VIRTUALIZING VEHICLE COMMUNICATION
IEEE P802.1DG

Outline for Draft 1.4
to be ready for TG Ballot before January 2022 Plenary
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
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
  - 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
Safety & Security

• Discussion of Differences

• Safety
  • Discussion of CRC32(-P4)
  • Safety at network layer vs. at application layer
  • discussion on redundancy (CB, 1AS, spanning tree)

• Security
  • Discussion on differences between SecOC, IPsec, TLS, MACsec (start-up, number of keys, multicast, ...)
  • Discussion of possible key exchange protocols (IKE, UDS, MKA, ...)
  • VLANs
  • ACLs and Policing
  • 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
  - 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
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)
THANK YOU

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