Virtualizing Vehicle Communication

ETHERNOVIA

VIRTUALIZING VEHICLE COMMUNICATION
IEEE P802.1DG

Outline for Draft 1.4

to be ready for TG Ballot before January 2022 Interim
(start ballot by week of Dec. 20th 2021)

2021-12-21 Status update and Ballot start!
Exclusions for Draft 1.4!

- Wireless links of any sort (cellular, wifi, ...)
- Ethernet encapsulation (USB, APIX, ...)
- Environmental Specifications (AEC Q100, temp., EMC, EMI, ...)
- Layer 1 details
- Link Aggregation
- TPMR specifics
- Smart Charge Communication
- OBD to Tester (ISO 13400) details
- Robo-Taxi specifics
- Profile definitions or requirements
Focus on Information not Requirements

• The new draft will focus on discussions and concepts
• Only descriptive, no normative language will be added
• Lessons-Learned from and parallels with:
  • AVnu
  • IEEE P60802
  • AutoSAR

This is the Editor's first work in FrameMaker, please be understanding ;)
Please mainly comment to change existing text with proposals, the editor is well aware of gaps, text proposals on how to fill them are very welcome!
Outline

- **Definitions and Abbreviations**
  - Automotive Terminology (NM, UDS, ...)
  - Time-Related Terminology (align w/ Autosar)

- **Limitations**
  - Availability of GPS, cellular, ...
  - power consumption
  - accessibility
  - start-up times (FMVSS111)
  - assembly line and repair

- **Topologies** (judge and justify network sizes)
  - Domain
  - Star
  - Zonal
  - Daisy Chain
ECU model

• the role Middleware
• Safety and Security boundaries
• Switch/Bridge Management
  • VLAN for security
  • Safe Switch management
  • Discussion of Monitoring
• Considerations for Small-ECUs (camera, display, microphone)
• Considerations for Compute-Platforms (hypervisor)
• Power Modes
• Diagnostics Modes
• “Birth Certificate” - protection from fraud or theft
• Start-Up times
Traffic Types

• Detailed description from contribution
• Reduction to 3 basic types:
  • cyclic/periodic
  • event based
  • reliable data transport

* Debug Traffic - 6.11.4

needs update based on new text in the draft!
Safety & Security

- Discussion of Differences
- Safety Annex D
  - Discussion of CRC32(-P4)
  - Safety at network layer vs. at application layer
  - Discussion on redundancy (CB, 1AS, spanning tree)
- Security Chapter 8
  - Discussion on differences between SecOC, IPsec, TLS, MACsec (start-up, number of keys, multicast, ...)
  - Discussion of possible key exchange protocols (IKE, UDS, MKA, ...) missing! :( 
  - VLANs
  - ACLs and Policing missing! :( 
  - Authentication, Authorisation and Privacy
  - Link-up detection (802.1X) benefits and limitations
  - Attack models
Shapers

• Goals of shaping in the automotive context
  • dangers of retransmission

• Discussion of Shapers - configuration effort
  • TAS modes
  • Qci dependencies missing :(
  • 1722 relation

• Discussion of combination of Shapers (CBS+TAS, ATS+TAS)
• Discussion of combination with Pre-Emption (CBS+preemption, ATS+preemption, TAS+preemption)
• Priority vs. WRR or other selection missing :(
Policing

- Definition
- Strict policing on high-prio and high-BW
- Risks of retransmission
Protocols

• SRP - sub-protocol complexity, security issues
• LLDP - supported TLVs
• DoIP - ISO 13400
• RAP
• Automotive NM
• SOME/IP
• Address Assignment (DHCP, MAAP, P802.1CQ, ...)
• DLT, XCP
Configuration

• Central vs. Distributed
• Dynamic vs. Static
  • semi-static (from a list)
  • defined learning
• YANG vs. ARxml
• Discussion of Service-Discovery
• Role of UDS
Error Reporting

• Metering and counters
• Yang and UDS
Time-Synchronisation

- Discussion of traceability to TAI/UTC (availability)
- Discussion of accuracy (audio, ...)
- Discussion of failure modes (e.g. from AVnu profile)
- Discussion of CMLDS in Domains
- Discussion of differences to Autosar
- Supported TLVs and control messages
- Discussion Rate-Ratio from Sync or pDealy (start-up time)

(IEEE1588-2019, subclause 7.2.1, p.72 / 802.1AS-2020, 8.2.1, p.48)
The closing date of this ballot is:
16th January 2022
The PDF file of P802.1DG/D1.4 can be found at:

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THANK YOU

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