AMASS

Architecture-driven, Multi-concern and Seamless Assurance and Certification of Cyber-Physical Systems

WP6 Cross and Intra Domain Reuse Progress and Achievements

First EAB Workshop
Trento, 11 September, 2017

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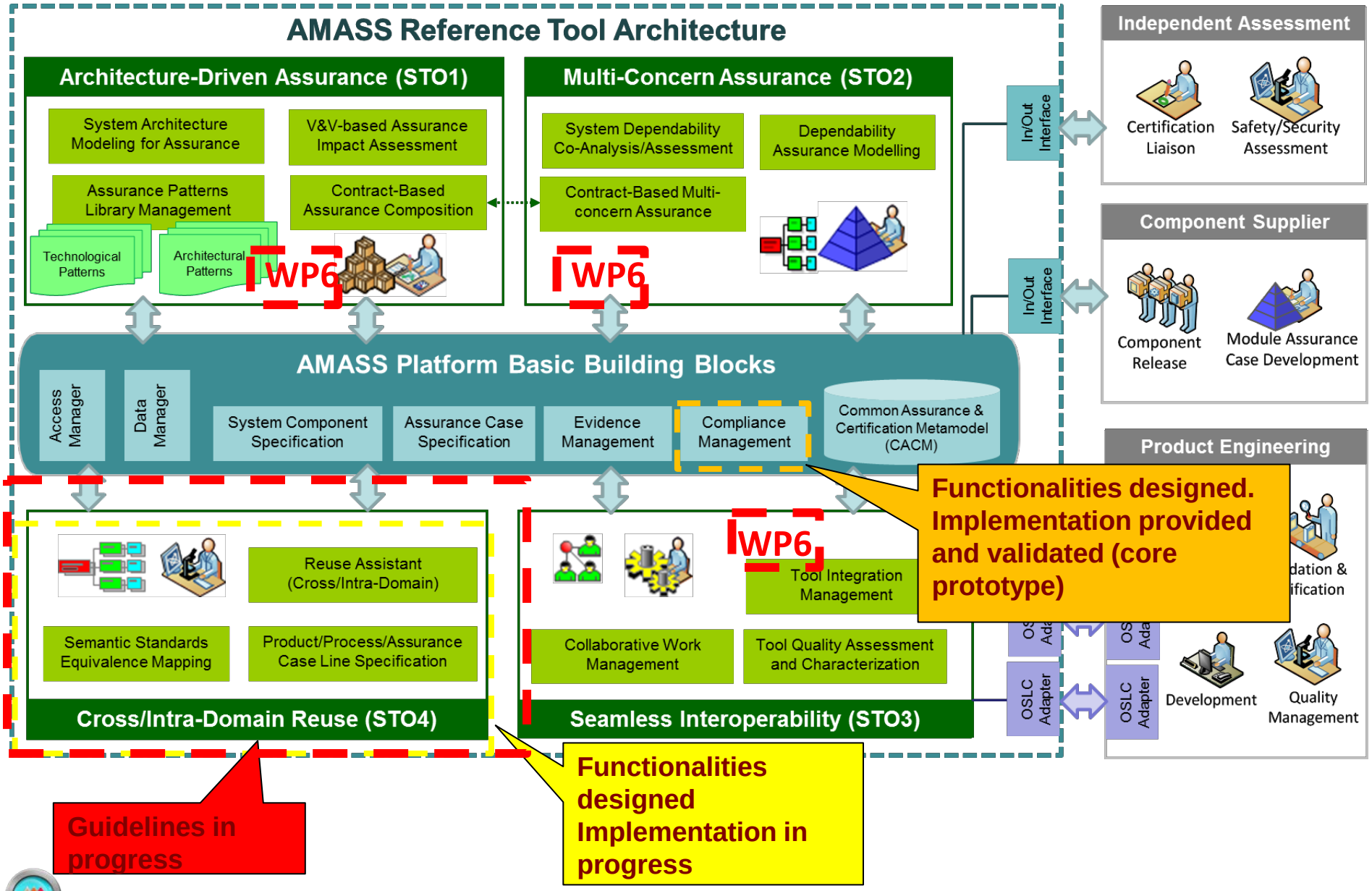
WP6 Objectives

Modelling and methodological capabilities for cross and intra domain reuse + compliance management

Main specific objectives:

1. Investigation and provision of tool-supported **modelling capabilities** aimed at enabling **systematization and reuse of commonalities and variabilities** in terms of process-product-and-argumentation elements.
2. Investigation and provision of tool-supported **ontology-based methods** aimed at enabling the semantic mapping between the standards.
3. Investigation and provision of tool-supported **modelling capabilities** aimed at enabling **semi-automatic generation** of certification artifacts.
4. Investigation of **metrics** aimed at quantifying the increased efficiency via reuse and automatic-generation.
5. **Demonstration** of the reuse of assurance results.
6. Consolidation and integration of previous work on **compliance management**.

AMASS Reference Tool Architecture: WP6 Scope

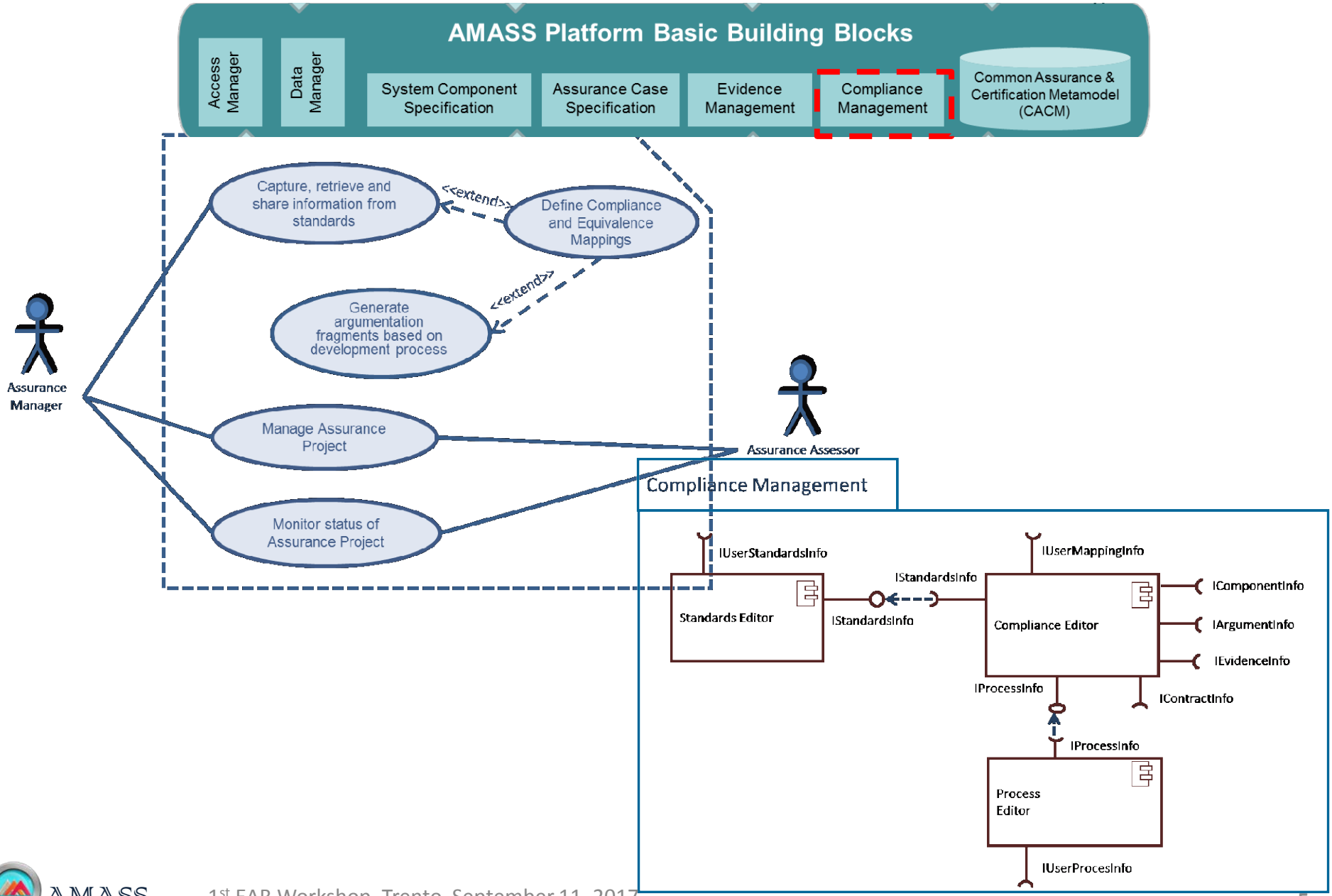


WP6 – ARTA functionalities to achieve STO4 ++

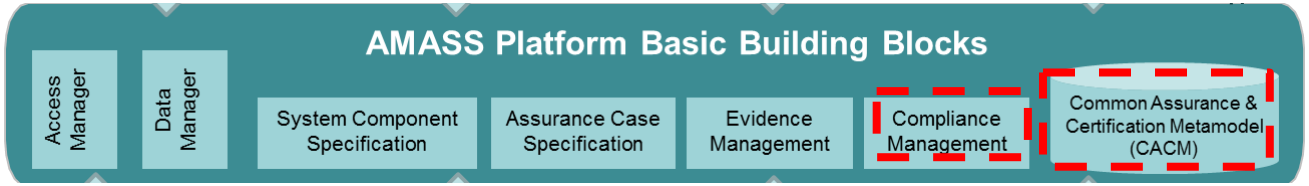
- **Prototype Core**
  - **Compliance Management**
    - **Standards modelling for Compliance Management**
    - **Process Modelling for Compliance Management**
      - **Capability Patterns for Compliance Management**
        - » **Interaction between Capability Patterns and Compliance Management/Assurance**
    - **Compliance management: Process and standards mapping**

- **Prototype 1**
  - Systematization
  - Mapping
  - Reuse assistant
  - Compliance Management (formal)

WP6: Prototype Core Functionalities

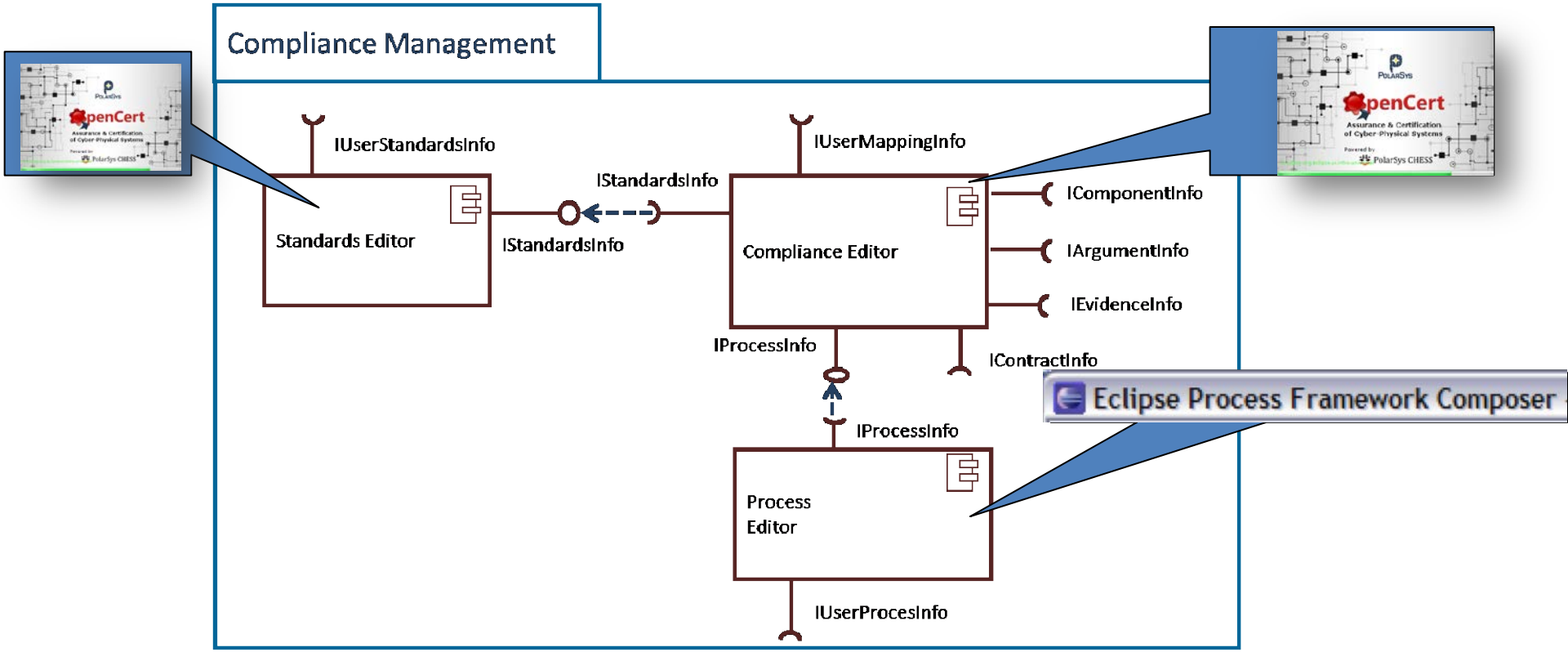


WP6: CACM



- SafeCer EPF Composer-based approach has been integrated
  - CACM includes UMA/SPEM2.0
  - A model transformation has been implemented
- OPENCOSS OpenCert-based approach has been merged

WP6: Core Prototype Tools Interplay



WP6 – ARTA functionalities to achieve STO4 ++

- Prototype Core
  - Compliance Management
    - Standards modelling for Compliance Management
    - Process Modelling for Compliance Management
    - Compliance management: Process and standards mapping

- **Prototype P1**
  - **Systematization**
    - **Variability Management for Cross and Intra Domain reuse**
      - **Process**
      - **Assurance Case**
      - **Product, including variability management of contexts**
  - **Mapping**
    - **Semantics-based mapping of equivalent standards**
  - **Reuse assistant**
    - **Syntax-based mapping of equivalent standards**
  - **Compliance Management (formal)**

WP6: Cross and Intra Domain Reuse

Reuse Scenarios

- Cross-Concern
- Cross-Domain
- Intra-Domain
- Cross-Systems (COTS)
- Cross-Systems (SEooC-like)
- Product Upgrade

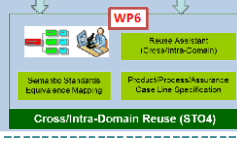
Reusable Assets

- Compliance Checks
- Artefacts
- Activities
- Requirements
- Design
- Code
- Arguments

Tooling Needs

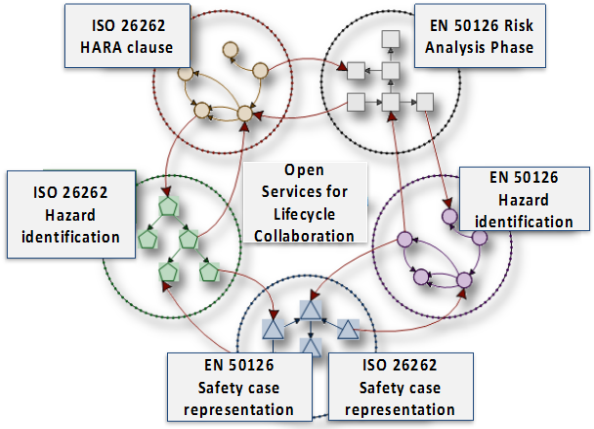
- Reuse Assistant
- Reuse Discovering
- Assets Management
- Impact Analysis
- Traceability

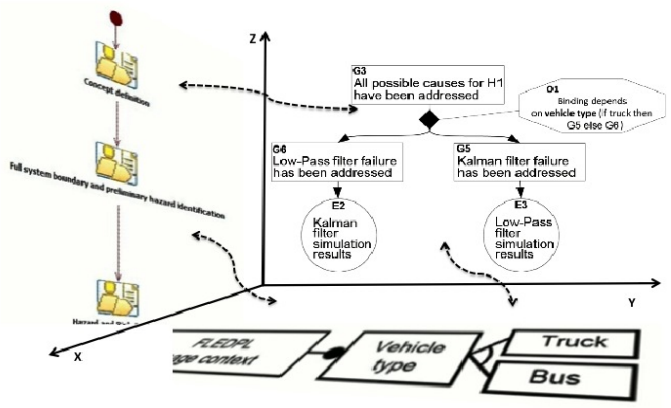
WP6-STO4: Functionalities Interplay



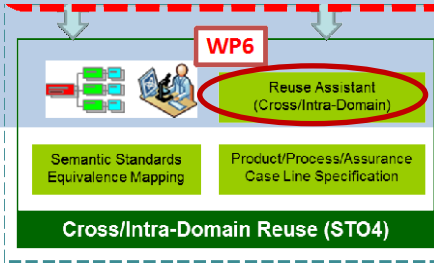
From Scratch

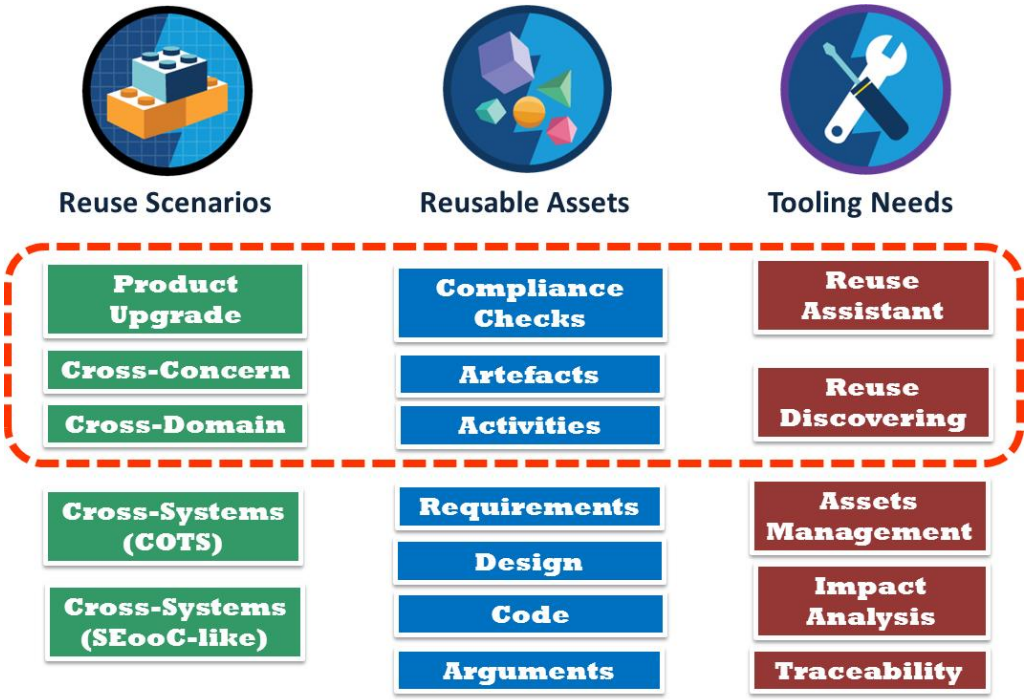
Systematization of commonalities and variabilities within and between families of Processes/Products/Assurance Cases



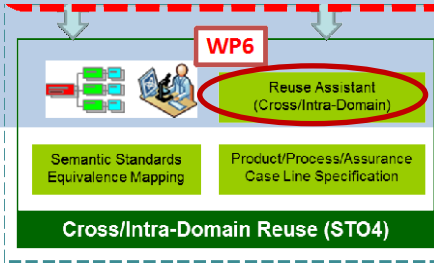


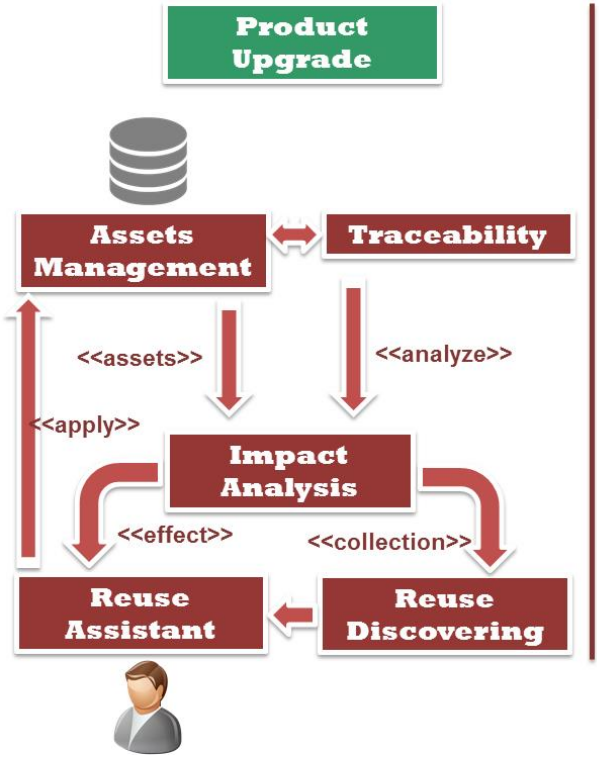
Reuse Assistant

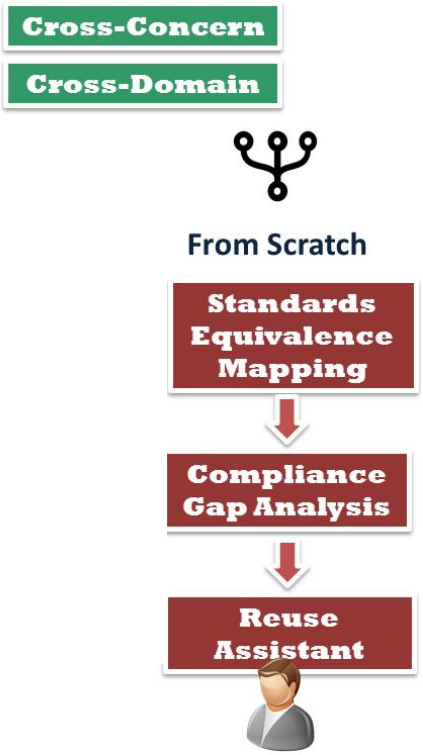




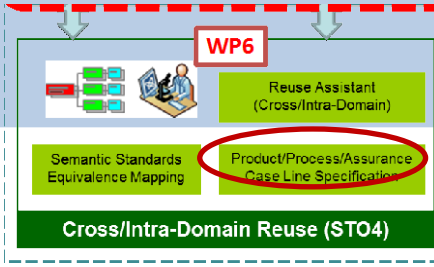
Reuse Assistant







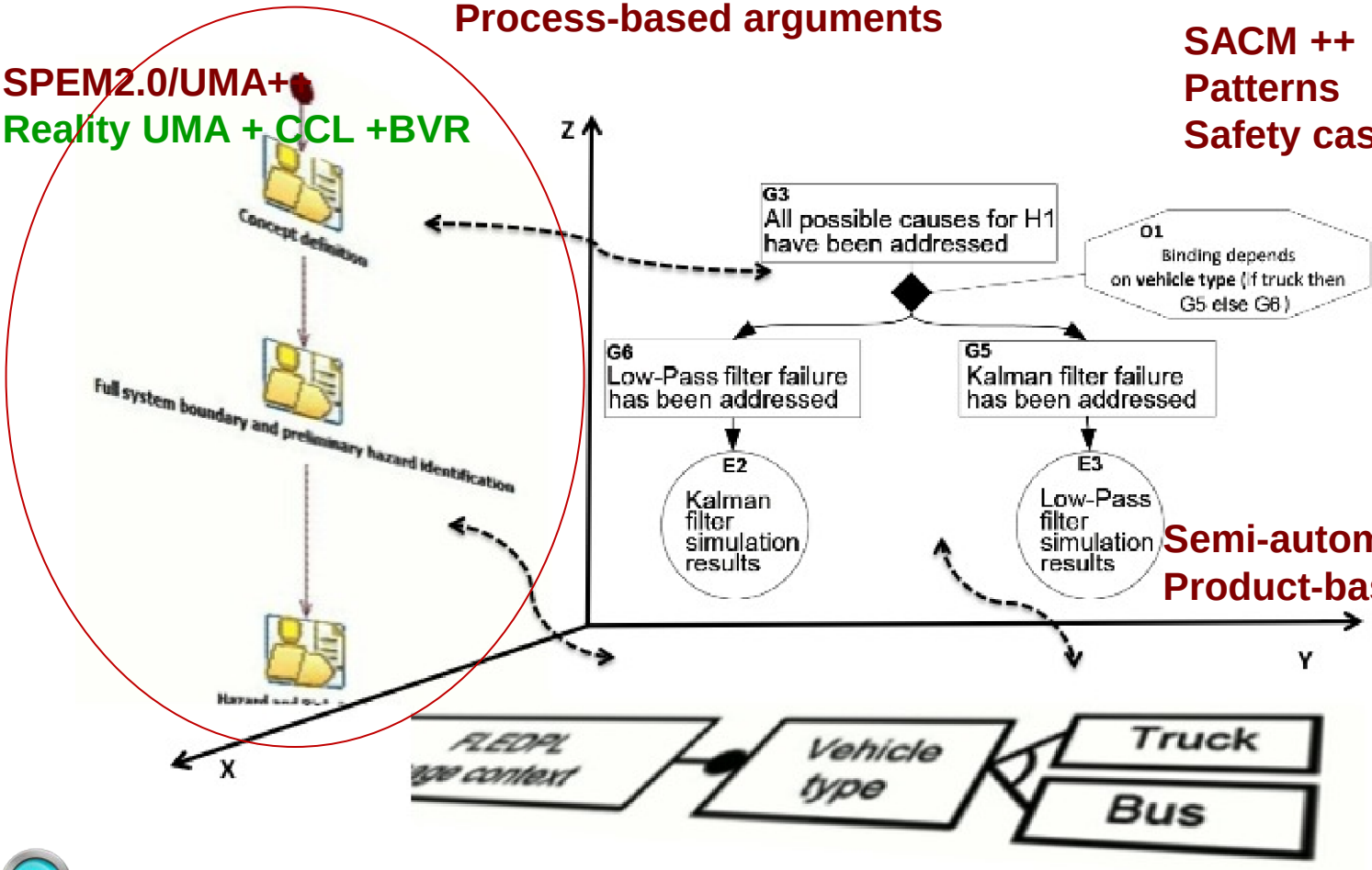
Anti-Sysiphus



Semi-automatic generation of Process-based arguments

SACM ++
Patterns
Safety case lines

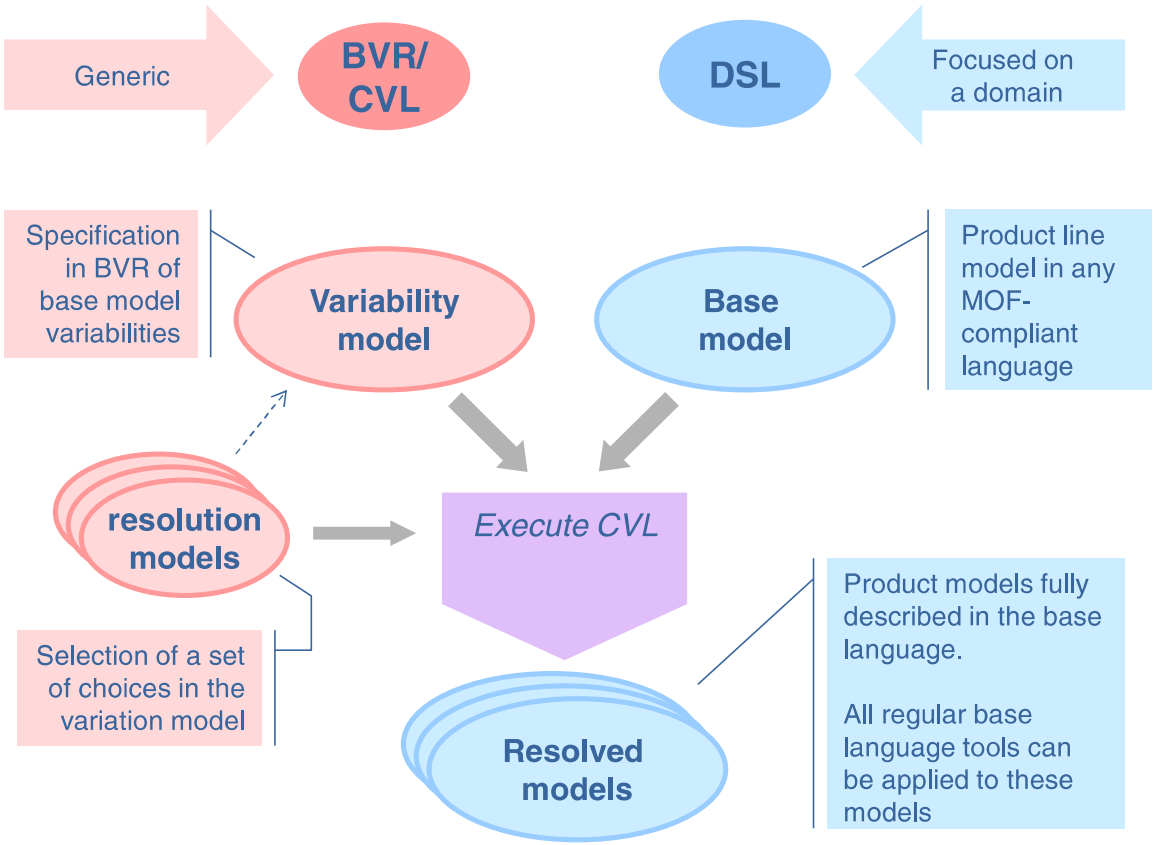
SPEM2.0/UMA+
Reality UMA + CCL +BVR



Semi-automatic generation of Product-based arguments

Process Reuse via EPF Composer & BVR Tool

Modelling variability as an orthogonal separate model

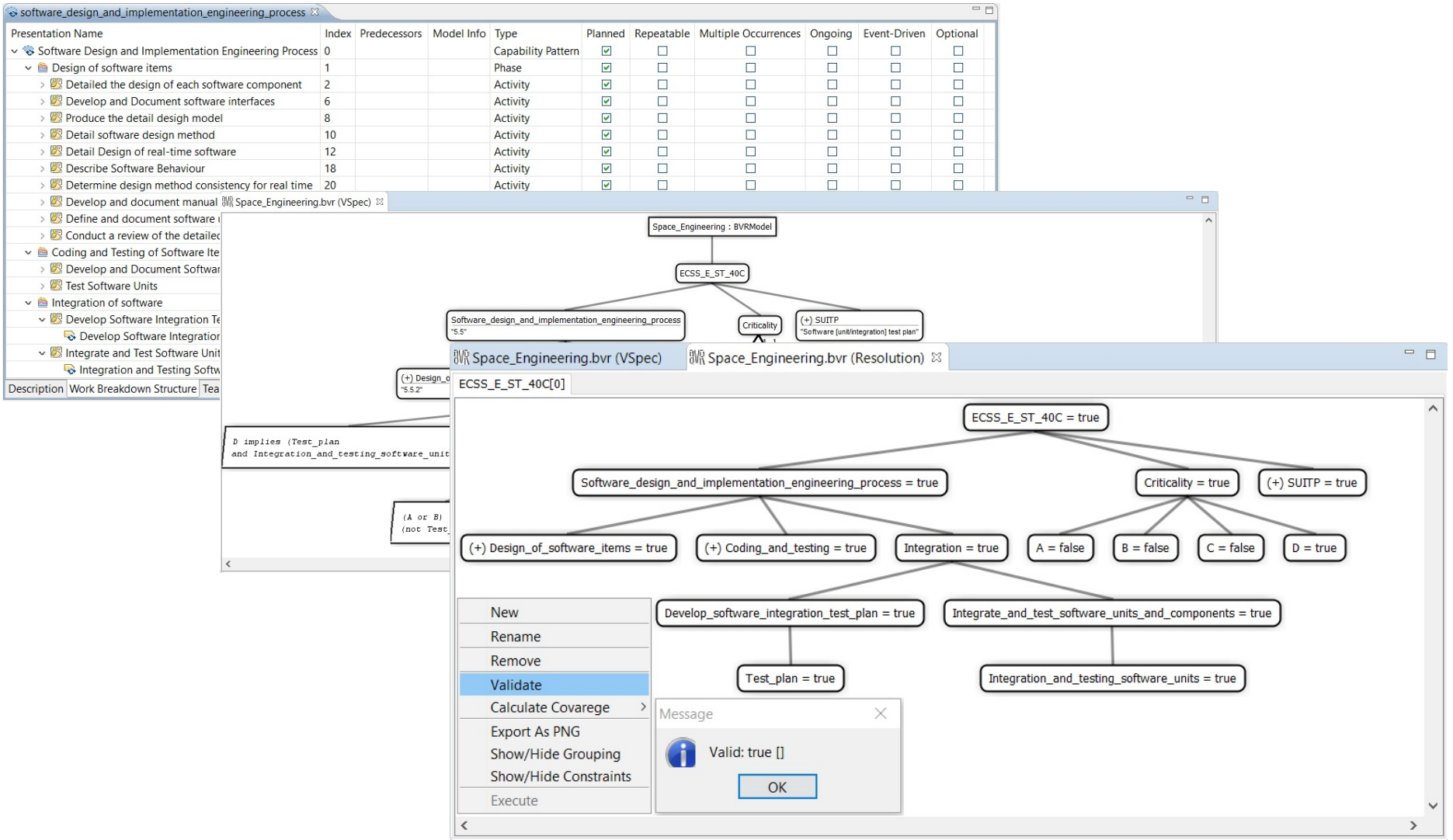


Our DSL= UMA

Base model = UMA-compliant model

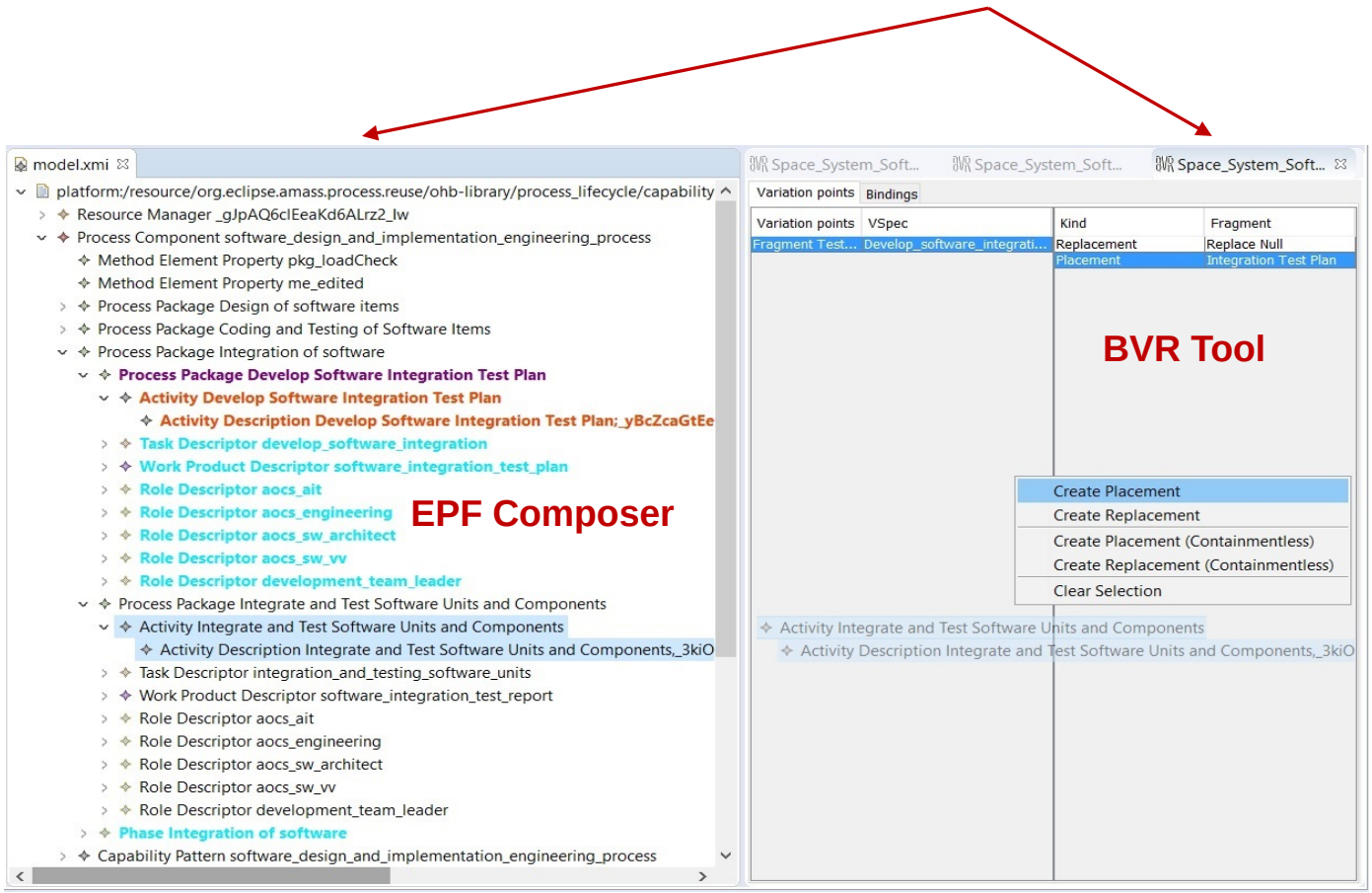
Resolved model = UMA-compliant model

Process Reuse via EPF Composer & BVR Tool



Process Reuse via EPF Composer & BVR Tool

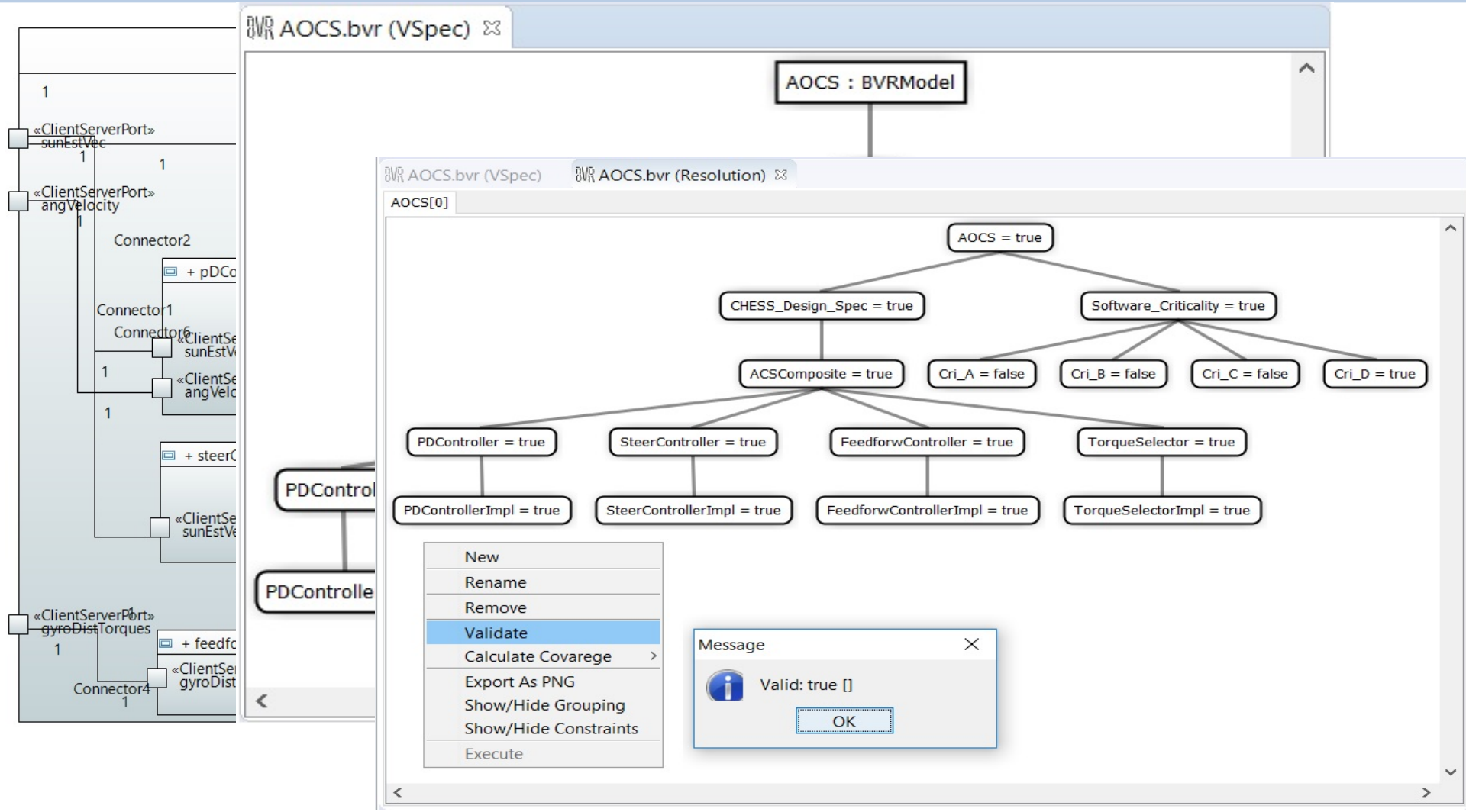
Bind between model(s) using fragments



UC11: Initial exploration of an intra domain (space) SoPLE

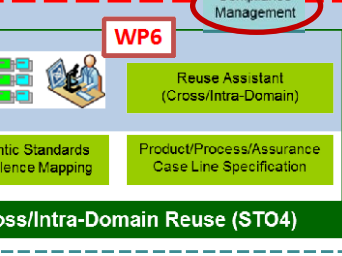
UC3: Initial exploration of an intra domain automotive SiSoPLE, focused on ISO 26262 and SAE J3061

Product Reuse via CHESS & BVR Tool



[System description modelled in a paper to be presented at ICRE-2017]

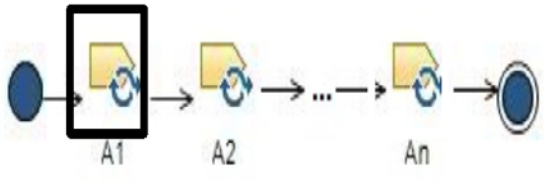
Compliance management (global vision)



Process Space

Normative Space

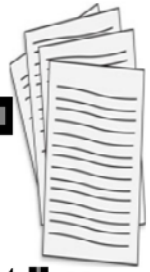
Process Model(s)



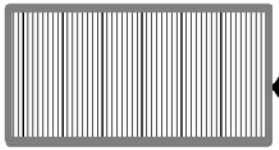
Mapping tables (Core)

Argumentation about compliance (P1)

Compliance checking (P2)

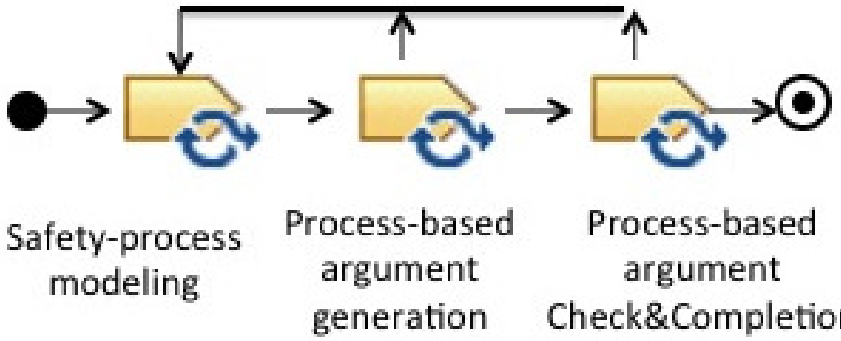


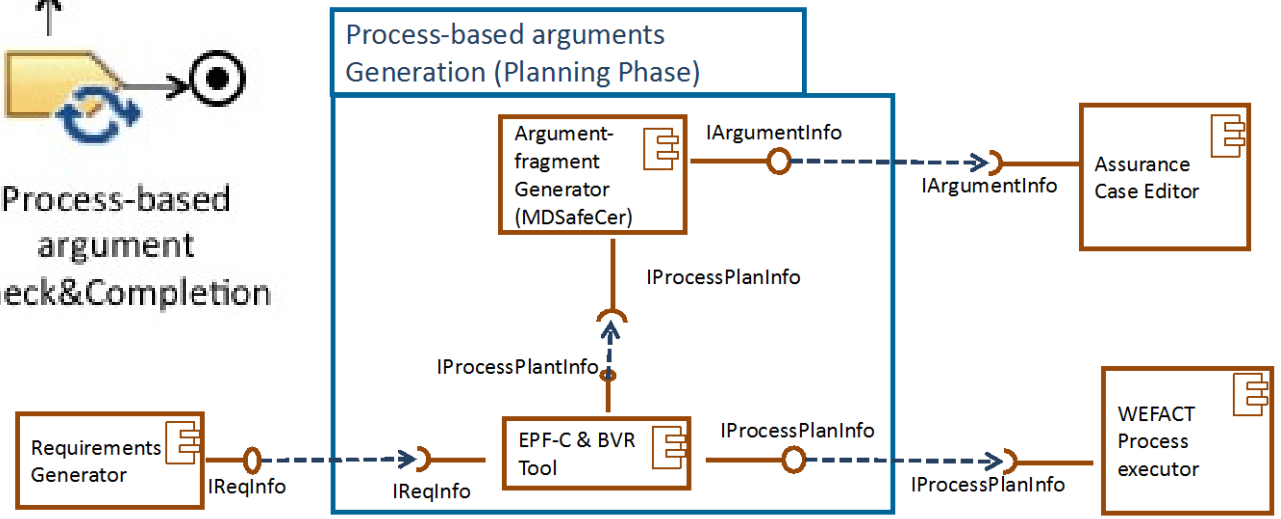
Norm(s)

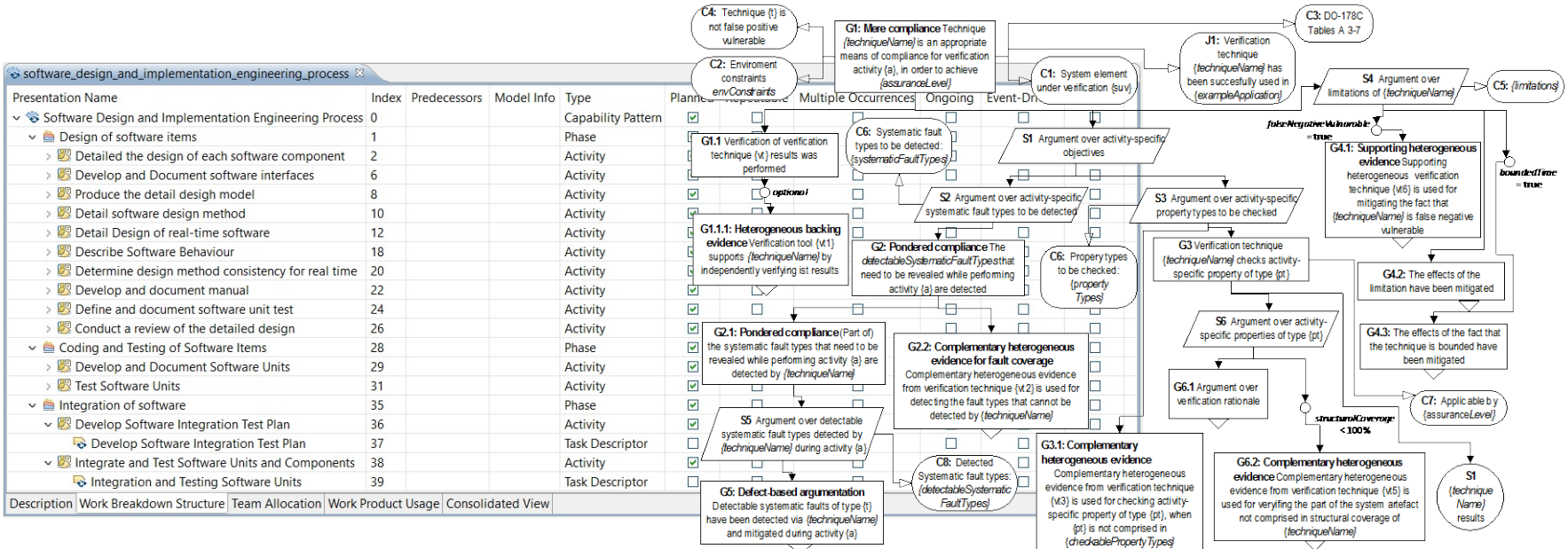


Formalization

Compliance management (via argumentation)

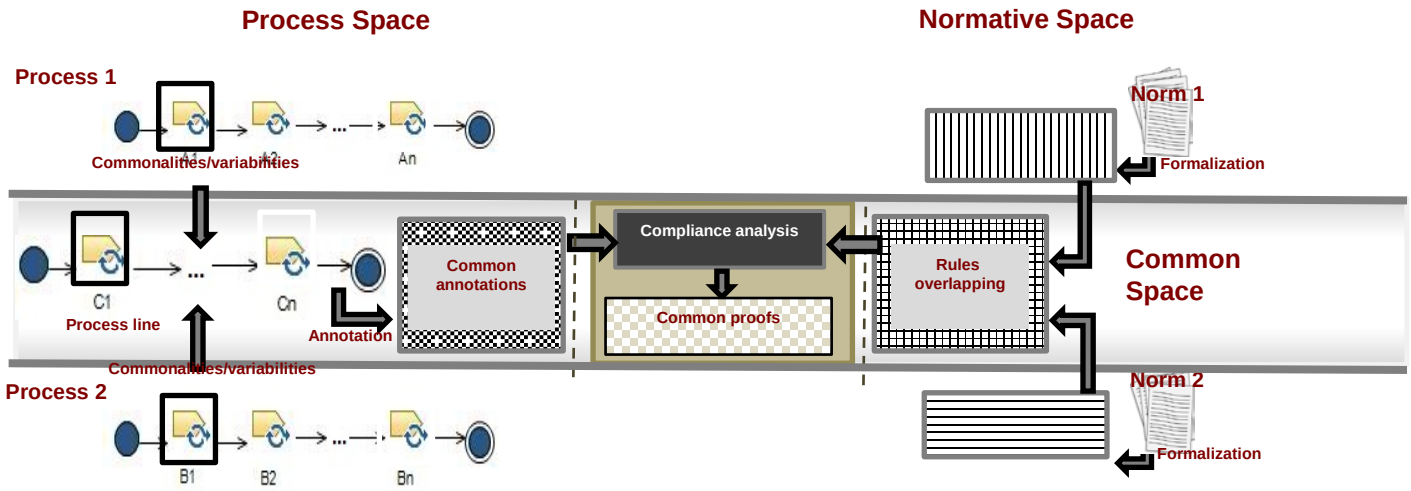






[Pattern introduced in a paper to be presented at SAFECOMP-2017]

Compliance management (via checking)



[Presented at EuroSPI&ASIA^2 2017]

[+ work to be presented at WoSoCER 2017]

Summary and future work

- First AMASS prototype has been released
- Solutions for the second prototype have been designed and partially implemented

- Guidelines will be provided
- The second prototype will be evaluated based on the measurement program
- The third prototype will be designed and evaluated

Thank you for your attention!