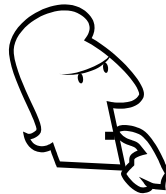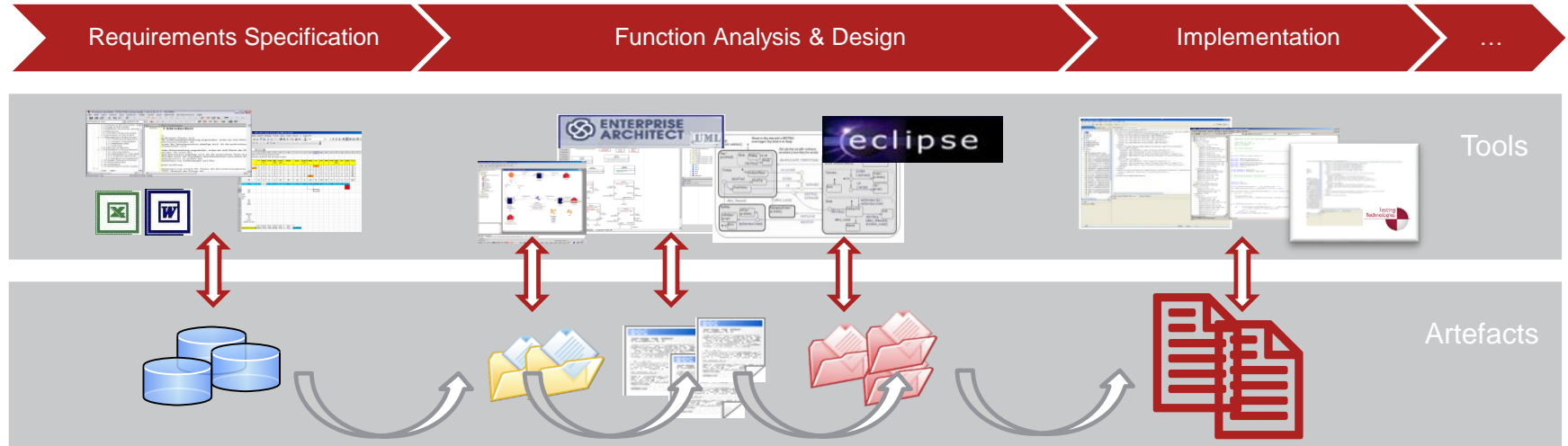# MODELBUS®
MASTERING COMPLEXITY

Dr. Tom Ritter
Eclipse Con Europe, Papyrus Summit, 2014

COMMON CHALLENGES IN SOFTWARE ENGINEERING

Requirements Specification → Function Analysis & Design → Implementation → …

Tools

Artefacts

- Inconsistency, low degree of automation, insufficient common terminology
- Complexity and costs
- Decoupled software tools
- Produced data remains proprietary and depends on specific tools

MODELBUS®

Introduction

ModelBus® is a model-driven tool integration framework which allows you to build seamlessly integrated tool environments for your development process.

- ModelBus® connects your tools – commercial off the shelf or in-house tools
- ModelBus® helps automating your development processes
- ModelBus® uses SOA principles and well established standards
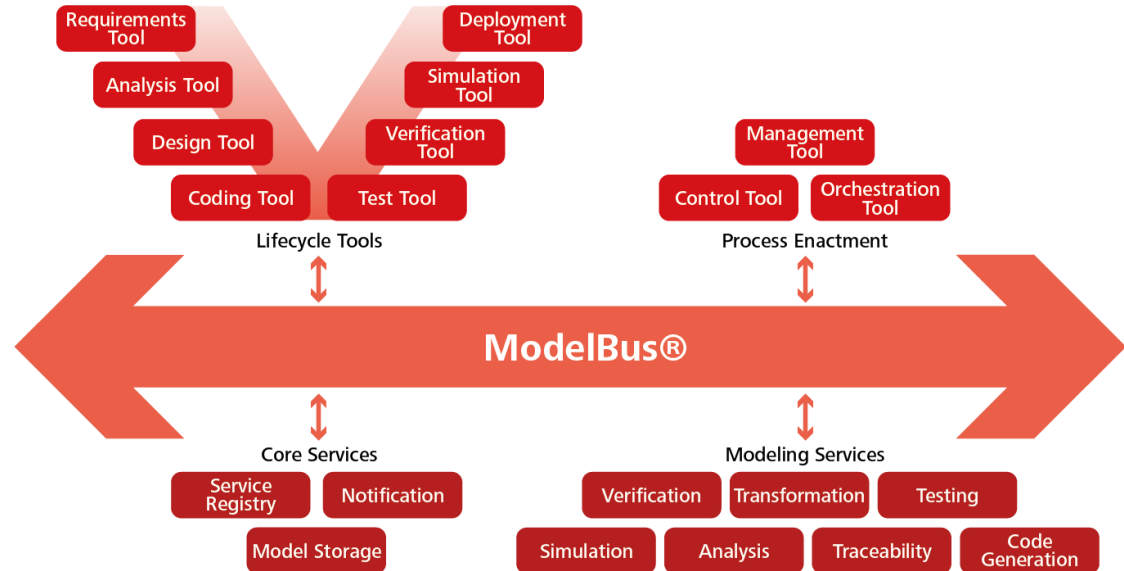
Fraunhofer
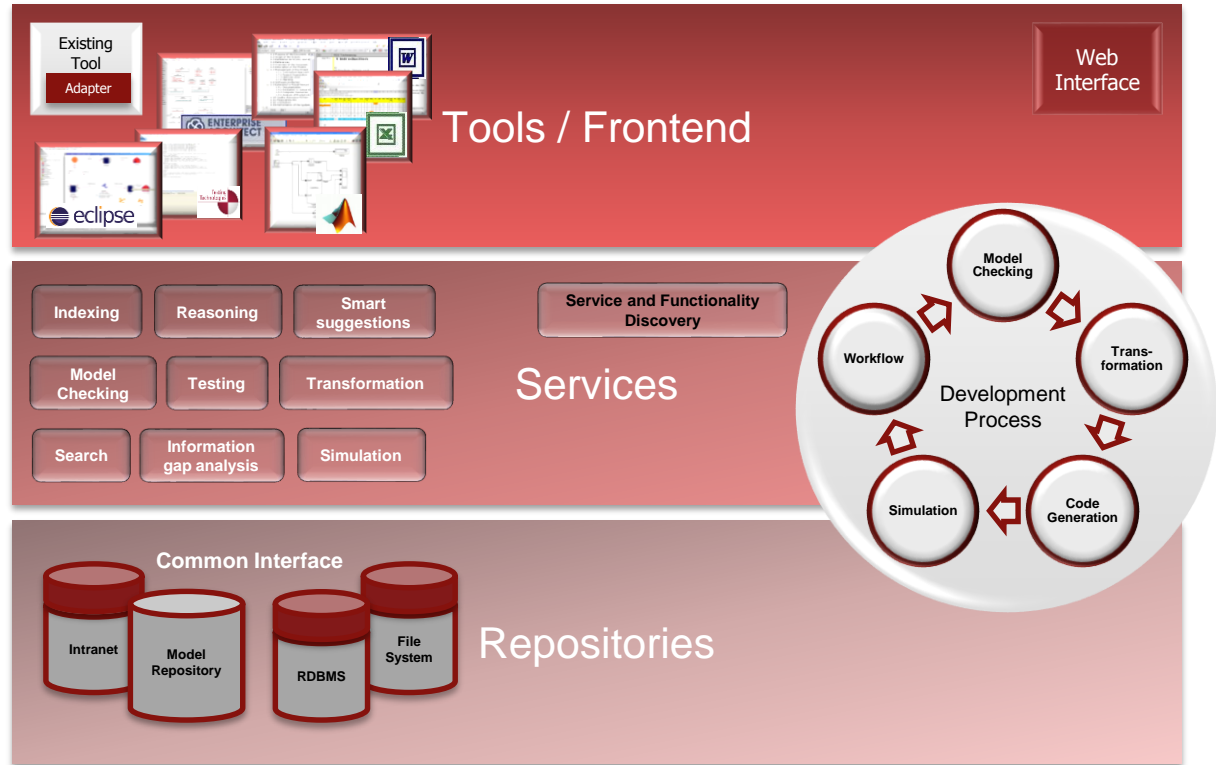**FOKUS**

MODELBUS®

General Concept

- Lifecycle Tools are needed for creative work

- Process Enactment controls the development process

- Core services are needed to operate the ModelBus

- Modeling Services provides back-end functionality for automation

Lifecycle Tools:
- Requirements Tool
- Analysis Tool
- Design Tool
- Coding Tool
- Deployment Tool
- Simulation Tool
- Verification Tool
- Test Tool

Process Enactment:
- Management Tool
- Control Tool
- Orchestration Tool

ModelBus®

Core Services:
- Service Registry
- Notification
- Model Storage

Modeling Services:
- Verification
- Transformation
- Testing
- Simulation
- Analysis
- Traceability
- Code Generation

MODELBUS®

Architecture

- Tools are connected via a ModelBus Adapter
- Slight modification of existing tools instead of introducing new tools
- Services can be easily created via ModelBus service interfaces supported by the ModelBus Development Kit
- Workflows can be orchestrated and will be trigger by ModelBus events
- Repositories store relevant artefacts (e.g. models, code, documents) via standardised interfaces

Tools / Frontend

Existing Tool — Adapter

Web Interface

Services

Indexing | Reasoning | Smart suggestions

Service and Functionality Discovery

Model Checking | Testing | Transformation

Search | Information gap analysis | Simulation

Development Process: Model Checking, Transformation, Code Generation, Simulation, Workflow

Repositories

Common Interface

Intranet | Model Repository | RDBMS | File System

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Selection of Connected Tools

- Eclipse-based Tools
    - Papyrus, ProR, …
- Rational Software Architect
- Doors
- Rhapsody
- Simulink
- Microsoft Office (Word, Excel)
- Sparx Enterprise Architect
- AVL InMotion
- Modelling Services
    - QVT, ATL, OCL, Metric Computation, Report Generation, Model Repository
- Traceability with Traceino
- Requirements Engineering with Requino
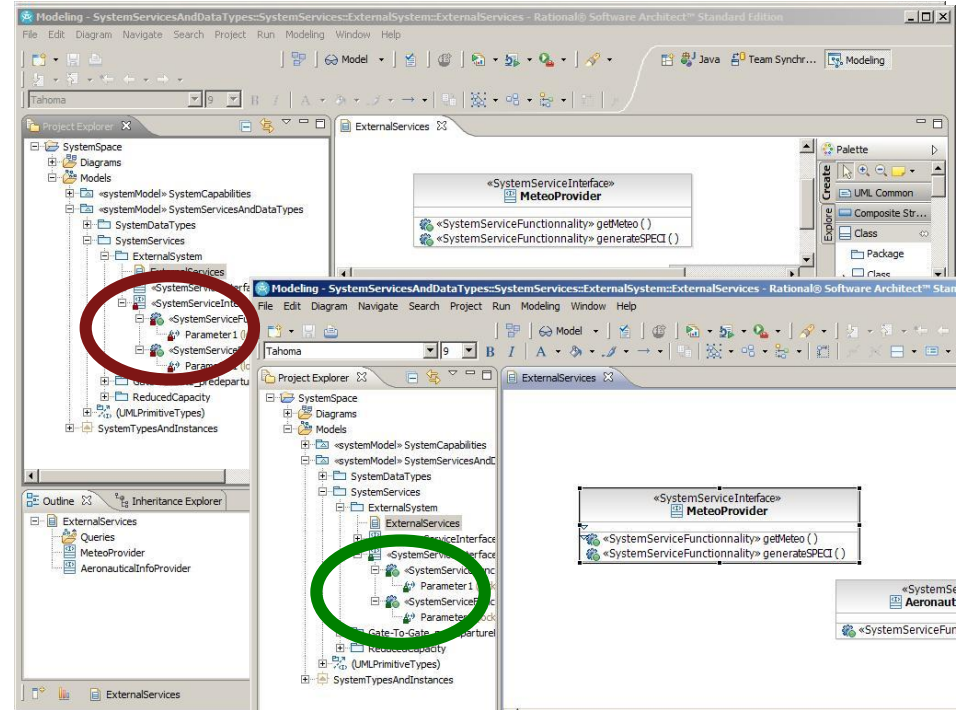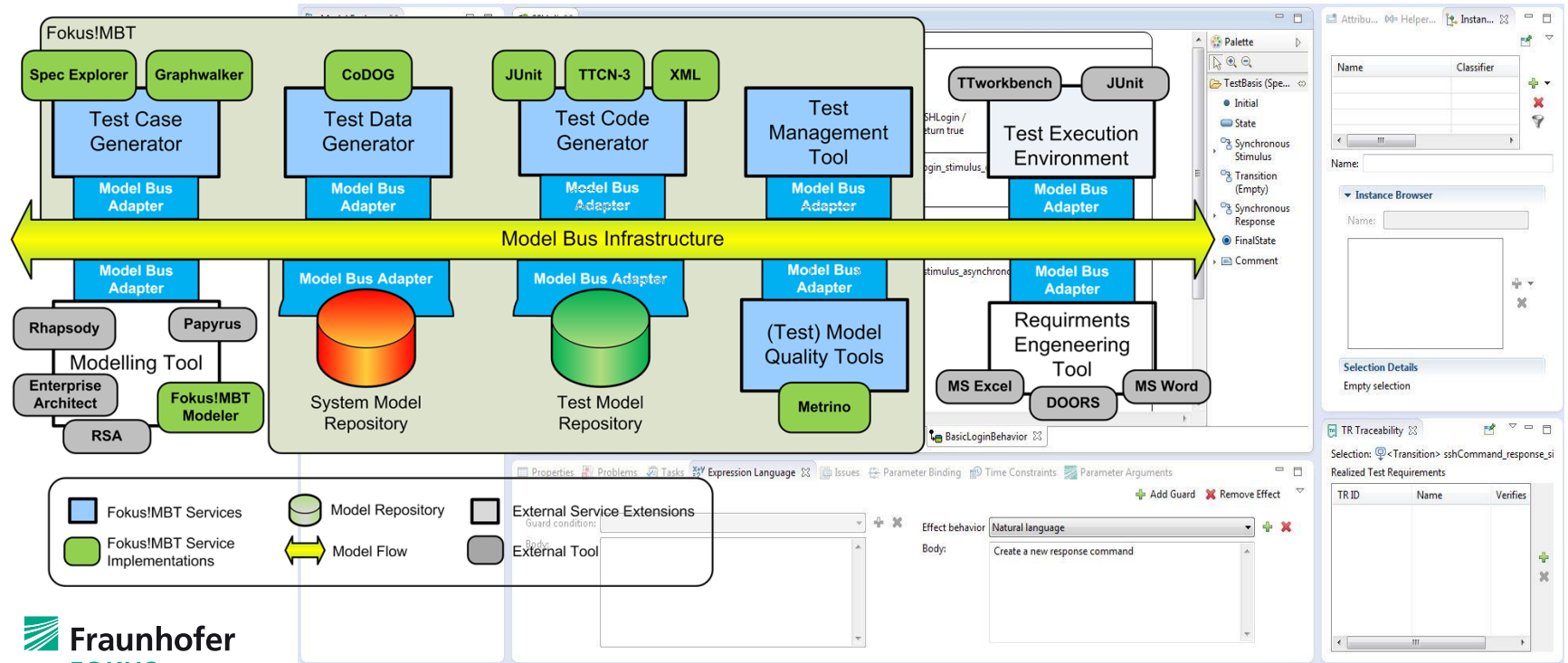- OSLC-Compatibility
- SVN, Git

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MODELBUS®

Avoiding merge conflicts

- Locking of parts of the model
- Interactive highlighting of locked model parts

- Interactive modelling

FOKUS!MBT – Customizing Papyrus for MBT

MODELBUS®

## Git Integration

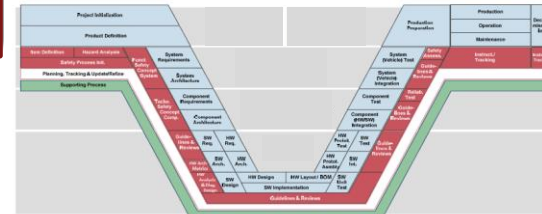ModelBus Client ↔ ModelBus Server Application

Conflict Resolution in ModelBus Clients

read/write

ModelBus Git Repository ↔ sync ↔ „Central" Repository

sync → Developer Git Repository 1
sync ↔ Developer Git Repository 2
sync → Developer Git Repository N

ModelBus Server

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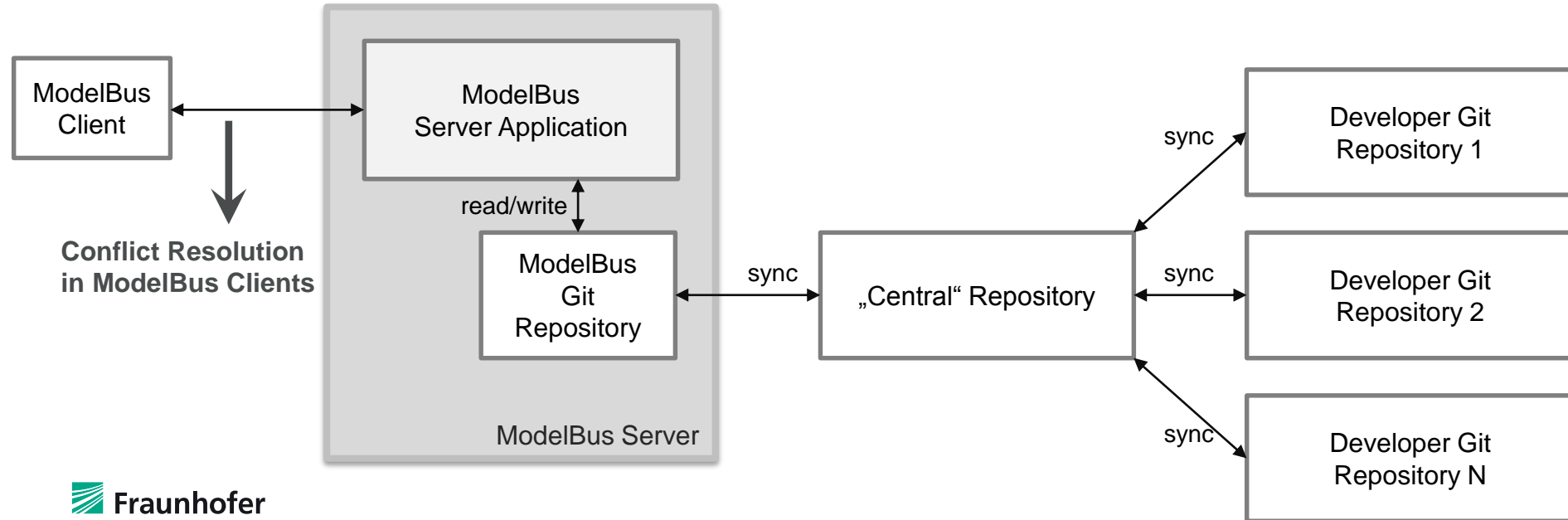
As product and consulting company for the automotive domain B&M is specialized in systems engineering, development and testing of complex electronic and mechanical systems. Within the case study B&M will appear as developer of automotive driver assistance software.
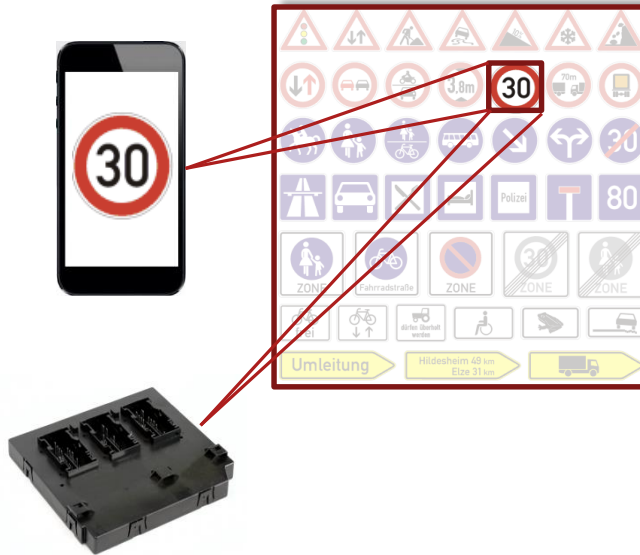
Traffic Sign Recognition System
- Different hardware and operating systems
- Different countries with variety of laws and regulations
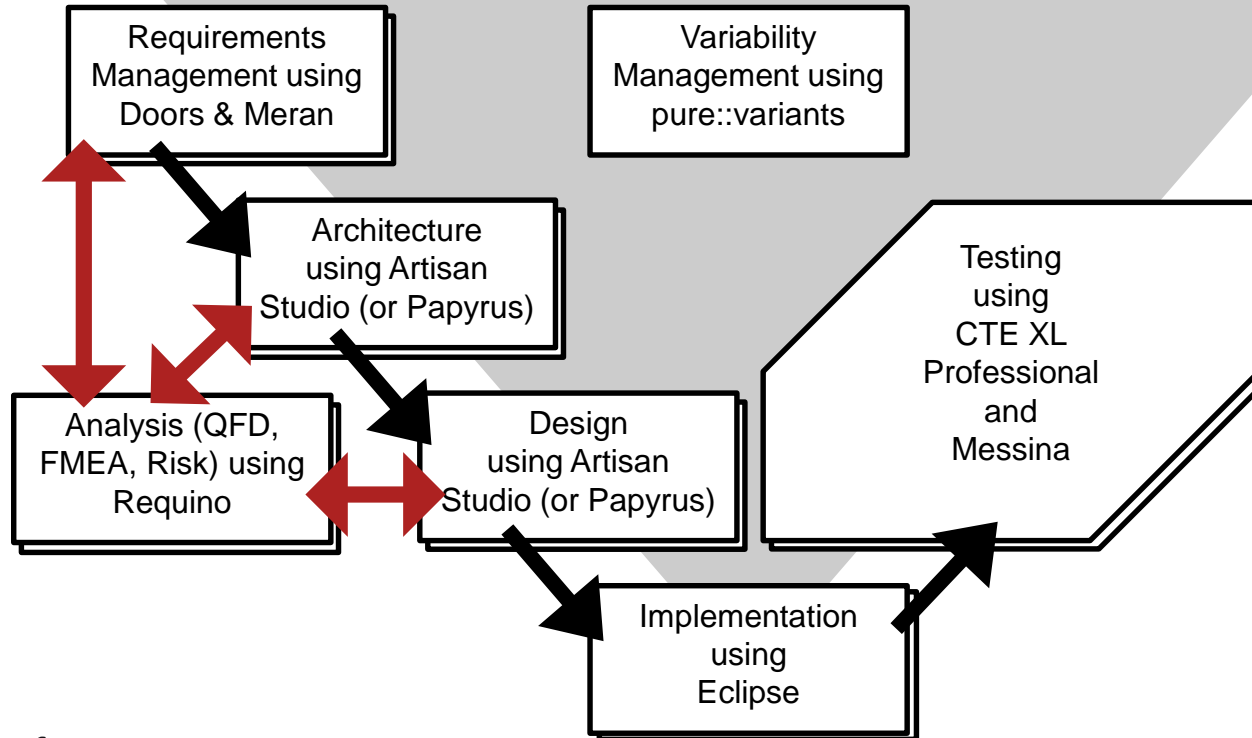- Different directions of traffic
- Different sets of customer specific functionalities
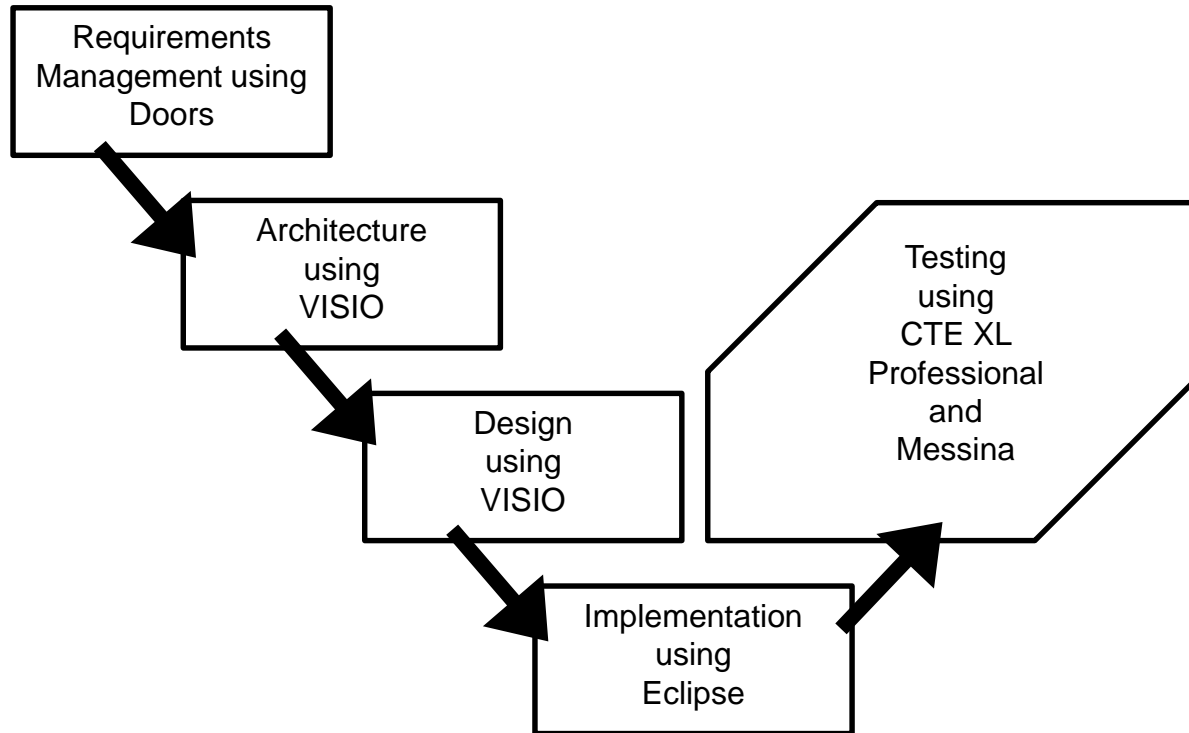
CONSISTENT VARIABILTY MANAGEMENT HANDLING
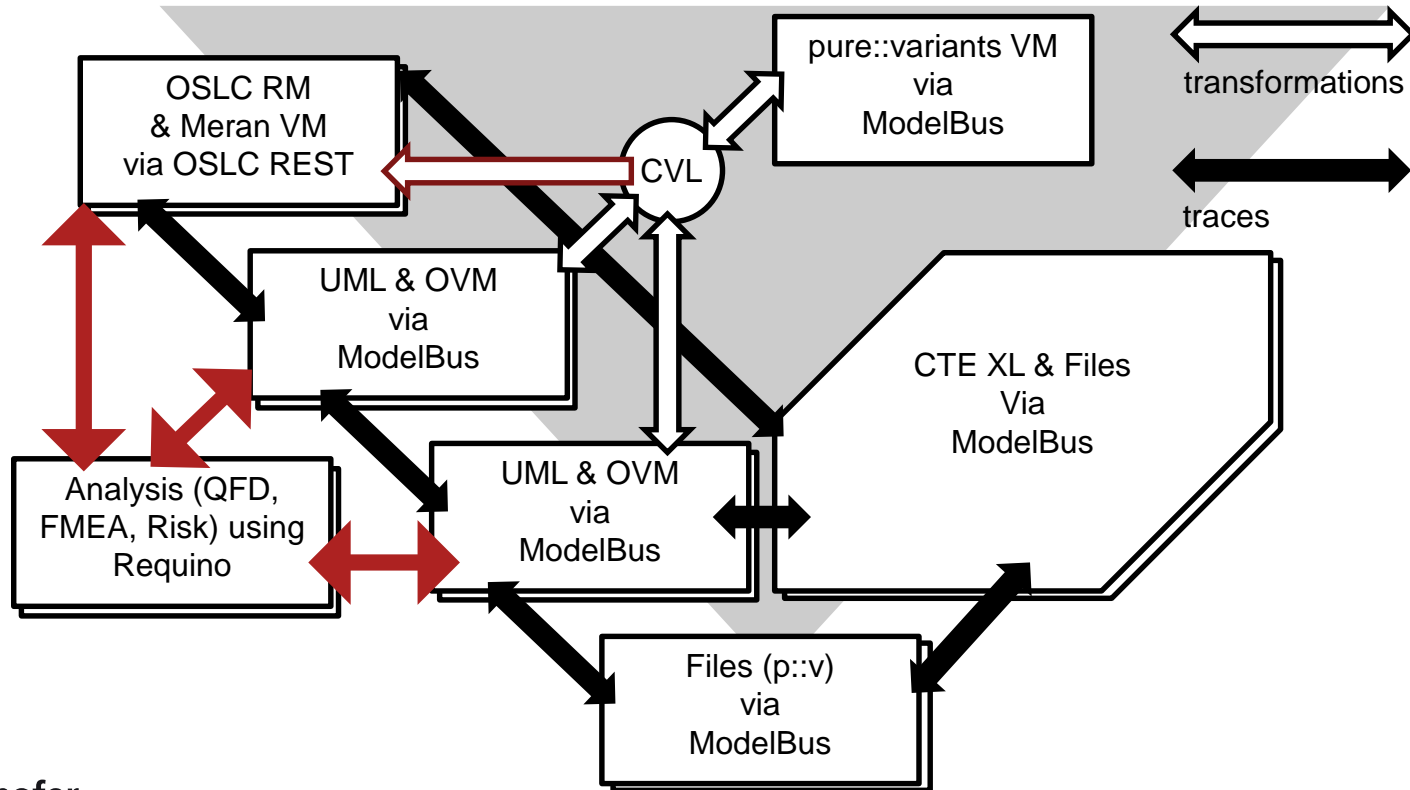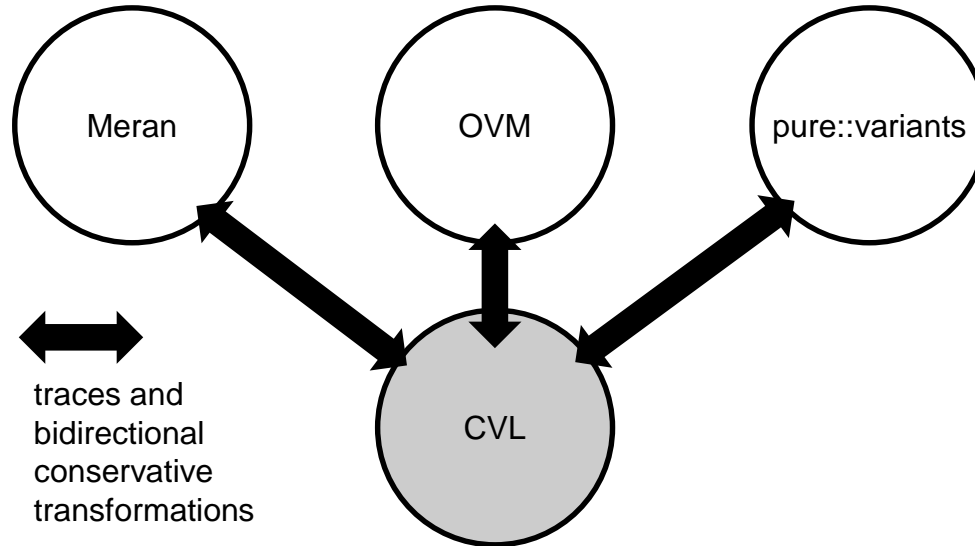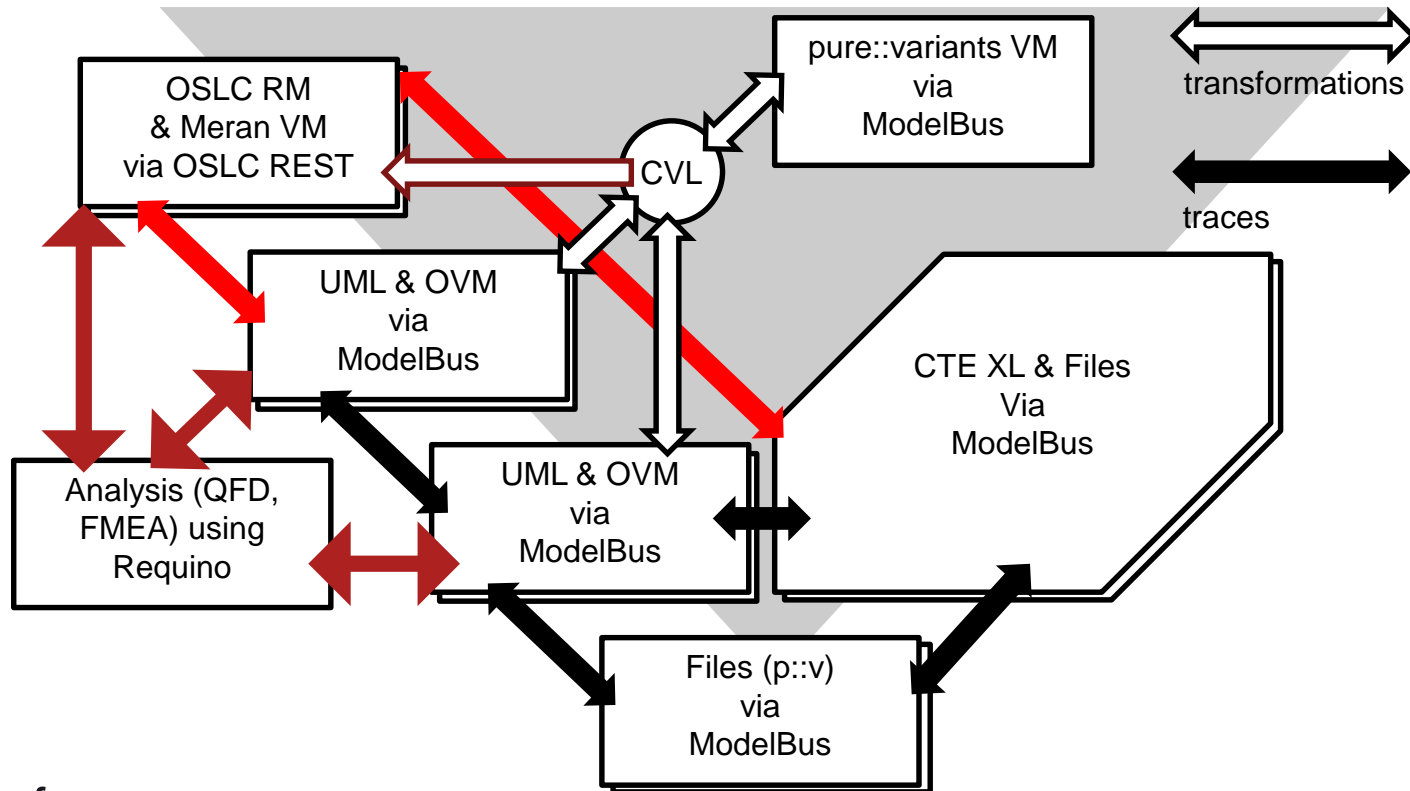

Meran

OVM

pure::variants

CVL

traces and
bidirectional
conservative
transformations

CROSS FRAMEWORK TRACEBILITY

MODELBUS®

Example Workflow

Eclipse/Papyrus

Sparx Enterprise Architect

UML concept space

shared concepts

Simulink concept Space

Matlab Simulink

mapping of the concepts
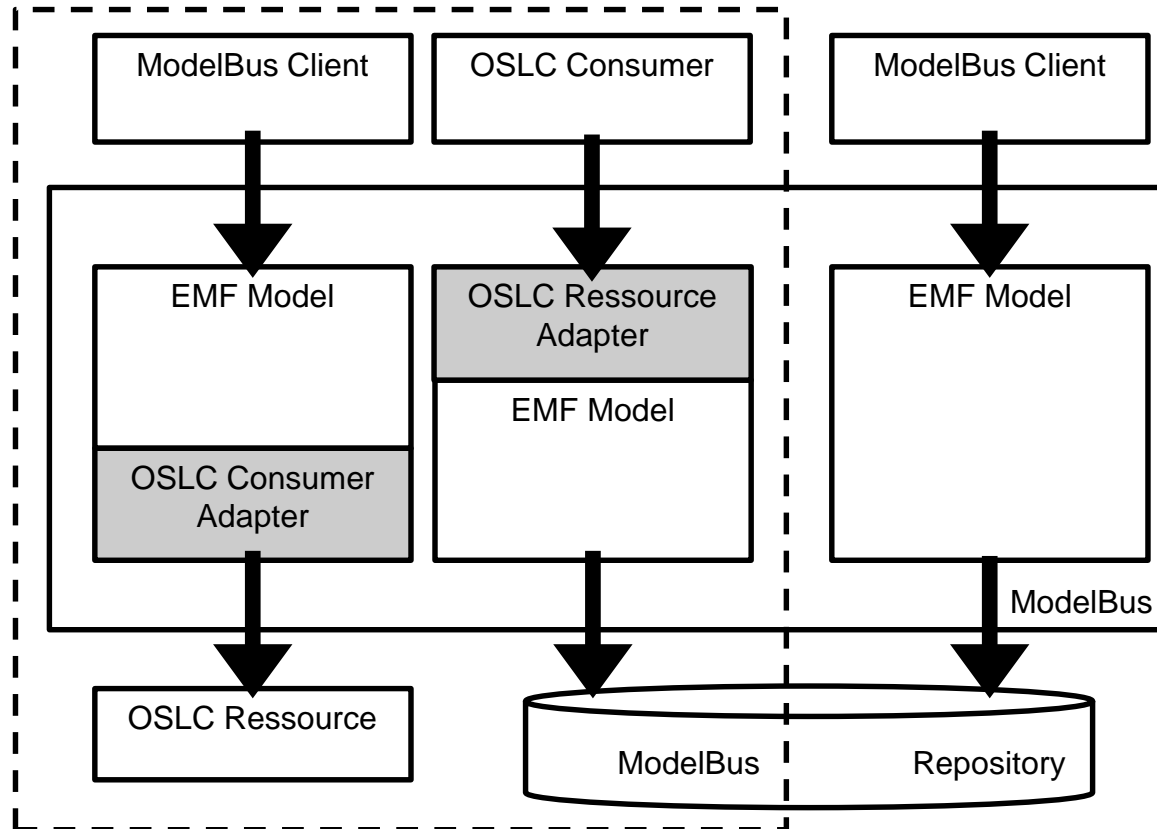
Simulink		UML
Block	⟷	Class
Port	⟷	Port
Line	⟷	Information Flow
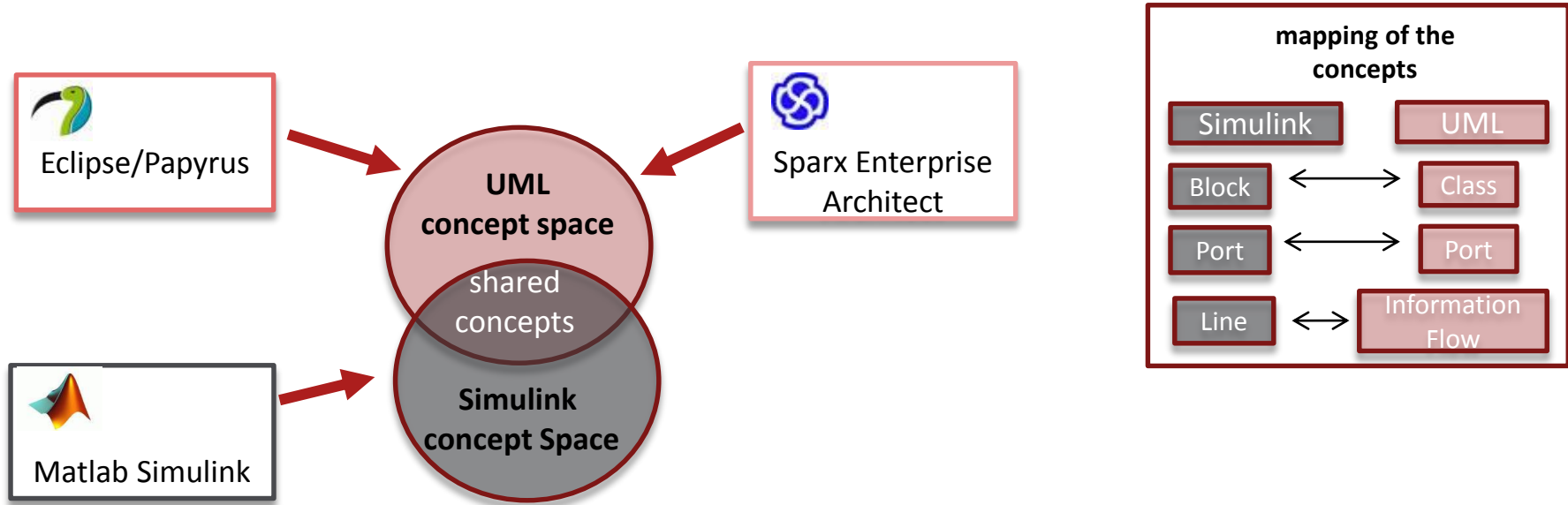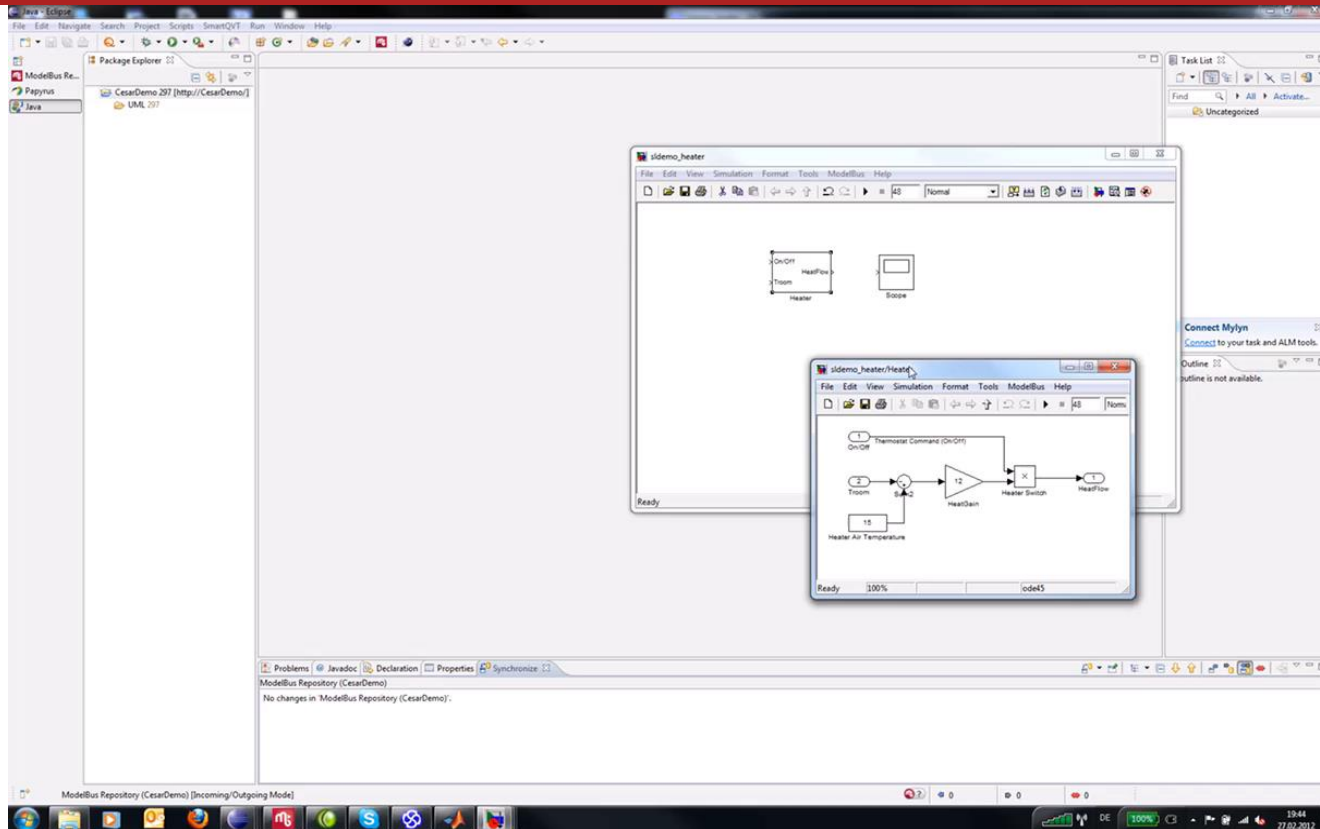
MODELBUS®

Benefits

− ModelBus®

    − connects tools and data coming from different teams

    − improves consistency in the development process

    − makes you independent of tool providers and prevents vendor lock-in

    − automates tedious tasks in your development

− ModelBus®

    − is extensible and customisable

    − Basic functionality is free to use and Open Source

    − A number of pre-existing tool adapters are available

ModelBus®: http://www.modelbus.org
YouTube Channel: http://www.youtube.com/user/ModelBusOrg

We want to move ModelBus Core
and TeamProvider to Eclipse

MODELBUS
METRINO
TRACEINO
REQUINO

Fokus! MBT

Ingrano Solutions

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ModelBus®: http://www.modelbus.org
YouTube Channel: http://www.youtube.com/user/ModelBusOrg