Collaborative Systems Engineering
Peter Gerber (Schaeffler Technologies)
Thema: Lore Ipsum

Yesterday
Product & Technique

source: Daimler

Develop a Product

Today
Emotions & Function

source: Daimler

Kiss my S

source: Daimler

Tomorrow
Mobility & Services

source: Daimler

We invented the automobile and are on a journey towards nothing less than the future of mobility

Develop a Smart Product or Service

source: Daimler
Masterplan for Co Action

Integrated Architecture Improves:

• Transparency
• Collaboration
• Efficiency
• Smart Functionality
• Increased Speed
• Traceability
• Complexity Management
SysML as central structure of the smart product

SysML Workflow Forum
SysML as central Element of the Product Architecture

SysML WF Forum: Establish Seamless Industrial-Level Collaboration using model-based Systems Engineering to support handling of Complexity
Focus on High Prioritised Use Cases
Including internal and external Collaboration

Company
Requirements Management/Engineering

SysML Authoring

Test Management

Partner
Requirements Management/Engineering

SysML Authoring

Test Management

SysML - RQM

"Model Exchange"

SysML - V&V
Base: Model Exchange
Use Cases and Requirements regarding technical solutions (Results of WP4)

Reference Process / Workflow:

Exchange of real model data (Use Case):

Description of Minimal Set of Information:

**Structural Content**

- **Use Case:**
  The diagram represents the structural context of a system

- **Intention:**
  - What is the SOI?
  - What are the neighboring Systems?
  - Where are constraints?
  - Are there explicit environmental conditions?

- **Diagram Type:**
  - Internal block diagram

- **Elements:**
  - Block/Part
  - Interface Block
  - Proxy Port
  - Connector
  - Flow Properties (in/out; direction)
  - Comments
  - Itemflow
  - Association
Reference Process / Workflow: Linking- and exchange process

In Work

- Description of Minimal Set of Information for Model- and Link Exchange
- Configuration and Release Management
SysML Models and Verification & Validation
Requirements regarding technical solutions (Results of WP7)

Integrated Model and Exchange Workflow

Description of Minimal Set of Information

Config, Release and Change Management

Baseline based on Feature/Release plan (on atomic artefacts)
From Documentation to Practise
Establish SysML Implementor Forum January 2021

SysML WF
Chair (Industry Rep.)
Processual interoperability

Requirements
Backlog
Solutions & Demonstrators

Collaboration

SysML IF
Chair (Industry Rep.)
Tool interoperability

Definition of reference process, requirements and test cases

Evaluation of alternative solutions implementation of a demonstrator
Mastery of a distributed product structure

Interdisciplinary Collaboration Framework Forum
Distributed product structure and ALM-PLM Integration
Best practices for cross-disciplines collaboration (CDLC conclusion)

Process, Use Cases, Architecture (Requirements)

Implementation in Demonstrators

prostep IVIP recommendation available in October 2020
Interdisciplinary MBSE Collaboration Framework
prostep ivip project: 2020-2023

Framework

Methods + Capabilities + Data Architecture + IT

WP1 Methods, Use cases & Requirements
WP2 Datamodel
WP3 Technologies
WP4 Proof Of Concept / Vendors Demonstrators
WP5 Synthesis & Communication

Traces
Interdisciplinary Collaboration Framework Approach

Available Technologies

Principles / Capabilities / Enablers

Requirements

Harmonized Artifact-/Informationmodel

Methods

Demonstrator

Scenarios

Use cases

- SQL is a query language used for relational databases.
- GraphQL is a query language used for graph-data developed by Facebook and published as open source.
- The SOAP-Interface, originally "Simple Object Access Protocol" is an international standard of the World Wide Web Consortium (W3C). It is an XML-based protocol to represent data as messages exchanged between organizations.
- The Acronym OSLC stands for Open Services for Lifecycle Collaboration (OSLC) which is an open standard developed by a large community in the fields of software development and lifecycle management. OSLC defines specifications for the exchange of information between tools and systems in a software ecosystem. As a protocol, OSLC is self-contained and independent of any XML or web standard, making it widely usable.
- The OData (Open Data Protocol) is an ISO/IEC approved, OASIS standard that defines a set of protocols and a corresponding application programming interface (API) to provide read, update, create, and delete (RUCD) operations on data. OData enables clients to get and manipulate data from web services, such as RESTful Web services, without having to build a custom solution for each service. OData supports the retrieval of data through the HTTP protocol and uses RDF and Atom formats for data representation.
Conclusion
Smart Collaboration enables Smart Products and Services
Collaborative Systems Engineering

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