EAST-ADL Introduction

EAST-ADL Tooling

Tool Categories

- **Modelling Tools**
  - Language Support: core east-adl editing functionalities, sometimes graphical
  - Methodology support: extensions to core editing functionalities for sofware synthesis, requirement management, model validation, etc.
    - Open source editors:
      - UML-modeling with Papyrus and EAST-ADL profile (graphical)
      - EATOP – EAST-ADL Open Tool Platform
    - Commercial editors
      - MetaEdit+ from MetaCase (graphical)
      - SystemWeaver from Systemite (graphical)
  - Interoperability support: import/export capabilities realized trough (de-)serialization of EAXML formats

- **Analysis Tools: verification activities, either**
  - Offered as extension of a modelling tool, or
  - External tools integrated to modelling tools by means of transformations

- **Optimization Tool**: integrates a modelling tool (to specify the model to optimize) and analysis tools (to carry multi-objective optimization based on different analysis outputs)

Tools

Analysis Tools

| Analysis Tool #1 (e.g. UPPAAL) | Analysis Tool #2 (e.g. Simulink) | Analysis Tool #4 (e.g. Hip-hops) | Analysis Tool #3 (e.g. Qompass) |

Optimization Tool (OptiPal)

Analysis gateways

EAST-ADL Modelling Tool #1 (e.g. MetaEdit+)
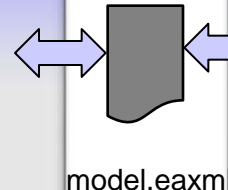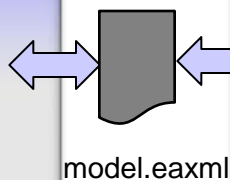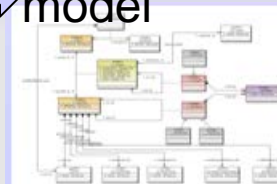
model

EAST-ADL Modelling Tool #2 (e.g. SystemWeaver)

model

EAST-ADL Modelling Tool #3 (e.g. Payrus+)

model

model.eaxml

model.eaxml

Modeling Platform

Papyrus-based tooling

Language support

Papyrus implementation of UML profile for EAST-ADL

Methodology support

AUTOSAR Gateway: automatic synthesis of Autosar architecture

Interoperability support

EAXML export

eatop

ARXML export

Artop AUTOSAR Tool Platform User Group

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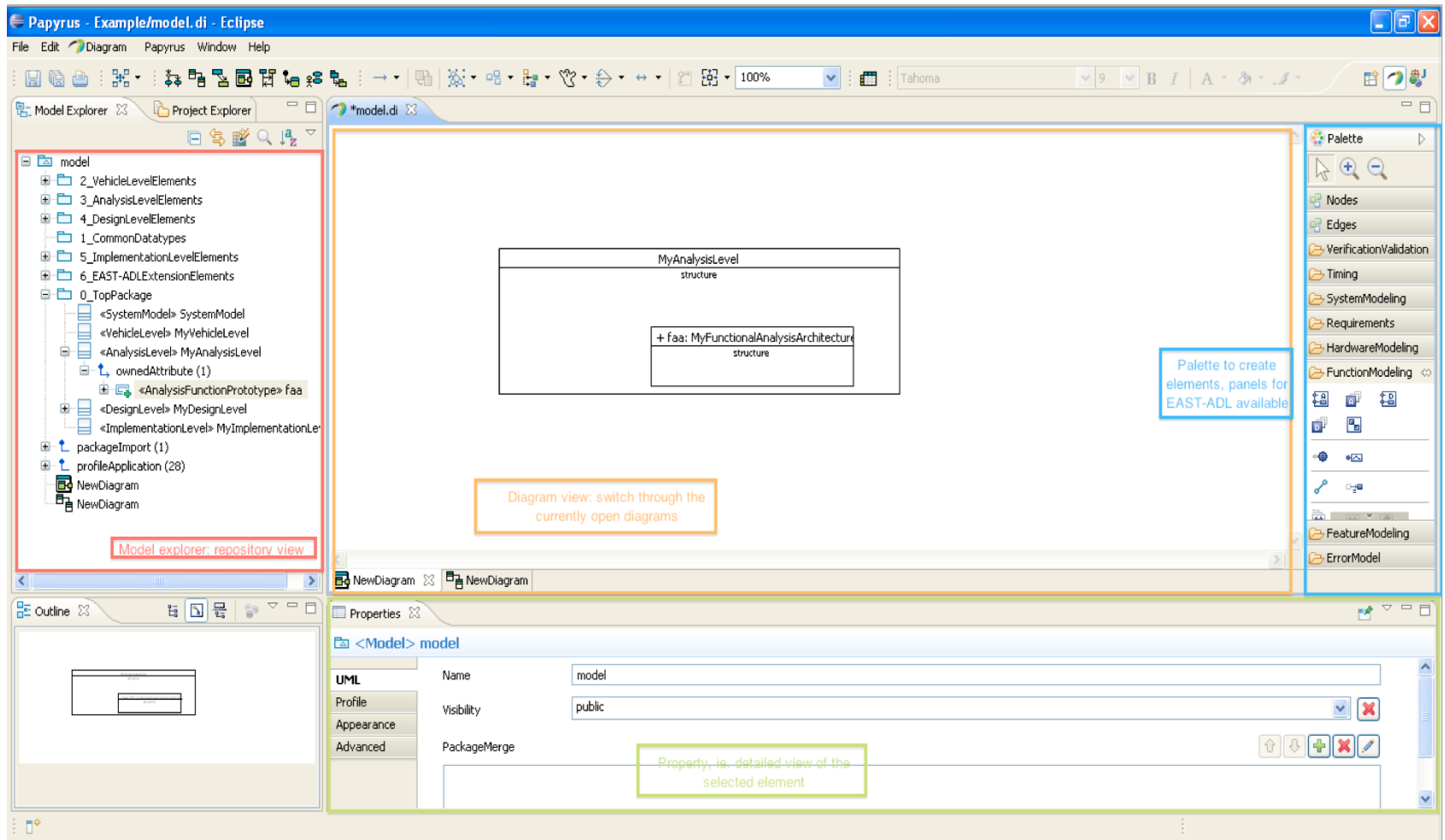
Papyrus UML tool for EAST-ADL

Eclipse MDT project

- Eclipse UML2 compliance
- Full respect of the UML2 standard as defined by the OMG
- Full respect of the DI (OMG Diagram Interchange) standard
- Extendable architecture of Papyrus that allows users to add new diagrams, new code generators, etc.
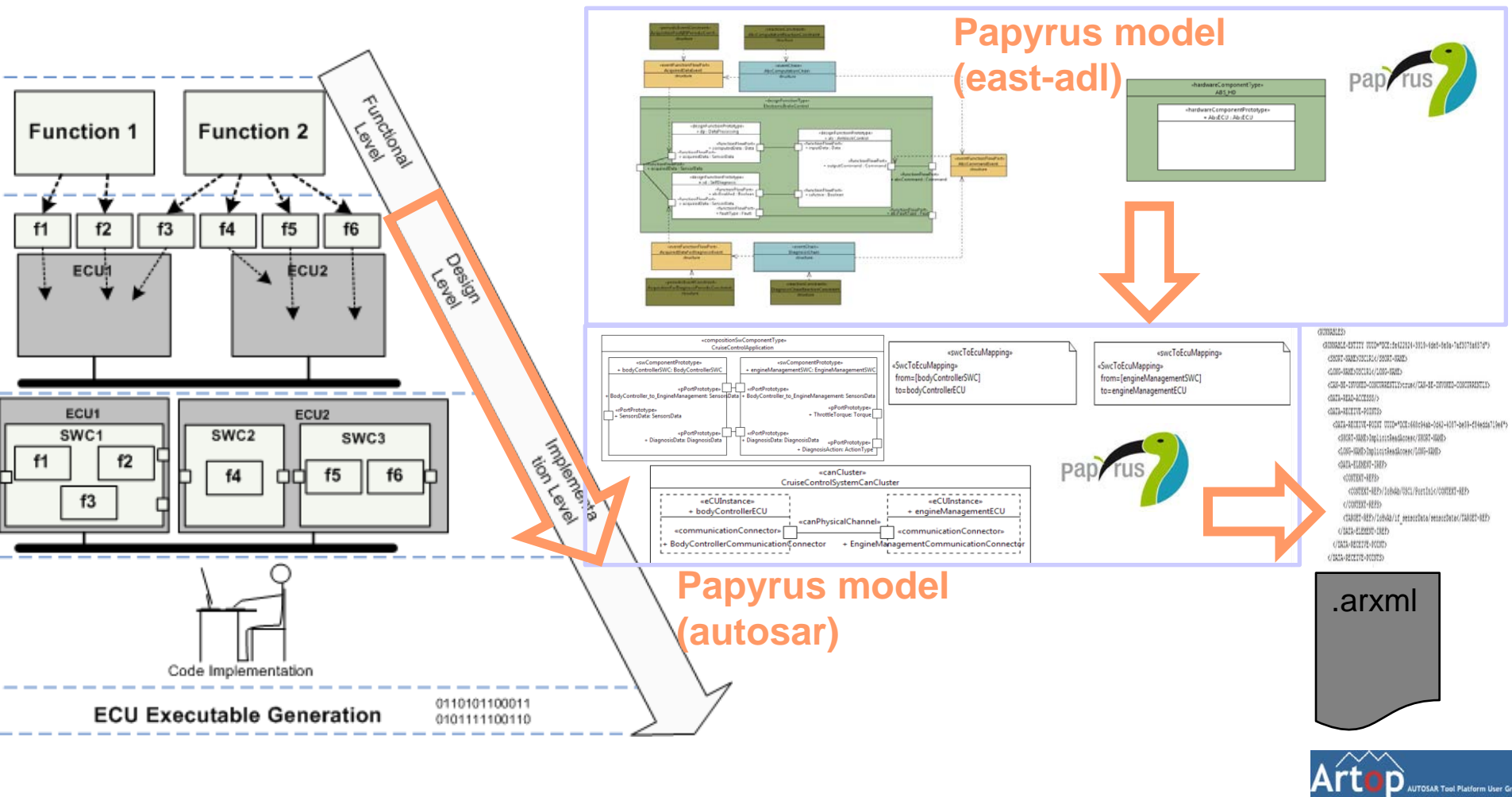- Profile development support

EAST-ADL Support

- Complete zip bundle, ready to use
- Tutorials for modeling, plugin development, etc. available

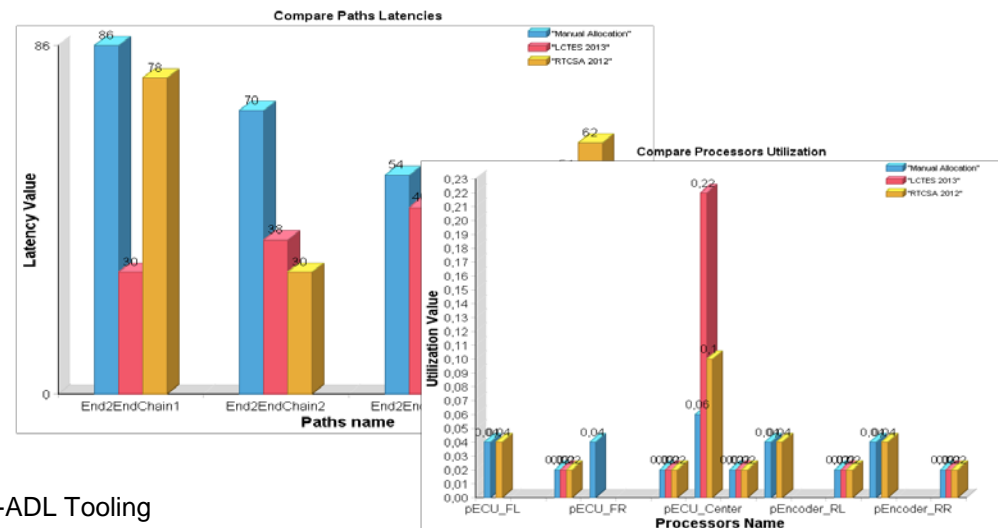# The most important views of a papyrus model

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Autosar Gateway

Papyrus model (east-adl)

Papyrus model (autosar)

.arxml

EAXML export

EAST-ADL Introduction: EAST-ADL Tooling

Papyrus enabled analysis tools

- Hip-Hops: for FTA and FMEA (safety, dependability analysis)

- Qompass : for schedulability estimation

EATOP – EAST-ADL Tool Platform

- Eclipse project initiated
  - Eclipse Automotive Industry Working Group
- Conceptually aligned with ARTOP
- Fully open

ARTOP - AUTOSAR Tool Platform

User Group that implements the AUTOSAR meta-model in an Eclipse based platform.

EATOP – EAST-ADL Tool Platform

EAST-ADL Meta Model Implementation

Serialization | Abstraction level M2M

EAST-ADL Explorer | Validation

EAST-ADL Editor | Tool Adapters

SPHINX

Navigator & Editor Sockets

CNF | Forms | GMF | Graphiti

Validation Runtime Extensions

Compare & Merge Integration

Subv/SVN

Engine & Editor

M2x Integration

Xtend/Xpand

Core

Workspace Management

EMF Runtime Extensions

Eclipse Platform Extensions

Eclipse

EATOP – EAST-ADL Tool Platform

EAST-ADL Association

Original

EAST-ADL meta-model definition in Enterprise architect

(.eap)

EAST-ADL UML profile

EAST-ADL XSD schema

EATOP

Platform-independent

EAST-ADL meta-model definition

(Ecore)

Java-oriented

EAST-ADL meta-model definition

(Ecore)

EMF-based

EAST-ADL meta-model implementation

(Eclipse plug-ins)

Use

EATOP plugins

Use

Use

Use

Use

Use

Tool vendors, research projects, others, …

Models Meeting Automotive Design Challenges. Henrik Lönn, Volvo Technology
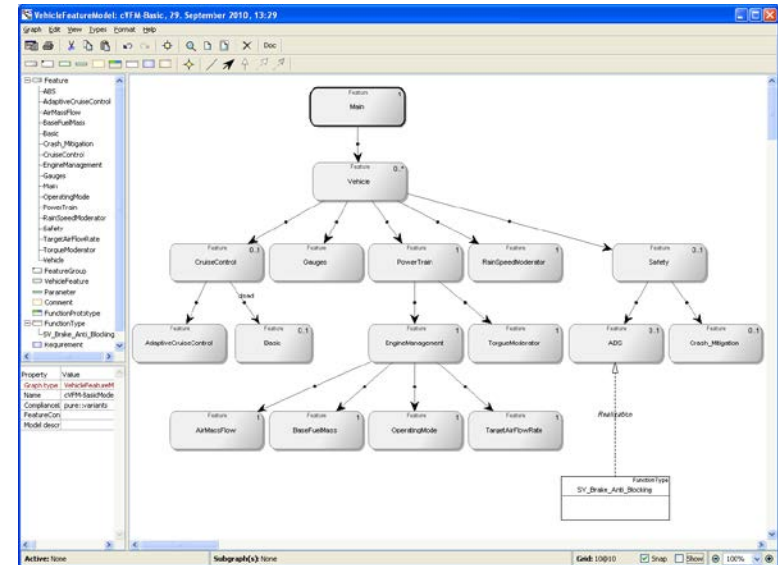EAST-ADL Introduction: EAST-ADL Tooling

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EAST-ADL with MetaEdit+

SystemModeling

VehicleFeatureModeling
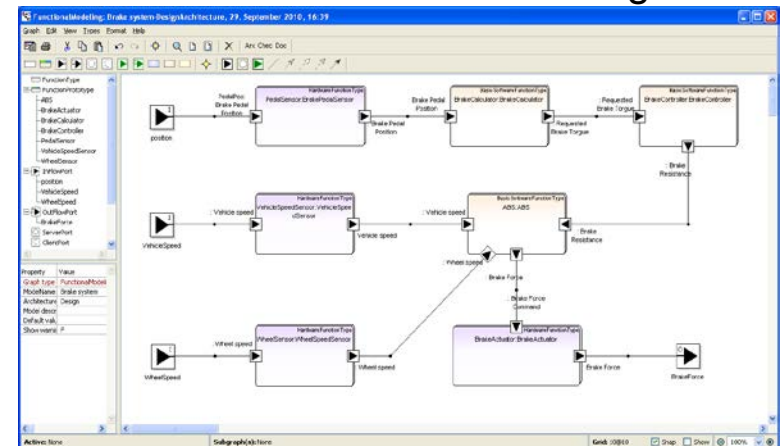
FunctionalDesignArchitecture

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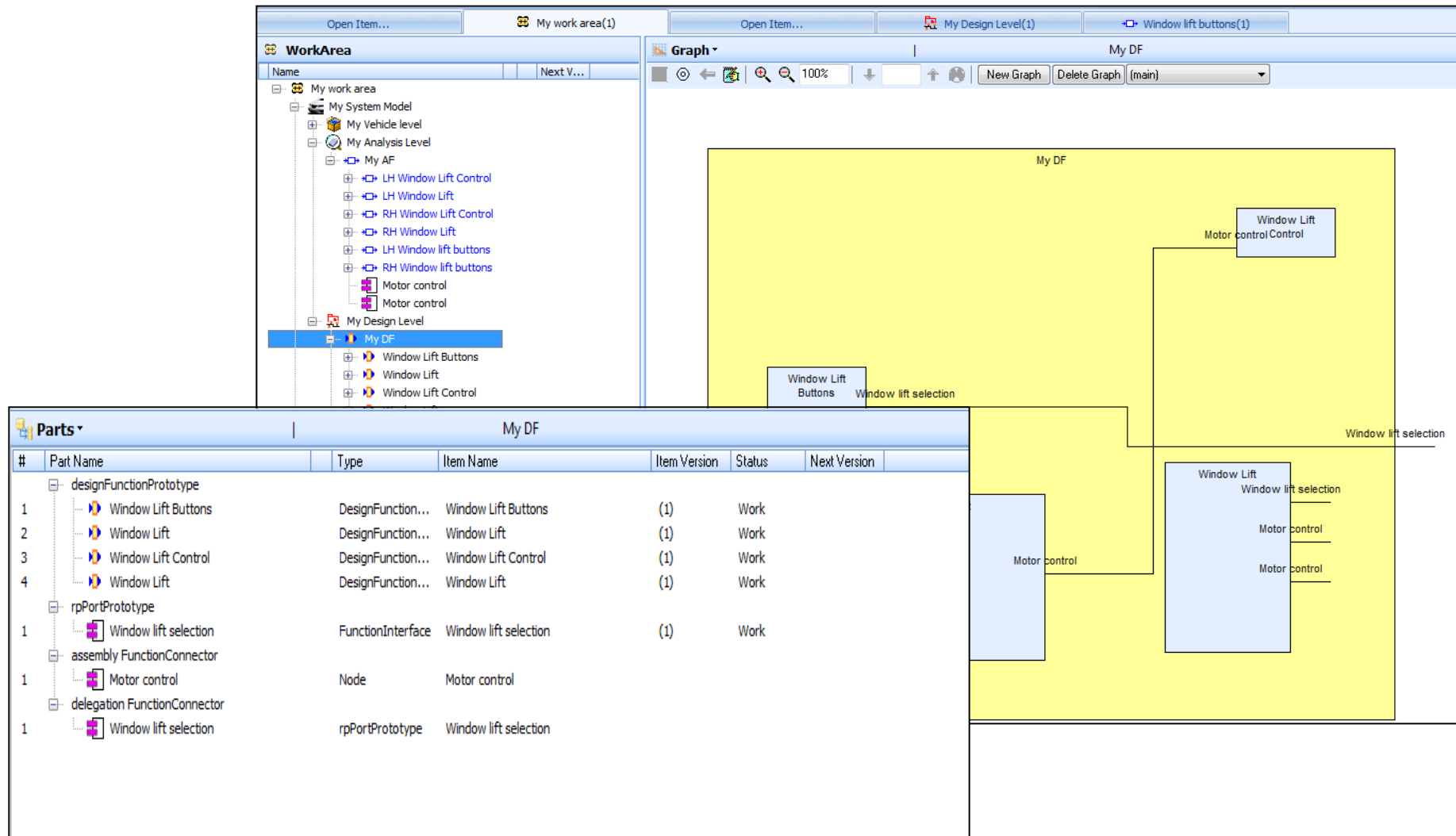
MetaEdit+ enabled analysis tools

- Several transformations available for Simulink, UPPAAL, SPIN enabling behavioral analysis

MetaEdit+ model

SPIN transformation

Promela Code

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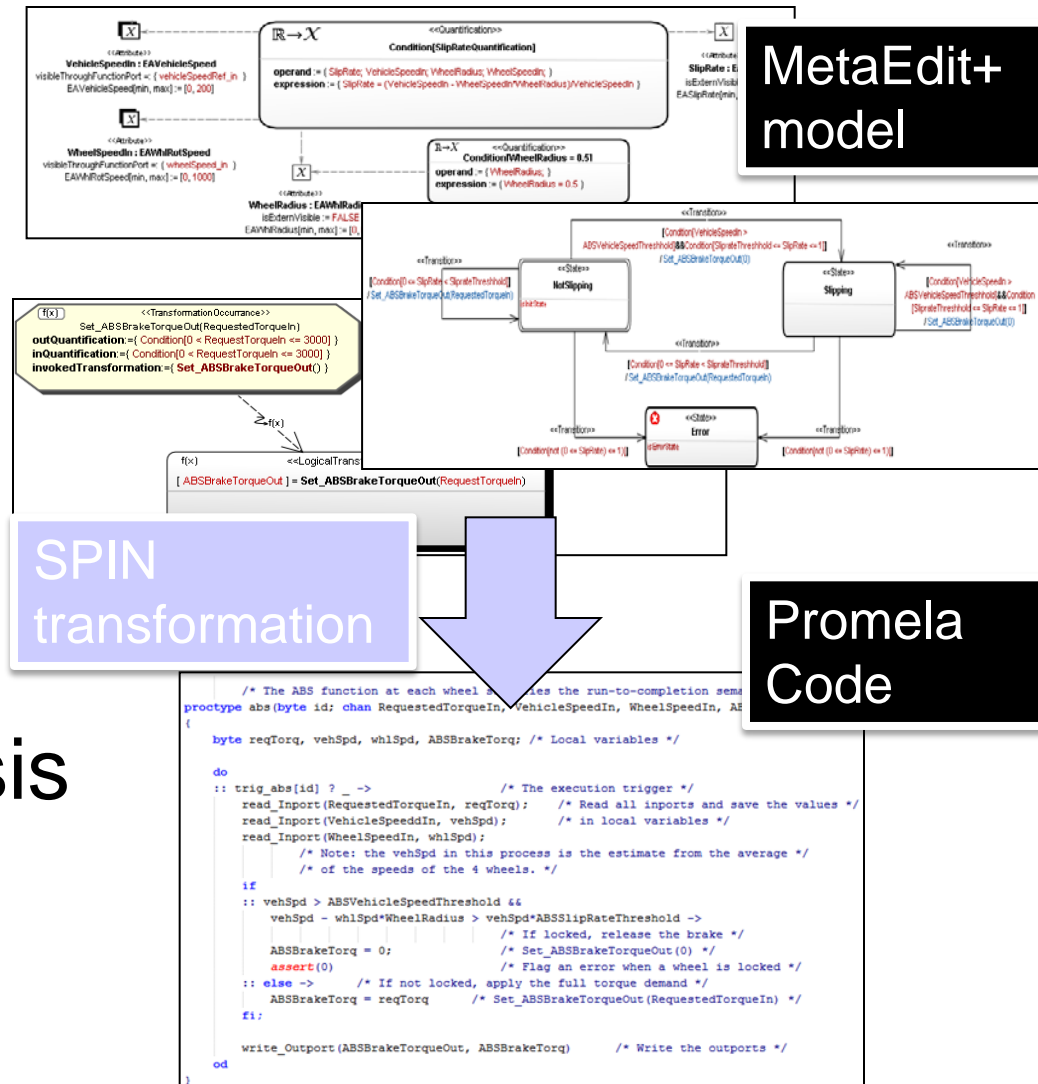
EAST-ADL with SystemWeaver

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Conclusion

- **EAST-ADL supports automotive embedded systems modelling "starting" with needs and requirements and "ending" with an AUTOSAR SW architecture**
- With maturity of language comes maturity of tools
- Tree flavors of tools:
  - UML-based
  - EATOP
  - COTS Tools
- New priorities with MAENAD:
  - Interoperability: UML-profile, XML format
  - Analysis and design scenarios with various sets of tools
- ✓ See other concept presentations on Analysis workbench, Optimization and commercial tools (System Weaver andMetaEdit+)