IEEE 802.1 Working Group
January 20-24, 2020 Interim Session
Geneva, Switzerland
Session Minutes

The Working Group (WG) Chair, Glenn Parsons, presided.
The 802.1 Recording Secretary, Jessy Rouyer, wrote the minutes in part based on input from sub group Chairs and their Secretaries.

1 Attendance and affiliation

Column legend (left to right):

1. Time-Sensitive Networking TG (Monday, 20-Jan-2020, 09:00 - 12:30)
2. Security TG (Monday, 20-Jan-2020, 09:00 - 12:30)
3. Time-Sensitive Networking TG (Monday, 20-Jan-2020, 13:30 - 18:00)
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ADEMAJ	Astrit	TTTech Computertechnik AG				•	•		•		•			•		•			•			•			•		•	•	•	
Andersdotter	Amelia	Article 19																								•				
Assmann	Ralf	Marvell Semiconductor, Inc.	•		•			•	•		•		•	•			•		•			•			•	•				•
BEAL	Julien	Robert Bosch GmbH						•			•						•													
Bernasconi	Eric	Robert Bosch GmbH						•			•						•													
Bierschenk	Jens	Robert Bosch GmbH	•		•			•		•			•		•			•				•		•	•	•				•
Boiger	Christian	b-plus GmbH	•		•		•	•		•			•		•			•				•		•	•	•				•
Canchi	Radhakrishna	Kyocera International Inc	•		•	•		•		•			•		•		•					•			•		•			
Chen	Feng	Siemens AG	•		•			•		•			•		•		•		•			•		•	•					•
Congdon	Paul	Tallac Networks; Huawei	•		•			•	•		•		•				•										•		•	•
Cummings	Rodney	National Instruments Corporation	•		•			•	•		•		•		•							•				•			•	
DeLaOlivaDelgado	Antonio	Universidad Carlos III Madrid																							•					
Dorr	Josef	Siemens AG	•		•			•	•		•		•		•		•				•	•		•	•				•	
Ehlers	Kristian	Microchip Technology, Inc.					•		•		•		•		•			•			•	•		•	•	•				
Enzinger	Thomas	B&R Industrial Automation GmbH								•			•		•		•			•		•		•	•	•				
Farkas	Janos	Ericsson	•		•				•		•						•			•										
Fedyk	Donald	LabN Consulting, L.L.C.		•		•		•			•	•		•							•			•	•	•				•
Fincher	Scott	Extreme Networks	•		•				•					•			•		•			•		•	•					•

Column legend (meeting sessions, in column order left → right):

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Finn	Norman	Huawei Technologies Co. Ltd	●		●			●	●		●			●			●	●		●						●	●			
Garner	Geoffrey	Huawei Technologies Co. Ltd	●		●			●	●		●			●		●			●			●			●		●			
GHARBA	Ahmed	Huawei Technologies Duesseldorf GmbH																			●				●	●	●			●
Gunther	Craig	Robert Bosch GmbH	●		●			●	●		●			●		●			●			●			●		●			●
Gutierrez	Marina	TTTech Computertechnik AG	●																											
Haasz	Jodi	IEEE Standards Association (IEEE-SA)			●					●				●						●										
Han	Ruibo	China Mobile Communications Corporation (CMCC)	●		●			●	●		●			●				●			●			●		●		●		●
Hantel	Mark	Rockwell Automation	●		●				●		●			●		●			●			●			●		●	●	●	
Holness	Marc	Ciena Corporation			●				●		●	●		●		●	●		●			●			●		●			
Horrmeyer	Bernd	Phoenix Contact																				●								
Hotta	Yoshifumi	Mitsubishi Electric Corporation	●		●				●		●			●		●			●			●			●		●	●	●	
Huszak	Gergely	Kone												●			●		●											
Janker	Georg	BMW Group, RUETZ System Solutions GmbH																			●				●					
Katsalis	Kostas	Huawei Technologies Duesseldorf GmbH	●		●		●			●				●		●			●			●			●		●		●	●
Kehrer	Stephan	Hirschmann Automation and Control, Inc.	●		●			●	●	●	●			●		●			●			●			●		●	●	●	
Kelsey	Randy	Engineering Solutions, 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	●		●				●		●		●	●		●		●	●						●					
Mansfield	Scott	Telefon AB LM Ericsson							●		●				●		●		●											●
Marks	Roger	EthAirNet Associates	●				●	●													●									●
Maruhashi	Kenichi	NEC Corporation	●		●		●	●		●				●			●				●									●
McMillan	Larry	Western Digital Corporation			●		●			●				●		●	●		●			●			●	●	●			
Nakano	Hiroki	CAHI Corporation	●		●		●		●		●		●	●			●			●				●						
Natarajan	Sriram	Cisco Systems, Inc.											●			●						●		●						
Osagawa	Daisuke	Mitsubishi Electric Corporation			●				●		●			●		●			●			●			●	●	●	●		
Ostertag	Martin	Zurich University of Applied Sciences												●		●	●		●			●			●	●	●			

IEEE 802.1 January 20-24, 2020 Interim Session in Geneva, Switzerland

Session columns (top to bottom, corresponding to the attendance columns right-to-left):

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Last Name	First Name	Affiliation
Parsons	Glenn	Ericsson AB
Petre	Razvan	Spirent Communications
Potts	Michael	Molex Incorporated
Proell	Dieter	Siemens AG
QIU	WEI	Huawei Technologies Co., Ltd
Rhee	Jong Myung	University of Myongji
Rouyer	Jessy	Nokia
Sato	Atsushi	Yokogawa Electric Corporation
Seaman	Michael	Individual
Seewald	Maik	Cisco Systems, Inc.
Sivakolundu	Ramesh	Cisco Systems, Inc.
Specht	Johannes	University of Duisburg-Essen and General Motors Company
Staengler	Ferenc	KONE
Stanica	Marius	ABB AB
Steindl	Guenter	Siemens AG
Takita	Daisuke	Mitsubishi Electric Corporation
Tarui	Isao	Mitsubishi Electric Corporation
Tatolov	Ievgen	Robert Bosch Car Multimedia GmbH
traore	karim	Microchip/Microsemi Corporation
Turner	Max	Ethernovia
Varga	Balazs	Ericsson AB
Wang	Tongtong	Huawei Technologies Co. Ltd
Weber	Karl	Beckhoff Automation
Winkel	Ludwig	PNO e.V.
Woods	Jordon	Analog Devices Inc.
Yachera	Timothy	US Department of Defense
YU	XIANG	Huawei Technologies Co., Ltd
Zein	Nader	NEC Europe (NLE)

2   802.1 Officers and Management

Glenn Parsons	Working Group Chair
John Messenger	Working Group Vice-Chair
Jessy Rouyer	Working Group Secretary
Paul Congdon	Maintenance Task Group Chair
Mick Seaman	Security Task Group Chair
Karen Randall	Security Task Group Vice-Chair
János Farkas	Time-Sensitive Networking Task Group Chair
Craig Gunther	Time-Sensitive Networking Task Group Vice-Chair
Marina Gutiérrez	Time-Sensitive Networking Task Group Secretary
Ludwig Winkel	IEC/IEEE 60802 Joint Project Chair
Josef Dorr	IEC/IEEE 60802 Joint Project Secretary
Roger Marks	Nendica Chair
Scott Mansfield	YANGsters Chair
Stephan Kehrer	YANGsters Vice-Chair and Secretary
Mark Hantel	Email Maintenance and IEC/IEEE 60802 Joint Project Website Maintenance
Paul Unbehagen	Website Maintenance
Hal Keen	Email Maintenance

3   Maintenance Task Group

Minutes of TG conference calls are available at https://1.ieee802.org/maintenance/.

Tuesday 21 January 2020

8:02 AM call to order by the TG Chair

The Maintenance Task Group Chair, Paul Congdon, presided and wrote the minutes.

At the beginning of the meeting the TG Chair presented the IEEE-SA Copyright Policy https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/copyright-policy-WG-meetings.potx, and the IEEE-SA PatCom Patent Slides for Standards Development Meetings https://development.standards.ieee.org/myproject/Public/mytools/mob/slideset.pdf, the IEEE 802 Participation slide https://mentor.ieee.org/802-ec/dcn/17/ec-17-0093-05-0PNP-ieee-802-participation-slide-ppt.ppt, and made the Call for Potentially Essential Patents. There were no responses to the call prior to the end of the meeting.

The TG Chair:
- Introduced the agenda per *Maintenance Task Group Meeting January 21, 2020 Agenda* in http://www.ieee802.org/1/files/public/docs2019/maint-congdon-session-0120-v01.pdf that was approved.
- Presented *Document Vehicles -Status Update* in http://www.ieee802.org/1/files/public/docs2019/maint-congdon-session-0120-v01.pdf.
- Led the discussion of open and new maintenance items.
  - 0230 - 802.1Qcp-2018 maintenance: Incorrect traffic-class-table-grouping
  - 0246 - IEEE Std 802.1Q-2018: Color-aware flow meters are color-blind

- o [0247](#) - 802.1Qcp-2018: Missing copyright release for YANG modules
- o [0248](#) - Managed objects for ECP in 802.1Q-2018
- o [0249](#) - Ambiguity in 802.1Qcc TSpec parameter MaxFramesPerInterval
- o [0250](#) - 802-1Q-2018 clause 8.6.5 NOTE 3
- o [0251](#) - 802.1Q-2018 Figure 8-13 missing stream_handle
- o [0252](#) - 802.1Q-2018 Clause 17 MIB

  Disposition: Details for discussion on all new items were logged in the IEEE 802.1 Maintenance database at https://www.802-1.org/home where items progressed at the meeting can be reviewed by selecting 'Meetings'.
- Created new maintenance item "[0253](#): Incorrect spelling of Bridge" received from and on behalf of Johannes Specht.
  Disposition: None.
- Led a brief discussion of SC6 JTC1 status detailed in http://www.ieee802.org/1/files/public/docs2019/maint-congdon-session-0120-v01.pdf
  Disposition: None.

Roger Marks led a discussion on proposed fixes for EPD and LPD confusion and presented *Fixing EPD and LPD in IEEE Std 802-2014* http://www.ieee802.org/1/files/public/docs2020/maint-Marks-802-epd-lpd-fix-0120.docx

- **Disposition**: Discussion on the topic was cut short due to time and the TG Chair proposed continuing the discussion on the Maintenance TG conference call scheduled March 10, 2020 at 11:00 AM EST.

Future meetings/teleconferences

The TG intends to hold teleconferences on Tuesday March 10, 2020 at 8:00 AM Pacific, unless cancelled prior to the call. The primary topic will be to discuss the EPD/LPD proposed changes.

The TG meets face-to-face next at the March 2020 IEEE 802 Plenary session.

Any Other Business

No further business was discussed in this session.

10:10 AM adjournment

Post-meeting, the TG Chair provided session slides updated based on discussion in http://www.ieee802.org/1/files/public/docs2019/maint-congdon-session-0120-v02.pdf. The TG website at http://www.ieee802.org/1/maint.html provides further details and discussion.

4 Security Task Group

The Security Task Group Chair, Mick Seaman, presided and wrote the minutes. In the temporary absence of the TG Chair, for comment resolution on other working group drafts during the Monday PM and Tuesday AM meetings, the meetings were chaired by Don Fedyk.

Minutes of TG conference calls are available at https://1.ieee802.org/security/security-task-group-minutes/.

At the beginning of the TG meeting on Monday, the TG Chair presented the IEEE-SA PatCom Patent Slides for Standards Development Meetings https://development.standards.ieee.org/myproject/Public/mytools/mob/slideset.pdf, the IEEE 802 Participation slide https://mentor.ieee.org/802-ec/dcn/17/ec-17-0093-05-0PNP-ieee-802-participation-slide-ppt.ppt, the IEEE-SA Copyright Policy slides https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/copyright-policy-WG-meetings.potx and made the "Call for Potentially Essential Patents". At the beginning of the TG meetings on Tuesday and

Wednesday, the TG chair announced that the meetings were subject to the Patent Policy as read and displayed at the opening of Monday's TG meeting. There were no responses to the calls prior to the end of the week's meetings.

Attendance is in section 1 and included the following participation:
- Amelia Andersdotter, Article 19 [Tuesday AM (part)]
- Don Fedyk, LabN Consulting, L.L.C. [Monday AM, PM, Tuesday AM, PM, Wednesday AM]
- Gergely Huszak, KONE Corporation [Wednesday AM]
- Randy Kelsey, Engineering Solutions Inc. [Monday PM, Tuesday AM, PM, Wednesday AM]
- Mick Seaman, Individual [Monday PM (part), Tuesday AM (part), PM, Wednesday AM]
- Timothy Yachera, US Department of Defense [Monday AM, PM, Tuesday AM, PM, Wednesday AM]

The draft agenda posted on the 802.1 website prior to the meeting was reviewed by the TG Chair at the start of the TG meeting on Monday morning
1. MAC Privacy protection (proposed P802.1AEdk)
2. A.O.B
3. Future meetings/teleconferences

Monday 20 January 2020

9:00 AM call to order by the TG Chair

A.O.B : P802.1AE-2018-Cor1

The TG Chair noted that the Sponsor (Standards Association) ballot of P802.1AE-2018-Cor1 (correction to Figure 9-4) had passed with 100% Approval and no comments. No further discussion would be necessary at this meeting, or the March plenary.
- **Disposition**: Permission to proceed to RevCom with P802.1AE-2018-Cor1 would be requested at the March plenary.

A.O.B : SC6 document progression

The TG Chair noted that Karen Randall had produced responses to the SC6 ballot comments on IEEE Std 802.1AR http://www.ieee802.org/1/files/public/docs2019/maint-randall-SC6CommentResponse8021ARFDIS-0120-v01.pdf. This would be discussed during the Maintenance TG meeting.
- [The Maintenance TG did not have time for discussion of the responses at this interim session.]
- **Disposition**: Discussion time to be requested in a maintenance TG telecom, or during the March plenary meeting.

MAC Privacy protection

The TG Chair noted that P802.1AEdk had yet to be approved, with NesCom approval scheduled for 22 January. All discussion at this session was therefore preliminary, aimed at increasing awareness of the alternatives and technology.

The TG chair led a discussion of fragment formats. The wide range of frame and 'super-frame' (privacy protected frame) sizes discussed in the November 2019 plenary session [frame sizes from TCP acks to 9 kbytes, non-standard, 'jumbo frames' carrying IS-IS updates; super-frame sizes possibly as little as 128/256 bytes to minimize the bandwidth wasted by packing frames into fixed sized super-frames] meant that a transmitted frame might comprise more fragments than envisaged in prior format discussions. In turn this meant that the separation of frame and

frame fragment number spaces was not efficient. Numbering frame fragments consecutively, adding a 'first fragment' bit and a 'last fragment' bit, and reassembling a frame from consecutively numbered fragments from first to last was more effective.

Don Fedyk presented 'IEEE 802.1 Security - MACsec Privacy - 1/14/2020'
http://www.ieee802.org/1/files/public/docs2020/dk-fedyk-ieee802-dot1ae-mac-privacy-0120-v00.pdf

- This document was commented on and updated on screen as the meeting progressed.
- **12:30 – 2:00 PM recess**
- Discussion continued. Challenge is to mitigate the impact on quality of service/loss of bandwidth of fixed frame size and frame timing. There is increasing inefficiency or content disclosure if super-frames of multiple priorities are used. Description should not suggest that frame reassembly for many different transmission (access) priorities (with potential reordering) is a desirable implementation attribute, as use of different access priorities impacts privacy and supporting multiple reassembly contexts can impose significant cost where large numbers of secure channels are supported. Pre-emption (two levels, pre-emptible and pre-empting) is a good model. Privacy channel (analog of MACsec secure channel) is a useful description where frames and fragments are packed into a given priority super-frame. Potentially two channels, one pre-empting the other when both carried in same super-frame priority.
- **Disposition**: Discussion to be continued.

4:10 PM recess

Tuesday 21 January 2020

10:30 AM call to order by the TG Chair

MAC Privacy protection

Discussion of privacy channels continued.
- One or two channels (channel distinguished by super-frame priority). If a single channel then an Urgent frame, possibly fragmented, can pre-empt the sequence of fragments of a Not-Urgent (Standard?) frame. Looking for a better name than 'Standard' to describe 'Not-Urgent'. If two channels then Urgent frames (and their fragments) are assigned to one channel, and Standard frames to the other. All fragments carry Urgent/Not-Urgent bit so reassembly is not dependent on the (externally visible) priority of the super-frame (which may be modified in transit by a service provider) and is not dependent on knowing which MACsec SC (Secure Channel) carried the super-frame over the red network. Maintains property that all the information required for reception reassembly is in the individual component frames/fragments/pads carried in the super-frames and not on other properties of the super-frames or how they are carried.

  In addition to Privacy Channels offering one or two levels of access priority for their super-frame, individual frames of selected user priorities can be wrapped in a super-frame without fragmentation and carried with any one of the 8 possible access priority levels (selected by the frame's user priority). Possibility of padding super-frames to a nearest byte multiple, e.g. 64, 128, 196, ... Nothing to prevent reception of super-frames of many priorities carrying entire frames (although may not specify this capability as part of standardized frame transmission), 'channel' designation is particular to fragmentation capability.
- **12:30 – 2:00 PM recess**
- Discussion continued. Need to support at least platinum/bronze description where link is over service provider. Focus on maintaining QoS stronger more in line with the 802.1 TSN objectives than in the IETF parallel project. Considerations of frame packing in channel, no point in fragmentation pre-emption if frame does not complete in an earlier

super-frame. Frame cannot be validated until super-frame ICV has been checked, so time critical time gated flows are best packed at the end of a super-frame, potentially preceded by a 'guard band' explicit pad.

Discussion of minimum super-frame size and minimum fragment size, aim would be to avoid crisis at receiver with several frame/fragment storing items to be written in a short period of time (similar to the 65 byte packet problem). Necessarily an exception for the last fragment (?). 802.3 pre-emption is a useful model. Aim is for maximum interoperability with receiver, making fragment reassembly a mandatory function and removing the need to check for a reassembly capable receiver. Since receivers are universal no need for capabilities exchange.

- **Disposition**: Discussion to be continued.

4:30 PM recess

Wednesday 22 January 2020

9:10 AM call to order by the TG Chair

MAC Privacy protection

The TG chair led a quick recap of the discussion at this session.
- [Don Fedyk's input document as updated during the course of the session *IEEE 802.1 Security - MACsec Privacy - 1/22/2020* http://www.ieee802.org/1/files/public/docs2020/dk-fedyk-ieee802-dot1ae-mac-privacy-0120-v01.pdf captured some of the progress made.]
- **Disposition:** Initial draft to be prepared by Don Fedyk, as editor, once project formally approved (approval recommended by NesCom January 22, 2020). May be made available in parts to expedite. Text input, suggestions to the editor welcome. Review in the March 2020 plenary session.

Future meetings/teleconferences

Agreed (informally, none dissenting) to hold teleconferences for progression of work as identified during this session and to address TG matters arising, subject to the usual required notice. P802E SA initial ballot processing will be addressed by teleconference and then by face-to-face discussion in the March 2020 plenary session.

9:50 AM adjournment

5 Time-Sensitive Networking Task Group

The Time-Sensitive Networking (TSN) Task Group Chair, János Farkas, presided.
The TG Secretary, Marina Gutiérrez, wrote the minutes.

Minutes of TG conference calls are available at https://1.ieee802.org/tsn-calls/.

At the beginning of the meetings on Monday, Tuesday, Wednesday, Thursday, and Friday the TG Chair or TG Vice-Chair presented:
- The IEEE SA Copyright Policy slides,
- The IEEE SA PatCom Patent Slides for Standards Development Meetings,
- The IEEE 802 Participation slide,
- The Decorum information,
- The reminder for participants to register their attendance
contained in http://www.ieee802.org/1/files/public/docs2019/admin-farkas-TSN-meeting-intro-1119-v01.pdf, and made the Call for Potentially Essential Patents. There were no responses to the calls prior to the end of the week's session.

Monday 20 January 2020

9:06 AM call to order by the TG Chair

The TG Chair presented the agenda in https://1.ieee802.org/2020-01-tsn-agenda/.
Disposition: The agenda was reviewed, discussed and approved.

Johannes Specht, P802.1Qcr editor, led the resolution of comments received on http://www.ieee802.org/1/files/private/cr-drafts/d2/802-1Qcr-d2-0.pdf.
- Comment resolution started.
- **10:02 AM – 10:30 AM recess**
- Comment resolution continued.
- **12:33 PM – 1:30 PM recess**
- Comment resolution continued.

Disposition: Continued later.

Rodney Cummings presented *802.1AS Hot Standby Amendment: Scope Discussion* http://www.ieee802.org/1/files/public/docs2020/new-cummings-as-hot-standby-scope-0120-v02.pdf.
Disposition: Presentation discussed. Related to a new project

Marc Holness, P802.1Qcx editor, led the resolution of comments received on http://ieee802.org/1/files/private/cx-drafts/d2/802-1Qcx-d2-0.pdf.
Disposition: Continued later.

6:00 PM recess

Tuesday 21 January 2020

10:32 AM call to order by the TG Chair

Jordon Woods presented *IEEE 802.1 Interim Meeting Proposal* http://www.ieee802.org/1/files/public/docs2020/admin-woods-May2021-interim-proposal-0120-v02.pdf.
Disposition: Presentation discussed. Related to a future meeting venue.

Marc Holness, P802.1Qcx editor, continued the resolution of comments received on http://ieee802.org/1/files/private/cx-drafts/d2/802-1Qcx-d2-0.pdf.
Disposition: Continued later.

12:15 PM - 1:36 PM recess

Rodney Cummings led the review of the draft PAR http://www.ieee802.org/1/files/public/docs2020/dm-draft-PAR-0120-v01.pdf and CSD http://www.ieee802.org/1/files/public/docs2020/dm-draft-CSD-0120-v01.pdf for a proposed P802.1ASdm *Standard for Local and Metropolitan Area Networks - Timing and Synchronization for Time-Sensitive Applications Amendment: Hot Standby*.
Disposition: New PAR targeted for pre-circulation for consideration for approval at the March 2020 plenary session.

Christophe Mangin, P802.1CBdb editor, presented *802.1CBdb/D0.4 Editor's report for 4th TG ballot comments resolution* http://www.ieee802.org/1/files/public/docs2020/db-mangin-d0-4-editors-report-0120-v01.pdf and led the resolution of comments received on http://www.ieee802.org/1/files/private/db-drafts/d0/802-1CBdb-d0-4.pdf.
Disposition: Ballot comments discussed.

5:50 PM recess

Wednesday 22 January 2020

8:00 AM call to order by the TG Chair and the IEC/IEEE 60802 Joint Project Chair

Minutes of this meeting, a joint meeting of the TSN TG and IEC/IEEE 60802 Joint Project, are provided in section 5.1.

10:00 AM recess

Following recess, the TSN TG split into two tracks A and B throughout Thursday CoB: minutes of track A are provided in section 5.1 and minutes of track B follow.

10:35 AM call to order by the TG Chair

János Farkas, P802.1CMde editor, led the resolution of comments received on http://www.ieee802.org/1/files/private/de-drafts/d2/802-1CMde-d2-0.pdf.
Disposition: Continued later.

12:35 PM – 1:35 PM recess

Norman Finn, P802.1CS editor, led the resolution of comments received on http://www.ieee802.org/1/files/private/cs-drafts/d2/802-1CS-d2-4.pdf.
Disposition: Ballot comments discussed. Disposition recorded in http://www.ieee802.org/1/files/private/cs-drafts/d2/802-1CS-d2-4-dis.pdf.

Scott Fincher, P802.1Qcj editor, presented *802.1Qcj D1.2 Status* http://www.ieee802.org/1/files/public/docs2020/cj-fincher-editors-report-d1-2-0121-v01.pdf and led the resolution of comments received on http://www.ieee802.org/1/files/private/cj-drafts/d1/802-1Qcj-d1-2.pdf.
- Comment resolution started.
- **3:37 PM – 4:46 PM recess**
- Comment resolution continued.

Disposition: Ballot comments discussed. Disposition recorded in http://www.ieee802.org/1/files/private/cj-drafts/d1/802-1Qcj-d1-2-dis-v01.pdf.

Scott Mansfield, P802.1ABcu editor, led the resolution of comments received on http://www.ieee802.org/1/files/private/abcu-drafts/d1/802-1ABcu-d1-0.pdf.
Disposition: Continued later.

6:05 PM recess

Thursday 23 January 2020

8:00 AM call to order by the TG Vice-Chair

Craig Gunther, P802.1DG editor, presented *P802.1DG/D1.1 Editor's Report for Ballot Comment Resolution (v6)* http://www.ieee802.org/1/files/public/docs2020/dg-cgunther-editors-report-d1-1-0120-v06.pdf and led the resolution of comments received on http://www.ieee802.org/1/files/private/dg-drafts/d1/802-1DG-d1-1.pdf.
- Comment resolution started.
- **10:00 AM – 10:30 AM recess**
- Comment resolution continued.
- **12:30 AM – 1:30 PM recess**
- Comment resolution continued.
- **3:30 PM – 4:00 PM recess**
- Comment resolution continued.

Disposition: Ballot comments discussed. Disposition recorded in

http://www.ieee802.org/1/files/private/dg-drafts/d1/802-1DG-d1-1-pdis-v07.pdf.

5:53 PM recess

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Friday 24 January 2020

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8:00 AM call to order by the TG Chair and the IEC/IEEE 60802 Joint Project Chair

Minutes of this meeting, a joint meeting of the TSN TG and IEC/IEEE 60802 Joint Project, are provided in section 5.1.

1:00 PM recess

Following recess, the TSN TG split into two tracks A and B throughout session adjournment: minutes of track A are provided in section 5.1 and minutes of track B follow.

2:02 PM call to order by the TG Vice-Chair

Marc Holness, P802.1Qcx editor, continued the resolution of comments received on http://ieee802.org/1/files/private/cx-drafts/d2/802-1Qcx-d2-0.pdf.
Disposition: Ballot comments discussed. Disposition recorded in http://www.ieee802.org/1/files/private/cx-drafts/d2/802-1Qcx-d2-0-pdis-v01.pdf.

Johannes Specht, P802.1Qcr editor, continued the resolution of comments received on http://www.ieee802.org/1/files/private/cr-drafts/d2/802-1Qcr-d2-0.pdf.
- Comment resolution started.
- **3:30 PM – 4:00 PM recess**
- Comment resolution continued.
Disposition: Ballot comments discussed. Disposition recorded in http://www.ieee802.org/1/files/private/cr-drafts/d2/802-1Qcr-d2-0-pdis-v03.pdf.

János Farkas, P802.1CMde editor, continued the resolution of comments received on http://www.ieee802.org/1/files/private/de-drafts/d2/802-1CMde-d2-0.pdf.
Disposition: Ballot comments discussed. Disposition recorded in http://www.ieee802.org/1/files/private/de-drafts/d2/802-1CMde-d2-0-dis-v00.pdf.

Scott Mansfield, P802.1ABcu editor, continued the resolution of comments received on http://www.ieee802.org/1/files/private/abcu-drafts/d1/802-1ABcu-d1-0.pdf.
Disposition: Ballot comments discussed. Disposition recorded in http://www.ieee802.org/1/files/private/abcu-drafts/d1/802-1ABcu-d1-0-pdis-v01.pdf.

Paul Congdon, P802.1Qcz editor, presented *P802.1Qcz D0.5 2nd Task Group Ballot Editor's Report and Discussion* http://www.ieee802.org/1/files/public/docs2020/cz-congdon-d0-5-report-0120-v02.pdf and led the resolution of comments received on http://www.ieee802.org/1/files/private/cz-drafts/d0/802-1Qcz-d0-5.pdf.
Disposition: Ballot comments discussed. Disposition recorded in http://www.ieee802.org/1/files/private/cz-drafts/d0/802-1Qcz-d0-5-pdis-v02.pdf.

Jong Myung Rhee presented *Seamless Ethernet (SEth) Approach without Ethernet frame modification* http://www.ieee802.org/1/files/public/docs2020/new-Rhee-Seamless-Ethernet-0120-v01.pdf.
Disposition: Presentation discussed.

Any Other Business

No further business was discussed in this session.

6:17 PM adjournment

5.1 IEC/IEEE 60802 Joint Project

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 Copyright Policy slides https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/copyright-policy-WG-meetings.potx, the IEEE-SA PatCom Patent Slides for Standards Development Meetings https://development.standards.ieee.org/myproject/Public/mytools/mob/slideset.pdf and the IEEE 802 Participation slide https://mentor.ieee.org/802-ec/dcn/17/ec-17-0093-05-0PNP-ieee-802-participation-slide-ppt.ppt were presented.
- 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 available at https://1.ieee802.org/2020-01-tsn-agenda/.

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

Wednesday 22 January 2020

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.

Mark Hantel and Ludwig Winkel reported on the 60802 Conformity Assessment (CA) status and activities. The next meeting will be held February 26-28, 2020 in Tampa, Florida. Interested participants are invited to contact Mark Hantel or Ludwig Winkel for details.

Geoffrey Garner presented *Information on IEC/IEEE 60802 status and references to IEC/IEEE 60802 and 802.1AS by 3GPP Service Requirements for Cyber Physical Control Applications* http://www.ieee802.org/1/files/public/docs2020/60802-garner-60802-status-and-3GPP-references-0120-v00.pdf.
Disposition: The presentation was discussed. Further discussion is needed.

Jordon Woods, 60802 editor, presented *Editor's Report 60802 Draft 1.1* http://www.ieee802.org/1/files/public/docs2020/60802-woods-D1-1-update-0120-

v00.pdf. The comments from the IEC review are now included in the editor's report and in the comment database.

Jordon Woods, 60802 editor continued the resolution of comments received on http://ieee802.org/1/files/private/60802-drafts/d1/60802-d1-1.pdf.
Disposition: Continued later.

10:10 AM recess

Following recess, the IEC/IEEE 60802 Joint Project met as TSN TG track A throughout Thursday CoB: minutes of track A follow.

10:30 AM call to order by the 60802 Chair

Geoffrey Garner presented *Input for Comment #406 Against 60802/D1.1* http://www.ieee802.org/1/files/public/docs2020/60802-garner-input-related-to-comment-406-against-d1-1-0120-v01.pdf.
Disposition: The proposed ITU-T definitions will be referenced in the next IEC/IEEE 60802 draft as resolution to comment #406.

Geoffrey Garner presented *Comparison of 802.1AS Annex B and 60802 Clock Stability* http://www.ieee802.org/1/files/public/docs2020/60802-garner-comparison-of-802-1AS-AnnexB-and-P60802-clock-stability-0120-v02.pdf.
Disposition: For information.

Geoffrey Garner presented *Discussion of Assumptions Needed for 60802 Network Simulations* http://www.ieee802.org/1/files/public/docs2020/60802-garner-discussion-of-assumptions-needed-for-60802-network-simulations-0120-v01.pdf.
- **12:30 – 1:30 PM recess**

Disposition: The assumptions arising from discussion can be used as a starting point for initial simulations to calculate max|dTE|.

Jordon Woods, 60802 editor, continued the resolution of comments received on http://ieee802.org/1/files/private/60802-drafts/d1/60802-d1-1.pdf.
- **3:00 – 3:30 PM recess**
- Comment resolution continued.

Disposition: Continued later.

6:00 PM recess

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Thursday 23 January 2020

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

Jordon Woods, 60802 editor, continued the resolution of comments received on http://ieee802.org/1/files/private/60802-drafts/d1/60802-d1-1.pdf.
- Agreed, none dissenting, to move subclause *5.1.11 Hot standby for synchronization redundancy* to Annex Z because IEEE P802.1ASdm was initiated to cover this topic. Comments on this subclause were not discussed in the meeting because of this reason. The commenters are encouraged to take part in IEEE P802.1ASdm.
- **10:00 – 10:30 AM recess**
- Comment resolution continued.
- **12:30 – 1:30 PM recess**
- Comment resolution continued.
- **3:20 – 3:50 PM recess**
- Comment resolution continued.

Disposition: Continued later.

6:00 PM recess

Friday 24 January 2020

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 summarized the work performed so far in this session.

The TG Chair indicated that future meetings are listed at https://1.ieee802.org/tsn/iec-ieee-60802/#Meetings_and_conference_calls and pointed out that a DetNet/TSN workshop is planned after the November 11-13, 2020 plenary meetings in Bangkok, Thailand. The 60802 Chair indicated that 60802 teleconferences will be held following email announcements on February 3 and 17, 2020, March 2 and 30, 2020, April 27, 2020, and May 11, 2020. There will be no 60802 teleconferences the week of the March 2020 IEEE 802.1 plenary session.

Marius Stanica presented *IEEE 802.1 Interim Preparations for a proposal Location: Helsinki, Finland* http://www.ieee802.org/1/files/public/docs2020/admin-stanica-Helsinki-interim-proposal-0120-v02.pdf.
Disposition: The TG expressed a preference for the Sokos Hotel.

It was indicated that the move of subclause 5.1.11 to Annex Z is the only change in the gaps list of 60802 draft 1.1 http://ieee802.org/1/files/private/60802-drafts/d1/60802-d1-1.pdf.

Stephan Kehrer presented *IEEE P802.1CBcv Editor's Report for Ballot Comment Resolution (v2)* http://www.ieee802.org/1/files/public/docs2020/cv-kehrer-editors-report-d0-2-0120-v02.pdf.
Disposition: None.

Geoffrey Garner presented *Information on IEC/IEEE 60802 status and references to IEC/IEEE 60802 and 802.1AS by 3GPP Service Requirements for Cyber Physical Control Applications* http://www.ieee802.org/1/files/public/docs2020/60802-garner-60802-status-and-3GPP-references-0120-v03.pdf updating the presentation given on Wednesday with comments also received on Wednesday.
Disposition: None.

Johannes Specht presented *On Standardization of Cut Through Forwarding (CTF)* http://www.ieee802.org/1/files/public/docs2020/new-specht-cut-through-tech-0120-v01.pdf.
Disposition: Presentation discussed. Further discussion needed.

10:30 – 11:00 AM recess

Günter Steindl presented *TSN inter domain communication concept* http://www.ieee802.org/1/files/public/docs2020/new-Steindl-TSN-inter-domain-communication-0120-v4.pdf.
Disposition: Presentation discussed. Further discussion needed.

A clarification was needed on what is allowed in a profile concerning selecting functions by not selecting a normative function within a base standard. The 802.1 Chair indicated that one reason for the success of IEEE 802 is widespread interoperability based on a minimum set of mandatory functions in 802 standards that have not changed in a long time. However, this does not prohibit discussing whether certain functions should continue to be mandatory. The 802.1 Chair indicated that such a discussion should only happen rarely when there is no other option, but if the consensus of the Working Group supports a change, then it can be progressed. While updating the base standard is preferred, implementation details would need to be decided on a case-by-case basis.

Disposition: After discussion, this was agreed as a principle. The TG chair noted that the IEC/IEEE 60802 PAR may need to be changed. This PAR will be checked and if needed IEEE 802.1 and IEC/IEEE 60802 management will take action.

1:00 PM recess

Following recess, the IEC/IEEE 60802 Joint Project met as TSN TG track A throughout session adjournment: minutes of track A follow.

2:00 PM call to order by the 60802 Chair

Jordon Woods, 60802 editor, continued the resolution of comments received on 60802 draft 1.1 http://ieee802.org/1/files/private/60802-drafts/d1/60802-d1-1.pdf.
- **3:30 – 4:00 PM recess**
- Comment resolution continued.

Disposition: Ballot comment dispositions are recorded in http://www.ieee802.org/1/files/private/60802-drafts/d1.
Comment resolution will be continued in the next 60802 teleconference.

Günter Steindl presented *IEC/IEEE 60802 to IECEE Reference Model* http://www.ieee802.org/1/files/public/docs2020/60802-Steindl-60802-to-IECEE-reference-model-0120-v2.pdf>.
Disposition: Presentation discussed. Further discussion needed.

Any Other Business

No further business was discussed in this session.

5:10 PM adjournment

6 Nendica

The IEEE 802 Network Enhancements for the Next Decade Industry Connections Activity (Nendica) Chair, Roger Marks, presided and wrote the minutes.

Minutes of Nendica conference calls are available at https://1.ieee802.org/802-nendica/.

In addition to the participants listed in section 1 who registered in IMAT, the following individuals were also reported as participating remotely (affiliation as understood by Nendica Chair):
- None.

Monday 20 January 2020

6:00 PM call to order by the Nendica Chair

The Nendica Chair presented the IEEE-SA Guidelines for IEEE-SA Meetings https://development.standards.ieee.org/myproject/Public/mytools/mob/preparslides.pdf, the IEEE SA Participation slides https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/Participant-Behavior-Individual-Method.pdf, the IEEE SA Copyright slides https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/copyright-policy-WG-meetings.potx, the IEEE 802 Participation slide https://mentor.ieee.org/802-ec/dcn/16/ec-16-0180.pdf, the IEEE ICCOM requirements https://1.ieee802.org/802-nendica/ieee-iccom-requirements/, and the IEEE 802 Nendica Procedures https://1.ieee802.org/802-nendica/ieee-802-nendica-procedures/.

Agenda Approval

The Nendica Chair presented the draft agenda made previously available.
Disposition: The agenda was reviewed, discussed and approved, as recorded in *Approved Nendica Agenda: 2020-01-20/22/23* https://mentor.ieee.org/802.1/dcn/20/1-20-0011-00-ICne.pdf. The posted agenda reflects additional modifications made during Meetings #2 and #3.

Update

The Nendica Chair:
- Showed the Nendica webpage https://1.ieee802.org/802-nendica/, and the Nendica Mentor server https://mentor.ieee.org/802.1/documents?is_group=ICne hosting documents to be discussed.
- Demonstrated how to record attendance on IMAT https://imat.ieee.org/.
- Presented *IEEE 802 "Network Enhancements for the Next Decade" Industry Connections Activity (Nendica): Status Report* https://mentor.ieee.org/802.1/dcn/20/1-20-0009-00-ICne.pdf. No comments ensued. [This report was revised post-session as revision 01.]

Review of Minutes

The Nendica Chair presented *Draft Minutes, Nendica Meeting, 2019-11-12/14* https://mentor.ieee.org/802.1/dcn/19/1-19-0084-00-ICne.docx, and *Draft Minutes of the Nendica Meeting of 2019-12-12* https://mentor.ieee.org/802.1/dcn/19/1-19-0093-00-ICne.docx.
- No comments were raised.
Disposition: The Nendica Chair announced that these minutes had been approved by unanimous consent.

The Nendica Chair presented *Draft Minutes of the Nendica Meeting of 2019-01-16* https://mentor.ieee.org/802.1/dcn/20/1-20-0006-00-ICne.docx.
- The Nendica Chair observed that the adjournment time was not specified and that he would create a revision 01 with the adjournment time noted as "11:00 ET".
Disposition: The Nendica Chair announced that the minutes in https://mentor.ieee.org/802.1/dcn/20/1-20-0006-01-ICne.docx had been approved by unanimous consent.

The Nendica Chair reviewed *Draft Minutes, Nendica Meeting, 2020-01-15* https://mentor.ieee.org/802.1/dcn/20/1-20-0007-01-ICne.docx.
- No comments were raised.
Disposition: The Nendica Chair announced that these minutes had been approved by unanimous consent.

Flexible Factory IoT: Use Cases and Communication Requirements for Wired and Wireless Bridged Networks (FFIoT)

Nader Zein, FFIoT editor, presented *FFIoT Status Report – IEEE 802 Nendica* https://mentor.ieee.org/802.1/dcn/20/1-20-0005-00-ICne.pptx reporting the progress of the Flexible Factory IoT Work Item and led the resolution of comments received in https://mentor.ieee.org/802.1/dcn/19/1-19-0091-03-ICne-consolidated-ffiot-comments.xlsx.
Disposition: Comment resolution was nearly completed, but further discussion will take place later, on Wednesday and/or Thursday.

9:30 PM recess

Wednesday 22 January 2020

10:03 AM call to order by the Nendica Chair

A WebEx teleconference call was opened.

The Nendica Chair reminded the group of the IEEE-SA Guidelines for IEEE-SA Meetings, the IEEE-SA Participation slides, the IEEE SA Copyright slides, the IEEE 802 Participation slide, and IEEE ICCOM requirements.

The Nendica Chair reviewed the agenda and noted two proposed changes, updating a document revision number and adding an item for "Complete FFIoT Comment Resolution," the latter anticipated for Meeting #3 on Thursday.
Disposition: The revised agenda was agreed without objection.

Study Item: Managed LAN as a Service [MLaaS]

Wei Qiu presented *Managed LAN as a Service (MLaaS) Study Item Update* https://mentor.ieee.org/802.1/dcn/20/1-20-0008-00-ICne.pptx. This included a proposal to delay the schedule, targeting Work Item initiation in July 2020.
Disposition: The proposal to delay the schedule was reviewed without comment. Further discussion is anticipated in future meetings. Those interested in the topic are welcome to communicate with the contributors.

New topics

Roger Marks presented *IEEE 802 Nendica Work Item Proposal: Revision of "The Lossless Network for Data Centers"* https://mentor.ieee.org/802.1/dcn/20/1-20-0002-00-ICne.pdf.
Disposition: The presenter agreed to issue a revision with changes to slide 7 to eliminate the word "obsolete". Further consideration will be deferred pending the addition of details on slide 8, or a document outline. Nendica agreement is targeted for a teleconference around February 5, 2020.

Roger Marks presented *IEEE 802 Nendica Work Item Proposal: Network Stream and Flow Interworking* https://mentor.ieee.org/802.1/dcn/20/1-20-0004-01-ICne.pdf.
- It was suggested to add a reference to the congestion notification tag of IEEE Std 802.1Qau in the reference list of slide 5.
- It was suggested to add, on slide 23, a reference to a possible March 17, 2020 joint meeting of the 802.1 TSN Task Group and the 802.11 TGbe Task Group.
- A straw poll was conducted concerning support for proceeding with this Work Item. The responses were:
  - Yes: 6, No: 0, Abstain: 2

Disposition: Agreement to submit the proposal was deferred until Meeting #3 or a teleconference meeting around February 5, 2020.

11:57 AM recess

Thursday 23 January 2020

10:00 AM call to order by the Nendica Chair

A WebEx teleconference call was opened.

The Nendica Chair reminded the group of the IEEE-SA Guidelines for IEEE-SA Meetings, the IEEE-SA Participation slides, the IEEE SA Copyright slides, the IEEE 802 Participation slide, and IEEE ICCOM requirements.

The Nendica Chair reviewed the agenda and noted that two draft motions had been inserted, for information, based on indications from participants regarding intended motions.
Disposition: The revised agenda was approved without objection.

Completion of FFIoT Comment Resolution

Nader Zein, FFIoT editor, reviewed the status of FFIoT comment resolution.
Disposition: Additional changes were agreed to the comment resolution database.
Disposition recorded in https://mentor.ieee.org/802.1/dcn/19/1-19-0091-05.xlsx.

Motions

The following motion was presented:
- **Motion**:
  - To forward 802.1-20-0004-02 <https://mentor.ieee.org/802.1/dcn/19/1-20-0004-02-ICne.pdf> ("IEEE 802 Nendica Work Item Proposal: Network Stream and Flow Interworking") for March approval by 802.1.
  - Moved by Oliva, seconded by Zein
  - The Nendica Chair announced that the motion had been approved without objection.

The following motion was presented:
- **Motion**:
  - To accept the Consolidated FFIoT Comments sheet at https://mentor.ieee.org/802.1/dcn/19/1-19-0091-05.xlsx as the resolution of comments on Draft 4 of the Flexible Factory IoT report and forward for approval Draft 5, produced accordingly, pending a 15 day recirculation.
  - Moved by Zein, seconded by Oliva
  - The Nendica Chair announced that the motion had been approved without objection.

Future Meetings

Nendica will meet during the March 2020 IEEE 802 plenary session. It was tentatively agreed to plan for two meeting slots, one to tentatively be a short slot (Tuesday 18:00-19:30).

The meeting agreed (none objecting) to schedule teleconferences as follows:
- February 5, 2020, 9:00 AM US Eastern Time (focus: new Work Item proposals)
- February 20, 2020, 9:00 AM US Eastern Time (focus: FFIoT)
- March 5, 2020, 9:00 AM US Eastern Time (if necessary)

Disposition: The Nendica Chair will arrange facilities and schedule the teleconferences, using the historical two-hour duration.

Any Other Business

The Nendica Chair thanked the participants for their contributions.

No further business was discussed in this session.

11:20 AM adjournment

7 YANGsters

The YANGsters Chair, Scott Mansfield, presided.
The YANGsters Secretary, Stephan Kehrer, wrote the minutes.

Tuesday 21 January 2020

6:05 PM call to order by the YANGsters Chair

The YANGsters Chair presented the IEEE-SA Copyright Policy slides
https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/copyright-policy-WG-meetings.potx, the IEEE-SA PatCom Patent Slides for Standards Development Meetings
https://development.standards.ieee.org/myproject/Public/mytools/mob/slideset.pdf, the IEEE 802 Participation slide https://mentor.ieee.org/802-ec/dcn/17/ec-17-0093-05-0PNP-ieee-802-participation-slide-ppt.ppt, and made the "Call for Potentially Essential Patents". There were no responses to the call for patents prior to the end of the week's meeting.

The YANGsters Chair presented the agenda in
http://www.ieee802.org/1/files/public/docs2020/yangsters-smansfield-meeting-agenda-w4-0120-v01.pdf.
- Three items on YANG structure had been raised before the meeting and would be discussed during the IEEE YANG structure topic.
Disposition: The agenda was reviewed, discussed and approved.

The YANGsters Chair led a discussion on the currently open *Maintenance Discussion*. YANG doctors have been contacted (yang-doctors@ietf.org) regarding the maintenance issue of providing a list size variable for certain items in IEEE Std 802.1Qcp. Four options were provided to the YANG doctors. The reply YANGsters received was that there is no real way to keep the size of a list in synchronization with a corresponding integer object because of the way datastores work. The suggestion provided was to just put the constraint verbally in the YANG Description by stating that the value needs to be kept in sync. The YANG Doctors also stated that a size operation might be something of interest for YANG/NETCONF in a future revision.
Disposition: YANGsters will create a website providing a YANG FAQ on different topics around the usage of YANG. The FAQ will provide brief answers to questions that come up around YANG and then point to more details for people interested in the "why" behind the answer.

The YANGsters Chair presented suggested *Boilerplate text for draft YANG* modules. The intention of the text is to point out explicitly if a YANG module is still in a draft state. The suggested text for YANG modules in the draft folder is as follows: "This YANG module is part of an ongoing standardization project, and does not represent a formally sanctioned YANG module of IEEE. Therefore, this YANG module will most likely change in incompatible ways from its current revision to the formally published YANG module for *<<Insert module here>>*."
Disposition: The suggested text is to be used in draft YANG modules for IEEE 802.1 standardization projects. This will be put down as a point of information in the YANG FAQ.

The YANGsters Chair provided *Information about the Joint 802 and ITU-T Study Group 15 Workshop on 25 Jan.* There was a brief discussion on the agenda and setup of the joint workshop.
Disposition: none

The YANGsters Chair presented the topic of *IEEE YANG Structure*. The following topics were discussed:
1. NMDA compliance and the YANG version to be used in IEEE 802.1 YANG modules. The decision by YANGsters in the past was to use YANG 1.1 and make modules

NMDA compliant. This was confirmed during the discussion. This also means that some currently published YANG modules will require maintenance items to add the yang-version indicating that they are YANG 1.1. YANGsters discussed whether a "proof of concept" can be provided to show that it is possible to automatically convert IEEE YANG modules that are NMDA compliant to YANG 1.0 version YANG modules using the duplicate data tree structures instead of NMDA.

2. There are currently technical issues with leaves that cannot be marked mandatory even though the standard says the object needs to be existing. Additionally, if there are leaves in a container that is conditionally present these leaves cannot be mandatory even if the standard says they have to be. In the discussion it was pointed out that the way the "mandatory true" statement is described in RFC7950 can be read as stating that a "leaf MUST exist" if it is associated with a "mandatory true" statement. There was also some discussion on how this relates to the way 802.1 YANG modules are modelled.

The following interpretation was given during the discussion by a member of YANGsters and provided for the meeting minutes via mail:

- o The term Client and Server will be used as follows:
  - **Client** is the application, typically run in a Management System, (e.g., NETCONF Client) to run the network configuration protocol that interacts with the network element (i.e., **Server**) that contains the YANG modules.
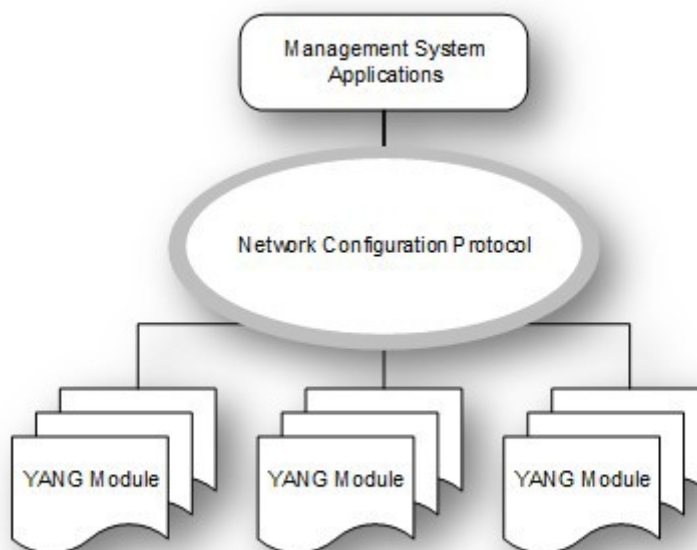
- o Consider a case where there is a feature that MUST have managed objects A, B, and C. The consequence of this is that the YANG module for this feature should also include A, B, and C.
  - This is illustrated below:

```
 2  module example-feature {
 3
 4    container my-feature {
 5      description
 6        "My feature description.";
 7      leaf A {
 8        type boolean;
 9        mandatory true;
10        description
11          "Blah, blah, blah.";
12      }
13      leaf B {
14        type yang:timeticks {
15          range "20..100";
16        }
17        default "40";
18        description
19          "Blah, blah, blah.";
20      }
21      leaf C {
22        type yang:timeticks {
23          range "10..100";
24        }
25        default "100";
26        description
27          "Blah, blah, blah.";
28      }
29    }
30  }
```

- o The implication of using the mandatory true statement in the YANG module is that the Client MUST include the leaf node in the network configuration protocol. So, it MUST include a configuration value for A. There is no need to provide a configuration value for B or C, since they are optional.
    - For example, the XML representation of the NETCONF protocol in this case is shown below:

```
 2  <rpc message-id="101">
 3    <edit-config>
 4      <target>
 5        <running/>
 6      </target>
 7      <config>
 8        <top xmlns="http://example.com/schema/1.2/config">
 9          <my-feature>
10            <A>"true"</A>
11          </my-feature>
12        </top>
13      </config>
14    </edit-config>
15  </rpc>
```

    - The Server will still use A, B, and C to configure the example feature. However, the values used for B and C are the defaults defined in the YANG module.
    - NOTE: It is perfectly acceptable for the Client to explicitly specify values for B and C as well. If this occurs, then it simply tells the Server to use these values instead of the defaults.

- o The end result is that the YANG module for the example feature implies that managed objects A, B, and C are needed to configure the feature. However, using the mandatory true statement in the YANG module implies that the Client MUST provide this value to the Server.
- o NOTE: The same logic applies to operational (i.e., read-only) data. It just means that all Servers that implement this YANG module MUST support that information for retrieval by the Client.
  - ▪ A classic example is stats. A YANG module may list a set of N (e.g., N=10) counters. However, if they are all optional, then not all Servers need actually implement the counters. However, if a subset of the N have the mandatory true statement associated with them, then all Servers that support this YANG module MUST support those counters.

3. YANG provides the possibility to not have a leaf present if it is not used. It was discussed by YANGsters how to implement managed objects stating that they return a specific value (e.g. 0) if they are not to be used.

Disposition:
1. YANG 1.1 is to be used for IEEE 802.1 YANG modules and they are to be NMDA compliant. The "yang-version 1.1" statement therefore has to be provided in the YANG modules (see RFC 7950, 7.1.2) and they need to state that they are NMDA compliant in the introductory section (see RFC 8407, 3.5).
2. YANGsters will contact the YANG doctors to clarify if the "mandatory" statement in YANG is intended to be used to model standards compliance or not.
3. How to handle managed objects that can return a value to indicate that it is not used needs to be discussed further and then decided on by YANGsters. In the case of comments to current drafts either approach is acceptable. In such a case, a comment should be provided in the disposition to indicate that the topic is currently discussed in YANGsters and the YANG file might have to be revised after the decision of YANGsters.

Future Meetings

The next YANGsters meeting will be a teleconference on 4 February 2020.

Any Other Business

No further business was discussed in this session.

7:30 PM adjournment

8 Next Session

March 16-20, 2020, Atlanta, GA, USA