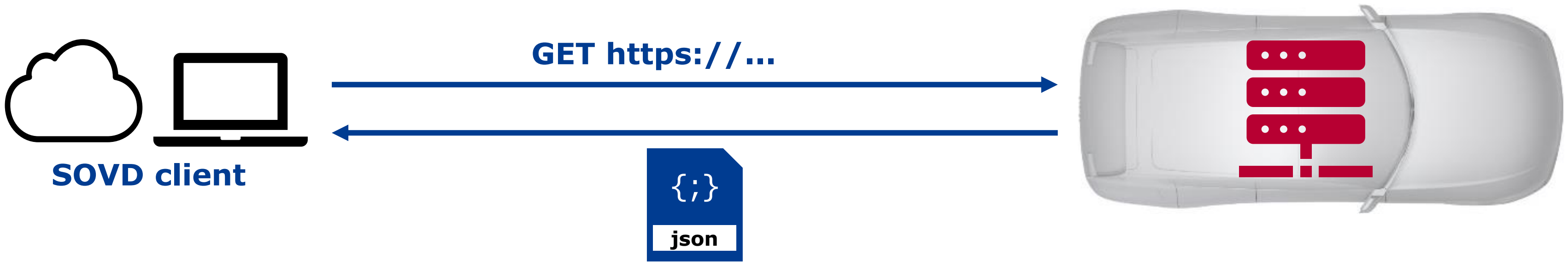
Successful Realization of SDV Diagnostics

ASAM Regional Meeting North America 2025 | October 23, 2025

SOVD Overview

Main principles of SOVD

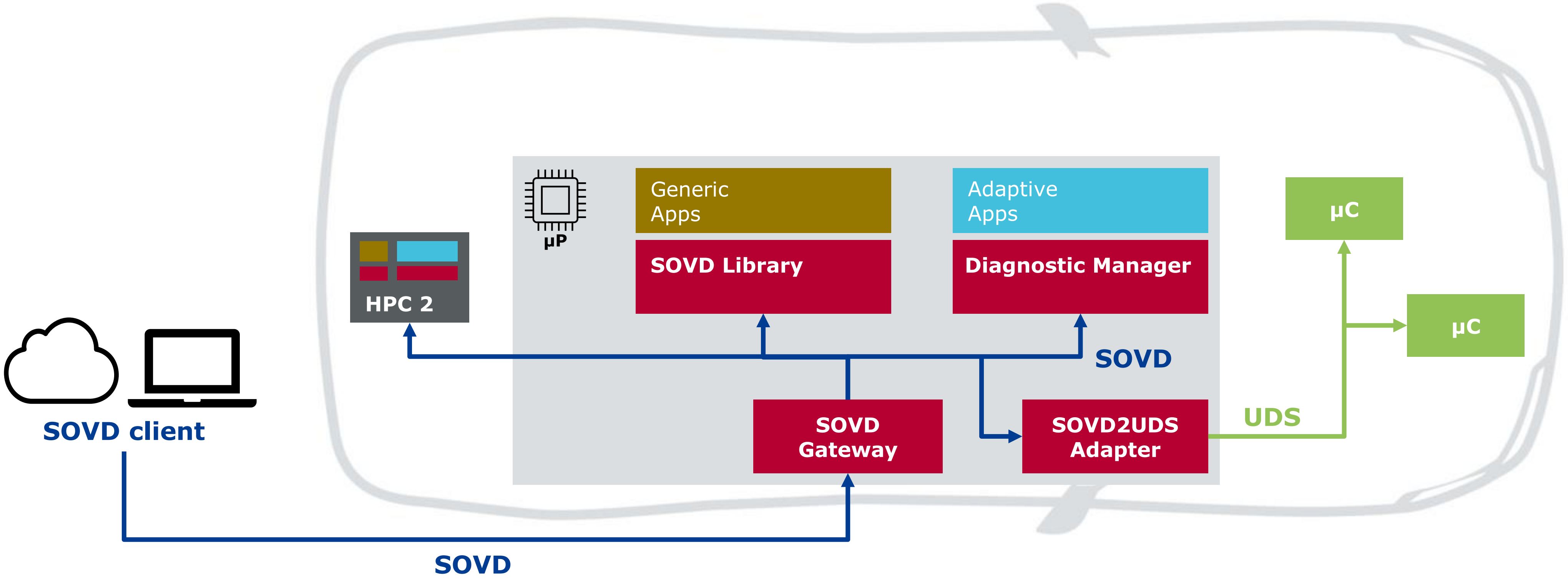
- Vehicle becomes one **REST** server
- Usage of **modern protocols**: HTTPS, JSON, OAuth, OpenAPI, mDNS
- API tree consists of **entities** (e.g. a machine) with **resources** (e.g. data, faults)
- API is **discoverable**
- Data is exchanged **physically** via JSON



Vector’s approach to enabling SOVD realization

In-Vehicle Software

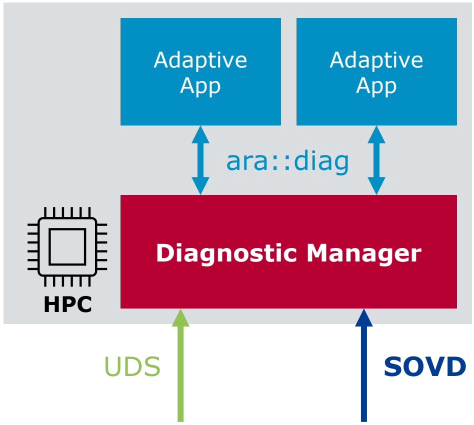
1. **SOVD Gateway** as SOVD edge node
2. **Diagnostic Manager** for Daemon-based approach
3. **SOVD Library** for Library-based approach
4. **SOVD2UDS Adapter** for integrating UDS ECUs



Diagnostic Manager - Introduction

The **Diagnostic Manager** has been extended to support SOVD and therefore is:

- a native SOVD server
- reusing existing port instances for SOVD and UDS **shared** use cases
- introducing new port interfaces for SOVD **exclusive** cases
- coordinating **simultaneous** UDS and SOVD requests
- relying on the AUTOSAR **DEXT** for the configuration



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Diagnostic Manager - SOVD Features overview

The **Diagnostic Manager (DM)** natively supports the following SOVD methods:

	SOVD Feature	Description	Matching UDS Service (if applicable)
Handled via interface to application	data	Read/Write data	$22, $2E
	configuration	Read/Write configuration	$22, $2E
	faults	Read/Clear Fault memory	$14, $19
	operations	Execution of operations	$31
	modes/communication_control	Set Communication Control	$28
	logs*	Get/control logging	
	updates*	Prepare/Execute/Delete updates	tbd
	bulk-data*	Download/Upload of bulk-data	tbd
	authorization	Authorization of Oauth tokens	Shared role model as $29
	proximity challenge	Validate Proximity Challenge	-
Handled internally by DM	modes/control_dtc_setting	Set DTC Setting	$85
	data-lists	Dynamic data composition	$2C
	locks	Semaphore for exclusive SOVD access	-
	docs	Receive OpenAPI doc	-
	capability discovery	Discovery of available SOVD resources	-

*Concept under discussion by AUTOSAR for R23-11

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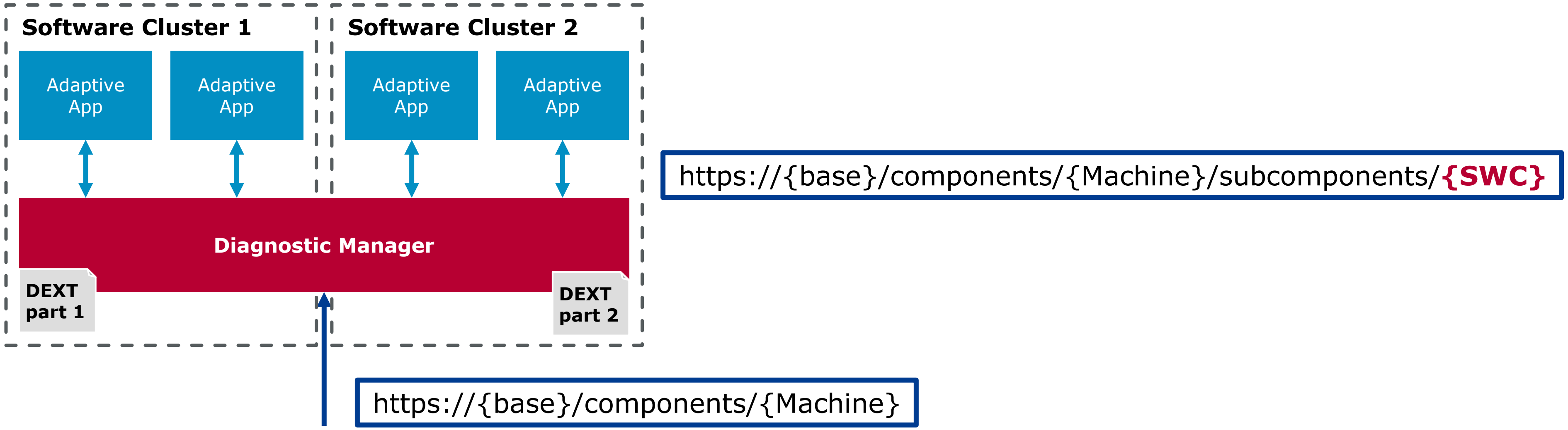
Diagnostic Manager - Configuration Approach

The **Diagnostic Manager** is configured using the Diagnostic Extract Template (DEXT).

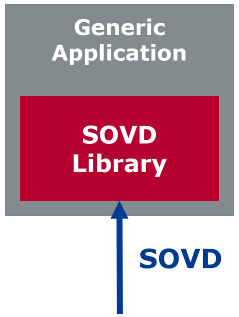
The DEXT is splitable and allows for diagnostics wise self-describing SW-Clusters.

Each Software Cluster is represented by a separate subcomponent that spans up its own namespace to allow for independent developments within each cluster.



SOVD Library - Introduction

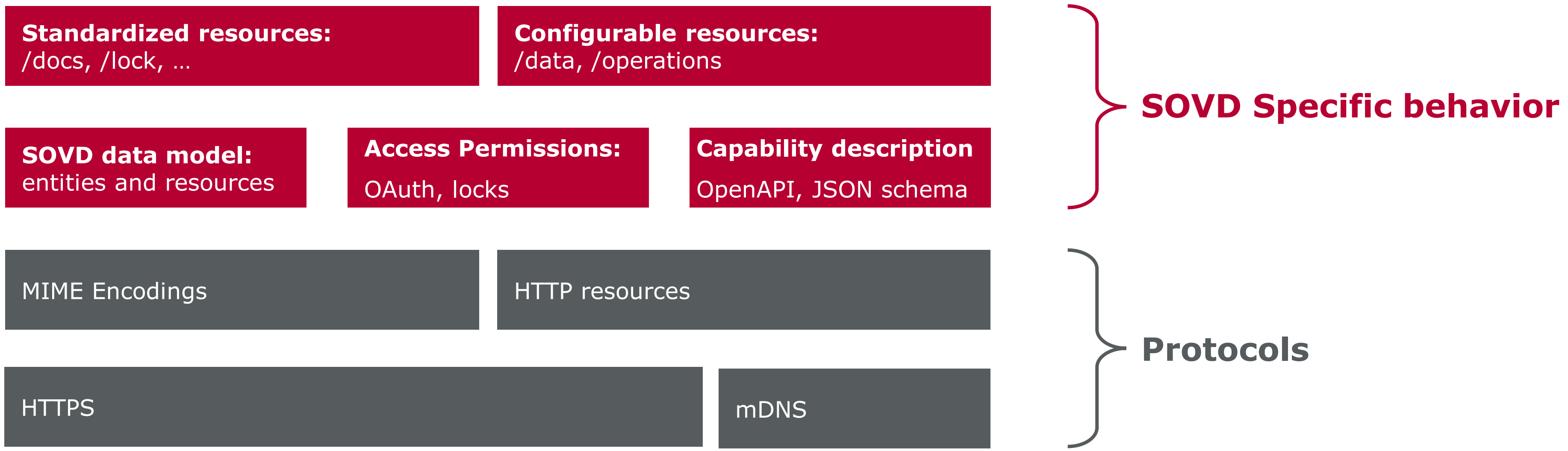
The **SOVD Library** enables generic applications to realize an **SOVD server**.



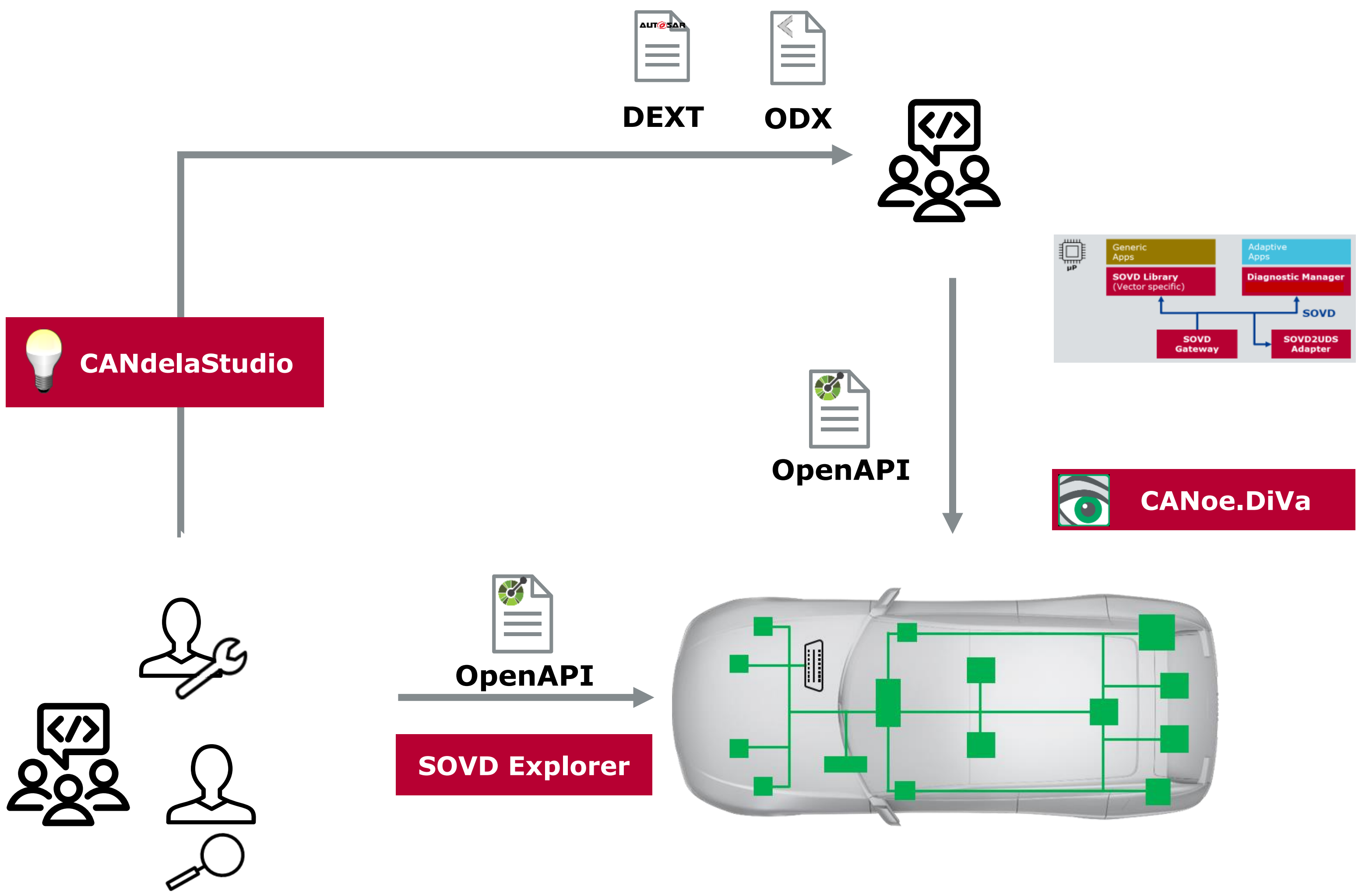
SOVD Library - Feature Set

SOVD Library realizes:

- Basic protocols for SOVD
- SOVD specific features

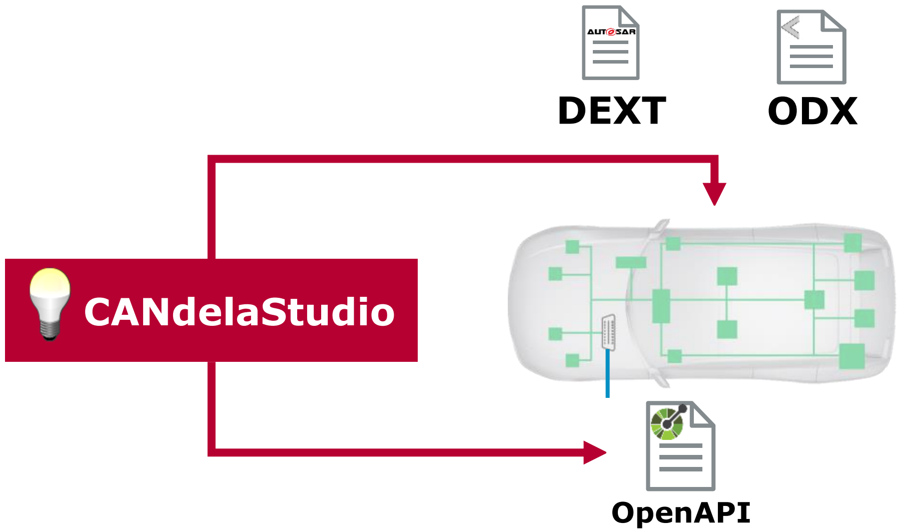


Diagnostic Authoring, Validation, Usage Workflow



Diagnostic Authoring

Vector CANdelaStudio to **specify** the SOVD-API



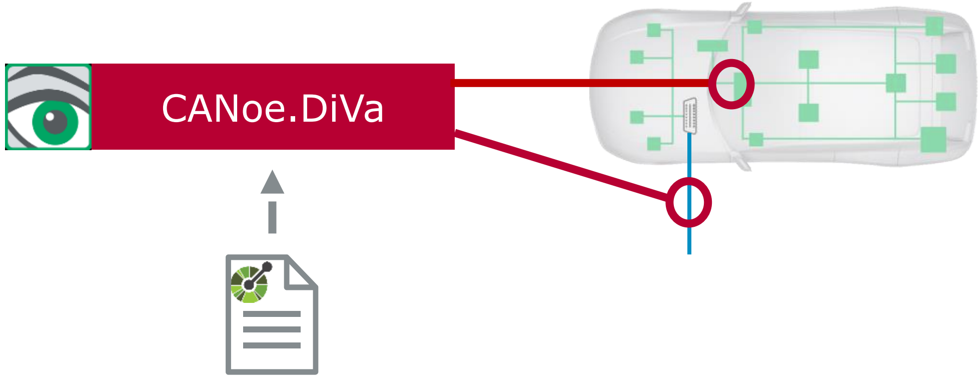
Specification of **SOVD** and **UDS** in one tool, support **fade-in** of SOVD on component level

Configuration of the in-vehicle implementation by standardized data-formats

Ensure availability of **process relevant** data by **template concept**

Diagnostic Validation

Vector CANoe.DiVa to **validate** the SOVD-API



Offline Capability Description (OpenAPI)

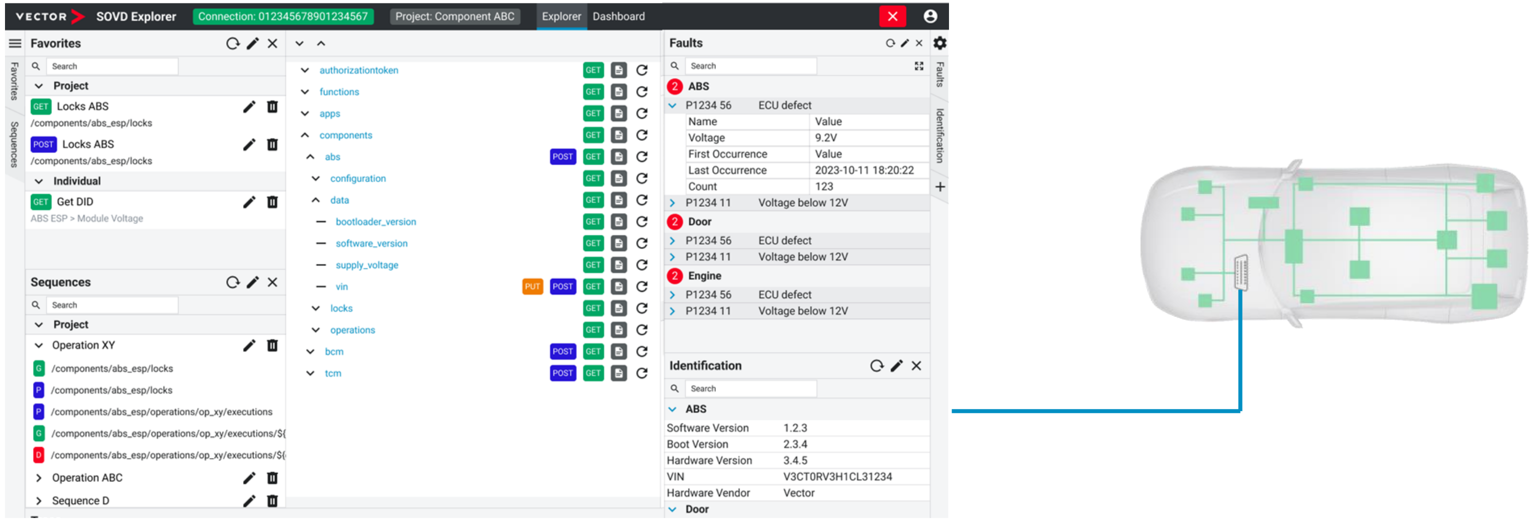
Automatically achieve a **reproducible**, high **test coverage** of the API

Ensure **compliance** of the API with the **specification** and the **SOVD standard**

Validate the **consistency** of **in-vehicle** communication and the **external** SOVD API

SOVD Client

Vector SOVD Explorer to conveniently **interact** with the SOVD API of a vehicle



Native access to the SOVD primitives, provide **full details** if required

Convenience functions based on the SOVD API Semantics, such as automatic discovery and navigation

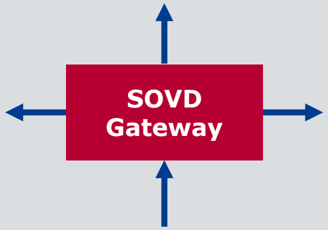
Conveniently build **specifies views** for **dedicated use-cases**

Summary

Vector's SOVD In-Vehicle Product Portfolio

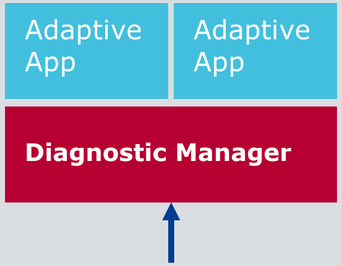
SOVD Gateway

- SOVD edge node
- Routing towards internal servers



Diagnostic Manager SOVD Extension

- SOVD with AUTOSAR methodology
- One application interface for SOVD and UDS

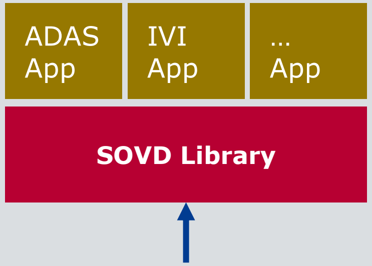


SOVD2UDS Adapter

- Incorporates UDS into SOVD

SOVD Library

- Embedded SOVD library
- Easy incorporation of non-AUTOSAR components



Vector's Tool Chain

Design and Specification
of the Diagnostic interface
using **CANdelaStudio**

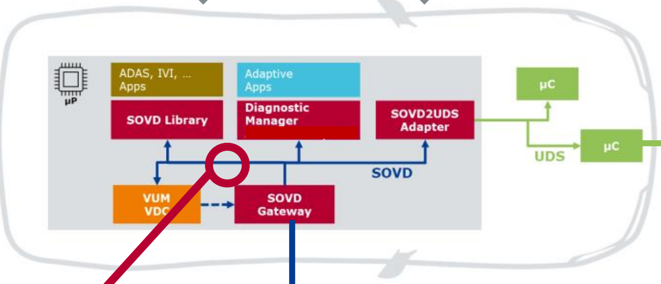
CANdelaStudio

DEXT

ODX

OpenAPI

In-Vehicle SOVD implementation
based on MICROSAR.Connect



SOVD2UDS Adapter

SOVD Explorer

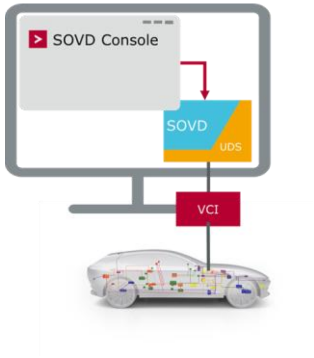
CANoe.DiVa

Test and Validate the SOVD API
using CANoe/ CANoe.DiVa

Next Generation Diagnostic Applications based on SOVD inside the vehicle or an offboard SOVD2UDS Adapter

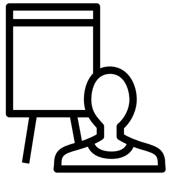
Vector’s Implementation Processes

- Hands-on experiences with SOVD to establishing SOVD-based processes:



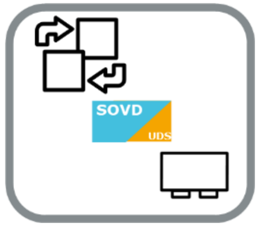
Evaluate SOVD with UDS based vehicles

SOVD Starter Kit



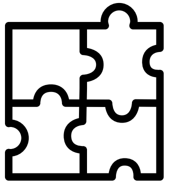
Build up in depth know-how for SOVD

SOVD Training



Jointly evaluate SOVD for a set of ECUs

SOVD PoC Projects



Define the future SOVD based process

SOVD Introduction Projects

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