Comments on the previous Automotive Profile Outline Suggestion

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Original Source:

Suggestions for Automotive Profile outline

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dg-finn-auto-prof-outline-0119-v02

ETHERNOVIA ®

VIRTUALIZING VEHICLE COMMUNICATION

Fundamental questions to answer, first

- Are we describing **one** way to build an in-vehicle network, or a **box of tools** for people designing automotive networks**?**
  - This presentation assumes we want a box of as few tools as possible.
- Are we building relationships (as with P802.1CM ←→ CPRI) with other SDOs who are writing standards that call out P802.1DG**?**   - Autosar
  - This presentation assumes that the answer is, "Yes."   - Open Alliance
- How much ~~security~~ do we do**?**   None!
  - This presentation assumes that we will describe some available security features. The industry needs a comprehensive security plan. To be developed in OA TC17
- These questions have a big impact on the document. If the above assumed answers are incorrect, this presentation is of questionable value.

P802.1DG table of contents

1. Overview, 2. Normative references, 3. Definitions, 4. Abbreviations

- These sections, of course, are mandated by the IEEE Standards Association.
- Also:
  - Introduction
  - Table of Contents
  - Annex A: Profile Conformance Statement
  - Annex <last>: Non-normative references
  - Annex Z: Working Group scratch pad

5. Conformance

1. Requirements terminology (explains shall, must, should)
2. PCS: describes use of PCS in Annex A
3. Automotive ~~Bridge~~ Relay only!
4. ~~Two-port Chained Station (3-port Bridge + end station)~~
   - ~~This is an example of a device we might define. Too early to say.~~
5. Automotive end station Transceiver incl. Middleware!
- There may be more than one profile defined, in which case the some of 5.3, 5.4, or 5.5 may be doubled.

Profile Modules: Frame Indentifictaion, ATS&CBS, TAS, …

6. Automotive In-Vehicle Networks

● The purpose of this clause is not historical or simply informative; the purpose is to justify a number of requirements on an automotive in-vehicle Bridged LAN. These requirements will be called out throughout the rest of the document to drive/justify the specifications.

1. Brief introduction to existing in-vehicle networks
   ● Including sample architecture to serve for further discussions
2. Interfacing with existing non-Ethernet networking technologies
3. Related standards' requirements on DG (e.g. AutoSAR)
4. ~~Failure mode operations~~
5. Fast start-up issues
6. ~~Maintenance mode operations~~
7. ~~Supported physical media~~
8. ~~Robustness~~

7. Life cycle

- The network behavior changes greatly over time
1. Component manufacture / test
2. Manufacturing
3. Start up sequence
4. Normal operation
5. Software updates
6. Fail safe operation
7. In shop maintenance

Lack of agreeability and OEM input

8. Security

- See also "notes"
1. Summary of useful external documents.
2. Threats
3. Cryptographic tools
4. Physical security tools
5. Application of these tools to following sections of this document

Open Alliance TC 17 is dedicated to this and interacts with IEEE

Move to an informative Annex

9. Traffic separation

1. Separation by VLAN
   - Separating groups of functional units on different VLANs
2. ~~Topology separation~~
   - ~~Multiple versions of the active topology can share a physical network: MST, SPB, SPB+PCR, configuration, network manager.~~
3. ~~Physical separation~~
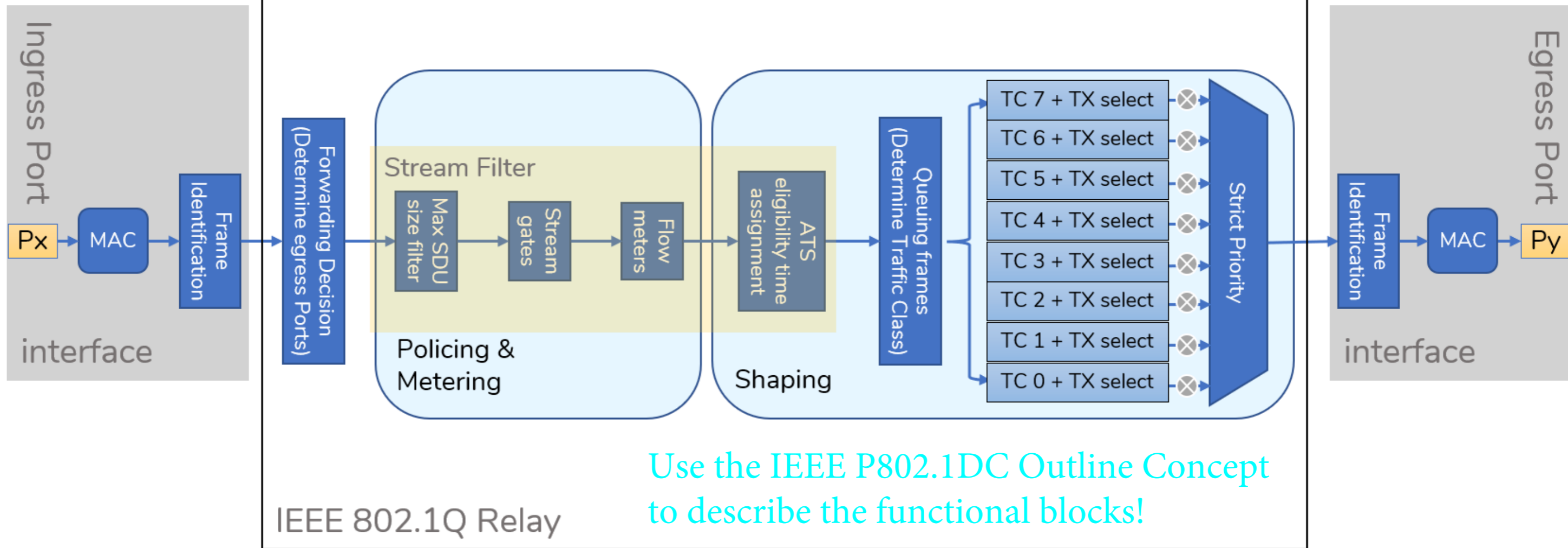   - ~~Separating groups of functional units on different LANs.~~
4. ~~Connectivity by router~~
   - ~~Selectively connecting different groups by IETF routing~~
5. ~~Connectivity by application gateway~~
   - ~~Selectively connecting different groups above the frame/packet layers.~~

Use the IEEE P802.1DC Outline Concept to describe the functional blocks!

10. Synchronized time

1. Precision Time Protocol
   - ~~Pick a profile and options~~

New Profile - Align with Autosar

2. ~~Robust and Secure PTP (Crypto is not enough!)~~
   - ~~Certainly, 802.1AS 2019 will be useful.~~
   - ~~Perhaps we call out an RFC.~~

11. Latency and congestion loss

1. Best effort flows Also have Latency requirements - goal is no LOSS!
2. Continuous vs. Intermittent flows
   - Intermittent flows can be scheduled. Hard to mix both types on same port.
3. Time scheduling for intermittent flows.

   Goal is to mix ALL kinds of
4. Bounded latency, zero congestion loss

   traffic on any egress port
   - Pick queuing method(s) for continuous flows.

   (zonal architecture)
5. Frame preemption
6. Cut-through forwarding   informative only
7. Separation by time (802.1Qbv)   Alignment Latency - Bus/Phased Mode
8. Separation by traffic class
9. Filtering and policing (so that misbehavior cannot ruin latency)

   what is that?   worst case vs. average!

12. Topology and ~~redundancy~~

1. Physical topology verification and/or determination Easier via ARP and ARL
   - Does the physical topology match ==expectations==? Tables?
2. ~~Best-effort active topology determination~~
   - ~~Pick one: MST, SPB, none (no loops) or a non-802.1 ring protocol.~~
3. ~~Critical flow active topology determination~~
   - ~~Pick one: None (no loops), FRER paths, or a non-802.1 ring protocol.~~
4. ~~Frame Replication and Elimination for Reliability (FRER)~~
   - ~~End-to-end, not ladder. Pick one: Configuration, SPB+PCR, net manager.~~
5. End station duplication.
   - Impact on the network, relationship to FRER. Informative Annex!

13. Protocols

1. Other IEEE 802 protocols required
   - One section for each protocol. 802.1AX? LLDP? Ether OAM? CFM?
2. Configured reservations for TSN flows
   - This will certainly be required. Where do addresses come from? (9.1?)
3. Reservations made by network controller
   - Pick one: NETCONF? RESTCONF? SNMP? Application controller?
4. Reservations made by peer to peer protocols
   - Or not. If allowed, RAP? MSRP? A variant of either?

Informative Annex, why dynamic config is difficult (Security, Safety, SD options, …)

14. Profiles Move further up!

- ~~One or two (hopefully one) profiles, for devices conformant to Clause 5, that will meet the needs of a significant market.~~

1. ~~Profile 1~~
   1. ~~Overview~~
   2. ~~Selection of tools~~
   3. ~~Specific profile parameters~~
2. ~~Profile 2 …~~

Modules!

C. (Informative annex) Safety

- Security
- FRER
- …

Updated Timeline:

- New Draft 1.5 to be published before the Plenary

- Go through some sections during the Plenary

- Start the Ballot during the Plenary

- PAR extension at this Plenary

Thank you   Norm for preparing this!!

Thank you!

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