

Automotive Software Engineering

The dramatically increasing amount and importance of software in automotive electronic systems poses new challenges to the engineering of such systems. Today's cars host nearly 1 GByte of code distributed over up to 70 electronic control units interconnected with up to five different buses. We believe that the key to meeting the challenges posed by this rising system complexity can be found in a sound design and analysis of the system's architecture. Therefore, we are interested in design and analysis methods for system and software architecture that support the achievement of predefined quality goals and, in particular, meet current requirements like composability and exchangeability of software components from different sources and throughout the complete vehicle network.

One way to analyze software architectures is the examination of scenarios that focus on a product's requirements. In requirements engineering, we distinguish between functional and non-functional (also qualitative) requirements of a product. Qualities are desired features which exceed correct functionality, e. g. reliability, changeability or testability.

Non-functional requirements are frequently given less attention than the functional ones. They are often harder to analyze but crucial for the success of software intensive systems. Whether a product achieves its quality requirements or not is strongly affected by its software and system architecture. A careful requirements analysis therefore enables the designer to choose an architecture for the system by balancing opposing requirements. One way to achieve the detected quality goals is to construct the system from architectural patterns.

For analyzing existing system architectures we are working on description languages that are constructed for the automotive domain. We hope to be able to detect architectural decisions that compromise and decisions that assist in reaching a product's business goals by giving the system designer the possibility to simulate his architecture early in the development cycle.

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