industrial-process measurement, control and automation

SC65C: Industrial communication networks

PT 60802: Time sensitive networking profile for industrial automation

Institute of Electrical and Electronics Engineers, Inc. (IEEE)

IEEE 802: LAN/MAN Standards Committee

IEEE 802.1: Higher Layer LAN Protocols Working Group

IEEE 802.1 TSN: Time-Sensitive Networking Task Group

Meeting: IEC/IEEE 60802 Joint Project
Meeting was based on the meeting announcement; see IEC collaboration tool <http://collaboration.iec.ch/> and <http://www.ieee802.org/1>

Date: 2019-05-22 — 2019-05-24

Location: Salt Lake City, Utah, USA

IEC WG9/PT 60802 Convenor and IEC/IEEE 60802 Joint Project chair: Ludwig Winkel

Daily minutes by: Josef Dorr

Minutes compiled by: Ludwig Winkel and Jessy Rouyer

Published minutes: Collaboration tool <http://collaboration.iec.ch/>, and IEEE 802.1 web site <http://www.ieee802.org/1/files/public/60802>

Ludwig Winkel, IEC WG9/PT60802 Convenor and IEC/IEEE 60802 Joint Project Chair (60802 Chair), and János Farkas, IEEE 802.1 TSN Task Group Chair (TG Chair), presided. Josef Dorr, IEC/IEEE 60802 Joint Project Secretary (60802 Secretary) wrote the minutes.

At the beginning of the meetings on each day:

- The IEEE-SA PatCom Patent Slides for Standards Development Meetings and the IEEE 802 Participation slide were presented (<http://standards.ieee.org/about/sasb/patcom/materials.html>).
- The Call for Potentially Essential Patents was made. There were no responses to the calls prior to the end of the week's session.
- The IEC WG9/PT60802 Convenor reminded the IEC participants that patent rules similar to those of IEEE-SA apply in IEC, reminded all that patents required for use of the IEC/IEEE 60802 profile must be announced to IEC and IEEE and made available

using the IEC licensing form, and reminded that presentations shall not have copyright marks or confidentiality information.

- The agenda and the expected results of the day were reviewed and approved. The final agenda is in <http://www.ieee802.org/1/files/public/docs2019/admin-60802-agenda-0519-v01.pdf> and also available at <https://1.ieee802.org/may-2019-interim-meeting-in-salt-lake-city-ut-tsn-tg-agenda/>.

Draft minutes were reviewed at the end of the week's session under the lead of the 60802 Secretary.

Attendance:

| IEC/IEEE 60802 Joint Project (Friday, 24-May-2019, 13:30 - 18:00) | | | | | | | | | |
|---|--------------|--|---|---|---|---|---|---|---|
| Time-Sensitive Networking TG + IEC/IEEE 60802 Joint Project (Friday, 24-May-2019, 08:00 - 12:30) | | | | | | | | | |
| IEC/IEEE 60802 Joint Project (Thursday, 23-May-2019, 13:30 - 18:00) | | | | | | | | | |
| IEC/IEEE 60802 Joint Project (Thursday, 23-May-2019, 08:00 - 12:30) | | | | | | | | | |
| IEC/IEEE 60802 Joint Project (Wednesday, 22-May-2019, 13:30 - 18:00) | | | | | | | | | |
| Time-Sensitive Networking TG + IEC/IEEE 60802 Joint Project (Wednesday, 22-May-2019, 10:30 - 12:30) | | | | | | | | | |
| Time-Sensitive Networking TG + IEC/IEEE 60802 Joint Project (Wednesday, 22-May-2019, 08:00 - 10:00) | | | | | | | | | |
| Last name | First name | Affiliation | | | | | | | |
| ADEMAJ | Astrit | TTTech Computertechnik AG | • | • | • | • | • | • | • |
| Assmann | Ralf | Marvell Semiconductor, Inc. | • | • | | | | | • |
| Bierschenk | Jens | Robert Bosch GmbH | • | • | | | | | • |
| Boiger | Christian | b-plus GmbH | • | • | | | | | • |
| Bottorff | Paul | Hewlett-Packard Development Company, L.P. | • | • | | | | | • |
| Canchi | Radhakrishna | Kyocera International Inc. | • | • | • | • | • | • | • |
| Chalupsky | David | Intel Corporation | | • | | | | | |
| Chen | David | Nokia | • | • | | | | | |
| Chen | Feng | Siemens AG | • | | | | | | • |
| Cheng | Weiyang | Infinera Corporation | • | • | | | | | |
| Congdon | Paul | Tallac Networks; Huawei | | | | | | | • |
| Cummings | Rodney | National Instruments Corporation | | • | | | | | • |
| Dorr | Josef | Siemens AG | • | • | • | • | • | • | • |
| Enzinger | Thomas | B&R Industrial Automation | • | • | • | • | • | • | • |
| Farkas | Janos | Ericsson | • | • | | | | | • |
| Fincher | Scott | Extreme Networks | • | • | | | | | • |
| Finn | Norman | Huawei Technologies Co. Ltd | • | • | | | | | • |
| Garner | Geoffrey | Huawei Technologies Co. Ltd | • | • | • | | | | • |
| Gravel | Mark | Hewlett Packard Enterprise | • | • | | | | | • |
| Gunther | Craig | Robert Bosch GmbH | • | • | | | | | • |
| Gutierrez | Marina | TTTech Computertechnik AG | • | • | | | | | |
| Haddock | Stephen | Stephen Haddock Consulting, LLC | • | • | | | | | • |
| Hantel | Mark | Rockwell Automation | • | • | • | • | • | • | • |
| Hotta | Yoshifumi | Mitsubishi Electric Corporation | • | • | • | • | • | • | • |
| Kehrer | Stephan | Hirschmann Automation and Control, Inc. | | • | • | • | • | • | • |
| Kojima | Fumihide | National Institute of Information and Communications Technology (NICT) | • | • | | | | | |
| KOTO | Hajime | National Institute of Information and Communications Technology (NICT) | • | • | • | • | • | • | • |
| Lawlis | James | Ford Motor Company | • | • | | | | | |
| Mangin | Christophe | Mitsubishi Electric Corporation | • | • | • | • | • | • | • |
| Marks | Roger | EthAirNet Associates; Huawei | • | | | | | | |
| Maruhashi | Kenichi | NEC Corporation | • | • | | | | | |
| McMillan | Larry | Western Digital Corporation | | • | • | | | | • |
| Messenger | John | ADVA Optical Networking Ltd. | | • | | | | | • |
| Mustala | Tero | Nokia Networks | | • | • | | | | |
| Neet | Kyle | Rockwell Automation | • | • | • | • | | | • |

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| Time-Sensitive Networking TG + IEC/IEEE 60802 Joint Project (Wednesday, 22-May-2019, 08:00 - 10:00) | | | | | | | | | |
| Last name | First name | Affiliation | | | | | | | |
| NOMIZU | TAKUMA | Hitachi, Ltd. | • | • | • | • | • | • | • |
| Noseworthy | Bob | University of New Hampshire InterOperability Laboratory (UNH-IOL) | | | • | • | • | • | • |
| Osagawa | Daisuke | Mitsubishi Electric Corporation | • | • | • | • | • | • | • |
| Pannell | Donald | NXP Semiconductors | • | • | | • | • | • | |
| Potts | Michael | General Motors Company | | • | | | | • | |
| Rouyer | Jessy | Nokia | • | • | | | | • | • |
| Sato | Atsushi | Yokogawa Electric Corporation | • | • | • | • | • | • | • |
| Seewald | Maik | Cisco Systems, Inc. | • | • | • | • | • | • | • |
| Sivakolundu | Ramesh | Cisco Systems, Inc. | • | • | | | | | |
| Specht | Johannes | University of Duisburg-Essen and General Motors Company | | • | | | | • | |
| Steindl | Guenter | Siemens AG | • | • | • | • | • | • | • |
| Takita | Daisuke | Mitsubishi Electric Corporation | • | • | • | • | • | • | • |
| Tarui | Isao | Mitsubishi Electric Corporation | • | • | • | • | • | • | • |
| Wang | Tongtong | Huawei Technologies Co. Ltd | • | | | | | • | |
| Winkel | Ludwig | Siemens AG | • | • | | • | • | • | • |
| Wood | Graeme | British Standards Institution (BSI), Rockwell Corp | • | • | • | • | • | • | • |
| Woods | Jordon | Analog Devices Inc. | • | • | • | • | • | • | • |
| Zein | Nader | NEC Europe (NLE) | • | • | | | | • | |
| Zinner | Helge | Continental Automotive Systems AG | • | • | | | | • | |
| Zweck | Harald | Infineon Technologies AG | • | • | | | | | |

Wednesday 22 May 2019

8:00 AM call to order by the TG Chair and the 60802 Chair

The TSN TG and IEC/IEEE 60802 Joint Project had a joint meeting.

The TG Chair and the 60802 Chair:

- Welcomed the participants of the IEC/IEEE 60802 Joint Project, a joint effort of the:
 - IEC 65C WG9/PT 60802 (TSN) Project Team, led by Ludwig Winkel; and
 - IEEE 802.1 Time-Sensitive Networking Task Group, led by the TG Chair.
- Provided information about internet access, lunch, attendance log to the IEC/IEEE 60802 Joint Project.

The 60802 Chair reported on the Conformity Assessment (CA) activities. There was a face-to-face meeting in Frankfurt and a follow-up conference call. The IEC/IEEE CA activity will be continued with a face-to-face meeting in Vienna, Austria following the July 22-24 plenary meeting.

Jordon Woods, 60802 editor, presented *Editor's Report 60802 Draft 1.0*
<http://www.ieee802.org/1/files/public/docs2019/60802-woods-D10-update-0519-v00.pdf>.

Jordon Woods, 60802 editor, started resolving comments received in the TG ballot and 1st IEC Committee Draft (CD) on <http://www.ieee802.org/1/files/private/60802-drafts/d1/60802-d1-0.pdf>.

Disposition: Ballot comments 86, 88, 89, 130, 165, 190-193, 288, 293-297, 299, 301, 302, 499, 500, 523, 524, 537 and 647 resolved as documented in <http://www.ieee802.org/1/files/private/60802-drafts/d1/60802-d1-0-pdis-v08.pdf>.

10:00 – 10:30 AM recess

Mark Hantel presented *TSN Interdomain Communications* <http://www.ieee802.org/1/files/public/docs2018/60802-Hantel-TSN-Interdomain-Communications-0718.pdf> then *TSN-IA Domains & Constructability* <http://www.ieee802.org/1/files/public/docs2019/60802-Hantel-TSN-IA-Domains-Constructability-0519-v01.pdf> and led a discussion on the definition of a “TSN Domain”.
Disposition: A common definition applicable to all TSN profiles was considered reasonable.

12:00 recess

1:40 PM call to order by the 60802 Chair

The IEC/IEEE 60802 Joint Project met separately from the TSN TG until Friday.

Stephan Kehrer and Günter Steindl led a discussion on interoperability issues and how to deal with quantity statements in the 60802 profile. Günter Steindl presented *Quantity Figures* <http://www.ieee802.org/1/files/public/docs2019/60802-Steindl-QuantityFigures-0519-v01.pdf> which were extracted from *Use Cases IEC/IEEE 60802 V1.3* <http://www.ieee802.org/1/files/public/docs2018/60802-industrial-use-cases-0918-v13.pdf>.

Disposition: Further discussion needed.

3:00 – 3:30 PM recess

Jordon Woods, 60802 editor, continued resolving comments received in the TG ballot and 1st IEC CD on <http://www.ieee802.org/1/files/private/60802-drafts/d1/60802-d1-0.pdf>.

Disposition: Ballot comments 289, 291, 495, 87, 504, 312-314, 95, 253, 50, 92-94, 525, 315 and 318 resolved as documented in <http://www.ieee802.org/1/files/private/60802-drafts/d1/60802-d1-0-pdis-v08.pdf>.

6:00 PM recess

Thursday 14 March 2019

8:00 AM call to order by the TG Chair and the 60802 Chair, 10:00 – 10:30 AM recess

Jordon Woods, 60802 editor, continued resolving comments received in the TG ballot and 1st IEC CD on <http://www.ieee802.org/1/files/private/60802-drafts/d1/60802-d1-0.pdf>.

Disposition: Ballot comments 529, 600, 99, 72, 246, 411, 412, 413, 159, 414, 611, 415, 416, 35, 417-421, 461, 247, 73, 462, 463, 601, 507, 19, 402, 245, 403 and 98 resolved as documented in <http://www.ieee802.org/1/files/private/60802-drafts/d1/60802-d1-0-pdis-v08.pdf>.

A contribution is expected to be provided covering the subject of Quantity Parameters and Values; volunteers to provide the contribution include Mark Hantel, Günter Steindl, Stephan Kehrer, Thomas Enzinger, Astrit Ademaj, Maik Seewald and Josef Dorr.

12:00 PM recess

1:30 PM call to order by the 60802 Chair with 15:00 – 15:30 PM recess

Jordon Woods, 60802 editor, continued resolving comments received in the TG ballot and 1st IEC CD on <http://www.ieee802.org/1/files/private/60802-drafts/d1/60802-d1-0.pdf>.

Disposition: Ballot comments 4, 408, 407, 402, 405, 134, 528, 251, 252, 34, 319, 250, 316, 317, 505, 320, 51, 3, 7, 8, 609, 315, 189, 292, 522, 188, 48, 304, 500, 306, 501, 131, 307, 502, 309, 310, 321, 6, 194, 195, 530, 248, 166, 468, 595, 36, 56, 469, 100, 614, 615, 20, 466, 465, 464, 226, 136, 27, 571, 148, 344, 422, 423, 622, 431, 438, 431, 443 and 457 resolved as documented in <http://www.ieee802.org/1/files/private/60802-drafts/d1/60802-d1-0-pdis-v08.pdf>.

6:00 PM recess

Friday 15 March 2019

8:00 AM call to order by the TG Chair and the 60802 Chair, 10:05 – 10:35 AM recess

The TSN TG and IEC/IEEE 60802 Joint Project had a joint meeting.

The TG Chair and the 60802 Chair summarized the work performed so far in this session.

Stephan Kehrer presented *TSN Configuration Enhancements PAR and CSD Discussion Material* <http://www.ieee802.org/1/files/public/docs2019/new-kehrer-config-enhance-PAR-CSD-discussion-v01.pdf> and led the review of the draft PAR <http://www.ieee802.org/1/files/public/docs2019/dj-draft-PAR-0519-v01.pdf> and CSD <http://www.ieee802.org/1/files/public/docs2019/dj-draft-CSD-0519-v01.pdf> for a proposed *Standard for Local and Metropolitan Area Networks--Bridges and Bridged Networks Amendment: Configuration Enhancements*.

Disposition: New PAR and CSD targeted for pre-circulation for consideration for approval at the July 2019 IEEE 802.1 plenary session.

11:45 PM recess

1:15 PM call to order by the 60802 Chair

The IEC/IEEE 60802 Joint Project met separately from the TSN TG until adjournment.

Josef Dorr presented *Distributed Stream Configuration in Industrial Automation* <http://www.ieee802.org/1/files/public/docs2019/60802-dorr-distributedConfiguration-0319-v01.pdf>.

Disposition: Further discussion needed.

Jordon Woods, 60802 editor, continued resolving comments received in the TG ballot and 1st IEC CD on <http://www.ieee802.org/1/files/private/60802-drafts/d1/60802-d1-0.pdf>.

Disposition:

- Ballot comments 430, 376, 606, 393, 185, 45, 69, 242, 626, 636, 627, 128, 277, 628, 187, 521, 85, 423, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 644, 646, 645, 90, 91, 196, 132, 197, 198, 527, 96, 17, 9, 10, 642, 200, 401, 97, 18, 225, 467, 227, 167, 508, 531, 616, 249, 610, 536, 75, 168, 74, 617, 176 and 184 resolved as documented in <http://www.ieee802.org/1/files/private/60802-drafts/d1/60802-d1-0-pdis-v08.pdf>.
- Final disposition (updated with ballot statistics including comments received from IEC) made available post-meeting and to be circulated to IEC National Committees: <http://www.ieee802.org/1/files/private/60802-drafts/d1/60802-d1-0-dis-v01.pdf>

Next steps

Further contributions are welcome to be made and presented by their contributors at the July 2019 plenary session in Vienna, Austria for potential incorporation into the next balloted draft. The next TG ballot and 2nd IEC CD circulation on draft 1.1 of IEC/IEEE 60802 are expected after the July 2019 IEEE 802.1 plenary session.

3:00 - 3:30 PM recess

Future meetings/teleconferences

The IEC/IEEE 60802 Joint Project meets next July 17-19 during the July 2019 IEEE 802.1 plenary session in Vienna, Austria: if the dates need to be changed due to

meeting room unavailability, the change would be announced to the IEC/IEEE 60802 Joint Project.

The next teleconference will take place on June 24, 2019.

Any Other Business

No other IEC/IEEE 60802 Joint Project business was discussed in this session.

4:50 PM adjournment

Annex A Final Agenda

**Meeting Agenda of IEC 65C/WG9.PT 60802 and the
IEC/IEEE 60802 Joint Project of IEEE 802.1
held in Salt Lake City (UT), at 2019-05-22... -24**

| | | |
|------|-------|---|
| Rev | rev03 | Ludwig Winkel (Convenor IEC SC65C/WG9 and chair IEC/IEEE 60802 Joint Project); János Farkas (TG chair of IEEE 802.1 TSN) |
| Key: | | means: Common session of "IEC/IEEE 60802 Joint Project" & "TG TSN" |

| Wed | 22-05-19 | [h:min] | [min] | Topics | Responsible |
|------|---------------|---------------|-------|---|-----------------|
| Room | 8:00 - 8:10 | | 10 | Welcome and organizational issues (IEEE intro, IEC intro) | Ludwig, János |
| | 8:10 - 8:15 | | 5 | Membership, attendees registration (IEEE imat), roster; administrivia | János, Ludwig |
| | 8:15 - 8:20 | | 5 | Agenda | Ludwig, János |
| | 8:20 - 8:20 | | | | |
| | 8:20 - 8:25 | | 5 | Status of Conformity Assessment (CA) activity | Ludwig, Mark |
| | 8:25 - 8:30 | | 5 | Next meetings (Friday of Vienna meeting) | Ludwig, János |
| | 8:30 - 9:00 | | 30 | Editor's report on Comment resolution process | Jordon |
| | 9:00 - 10:00 | | 60 | Draft 1.0 TG ballot comment resolution | Jordon |
| | 10:00 - 10:35 | | 35 | Break | |
| | 10:35 - 10:35 | | | | |
| | 10:35 - 11:40 | | 65 | Draft 1.0 TG ballot comment resolution | Jordon |
| | 11:40 - 12:00 | | 20 | TSN Domain | Mark |
| | | 12:00 - 13:40 | | 100 | Lunch |
| | 13:40 - 15:00 | | 80 | Quantities discussion | Stephan, Günter |
| | 15:00 - 15:00 | | | | |
| | 15:00 - 15:30 | | 30 | Break | |
| | 15:30 - 15:30 | | | | |
| | 15:30 - 17:50 | | 140 | Draft 1.0 TG ballot comment resolution | Jordon |
| | 17:50 - 17:50 | | | | |
| | 17:50 - 17:50 | | | | |
| | 17:50 - 18:00 | | 10 | Review of minutes of the day | Josef |
| | 18:00 | | | Recess of 60802 JP meeting | |

| Thu | 23-05-19 | [h:min] | [min] | Topics | Responsible |
|------------|----------------------|---------|-------|---|--------------------|
| | 8:00 - 8:10 | | 10 | IEEE Intro, Review Agenda; expected results of the day | Ludwig |
| | 8:10 - 10:00 | | 110 | Draft 1.0 TG ballot comment resolution | Jordon |
| Room | 10:00 - 10:00 | | | | |
| | 10:00 - 10:30 | | 30 | Break | |
| | 10:30 - 10:30 | | | | |
| | 10:30 - 12:00 | | 90 | Draft 1.0 TG ballot comment resolution | Jordon |
| | 12:00 - 12:00 | | | | |
| | 12:00 - 12:00 | | | | |
| | 12:00 - 12:00 | | | | |
| | 12:00 - 13:30 | | 90 | Lunch | |
| | 13:30 - 13:30 | | | | |
| | 13:30 - 15:00 | | 90 | Draft 1.0 TG ballot comment resolution | Jordon |
| | 15:00 - 15:00 | | | | |
| | 15:00 - 15:00 | | | | |
| | 15:00 - 15:30 | | 30 | Break | |
| | 15:30 - 15:30 | | | | |
| | 15:30 - 17:50 | | 140 | Draft 1.0 TG ballot comment resolution | Jordon |
| | 17:50 - 17:50 | | 0 | Distributed Stream Configuration in Industrial Automation | Josef |
| | 17:50 - 18:00 | | 10 | Review of minutes of the day | Josef |
| | 18:00 | | | Recess of 60802 JP meeting | |

| Fri | 24-05-19 | [h:min] | [min] | Topics | Responsible |
|------------|----------------------|---------|-------|---|--------------------|
| | 8:00 - 8:05 | | 5 | Review Agenda; expected results of the day | Ludwig, János |
| Room | 8:05 - 8:15 | | 10 | Recap past days | Ludwig, János |
| | 8:15 - 8:15 | | 0 | Discussion on draft profile document Annex Z | Jordon |
| | 8:15 - 8:15 | | 0 | Liaison | Liaison partners |
| | 8:15 - 8:15 | | 0 | Any other business | Ludwig, János |
| | 8:15 - 8:15 | | | | |
| | 8:15 - 10:05 | | 110 | PAR on Engineering (SDN topic) | Stephan |
| | 10:05 - 10:35 | | 30 | Break | |
| | 10:35 - 11:45 | | 70 | PAR on Engineering (SDN topic) | Stephan |
| | 11:45 - 11:45 | | | | |
| | 11:45 - 11:45 | | | | |
| | 11:45 - 13:15 | | 90 | Lunch | |
| | 13:15 - 13:15 | | 0 | OPCUA FLC (Vision, Members, Structure, ...) | Thomas |
| | 13:15 - 14:15 | | 60 | Distributed Stream Configuration in Industrial Automation | Josef |
| | 14:15 - 15:00 | | 45 | Draft 1.0 TG ballot comment resolution | Jordon |
| | 15:00 - 15:30 | | 30 | Break | |
| | 15:30 - 16:30 | | 60 | Draft 1.0 TG ballot comment resolution | Jordon |
| | 16:30 - 16:30 | | | | |
| | 16:30 - 16:30 | | | | |
| | 16:30 - 16:50 | | 20 | Review of the minutes | Josef |
| | 16:50 | | | Adjournment of IEC/IEEE 60802 JP meeting | |

| <u>1st Names in the Agenda</u> | <u>Name</u> | <u>Affiliation</u> | <u>Position in the joint project</u> |
|---------------------------------------|--------------------|---------------------------|---|
| Ludwig | Winkel | Siemens AG | Convenor IEC SC65C/MT9 and chair IEC/IEEE 60802 Joint Project |
| János | Farkas | Ericsson | Chair IEEE 802.1 TG TSN |
| Jordon | Woods | Analog Device | Editor, IEEE 802.1 voter |
| Josef | Dorr | Siemens AG | Secretary |
| Mark | Hantel | Rockwell Auto | Web master, IEC/AVNU ALLIANCE Liaison officer, IEEE 802.1 voter |
| Astrit | Ademaj | TTTech | IEEE 802.1 individual |
| Günter | Steindl | Siemens AG | IEC expert, IEC/PI Liaison officer |
| Yoshifu | Hotta | Mitsubishi Ele | IEC expert, IEC/CC-Link Liaison officer |
| Stephar | Kehrer | Hirschmann | IEC expert, |
| Thomas | Enzinger | B&R Industria | IEC expert, |