SET Level

Simulation-based Development and Testing of Automated Driving

Supported by:



on the basis of a decision

by the German Bundestag

A Platform for Automated Simulation of Scenario Sequences

What does it take to bring the SET Level approach to life?

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• Different requirements, goals and technologies in use

Goals:

- Automated Configurable Simulation Toolchain with standardized interfaces
- Platform with highly generic components –

open, flexible and extendable







Why an automated configurable toolchain?



- Automation enables scalability
 - cuts down wall-clock-time spent simulating
- Automated configuration (and integration) enables **flexibility**
 - Flexibility means gaining adaptivity while keeping production systems
 - Single source of truth
- Frees up resources / mental capacity for the important problems

Why a platform architecture?

- Best-practice of large-scale software solutions
- Microservice-like building blocks bring independence of individual simulation tools and components
- "no experts needed"-abstraction
- "Don't maintain, just use."



How to platform?



SimAAS Components





SimAAS Components





SimAAS Components







Simulation Platform Management

• Input:

- Task Description
- Simulation Platform Configuration
- Evaluation Result

• Tasks:

- Generate, if necessary, concrete scenarios from logical ones
- Initialize simulation platform and passes on scenario and other instantiation data
- Orchestrate execution of tasks description



Simulation System

- Input:
 - Concrete Scenario
 - Instantiation data
 - Execution instructions
- Tasks:
 - Instantiate scenario, models and test object
 - Drive interfaces for scenarios, simulation models & simulation core extensions
 - Simulate traffic events
 - Record simulation results



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Evaluation System

- Input:
 - Simulation Data (online/offline)
 - Evaluation Criteria
 - Runtime Commands
 - ...
- Tasks:
 - Analyze given data through running evaluation modules
 - Save results
 - Generate Evaluation Report
 - Report Evaluation Result and Evaluation Status





Repositories

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- Store different models and modules, e.g.
 - Simulation models
 - Simulation Core extensions
 - Evaluation modules
- Enables single source of truth
- Provides classic methods, e.g.
 - Push
 - Pull
 - Search
 - ...





Simulation Platform for scenario-based testing

Simulation Platform for scenario-based testing





Proof of Concept: Research Implementation



A clean workbench

Features:

- Setup and run simulations from one configuration source
- Demonstrating the viability of our platform concept

Advantages:

- open software to research Simulation-as-a-Service workflows
- flexible test of new approaches
- public demonstration of readiness of new concepts

Research Implementation

Automated execution of scenario sequences



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Research Implementation





Key Take-Aways



- Single source of truth for configuration
- Architectural concept of an automated simulation platform for scenario-based testing
- Open implementation as a proof of concept





Many thanks for your attention! Questions?

Towards a SETLevel Methodology - Itemization Matrix **SET Level** Core Dimensions of the Configured Toolchain



Image: sector of the sector

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