

The image features a futuristic, glowing blue car with a digital cityscape background. The car is rendered in a semi-transparent, wireframe style, with bright blue light trails and data stream overlays. The background shows a city skyline with tall buildings, all in shades of blue and white. The overall aesthetic is high-tech and digital.

# ETHERNOVIA

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)



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A futuristic, glowing blue wireframe car is shown in a cityscape. The car is composed of a grid of lines and is surrounded by digital light trails and a grid pattern. The background features a city skyline with tall buildings under a blue sky. The overall scene is illuminated with a strong blue light, creating a high-tech, digital atmosphere.

THANK YOU

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