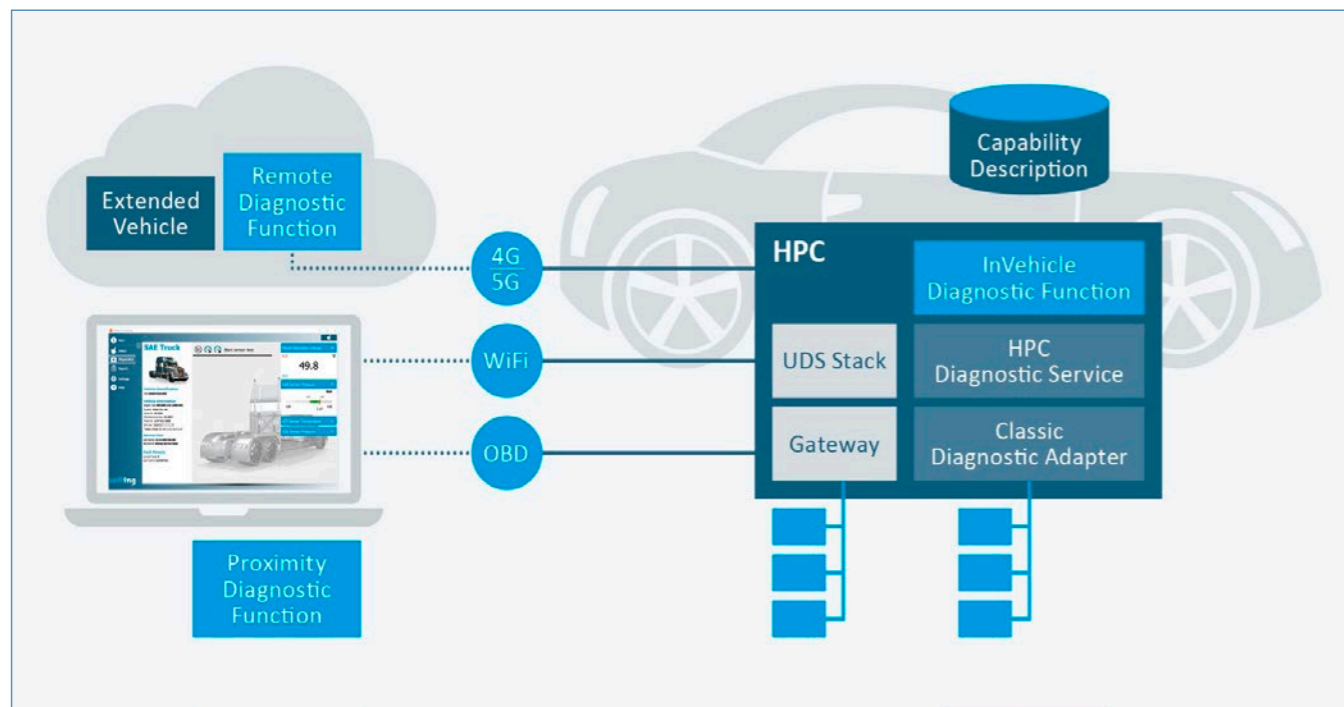


The Changing World of After-Sales Diagnostics

The Challenge of Workshop Solutions with Software-defined Vehicles – SOVD in Action

By Oliwier Sochor, product manager for after-sales diagnostics at Softing Automotive Electronics GmbH

In modern vehicles, comfort, safety, and efficiency are increasingly defined by software. Due to the increasing amount of software in vehicles, there is a clear trend toward high-performance computers (HPC) that provide the necessary computing power and serve as an integration platform for the ECUs that have been replaced. This technological evolution is changing not only the vehicle itself, but also what is required in terms of diagnostics.



Standardized Vehicle Access: Proximity, Remote, In-Vehicle

SOVD (Service Oriented Vehicle Diagnostics) is a new standard that defines a uniform communication interface between vehicles and external diagnostic systems. Softing TDX is the perfect solution for keeping pace with the new system architecture and successfully supporting change in after-sales.

SOVD – The Diagnostic Standard for Software-Defined Vehicles

The SOVD standard describes a service-oriented programming interface (API) for a diagnostic system integrated in the vehicle. The SOVD server running on an HPC

there provides standardized diagnostic functions that can be controlled by a repair shop tester. SOVD massively reduces interface complexity and creates the basis for uniform processes throughout the entire vehicle life cycle. Various use cases can be addressed:

- Diagnostics on site on the vehicle (proximity)
- Remote access, e.g., for expert support from technical centers
- In-vehicle diagnostics, e.g., for continuous state monitoring (Vehicle Health State)

Diagnostics Remains the Core Task – But is Undergoing Fundamental Change

Classic diagnostic tasks such as reading error memories, software updates, parameterization, and commissioning are also part of the standard repertoire for service-oriented diagnostics. However, SOVD fundamentally changes the diagnostic architecture: GUI, business logic, and all repair and maintenance-related content (e.g., instructions, videos, warehouse connection) remain in the tester. The connection to administration systems (e.g., warehouse logistics, invoicing) will also continue to be handled by the tester.

The diagnostic system, including processes (OTX), diagnostic communication (ODX), and protocol handling (D-PDU API), is being relocated to the vehicle. SOVD provides the API for such a system. Since an SOVD server in a vehicle must map different installation variants and diagnostic functions are subject to change during a vehicle's lifetime, parameterization via configuration data is very efficient. In practice, reusing diagnostic data from ECU development makes release handling extremely easy. The integration of additional information sources, such as other HPCs or intelligent sensors, is also possible in this way.

Tester development is therefore undergoing fundamental change: In future, the tester will rely on existing processes in the vehicle instead of freely defining ECU communication. Repair shop diagnostics must therefore be clearly defined during vehicle engineering in order to integrate the correct diagnostic tasks in the SOVD server. Cooperation between engineering and after-sales will become much closer.

SOVD Brings Momentum – New Requirements for Data Processes and Variant Management

The introduction of SOVD fundamentally changes update processes: In addition to the ECUs, the diagnostic component integrated in the vehicle (SOVD server) must also be updated and parameterized regularly. Changes to individual components often have a direct impact on diagnostic capabilities. Smart rollback strategies are therefore essential for parallel software updates. A major advantage: All diagnostic information is stored in the vehicle – the distribution of ODX data is no longer necessary.

At the same time, the separation of the tester and the diagnostic system leads to a growing diversity of variants. Different software versions and parameter settings on both sides create numerous possible combinations in the field. Well-thought-out variant management is necessary to ensure that diagnostics remains efficient and future-proof despite increasing system complexity:

- Standardized parameterization specifications help to ensure consistency in return data.
- Dynamic diagnostic procedures enable vehicle-specific functions to be queried during runtime and responded to flexibly.
- Targeted version changes should be planned and implemented carefully, e.g., with automatic switching logic in the tester to ensure compatibility.

- Robust configuration management ensures clarity about which tester and vehicle variants are compatible with each other.

Softing TDX Unites the Old and the New Diagnostic World

Since existing fleets use classic ODX/UDS-based systems, while new vehicles are already based on SOVD in addition to transfer control units, the reality in repair shops will remain hybrid for another two decades. Consequently, an after-sales solution is required that can map both the new and old worlds. This is exactly where Softing TDX comes in. The tool suite essentially consists of three components:

- Softing TDX.studio: Creation of diagnostic procedures, GUIs, and business logic
- Softing TDX.server: Cloud-based management of software versions, diagnostic data and content, roles and rights as well as licenses, return of diagnostic data and information from the field
- Softing TDX.workshop: Use in the repair shop

To support the hybrid approach, Softing TDX.workshop features an adapter below the business logic alongside the integrated diagnostic system (Softing SDE). This enables the integration of various remote diagnostic systems. The approach has already proven itself as Softing SDE is a diagnostic system already in use in vehicles today. Various variants and diagnostic systems can be abstracted in the adapter, so that only minor adjustments are necessary to the business logic. This means that existing software components are not affected by adjustments for new vehicles, which makes approvals much easier.

The Future is Service-Oriented – And Hybrid

After-sales diagnostics is undergoing fundamental change. With SOVD, IT-related concepts are finding their way into vehicles, enabling new, service-oriented applications. Softing TDX provides the right technology to successfully master this change: tried and tested, hybrid, cloud-enabled. For repair shops, this means even more efficient repair and maintenance processes – today and in the future.

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