



Activity overview and updates for CVII

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*all information and representations shown are personal understanding and do not necessarily correspond to those of DENSO Automotive Germany, ISO, AUTOSAR or ASAM

Activity overview and updates for CVII

1. ISO Extended Vehicle

2. SOVD – Service-Oriented Vehicle Diagnostics

ISO Extended Vehicle (ExVe)

Background

- Liaison between ISO TC22/SC31/WG6 and COVESA officially established in Q3/22
 - Motivation: Exchange data description concepts and ideally benefit from COVESA expertise on technical level

WG 6 Project team „Data and function description and data catalog“

- VMs: Stellantis, Renault, Toyota | Suppliers: Michelin, Bosch, Denso | Telco: Huawei
- Goals – Investigate the potential for ...
 1. Development of standardized data model (ruleset for syntactic representation) within the ExVe framework
 2. Creation of a standardized data catalog within the ExVe framework
- Underlying question: ExVe API is well defined and standardized, but the content transmitted through the API in regard of data format is not. Is it possible and useful to standardize?

ISO PWI 20077-4

- Officially registered preliminary work item (PWI) incl. an evolving draft document
- The draft document is certainly influenced by concepts of COVESA VSS
 - Basic principles: Data specification, units, value ranges, I/F technical description
 - Signal types: Signals, Attributes, Sensors, Actuators, References, Events, Streams
- [Live preview into draft document](#)



Activity overview and updates for CVII

1. ISO Extended Vehicle

2. **SOVD – Service-Oriented Vehicle
Diagnostics**

Service Oriented Vehicle Diagnostics (SOVD)

*copied from the foreword of the SOVD base standard

- The SOVD Standard provides an API for diagnosing software-based vehicles. It provides uniform access to the diagnostic content of HPCs and their related applications as well as classical ECUs.
 - SOVD follows an HTTP REST based approach. Thereby no automotive specific stack is needed on client side. Due to the flexible type-system used, it provides access to broad variety of content required for HPC diagnostics.
 - SOVD supports the following scope:
 - Capability discovery
 - Reading and deletion of fault entries
 - Reading and writing of data resources
 - Reading and writing of configurations
 - Control of operations (including control of entity states via defined modes and locking of entities)
 - Support of software update
 - Handling of bulk-data
 - Logging data access
- ...

Service Oriented Vehicle Diagnostics (SOVD)

Motivation

- Support of next generation software architectures
- ADAS using HPCs (software-based systems)
- Continuously update of software in the vehicle, which includes also new functionalities
- Analysis of software while running (not simple reading of Error codes)
- Not limited to data use cases, but also considered to process related use cases

Assumptions

- UDS* is still the choice for classic ECUs but will not cover all requirements of future systems
- UDS is not designed to be flexible and requires a static description of content
 - Hard to keep this up-to-date if the vehicle is constantly updated
- Data required for diagnosing SW-based systems does not really fit to today's UDS (byte-)based world
 - Read and filter accumulated and structured logs & traces
 - Read faults and crashes with environment data like e.g. stack traces
 - Install and remove apps, update software
 - Access of terminals
 - Continuously stream logs, traces, metrics and data like e.g. camera input
- **SOVD will not replace UDS, both will co-exist**

* **Unified Diagnostic Services (UDS)** - a diagnostic communication protocol used in ECUs and specified in ISO 14229

Service Oriented Vehicle Diagnostics (SOVD)

Remote

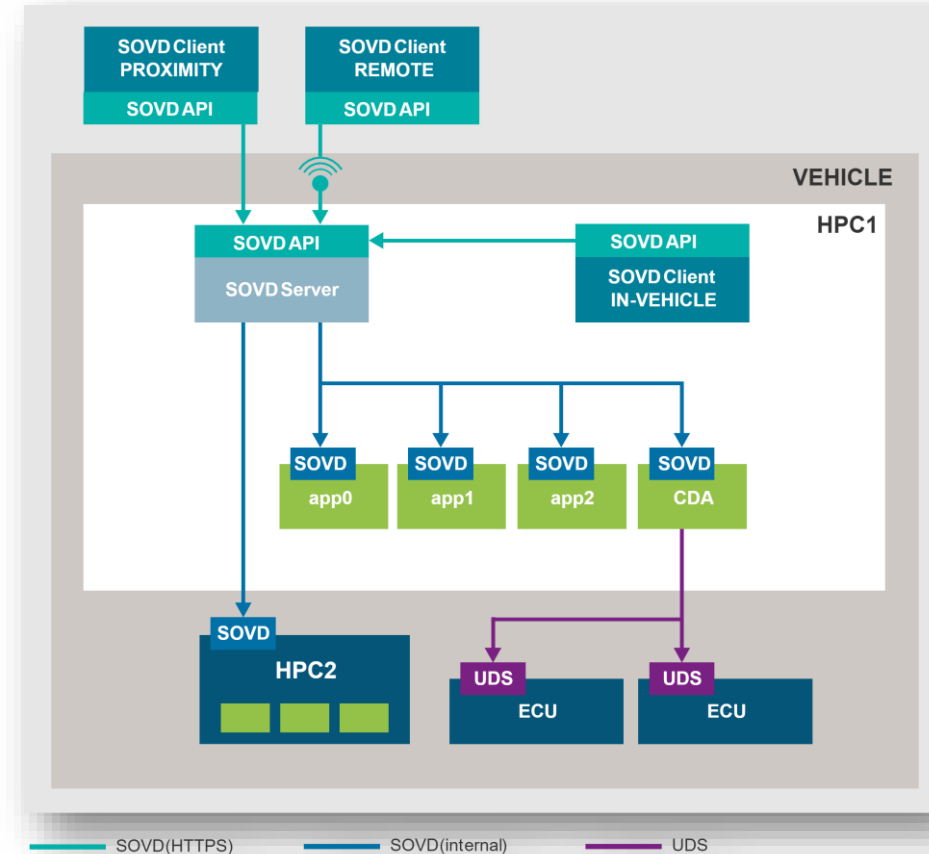
- SOTA
- Backend evaluation
- Fleet management
- Remote assistance (also on roadside)
- Activation on functionality as paid by customer

Proximity

- Workshop / Service
- Manufacturing (e.g. EOL)
- Emission check and ePTI

In-Vehicle

- Monitoring (sporadic errors)
- Predictive maintenance
- Health status access



Service Oriented Vehicle Diagnostics (SOVD)



ASAM*

- Development of Base Standard (BS) started 2018
- DENSO participated in public review with technical comments from DNJP and DNDE
- Base standard released June 2022



AUTOSAR Concept Group SOVD (CONC 704)

- Implementation on AUTOSAR Adaptive Platform (AP)
 - *ara::diag* extension and revision of *AUTOSAR SWS Diagnostic* to integrate SOVD components in addition to UDS
- Project lead: Mercedes Benz | Members: GM, Vector Informatik, Bosch, DENSO, CARIAD

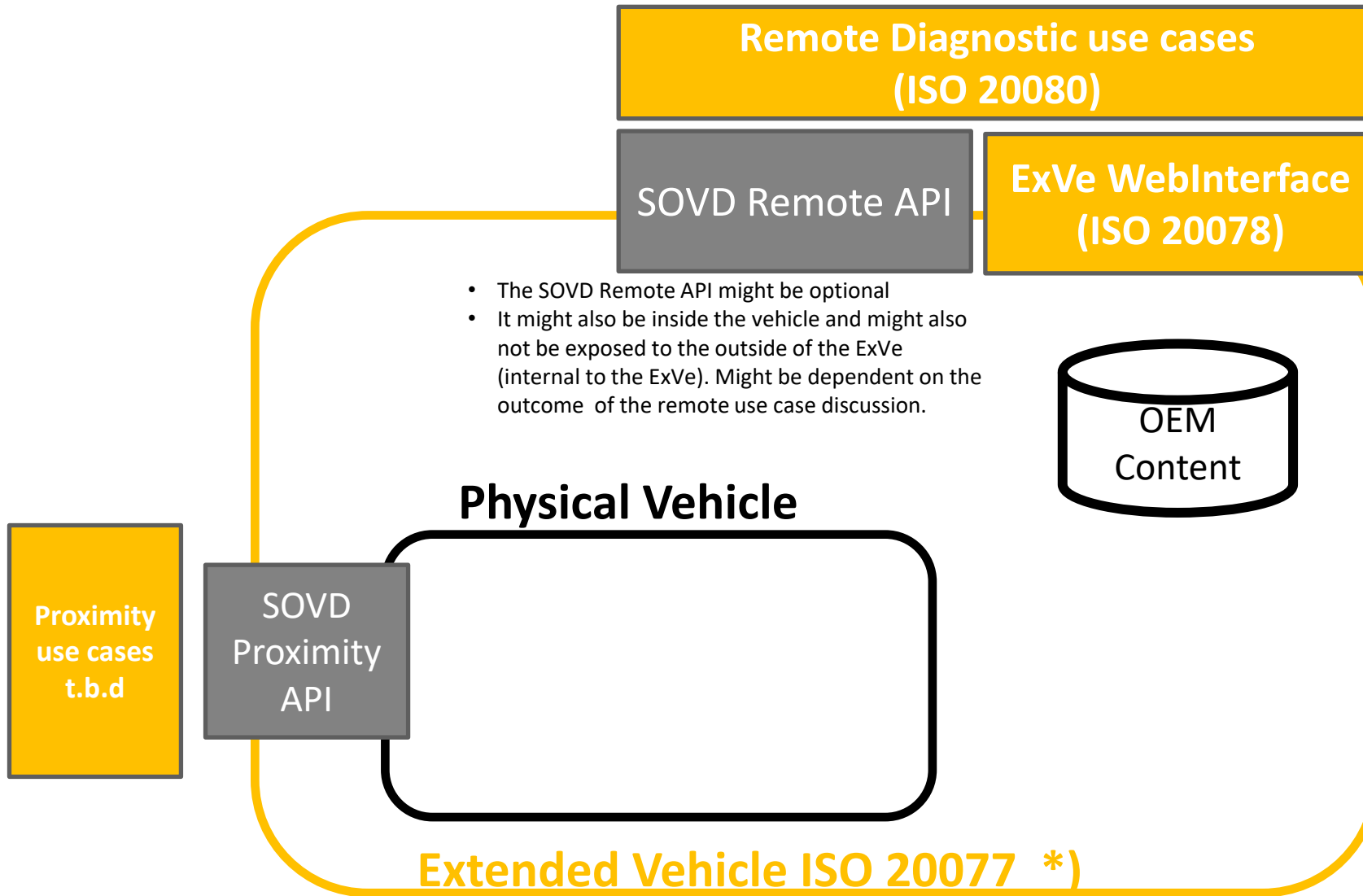


DIN NAAutomobil AA31: ISO 17978-1 SOVD

- ISO standardization (de-facto standard -> de-jure standard)
- Project owner: Vector Informatik

*Association for Standardisation of Automation and Measuring Systems

ExVe and SOVD - bridges (... or walls?)



*) Definition of what is provided on which API according to ISO 20077

DENSO

Crafting the Core