TRC WEBINARS 2018

Requirements Quality with Logical&Physical models and Ontologies

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  - The Webinar will start in few minutes
  - You'll be muted all along the Webinar
  - There's a chatting box to ask your questions or send your comments when you want
  - Please address these comments and questions to the user "The REUSE Company" and not to the presenter directly
  - If you have any technical issue please use this chatting box, or mail us at: support@reusecompany.com
  - The Webinar will be recorded. A link to the recording will be sent to you in few days

TRC

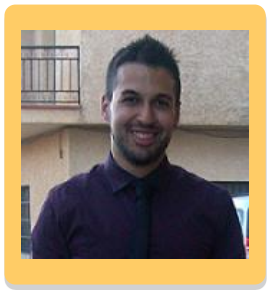
WEBINARS 2018

Requirements Quality with Logical & Physical Models (Rhapsody & Simulink) and Ontologies (Protégé)

Friday, 16 March 2018

Presenters' profile

- Borja López
  - Rich Authoring Tool Architect



Borja López
borja.lopez@reusecompany.com

Content

- Description of The Reuse Company
- Requirements Management and Modelling
- An ecosystem full of tools
- Knowledge Interfaces
- Quality Assessment based on External Knowledge
- Demo
- Q&A

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Brief description of The Reuse Company

the REUSE company

T(he) R(euse) Q(ompany)

Trace + Retrieval + Quality (Reuse)

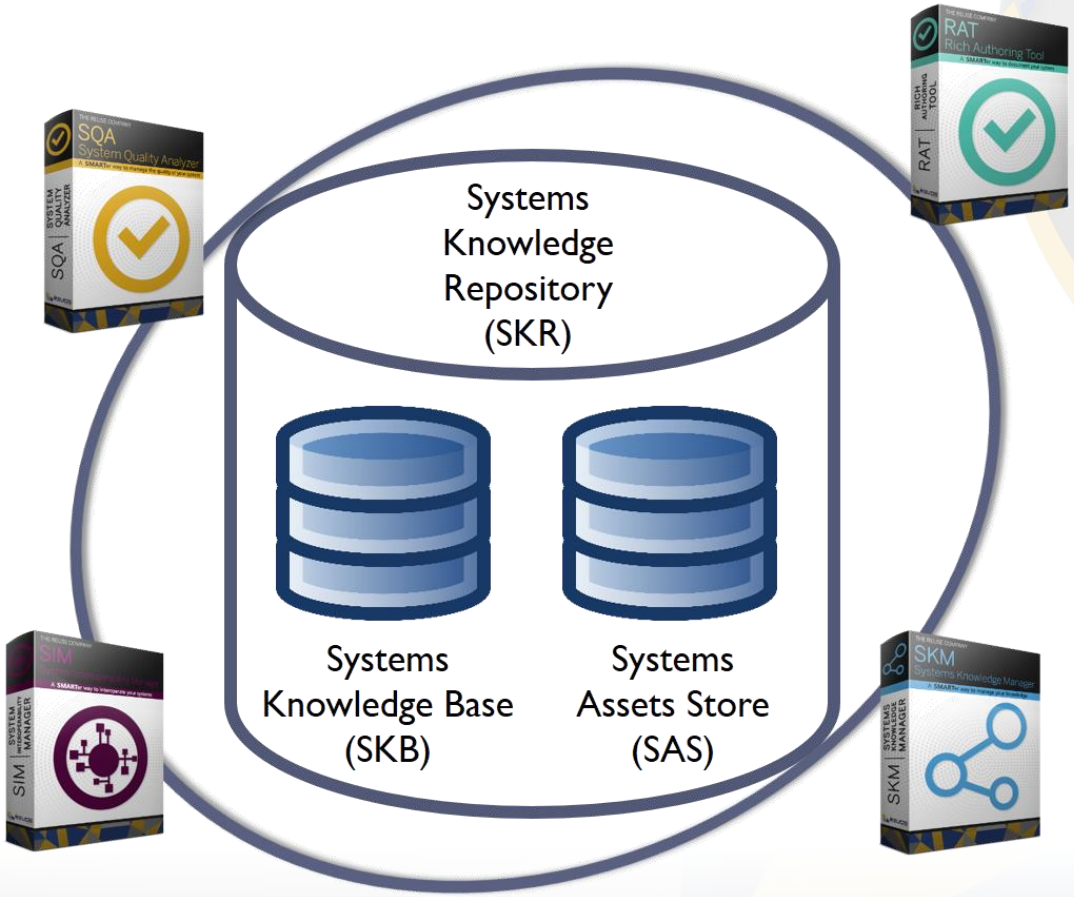
Aiming to **Improve Project performance**

By means of a: **Knowledge Centric Approach**

KCSE Suite v18

SQA -System Quality Analyzer

Global Quality Management



RAT –Rich Authoring Tool

Smart text authoring

SIM –System Interoperability Manager

Tailorable Interoperability Platform

- R+ Manager

Managing requirements transformations

Managing models transformations

- T+ Manager

Managing traceability

- Reasoning Manager

Task based environment

SKM –System Knowledge Manager

Management of System Knowledge

Libraries

The REUSE Company in the World

Selected set of Customers

Aerospace and Defense

AIRBUS
AIRBUS DEFENCE & SPACE
THALES
SAFRAN Snecma
AIRBUS HELICOPTERS
EADS INNOVATION WORKS
MBDA MISSILE SYSTEMS
SAFRAN Sagem

Automotive

RENAULT

Energy

FUSION FOR ENERGY
iter the way to new energy

Consulting

indra
SHERPA ENGINEERING

Banking

BCR Banco de Costa Rica
Santander

Health care

THINK SURGICAL
Health Net

Other industries

sage
SIEMENS
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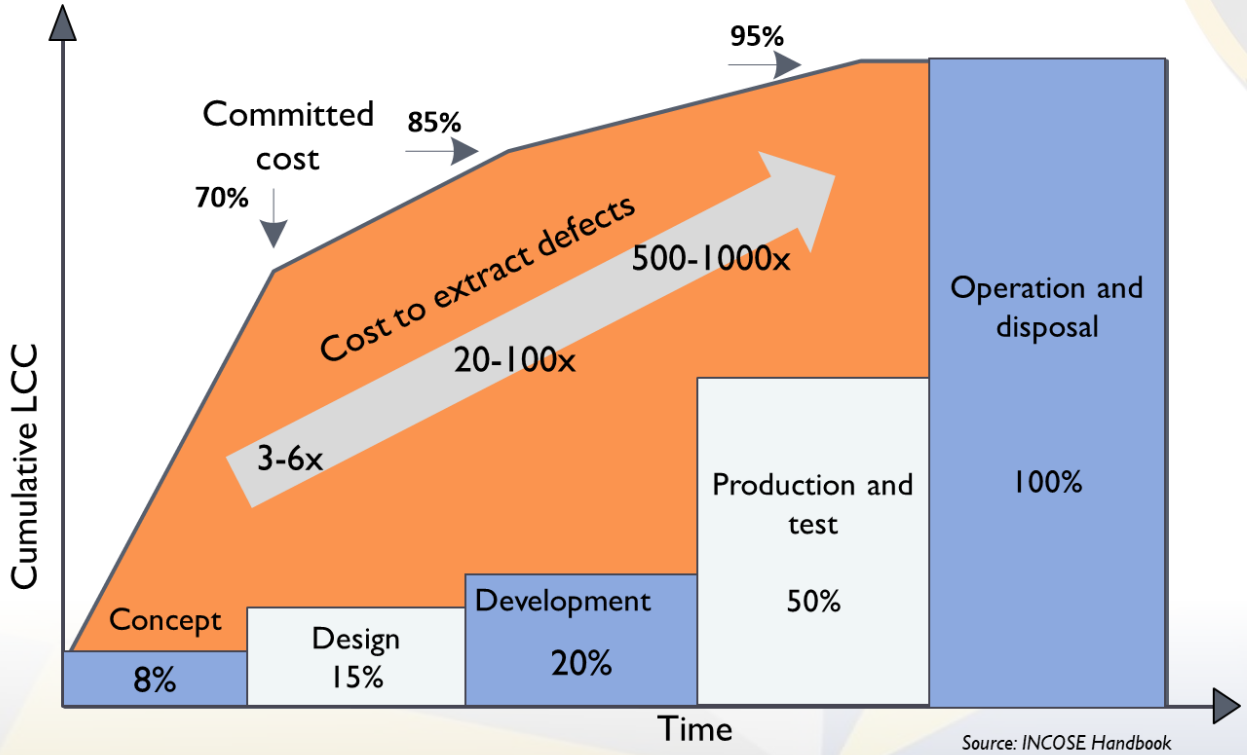
Requirements Management

- **The development process** is affected by a fast-changing environment:
  - Technology issues
  - Changing needs
  - Unidentified risks
- **Requirements Engineering** becomes central for organizations
  - Reducing the development cycle (time to deploy the technology)
    - Time to Market …
    - **Time to Market with the right Product**
- **Requirements** become the base

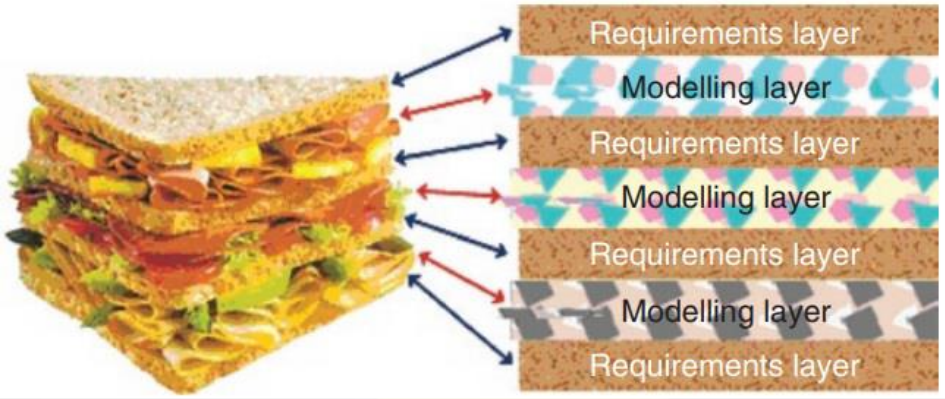
Requirements Management

- Importance of writing **High Quality Requirements**

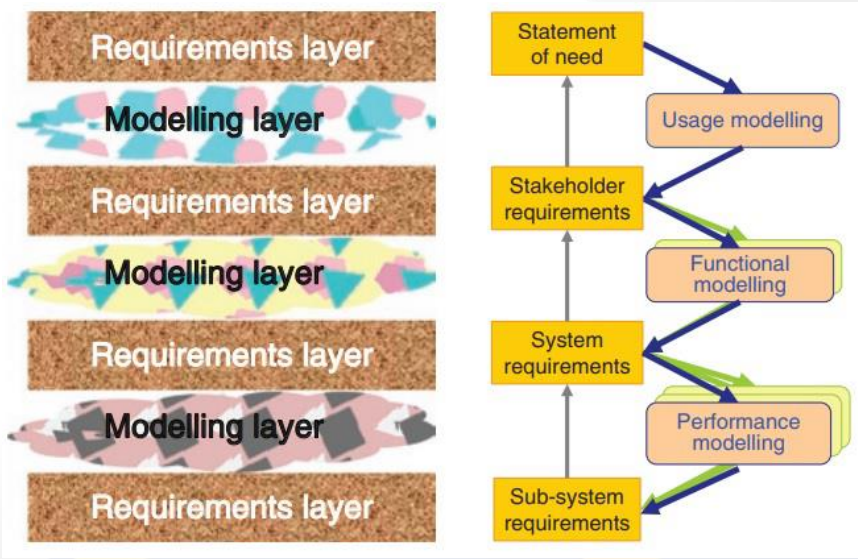


Requirements and Modelling

- Relationship between **Requirements Management** and **System Modelling**
  - Modelling supports the design activity
  - Modelling helps decompose the requirements into the next level down
  - Models never say everything about a system
    - Requirements can cover not modelled aspects



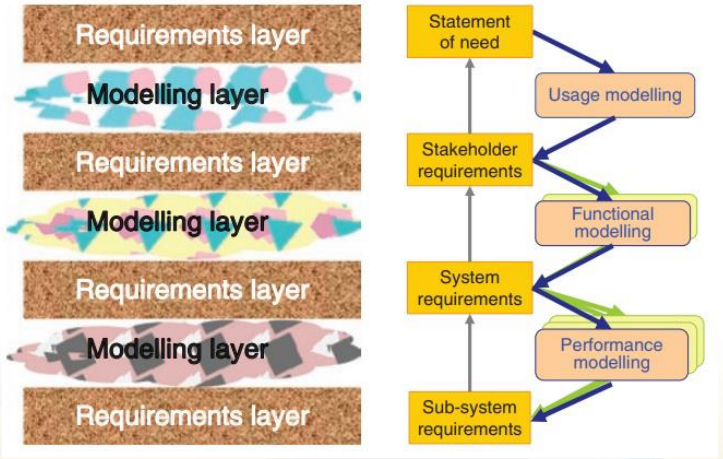
Source: Requirements Engineering, Third Edition



Source: Requirements Engineering, Third Edition

Requirements and Modelling

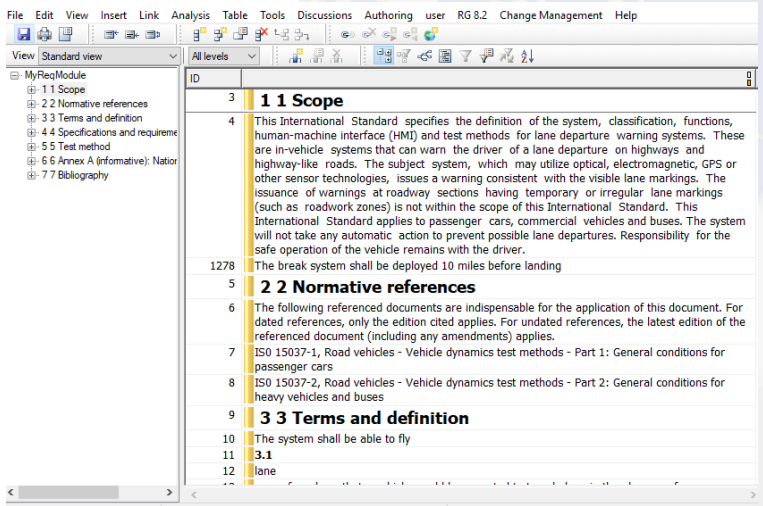
- Models assist the requirements engineers in analyzing the requirements
  - Improve understanding of the system
  - Presence of desired emergent properties (and absence of undesirable ones)
  - Help determine how to satisfy requirements among different layers

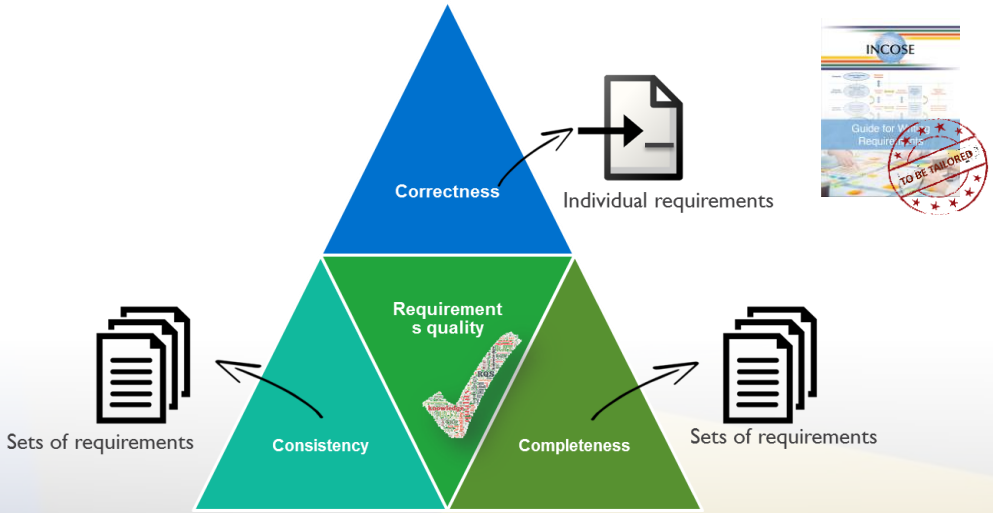


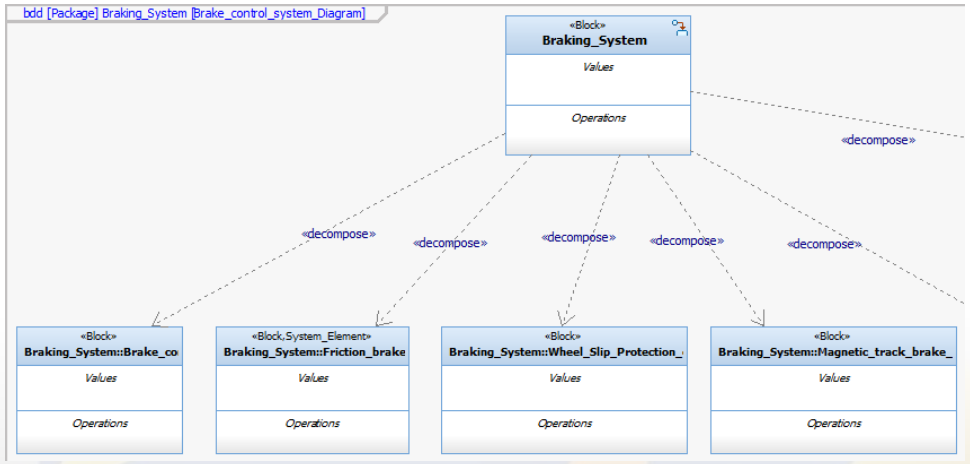
Source: Requirements Engineering, Third Edition

Requirements and Modelling

- Important to analyze the quality of the requirements
  - Requirements are not isolated artifacts:
    - Are they Correct?
    - Are they **Consistent** with the models?
    - Are they **Complete** regarding the information stored in the models?







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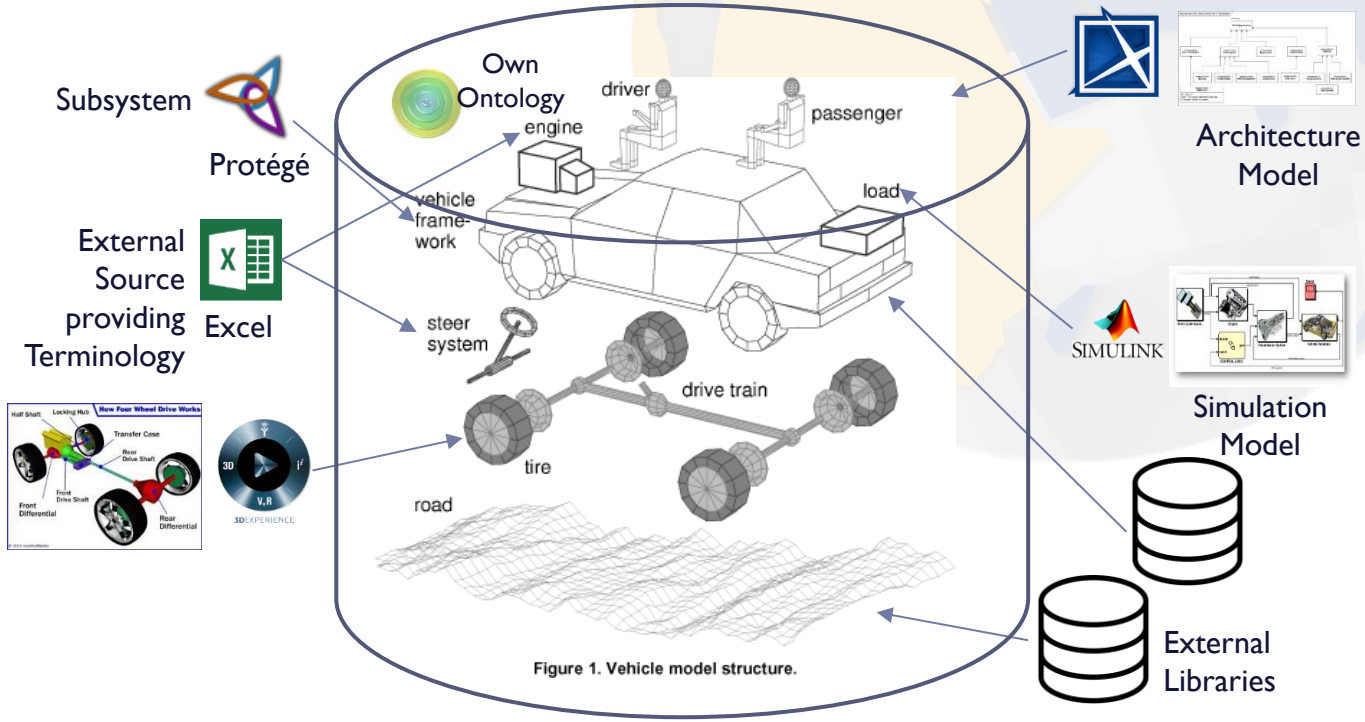
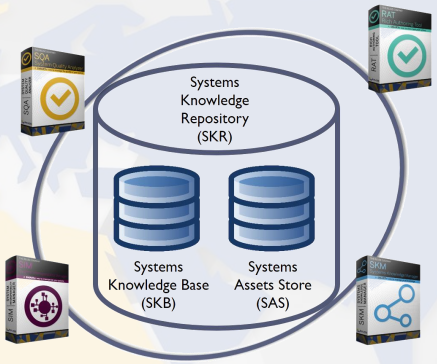
MBSE: An ecosystem full of tools

- Different tools for different purposes:
  - Requirements Management
  - Modelling
  - Traceability
  - Simulation
  - Quality Management
  - …
- **KCSE Suite** → Interoperability
  - Key: Not to model everything in KM, but dynamically load the knowledge on real time
  - This way, SQA will perform quality assessment with all this knowledge

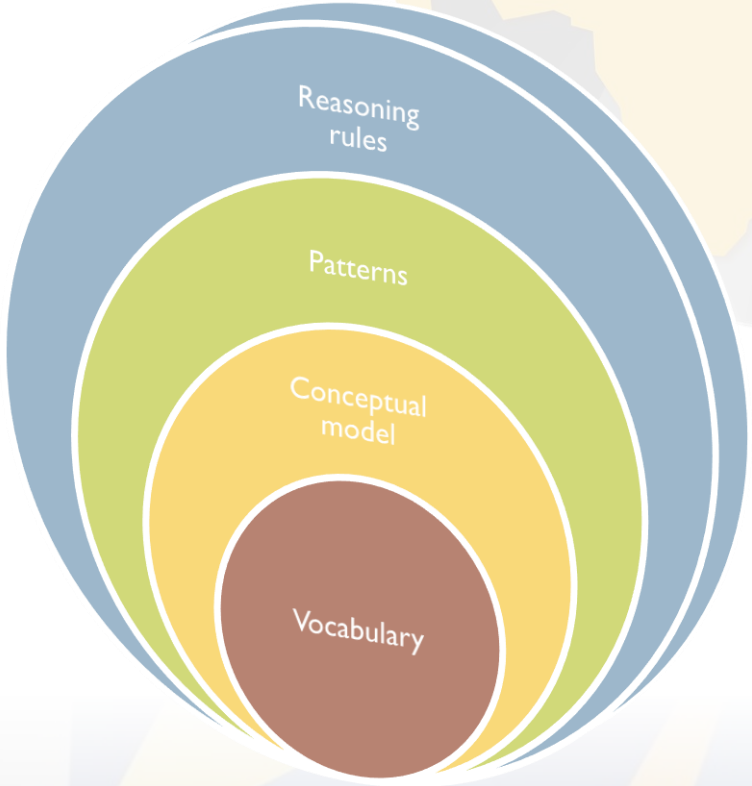


Quality Assessment based on a Knowledge Base



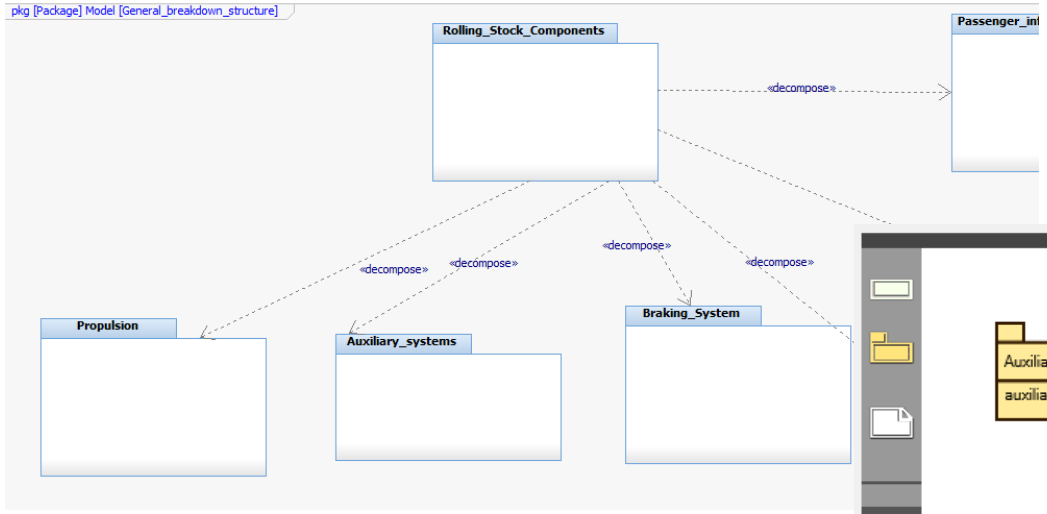
- Knowledge is the Core
  - Systems Knowledge Base (SKB) → Ontology
    - Terminology layer (Vocabulary)
    - Thesaurus layer (System Conceptual Model)
    - Patterns layer (Boilerplates)
    - Reasoning layer (Decision Making)

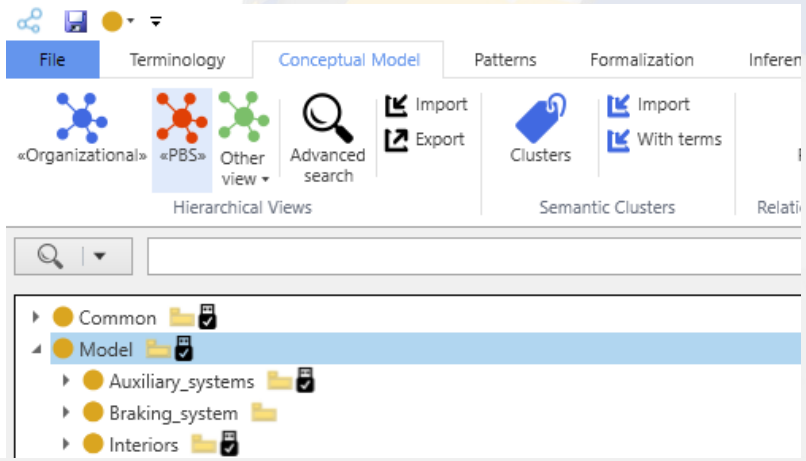
- Knowledge Manager allows the user to model the domain (knowledge) into an ontology
  - Manual process + Semi-Automatic Import / Export.

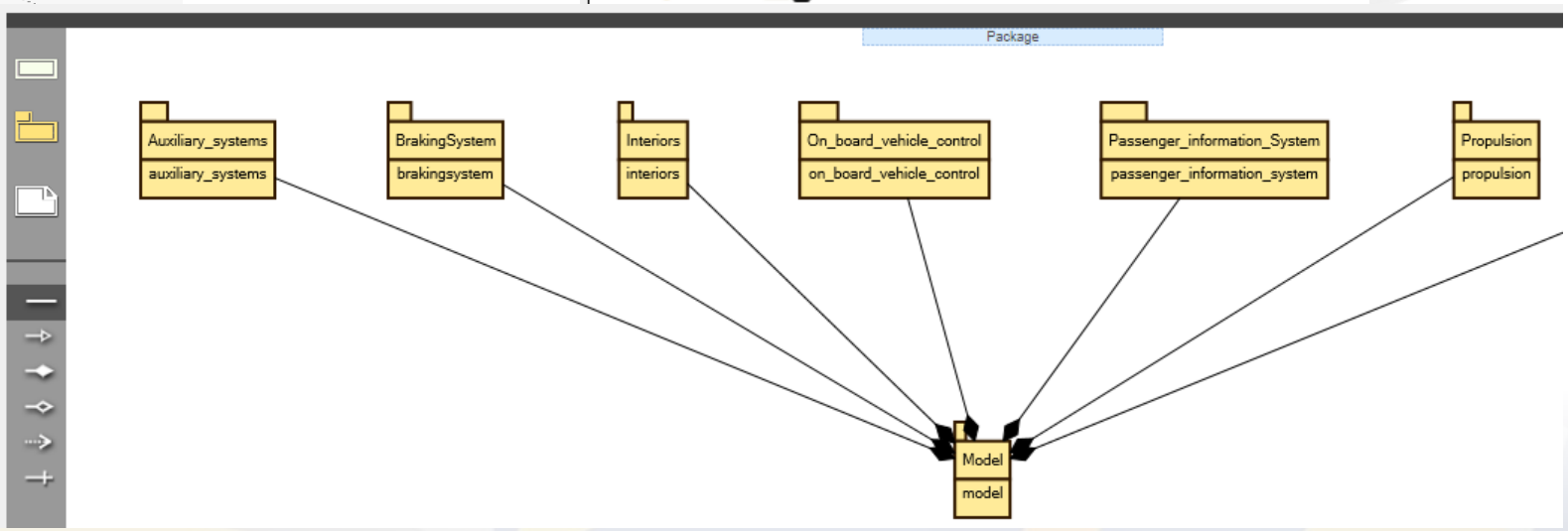


Quality Assessment based on a Knowledge Base

- Dynamic Knowledge Base



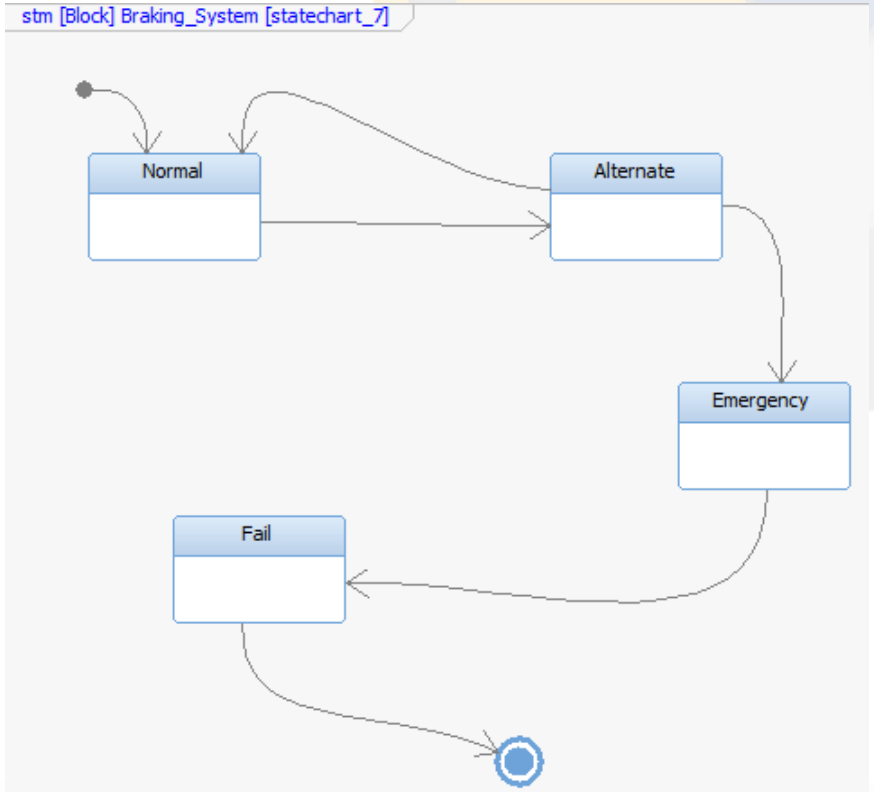




Requirements and Modelling

- Use Case: Completeness checking of a Rhapsody model

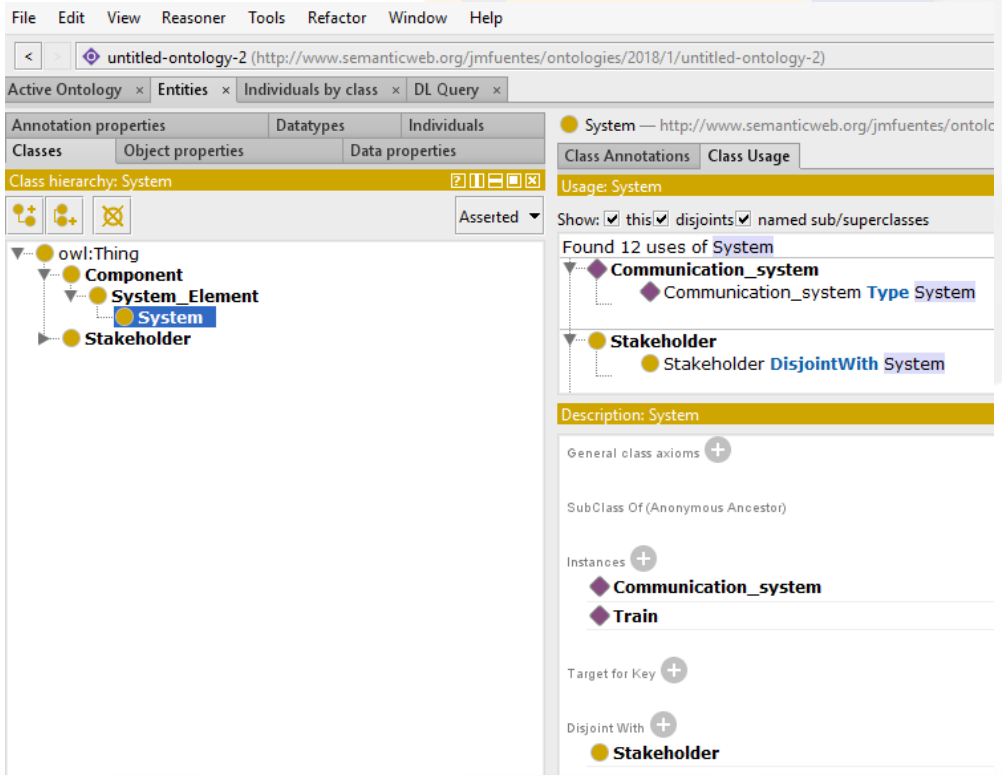
Are the transitions of the State Charts well defined in the requirements specification?



Requirements and Modelling

- Use Case: "Communication System" defined in Protégé

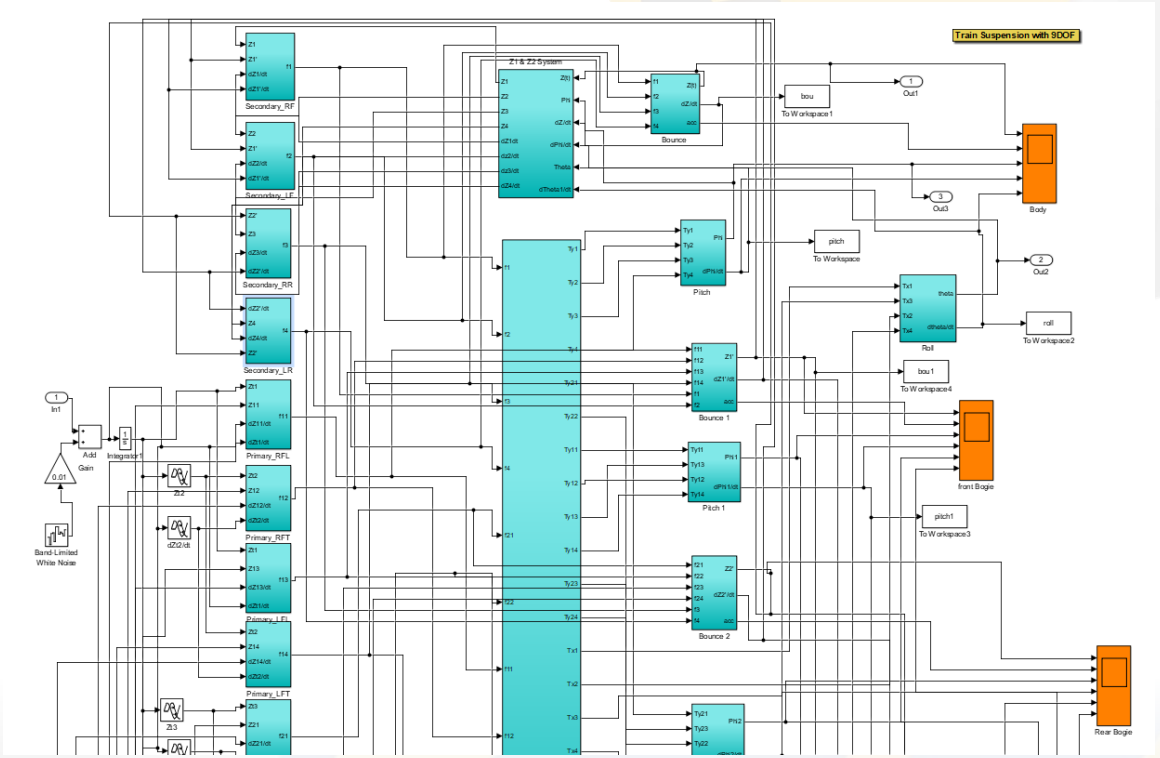
Is the Communication System specified in the requirements?



Requirements and Modelling

- Use Case: Components defined in Simulink

Are the requirements specifying properly the Simulink components?



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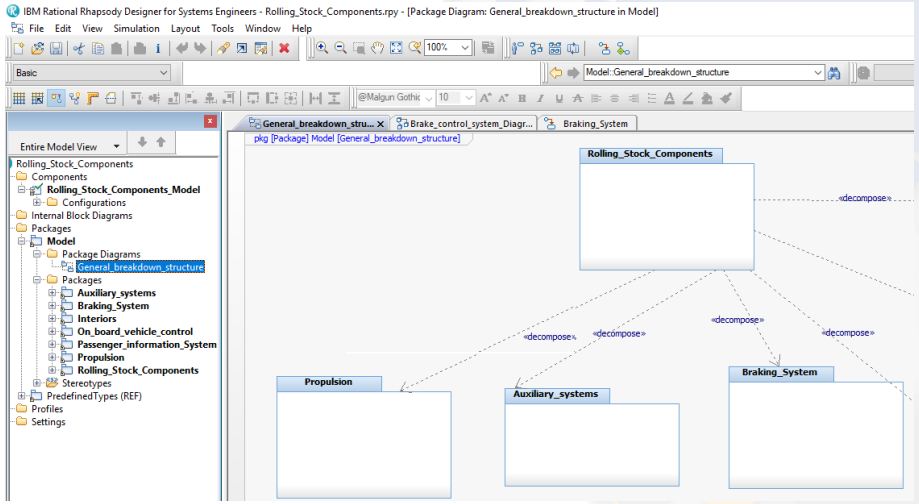
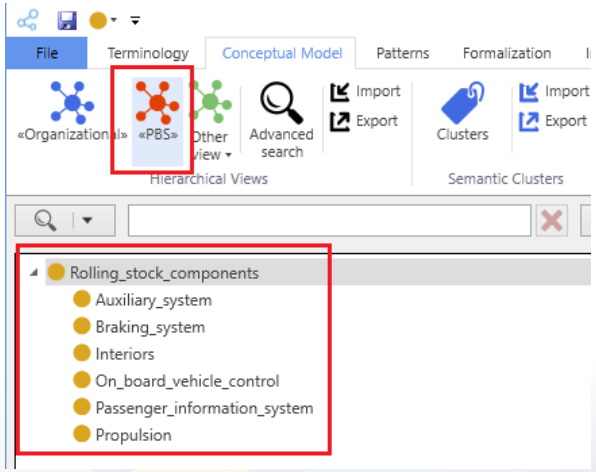
Modelling Knowledge into KM

- KM allows the user to model the information into the SKB (e.g. Rolling Stock Components of a Rhapsody model)



- A Product Breakdown Structure (PBS) can be modelled to represent the decomposition of the Rolling Stock Components
  - Different structures (relationship types) for the different elements of the model



- Cons:
  - Manual or Semi Automatic work is needed
  - Duplicated knowledge (Rhapsody & KM)

Knowledge Interfaces for SKB Extensibility

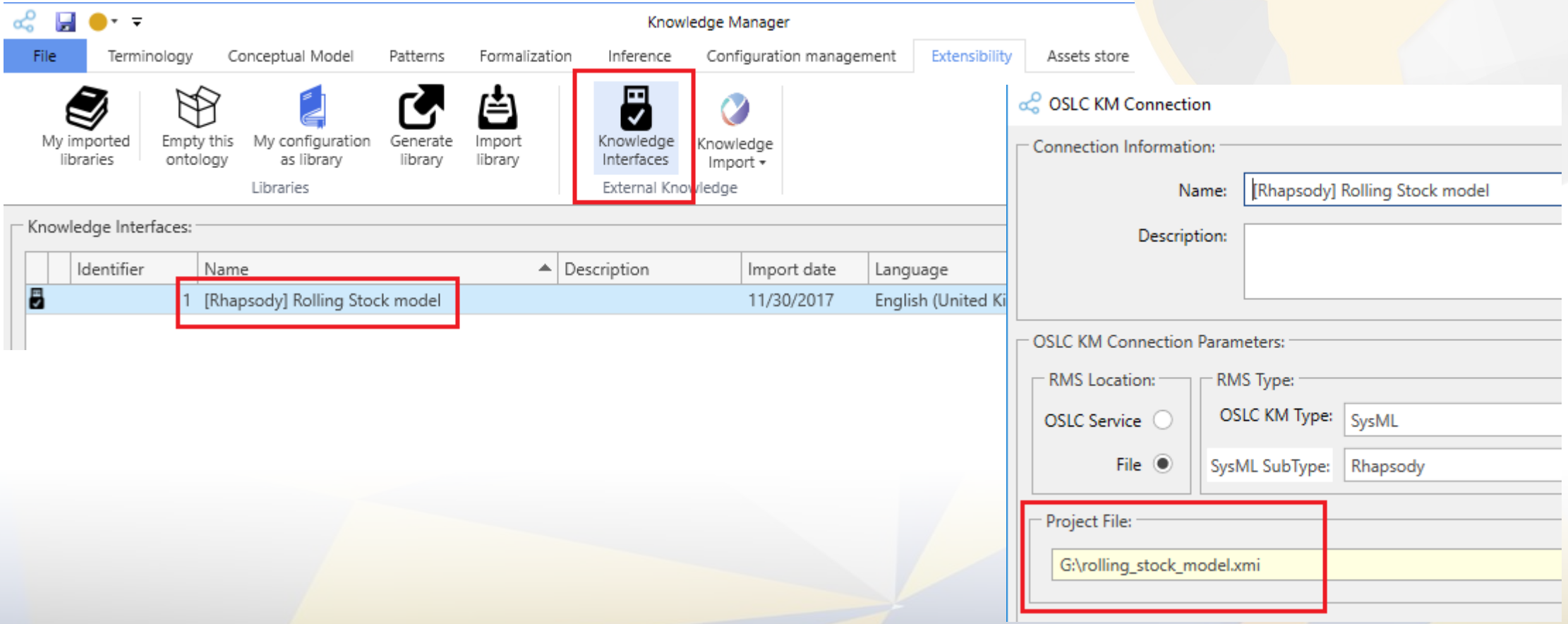
- What if … the SKB (System Knowledge Base) was dynamically fulfilled?
  - No human effort in exporting / importing glossaries, taxonomies, etc.
  - No need to maintain / update the SKB.

- KCSE v18 Feature → **Knowledge Interfaces**
  - Connectors to external sources of knowledge (OSLC-KM).

- Changes on the source artifacts (e.g. SysML Rhapsody Model) → The SKB gets updated.

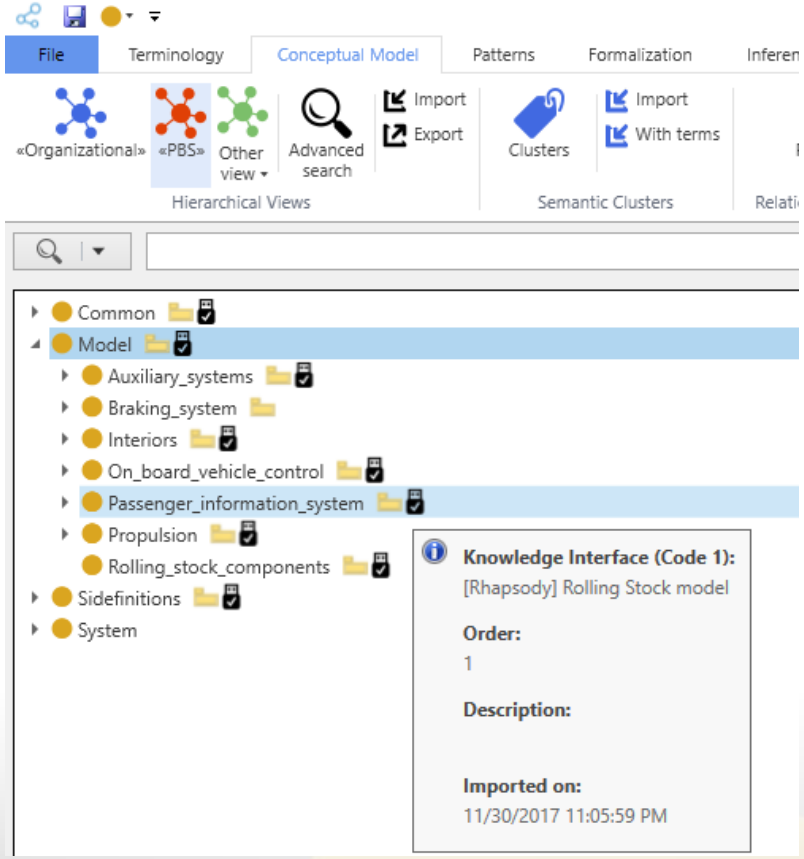
Knowledge Interfaces for SKB Extensibility

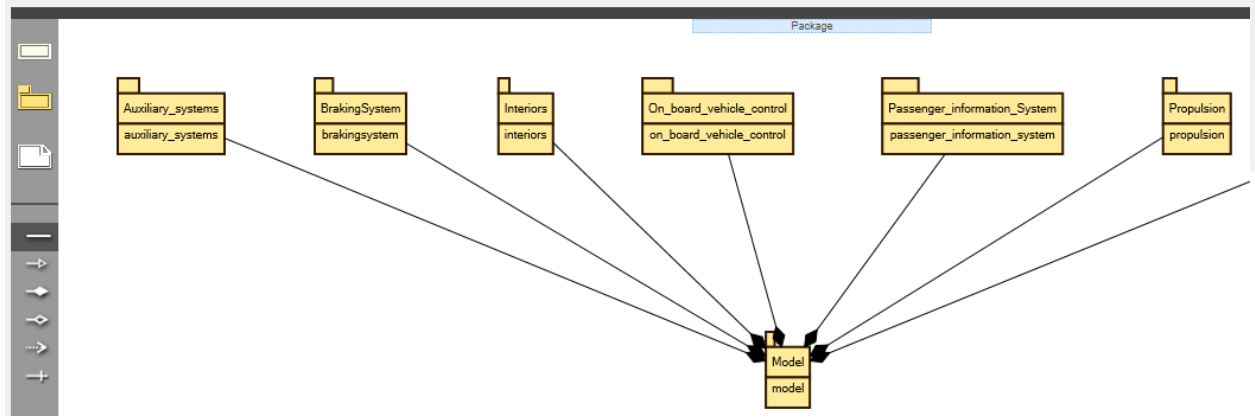
- Managing connectors in Knowledge Manager



Knowledge Interfaces for SKB Extensibility

- Filling out the SKB in a dynamic way





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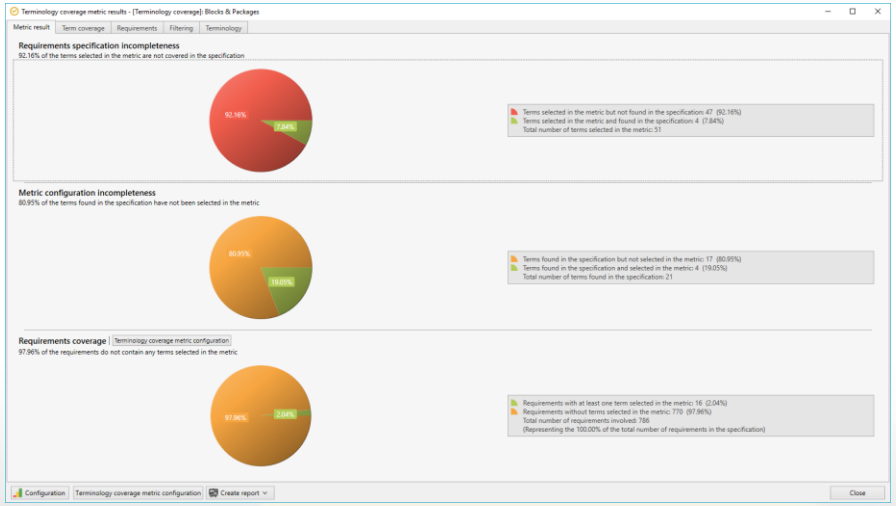
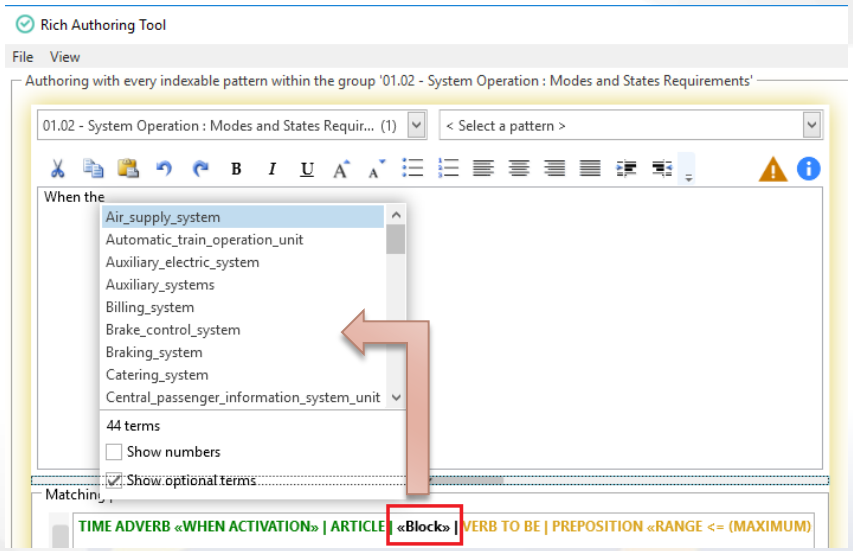
Using Knowledge Interfaces - Overview

- Knowledge Interfaces are fully integrated on SQA and RAT
  - Native support of UML/SysML (classes, blocks, actors, etc)
  - Available for quality assessment
    - Quality Metrics can be configured with the content of Knowledge Interfaces (e.g. **state charts coverage**)
    - Available for pattern-based authoring





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Demo Summary

- Integrating a Rhapsody Model and a Simulink file to assess requirements quality
  - KM to connect the Knowledge Base to the Rhapsody Model + the Simulink file
  - SQA to define a set of quality metrics
  - SQA to perform quality assessment
  - RAT to create some missing requirements

- Integrating a Protégé ontology for the Communication Subsystem assessment
  - KM to connect the Knowledge Base to the Protégé Ontology
  - SQA to define a set of quality metrics and perform quality assessment


Q&A

TRC WEBINARS 2018

Next webinar

- **Topic:** Can script based languages, like DXL, hack Natural language Processing?
- **Content:**
  A recent blog post by our esteemed college Christer Fröling has sparked a tidal wave of interest and his paper "NLP beats DXL (DOORS scripting) every day of the week" has been distributed widely. But can his claim be substantiated?

  Dr. Simon Wright will investigate this claim during a webinar and examine the evidence. As someone who has been involved in improving requirements quality for over 20 years and as a DXL programmer for over 10 years he is ideally placed to referee this match, DXL verses NLP.
- **Dates:**
  - Tuesday 10th APR 2018 at 5.00 pm CET
  - Thursday 12th APR 2018 at 9.00 am CET

WEBINAR ID	NAME	DATES	TIME
TRCW-01	Requirements Quality along the supply chain	16/01/2018 18/01/2018	5.00 pm CET 9.00 am CET
TRCW-02	Managing the quality ecosystem: DOORS, Rhapsody, Simulink and Modelica	20/02/2018 22/02/2018	5.00 pm CET 9.00 am CET
TRCW-03	Ontologies Configuration Management	13/03/2018 15/03/2018	5.00 pm CET 9.00 am CET
TRCW-04	Can script based languages, like DXL, hack Natural Language Processing?	10/04/2018 12/04/2018	5.00 pm CET 9.00 am CET
TRCW-05	Procuring systems: PQS for SMARTer acquisition	08/05/2018 10/05/2018	5.00 pm CET 9.00 am CET
TRCW-06	The SMARTER way to improve your requirement specifications	05/06/2018 07/06/2018	5.00 pm CET 9.00 am CET
TRCW-07	Knowledge and Quality management milestones in a SE organization	11/09/2018 13/09/2018	5.00 pm CET 9.00 am CET
TRCW-08	Automatic checking of quality metrics for logical and physical models	16/10/2018 18/10/2018	5.00 pm CET 9.00 am CET
TRCW-09	Following standards patterns in KCSE: An application to EARS patterns in RAT and SKM	03/07/2018 05/07/2018	5.00 pm CET 9.00 am CET
TRCW-10	Tracing system work products: T+ Manager	06/11/2018 08/11/2018	5.00 pm CET 9.00 am CET
TRCW-11	Defining your own quality rules in KCSE: A one-hour practical approach	11/12/2018 13/12/2018	5.00 pm CET 9.00 am CET
TRCW-12	The KCSE approach in a nutshell	15/01/2019 17/01/2019	5.00 pm CET 9.00 am CET
TRCW-13	Requirements Transformations	12/02/2019 14/02/2019	5.00 pm CET 9.00 am CET


Q&A

the REUSE company