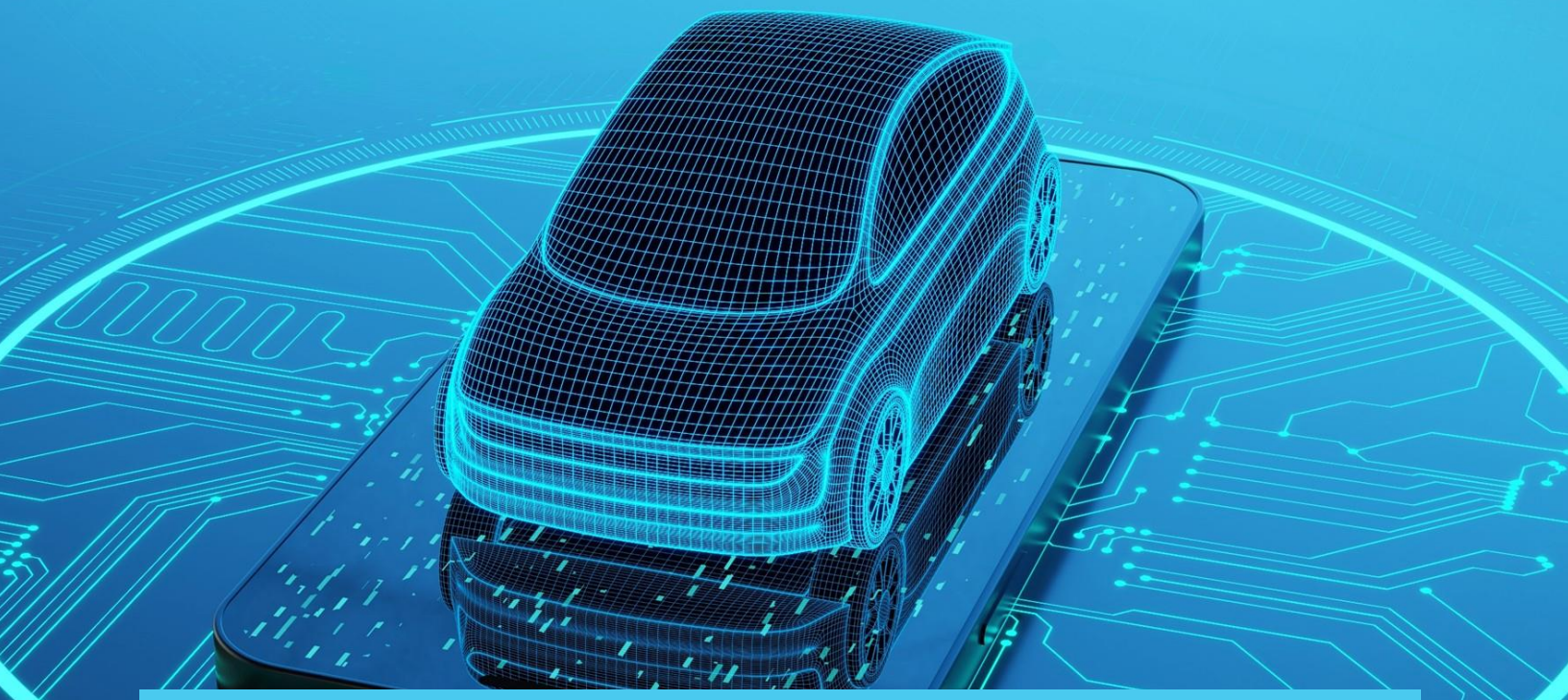
Diagnostics of Software-Defined Vehicles (SDV)



^ Source- Deloitte

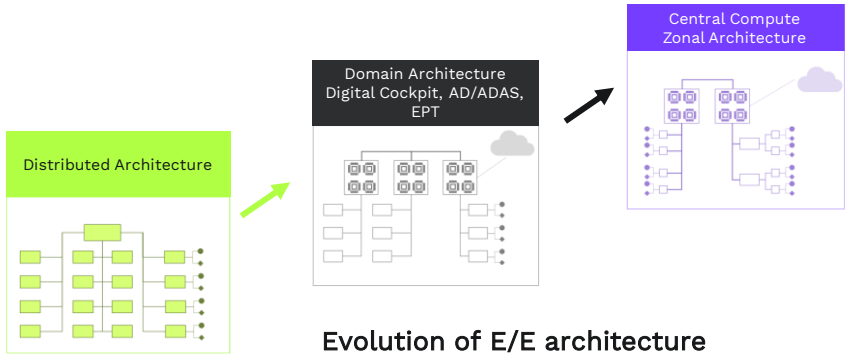
^ The software-defined vehicles transformation will be an inexorable trend driving the development of the automotive industry over the next 5-10 years.

However, this transition isn't going to be straightforward, and will require new thinking, new technologies and new business models.

The SDV approach follows a reverse development chronology compared to traditional vehicles. The software architecture anchors the vehicle development process and defines and shapes the hardware around it- a clear departure from the existing methodology that involves integrating software into a pre-defined vehicle architecture.

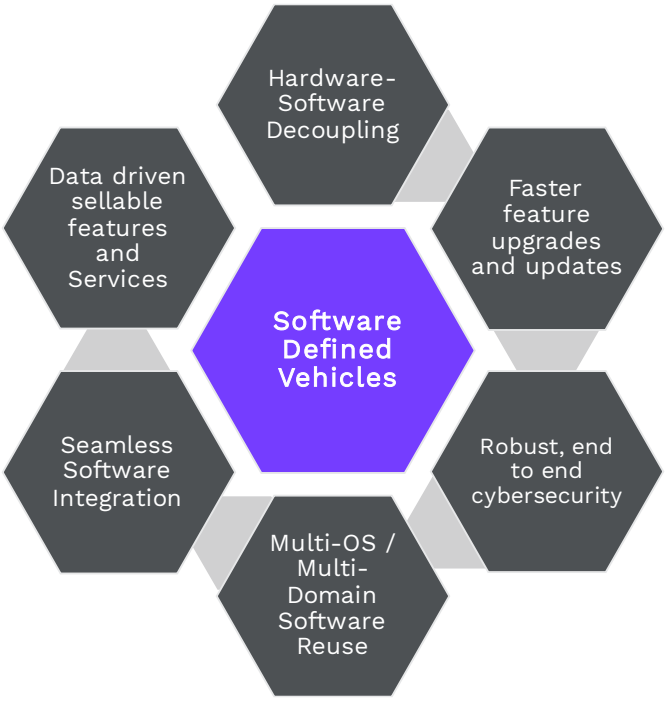
Automotive OEMs are already aligning their strategies with SDV concepts and have started transitioning to central compute-zonal vehicle architectures.

Most of them are targeting MY25/MY26 to be software-defined.



Evolution of E/E architecture

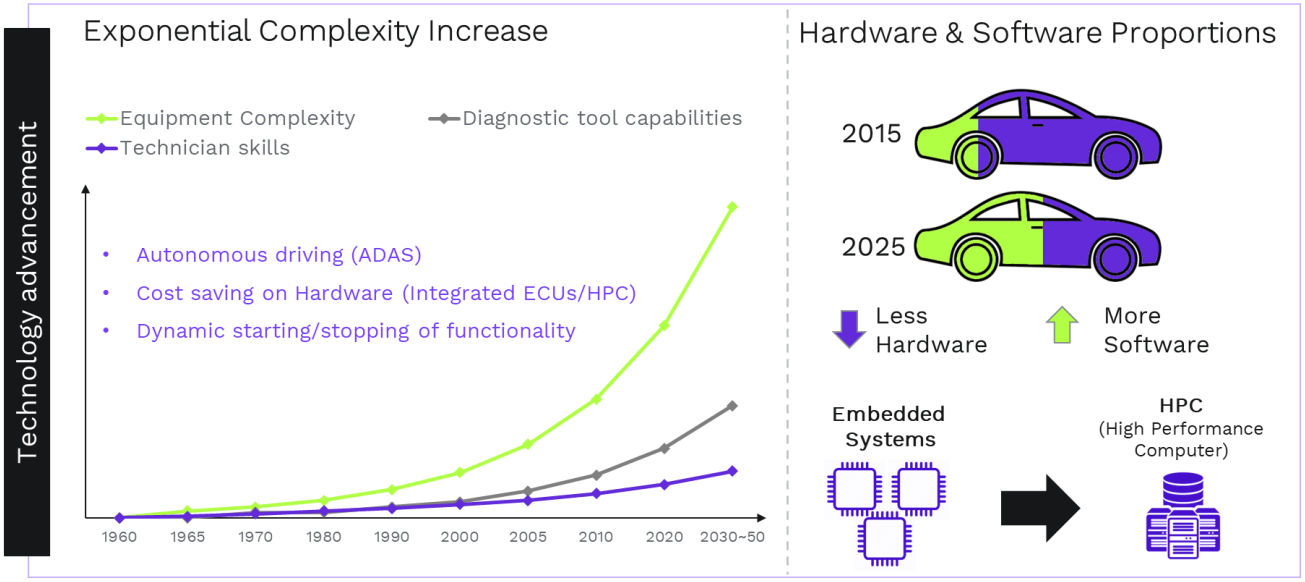
Future Vehicle Architectures- The Needs of SDV



Software-defined vehicles with software centric integration need new integration workflows, tools & methodologies.

The transformation of electronic vehicle architecture toward centralized high-performance computers also necessitates **changes** in **diagnostic procedures** and **standards**

The motivation for next-gen diagnostic standards



A software-defined vehicle will feature higher levels of autonomy and interconnectivity with smart external environments and systems, which in turn will demand much higher levels of processing and computing capabilities, compared to what's prevalent today. That's how & why high-performance computers (HPCs) become pivotal and critical to the realization of SDVs.

From a diagnostics standpoint, while existing diagnostics standards focus on detecting malfunctions of sensors, actuators or their circuits and ECU interconnections via bus systems, the **software-driven vehicle**, powered by HPCs will warrant an **analysis** & **diagnosis, fix** and **post fix validation** of the **software running** on the **HPCs**, in addition to hardware system diagnosis- leading to the definition of a new diagnostic standard.

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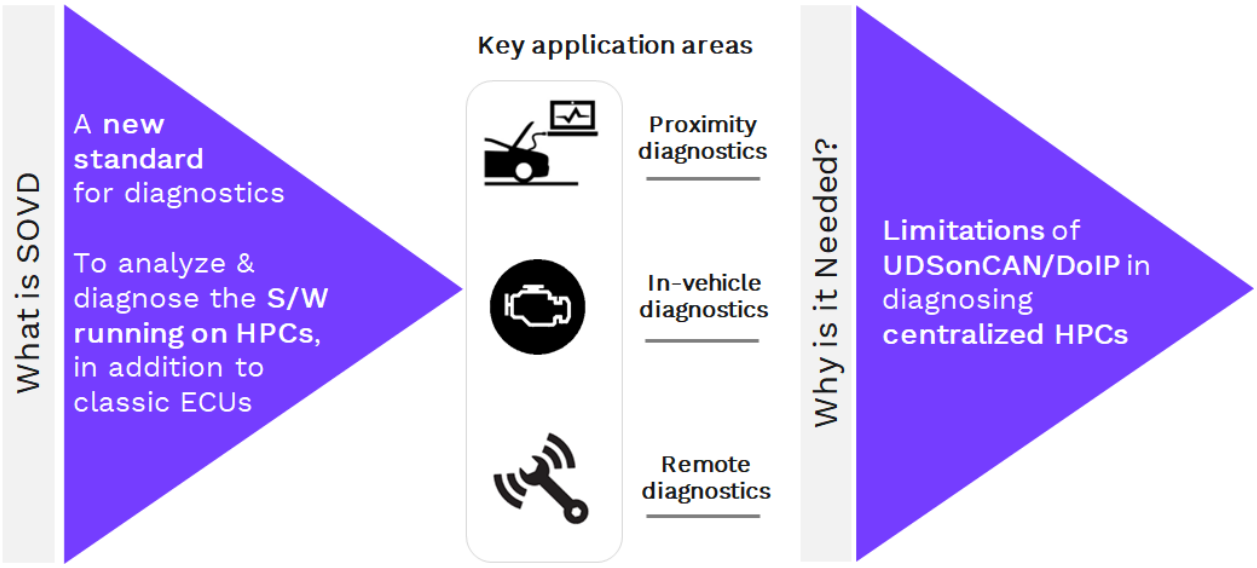
The New Standard | SOVD

Service Oriented Vehicle Diagnostics (SOVD) is being currently standardized by ASAM as an interface that will fulfill the needs of software-defined vehicle architectures and enable the diagnostics of future high-performance computers (HPCs).



What makes SOVD the diagnostic standard for the future?

Covers software too
Existing Diagnostic Protocols like UDS are capable of diagnosing mechanical/hardware issues, only. It does not cover diagnosis of software which is already an integral part of the modern vehicle with applications for ADAS, Infotainment, etc. Whereas SOVD offers a comprehensive infrastructure to hardware and software system diagnostics.

Dynamic and flexible
Existing systems using static descriptions are not flexible enough. To cover diagnosis of software, dynamic descriptions are needed to provide more information during runtime like e.g., Logfiles from different applications

Future E/E architecture oriented
Diagnostics of futuristic E/E architecture needs to scope in Software-based systems like HPCs, and perform software-centric actions like:

- Install, remove or rollback apps
- Retrieve software logs for RCA like stack traces, kernel-dumps, ...
- Configure applications & their log levels
- Access diagnostics remotely

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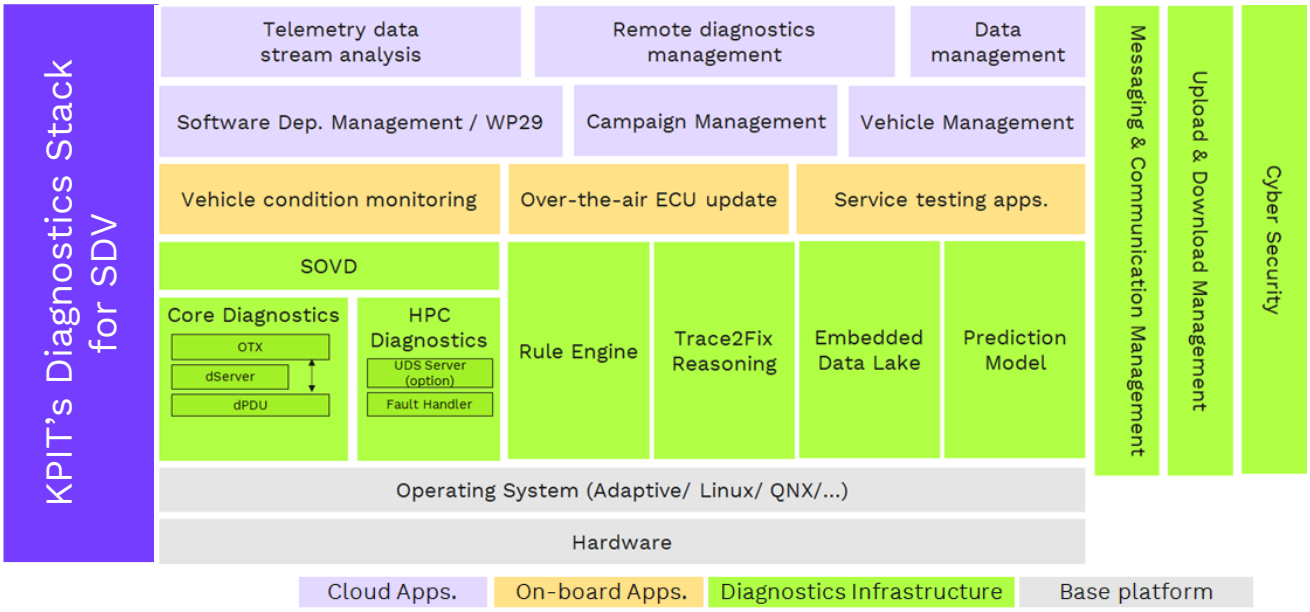
KPIT's SDV Diagnostics Approach

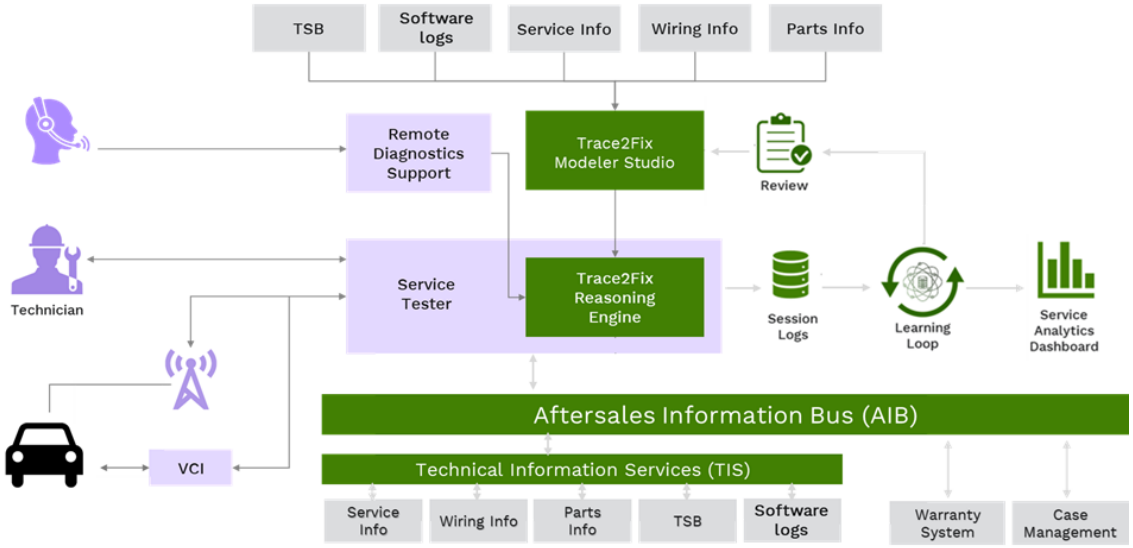
KPIT is a part of the ASAM-SOVD working group and is realigning its solutions to accelerate the transformation toward software-defined vehicles.

KPIT's **Diagnostic runtime environment** combined with **innovative on-board** & cloud-based analytics solutions forms the foundational building block of a service-oriented diagnostics solution for SDVs, and can provide:

- **Software modules** to help OEMs realize SOVD-compliant ECUs
- **Battle-tested software stack** leveraging existing standards (ODX, OTX, D-PDU API)



KPIT's **failure event prediction framework** enables real-time acquisition and monitoring of software operations and can diagnose the failure and rectify it as needed.



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