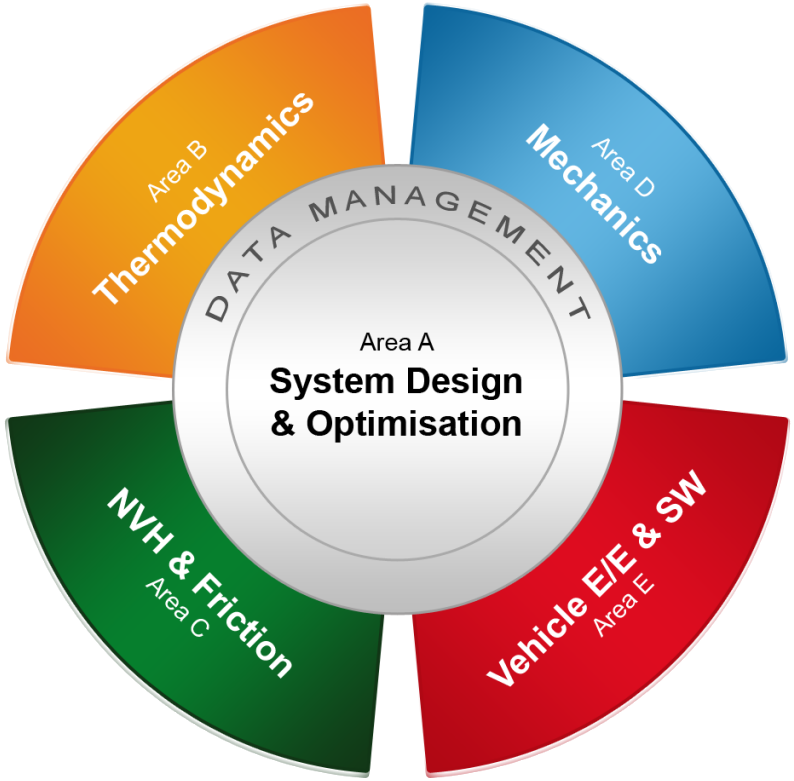
Kompetenzzentrum das Virtuelle Fahrzeug Forschungsgesellschaft mbH

virtual vehicle



bmvit Bundesministerium für Verkehr, Innovation und Technologie
bmwfj Bundesministerium für Wirtschaft, Familie und Jugend
FFG COMET
Das Land Steiermark
SFG Im Auftrag des Wirtschaftslandesrates
TU Graz Graz University of Technology

COMET K2 Competence Center - Initiated by the Federal Ministry of Transport, Innovation & Technology (BMVIT) and the Federal Ministry of Economics & Labour (BMWFI). Funded by FFG, Land Steiermark and Steirische Wirtschaftsförderung (SFG)

MBAT – Introduction and VIF Contribution

Christian Schwarzl

Agenda

- MBAT Goals
- VIF Contribution
  - Test case generation tool chain (STATION)

MBAT Goals

Combined Model-based Analysis and Testing of Embedded Systems

- Combination of Analysis and Test
  - Usage of e.g. static code analysis results for testing
    - Limitation of the search space for test case generation

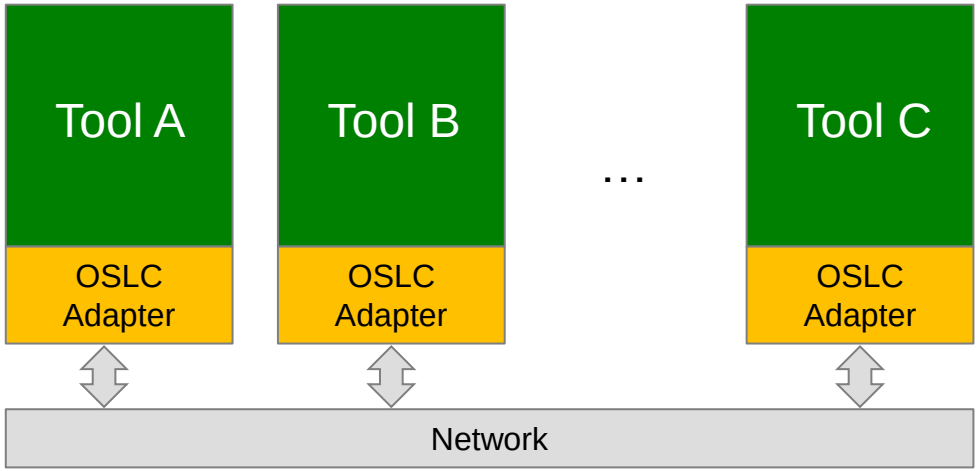
- Development of a Reference Technology Platform (RTP)
  - A RTP is a set of tools and services
  - Implementation of MBAT Use Cases in RTP Instances (tool chains)
  - Realization of the tool integration based on OSLC

OSLC – Open Services Lifecycle Collaboration

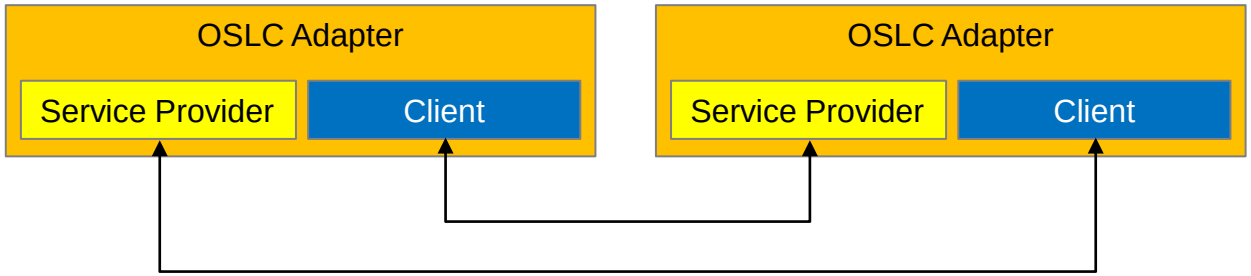
- Implementation of a Service Oriented Architecture (SOA)
  - Communication between Service Provider and Clients
  - Service Provider makes defined data available for Clients
  - Clients can access this data and potentially change it

- Tool integration is realized with an OSLC Adapter
  - An adapter can contain a Service Provider in order to provide data
  - An adapter can be a Client requesting data at the same time
  - Development of a tool specific adapter is required
  - Arbitrary tool functionality is allowed

RTP the on basis of OSLC

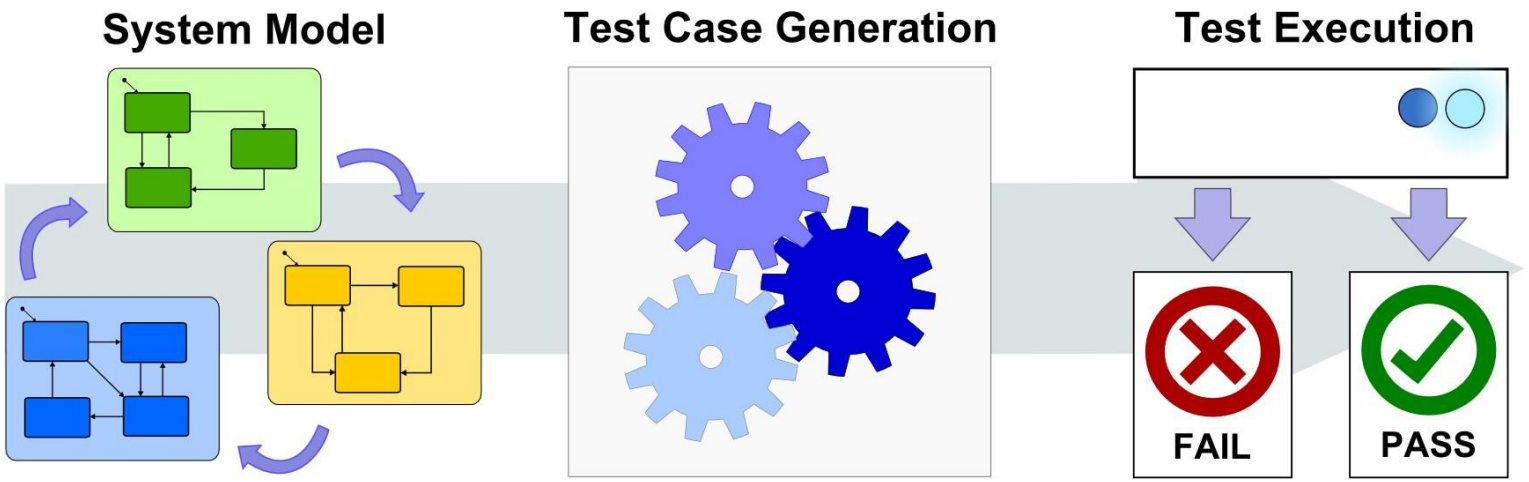


OSLC Adapter Concept



Virtual Vehicle Contribution

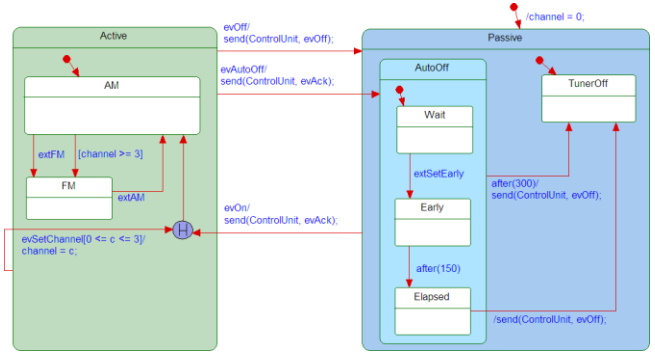
Toolchain for Model-based Test Case Generation



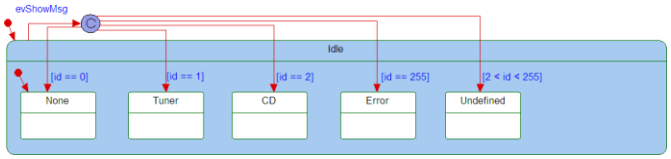
- Model-based test case generation @ VIF
  - Effort reduction for test case development by automation
  - Flexible usage of models (state machines)
    - Modeling of functional behavior, test cases, protocols, …
    - Models can express different things
    - Combination of these model artifacts
    - Wide range of applications
  - Easy integration of existing test automation systems

- Supported test definitions
  - *Focused* by selecting states and transitions
  - *Exhaustive* by creating input combinations
  - *Random* by selecting transitions corresponding to probability

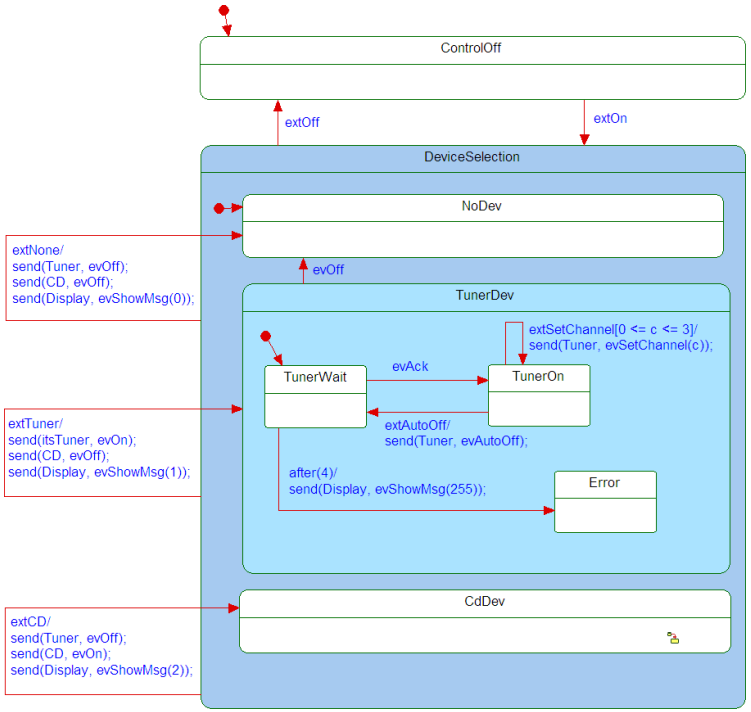
Example: Communicating State Machines (Behavior Models)



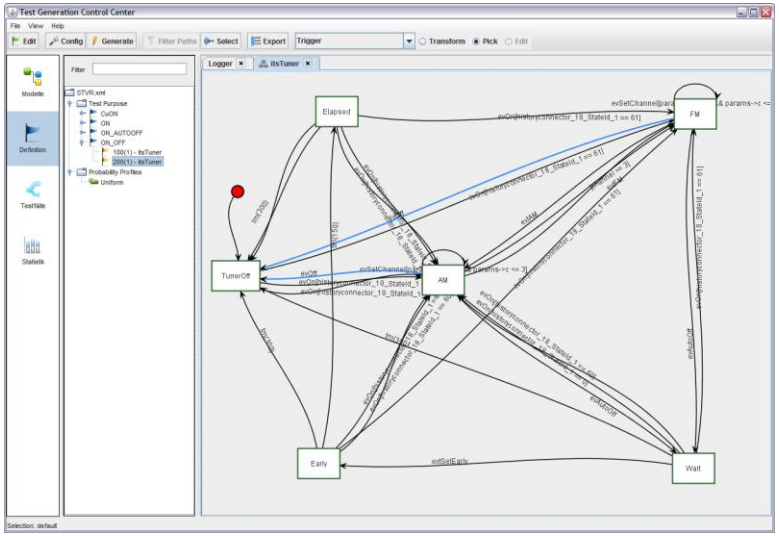
State Machine 1



State Machine 3

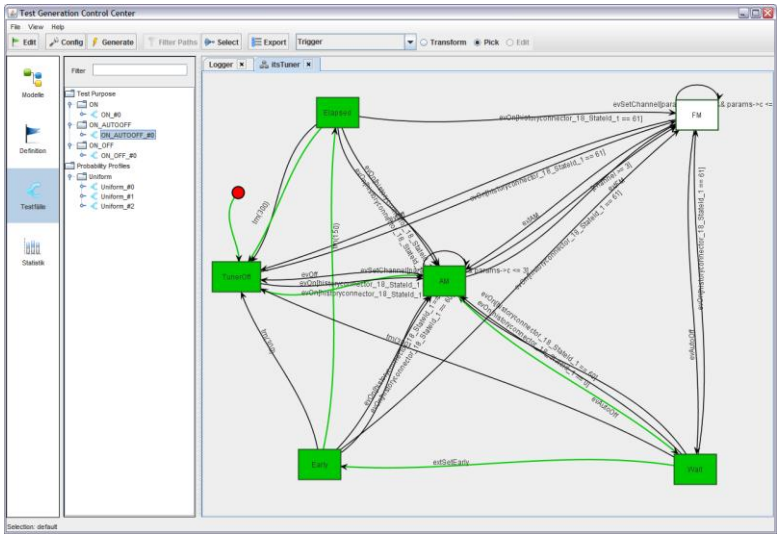


State Machine 2



Test Definition

- STATION
  - Test case generation tool
  - Prototypic implementation
  - Used in industrial setting for the generation of integration tests
    - Creation of an integrated tool chain from modeling to test execution



Test Coverage

- STATION
  - Calculation of input parameters
  - Calculation of verification data
  - Resolution of model dependencies caused by communication
  - Calculation of state- and transition-coverage (functional coverage)
  - Multiple views on test coverage
  - Calculation of differences in test cases

Planned Integration of STATION in MBAT

STAte based system Test and simulatION

- Implementation of an OSLC Adapter for STATION
  - STATION provides generated test cases
    - Clients can retrieve them an eventually trigger a re-generation
  - Client can import models from modeling tool

- Integration of the test automation
  - Implementation of OSLC Adapter Clients
    - Retrieving test cases from STATION
  - Implementation of a Service Provider to provide test results and reports

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