

Perspectives on Service Oriented Vehicle Diagnostics (SOVD)

Syed Shihab Ullah
General Motors

28 October 2021

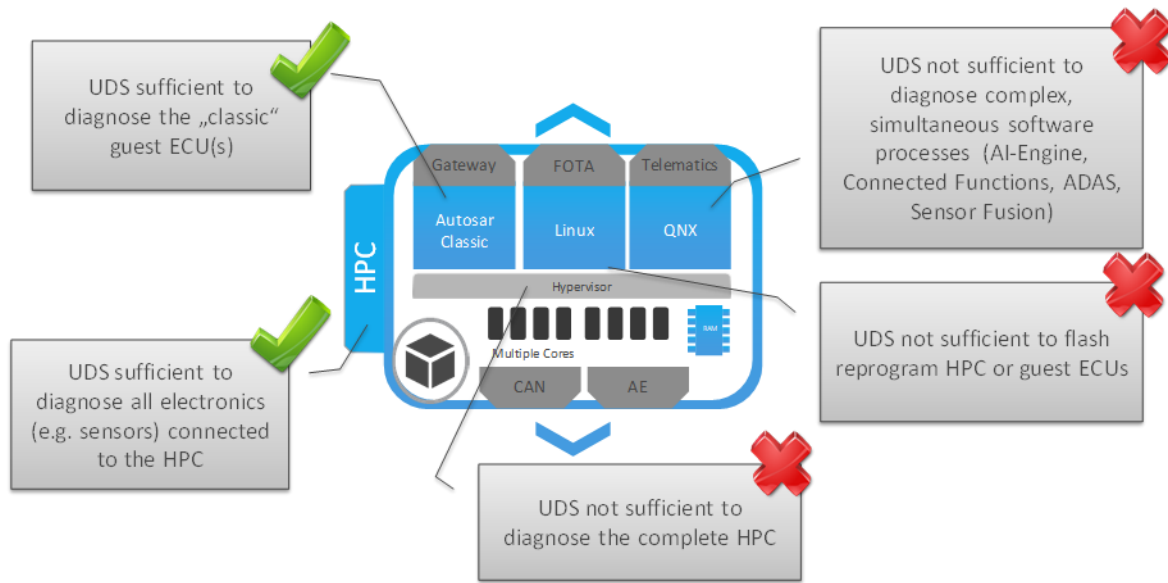


Agenda

- Service Oriented Vehicle Diagnostic (SOVD) Concept Overview
- SOVD Development within AUTOSAR Platform
- SOVD from User Perspective

Service Oriented Vehicle Diagnostic Concept Overview

Motivation



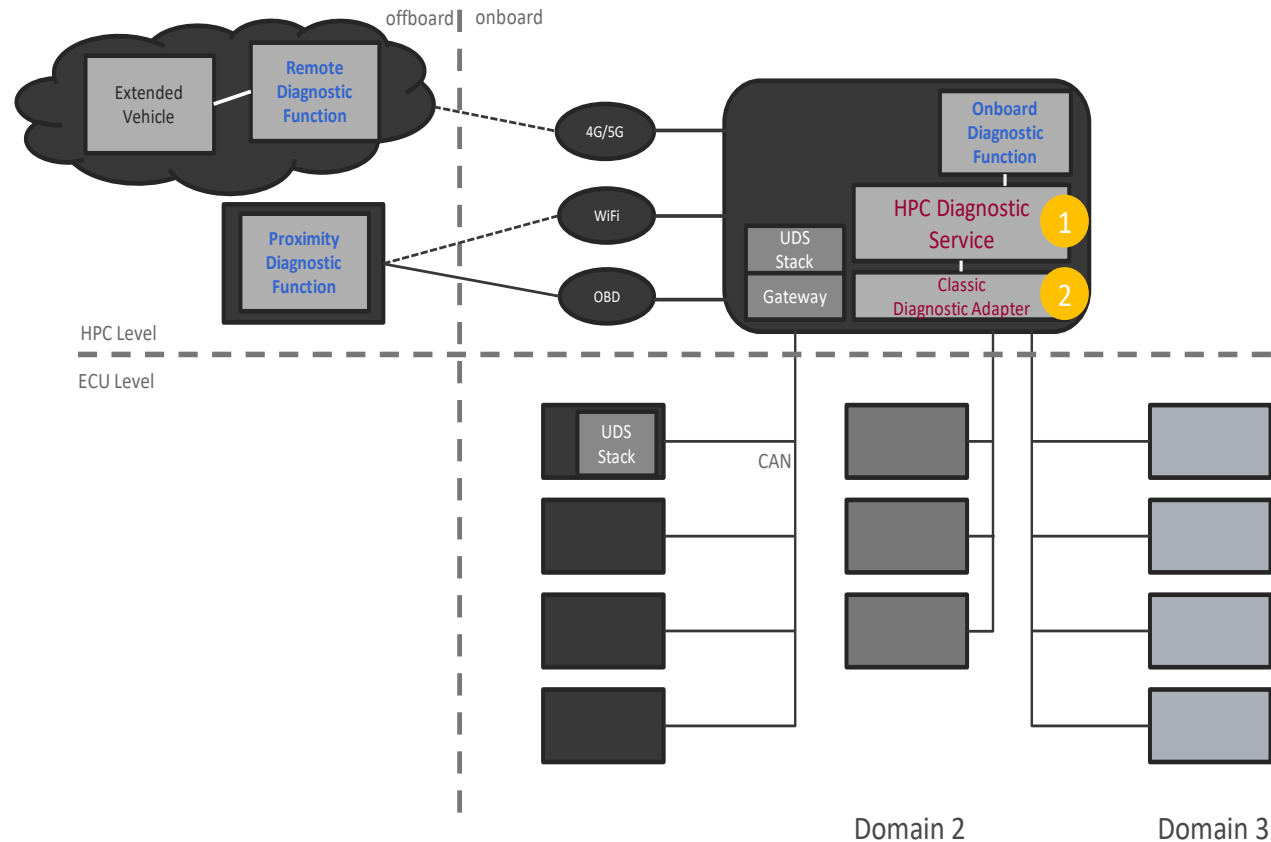
New needs demand new technology, to evaluate whether we can go beyond UDS capabilities!



- Classic AUTOSAR based ECUs currently rely heavily on **UDS protocol** for diagnostic functions.
 - **ECU centric Diagnostic** approach that supports -
 - Physical/Functional Fault Detection and Access
 - Parameter/Memory Read
 - Cybersecurity functions
 - IO/Routine Control
 - Programming (Software/Calibration) etc.
- Autonomous and similar applications introduced a new breed of ECUs (HPCs) which can support **multi-core, multi-threaded computing** where –
 - **Multiple Processes and applications** can run within the machine
 - **Feature/functions** are distributed across **multiple virtual applications** (system within a system), which can run as part of the same process (no longer tied to an ECU)
 - Fault detection and logging needed not only for electronics, but also for **software processes**.
 - Systems/Sub-systems require **rapid updates** to meet market demand.

Service Oriented Vehicle Diagnostic Concept Overview (cont.)

Concept Highlights

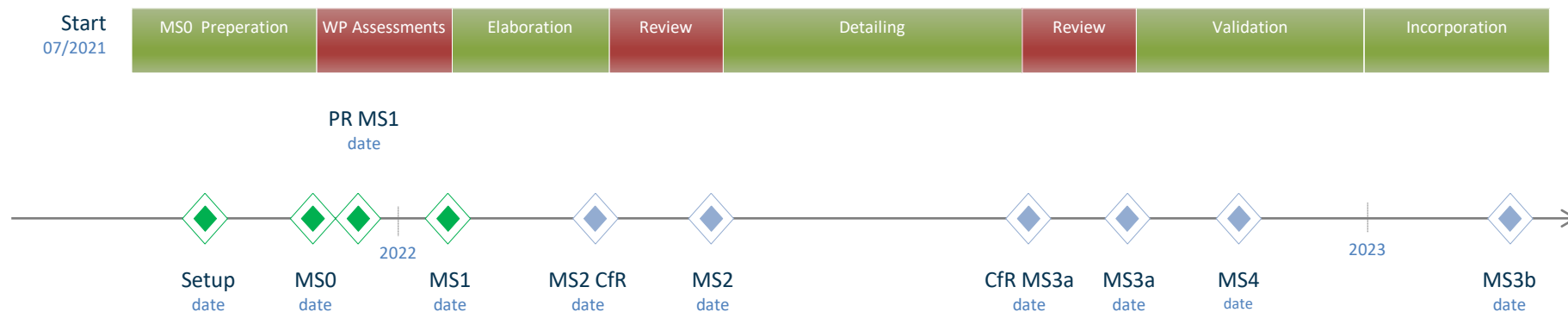


- Supports **Service Oriented Diagnostic Communication (REST API Based)**
- Supports **existing features** from UDS (Data/Fault read, programming etc.) and beyond
- Allows the flexibility to choose one HPC or multiple HPCs as the **centralized diagnostic access point** for the vehicle
- Allows **translation of service-oriented communication to UDS requests** to support existing Classic AUTOSAR based ECUs.
- Allows **context-based diagnostics access** (ECU, domain etc.)

SOVD Development within AUTOSAR Platform

Project Status

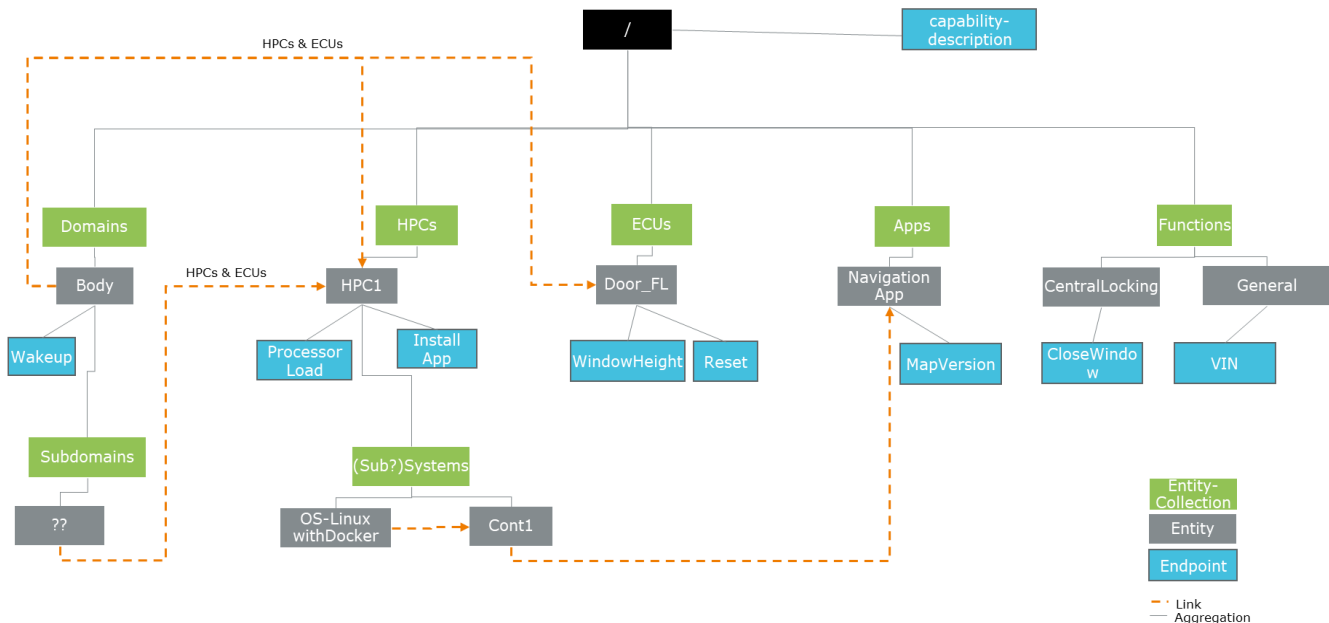
- Concept 704 (Service Oriented Vehicle Diagnostics) was introduced in AUTOSAR consortium in **2020** to comprehend the ideas of SOVD within AUTOSAR Framework.
- AUTOSAR SOVD Workgroup was kicked off in **July'2021**. Currently, multiple OEMs and Tier1/Tier2 suppliers are participating in the WG on bi-weekly basis. Collaboration sessions were established with ASAM SOVD WG.
- As per initial plan, draft requirements were expected to be released in **R22-11 (due date Nov'2022)** whereas Final valid release is expected in **R23-11** release.
 - There is a sense of urgency here, as **MS0** is expected in **Q1'2022**.
 - Release and Gate review timeline will be finalized **by end of this year**.



SOVD Development within AUTOSAR Platform (Cont.)

Current Focus and Challenges

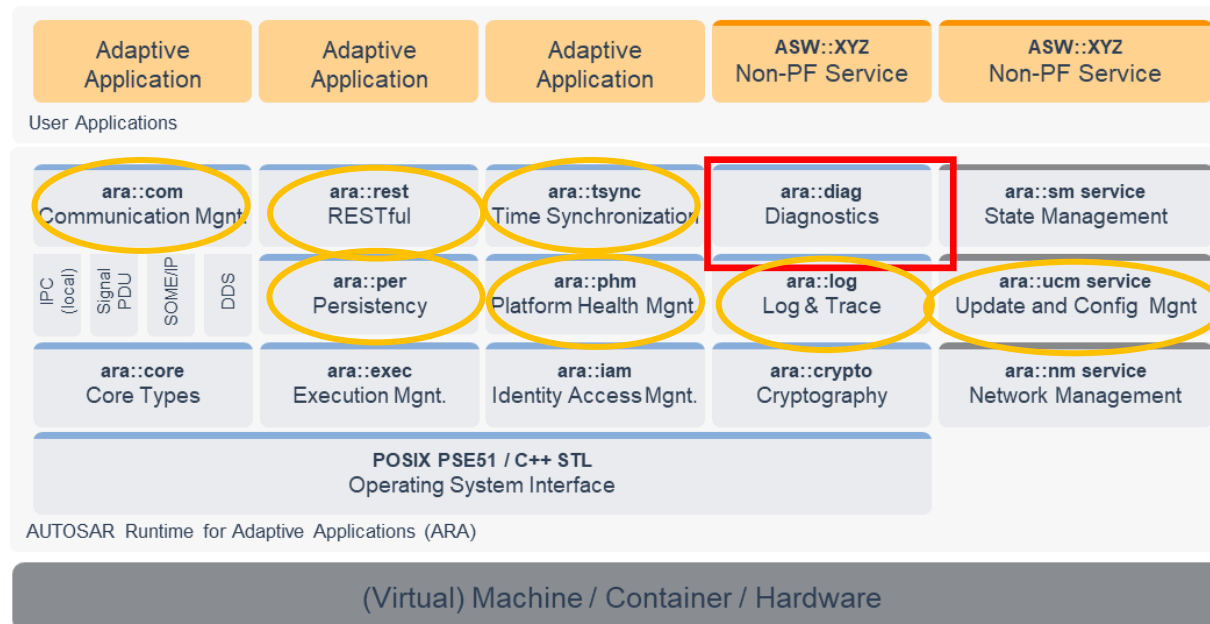
- Current development focus on **Adaptive AUTOSAR platform**.
- The team is engaged in understanding **ASAM Use Cases** better and map the required functionalities to **existing Diagnostic Manager (DM) Functions (and find new development opportunities)**.
- A few key challenges –
 - Deciphering functional **requirements laid out by ASAM** and translating them into implementable requirements within **AUTOSAR design paradigm** (example: definition of 'entity' and how 'entity' specific information can be gathered, or software updates could be pushed).



SOVD Development within AUTOSAR Platform (Cont.)

Key Challenges (Cont.)

- Identifying **dependencies** with other functional clusters.
- **Standardization of Classic AUTOSAR Adaptors** (that allows to translate service based requests to UDS requests for Classic AUTOSAR ECUs) and defining interactions with existing Classic AUTOSAR based ECUs
- Ensure **backward compatibility** etc.



SOVD from User Perspective and Future Outlook

- An **industry standard solution** like 'SOVD' was needed '**Yesterday**' for OEMs and Suppliers alike (we're already late in the game!)
- Due to market demand to support growing need of large computing platform, there is a **possibility** that OEMs/Suppliers would produce their **unique solutions** before SOVD is **formalized and released**.
 - The **future challenge** would be **aligning the industry with SOVD paradigm** and find opportunities to improve on the capabilities offered by the concept.
- Successful execution of SOVD demands not only '**technological**' changes but also '**Mindset**' shift as well.
 - Tools Chain update
 - Cloud Capability update
 - OEM and supplier alignment
 - Functional lane alignment (Service, Manufacturing etc.)
- **Cost to Change Vs. Benefit offered by SOVD** is going to be a key metric in the adoption strategy.

THANK YOU!

Syed Shihab Ullah
General Motors
syedshihab.ullah@gm.com