Editor's Report
60802 Draft 1.2

May 2021
IEEE802.1 Virtual Interim

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Respondents

Table 1—Table of responses

SATUS	VOTE	NAME	COMMENTS
N	O	Abdul, Amin	Y
V	N	Ademaj, Astrit	Y
V	T	Congdon, Paul	N
V	N	Dorr, Josef	Y
V	Y	Enzinger, Thomas	Y
V	N	Farkas, Janos	Y
V	N	Garner, Geoffrey	Y
V	E	Gunther, Craig	N
V	E	Haddock, Stephen	N
V	N	Hantel, Mark	Y
V	N	Kehrer, Stephan	Y
V	E	Kelsey, Randy	N
N	Y	Lv, Jingfei	Y
V	N	Mangin, Christophe	Y
V	Y	McCall, David	Y
V	E	McMillan, Larry	N
V	Y	Ohsawa, Tomoki	N
V	Y	Ohue, Hiroshi	N

SATUS	VOTE	NAME	COMMENTS
N	N	Osagawa, Daisuke	Y
V	T	Pannell, Donald R	N
V	Y	Potts, Michael	N
V	Y	Proell, Dieter	Y
V	E	Randall, Karen	N
N	Y	Rodrigues, Silvana	Y
V	Y	Sato, Atsushi	Y
V	N	Seewald, Maik	Y
V	Y	Stanica, Marius	Y
V	N	Steindl, Guenter	Y
N	N	Takita, Daisuke	Y
N	N	Tarui, Isao	Y
V	Y	Wang, Hao	N
V	N	Weber, Karl	Y
V	Y	Winkel, Ludwig	Y
V	N	Woods, Jordon	Y
N	N	IEC, CA	Y
N	N	IEC, DE	Y

Ballot Statistics

Table 2—Results

CATEGORY	All Respondents	
	TOTAL	%
Yes	10	47.62%
No	11	52.38%
Voting Yes or No	21	100.00%
Abs. Time	2	5.56%
Abs. Expertise	5	13.89%
Abs. Other	0	0.00%
Respondents	36	
Voting members	28	
Non-voting	8	
No. of commenters	25	69.44%
No. of comments	959	

Timeline

- The 60802 TSN Profile is currently in the third round of task group ballot (draft 1.2 or d1.2). Current timeline for finalization is as follows:

TG/WG ballot drafts:	Date:
TG D1.3	March 2021
TG D1.4	Oct 2021
WG D2.0	early 2022
WG D2.1 … 2.n	
IEEE SA D3.0	mid to end 2022

- Note: as with all standards work, this timeline is dependent upon achieving consensus on complex topics and is, therefore, subject to change.

Current Status

Network Access	0	Complete
Conformance Clause	6	Dependent upon time sync and Bridged End Station discussions
Traffic Types	0	Complete
Management	0	Complete
Time Sync	12	Dependent upon simulations
Editorial	0	Complete
Misc	1	No dependency
Total unresolved	19	
Resolved	940	
	959	

- We have resolved 940 comments to date
- We have 19 comments remaining, all dependent upon the on-going time sync simulation
- Work on d1.3 has begun. 522 of 959 comments have been implemented

Comments 765, 766, 767

- Comment
  - Link speed is pointing to the link segment which relates to the signal propagation and is only mentioned once in 22.2 in IEEE Std 802.3, data rate is used 676 times in the related standard. We shall use the terms in the same way as in the referenced Standards.
- Suggested Remedy
  - Change link speed to data rate
- Response:
  - REJECT. Link speed is used throughout 802.1Q. The term link speed will be used for consistency with that standard..
- After discussion with the commenter, the editor proposes changing the response to ACCEPT.

Comments 331, 332, 333, 334, 335, 336

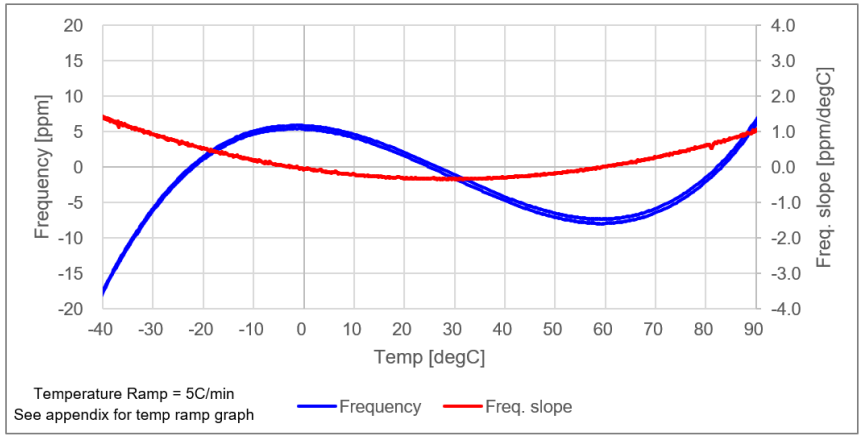
- Several comments requested specifically listing the MAU types supported
- Other comments requested eliminating MAU types that weren't in the range of 10 Mb/s to 10 Gb/s
- Response:
  - The MAU types will be broken out. If the editor feels that some of the MAU types are not appropriate, he will bring a contribution to the group. Items d), k), l) and m) will also be broken out. Item g) is a SPE standard and will be listed seperately.
- Proposal follows

Proposal – MAU Types

5.6.1 Item	Bandwidth	MAU Types Included	MAU Types Excluded
a	100 Mbps baseband networks	100BASE-TX 100BASE-FX	100BASE-T2 100BASE-T4
d	1000 Mbps Baseband Networks	1000BASE-T 1000BASE-SX	1000BASE-TX (Telecom) 1000BASE-CX (COAX) 1000BASE-KX (Backplane) 1000BASE-LX (long reach fiber) 1000BASE-LX10 (long reach fiber) 1000BASE-BX10 (long reach fiber) 1000BASE-RHx (POF)
e	10 Gbps Baseband Networks	10GBASE-T 10GBASE-SR	10GBASE-CX4 10GBASE-LR, (long reach) 10GBASE-LRM, (long reach multi-mode) 10GBASE-ER (extended reach) 10GBASE-LX4 10GBASE-PR
g	100 Mbps SPE	100BASE-T1	None
h	1000 Mbps SPE	1000BASE-T1	None
k	25 Gbps Baseband Networks	None (item deleted)	All
l	200 Gbps and 400 Gbps Baseband Networks	None (item deleted)	All
m	2,5 Gbps and 5 Gbps Baseband Networks	2.5GBASE-T 5GBASE-T	None
n	10 Mbps SPE	10BASE-T1L	None

Time Sync Simulation work

- The 60802 profile requires max|TE_R| of the synchronized time, relative to the Grandmaster Clock, is expected to be 1 µs across 64 network hops (goal: 100 hops).
- Currently, the IEC/IEEE 60802 Joint Project is engaged in simulations to establish that the 1 us goal is achievable using IEEE 802.1AS-2020
- This work will establish default parameters for industrial applications including:
  - Timestamp accuracy
  - Timestamp precision
  - Residence time
  - Message intervals (sync, pdelay, etc.).



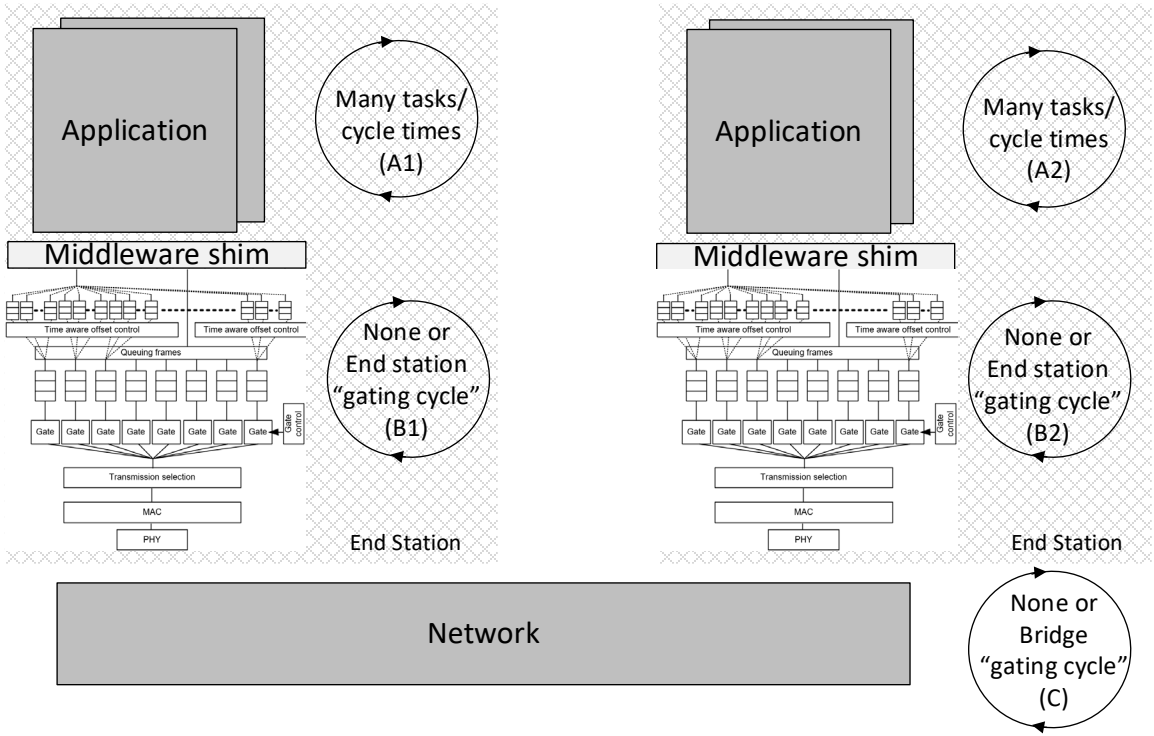
Traffic Types

- Various industrial traffic patterns have different characteristics and thus, impose different requirements on a TSN network. To specify these traffic types, a two-step approach is used:
    1. First define characteristics of generic traffic type (traffic-type-categories) and
    2. Second define instances of the generic types, i.e., the traffic types.
- This two-step approach allows a clear differentiation between characteristics as seen from the “Ethernet interface” point of view and “application” point of view.

Traffic type name	Cyclic	Data delivery requirements	Time-triggered transmit	Traffic-type-category
Isochronous	Yes	Deadline	Yes	IA time-aware-stream
Cyclic-Synchronous	Yes	Latency	Yes	IA time-aware-stream
Cyclic-Asynchronous	Yes	Latency	No	IA stream
Alarms and Events	No	Latency	No	IA traffic engineered non-stream
Configuration & Diagnostics	No	Latency	No	IA traffic engineered non-stream
Network Control	Optional	Latency	No	IA traffic engineered non-stream
Best Effort	No	N/A	No	IA non-stream

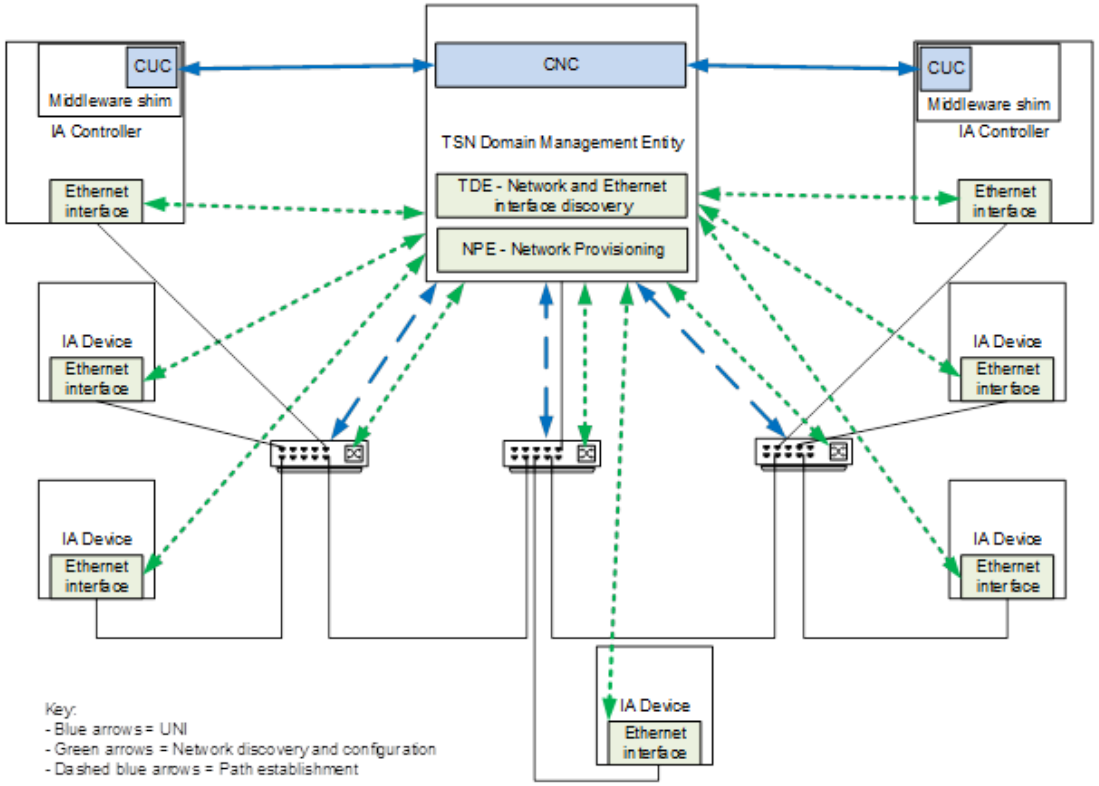
Improved Overview of Industrial applications

- Draft d1.2 attempted to characterize the relationship between the application cycle and access to the network. However, industrial applications can contain multiple tasks.
  - These tasks are executed based upon time or other events.
  - Thus, an industrial application can have multiple tasks executing on different cycles
- This approach eliminates the need for several definitions:
  - Application Data Cycle
  - Isochronous Application
  - Network Access
  - Network Cycle
  - Scheduling Cycle
  - Start of cycle trigger



Simplified Management Model

- Defines a TSN Domain Management Entity consisting of:
  - CNC (IEEE Std 802.1Qcc-2018).
  - Topology Discovery Engine (TDE).
  - Network Provisioning Entity (NPE).
  - Best Management Entity Algorithm (BMEA – not pictured).
- TDE Roles:
  - topology discovery
  - bridge/end station identification
- NPE Roles:
  - gPTP Domain(s) establishment
  - assigns TSN Domain ID
  - establishment of IA-stream and IA-non-stream VLAN



Summary

- The 60802 TSN Profile is currently tracking to the current timeline (release to SA Ballot in late 2022)
- Considerable progress toward consensus on multiple fronts:
  - Mandatory and optional features for both conformance classes
  - Traffic Types
  - Industrial Application/end station model
  - Management model
- Still considerable work ahead
  - Further refinement of the management model
  - Discovery and management of the bridges and end stations in a bridged end station model.
  - Distributed management model
  - Security model

Thank you