Open Thesis / Project:
Formal Methods for Reliable Integration of SDV Components in Automotive Linux

Motivation & Summary

The automotive industry is transitioning to Software-Defined Vehicles (SDVs) and Automotive Grade Linux (AGL), emphasizing modular and updatable software stacks. AGL, an open-source platform for High-Performance Computers (HPC) in modern vehicles, ensures scalability, real-time performance, and interoperability by integrating diverse software components from multiple suppliers. It reduces costs, fosters innovation, and adheres to industry standards.

This thesis leverages AGL to tackle SDV integration and verification challenges. It aims to develop automated formal modeling methods for open-source SDV components and their compositions, enabling structured verification. Formal models will be created for individual components and integrated into a cohesive system, with verification applied to ensure reliability. An HPC demonstrator with AGL will showcase these methods, streamlining integration checks and supporting scalable, efficient verification workflows.

Thesis Type

■ Master's Thesis

Recommended Prior Knowledge

■ Formal Methods and Model Checking Techniques
■ Proficiency in Programming (e.g., C/C++, Python)
■ Familiarity with Open-Source Software

Student Target Groups

■ Computer Science (CS)
■ Information and Computer Engineering (ICE)
■ Electrical Engineering (EE)

Goals & Tasks

■ Develop a method for the automatic formal modeling of open-source SDV components.
■ Implement a method to generate formal models for individual components and their integration.
■ Verify the components and their integration using formal verification techniques.
■ Evaluate the method's effectiveness through a demonstrator system utilizing an HPC with AGL.

Industry Collaboration

■ AVL List GmbH (with financial support!)
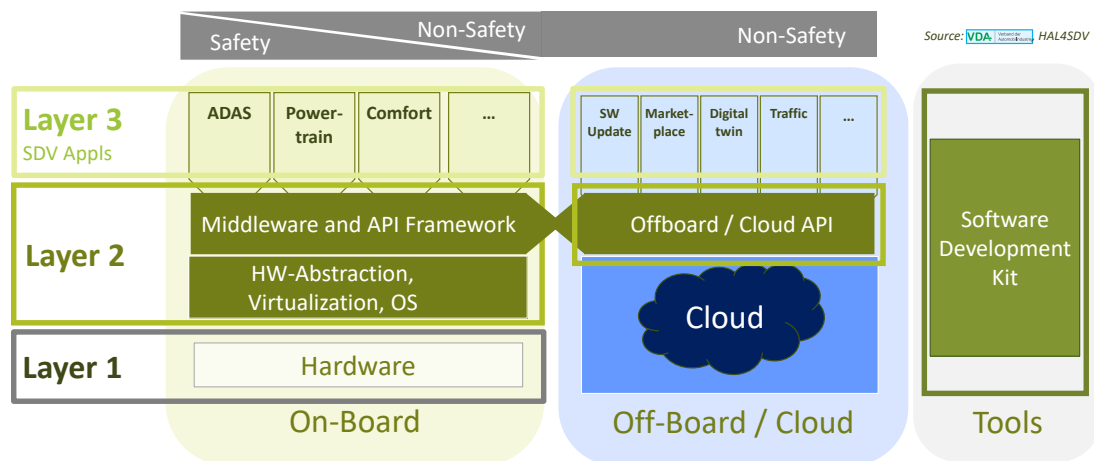
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