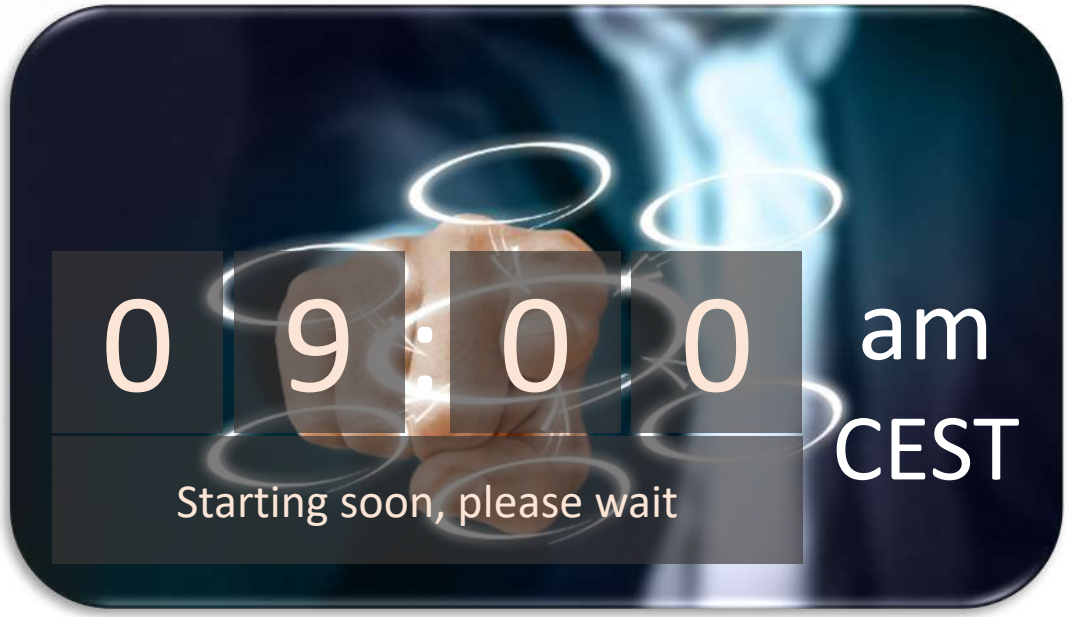

- Webinar rules:
  - You'll be muted all along the Webinar
  - There's a *Question* section to ask your questions or send your comments whenever you want
  - If you have any technical issue, please use the chat box (not the *Question*)
  - The Webinar will be recorded. A link to the recording will be sent to you in few days

How to Enhance the Capabilities of PTC Codebeamer with the Systems Engineering Suite

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Chief Operating Officer
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THE REUSE COMPANY

Contents

- Introduction to The REUSE Company and the speaker
- PTC Codebeamer
- AI and Classic semantic features:
  - Ontology population
  - Requirements quality and writing assistant
  - Traceability assistant
  - Interoperating Requirements
- Live demos
- Q&A

About The REUSE Company (TRC)

01 The company was established in **1999**

As a spin-off of a University in Madrid

02 **System + Software Engineers**

Smart combination between Company staff and R&D from Academia

03 **Headquarters:**
Madrid (Spain)

International offices:
Miami (USA)
Stockholm (Sweden)
Tokyo (Japan) Delegation

04 To promote a **reusable**, **scalable** and global solution to a **smart** and **interoperable** Systems Engineering environment, by offering a **semantic knowledge centric** approach.

THE REUSE COMPANY

a solution provider specialized in the application of

SEMANTIC TECHNOLOGIES and

ARTIFICIAL INTELLIGENCE

to improve the digitalization of the

Systems Engineering life cycle.

WHO IS USING OUR TECHNOLOGY?

- Aerospace
- Defense
- Automotive
- Energy
- Healthcare
- Infrastructure
- Legal
- Software

The presenter

José Fuentes

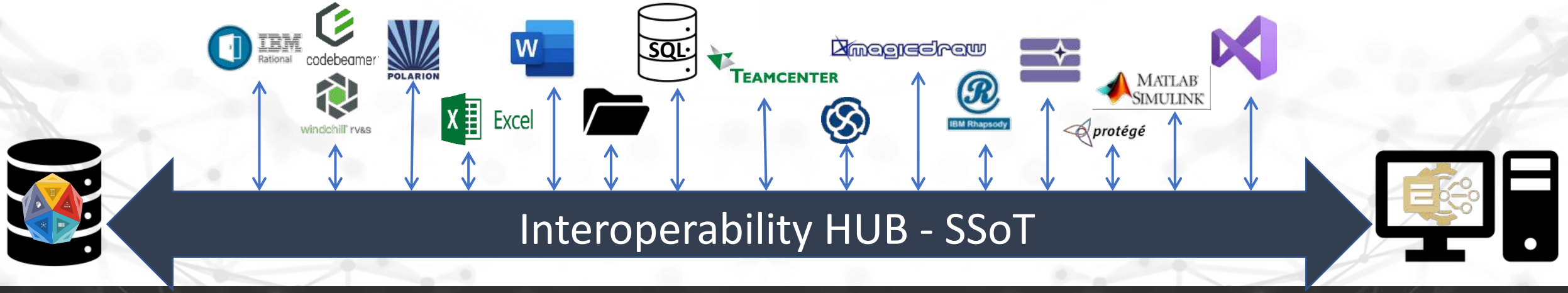
- **Current Position:** Chief Sales Manager of The REUSE Company
- Former Product Manager of RQA and the Systems Engineering Suite
- INCOSE CSEP Certified
- Graduated in the INCOSE Institute for Technical Leadership
- Member of the board of AEIS – The Spanish chapter of INCOSE
- Active contributor to the INCOSE Guide to Writing Requirements
- Other certifications: ITIL
- Other interests: Project Management, Business Analysis, Risk Management

INTRODUCING CODEBEAMER AND SES ENGINEERING STUDIO

- Codebeamer is one of the references in the field of Application Lifecycle Management
- A modern and agile web-based interface providing Requirements Management, Risk and Test Management, end-to-end Traceability of these artifacts…

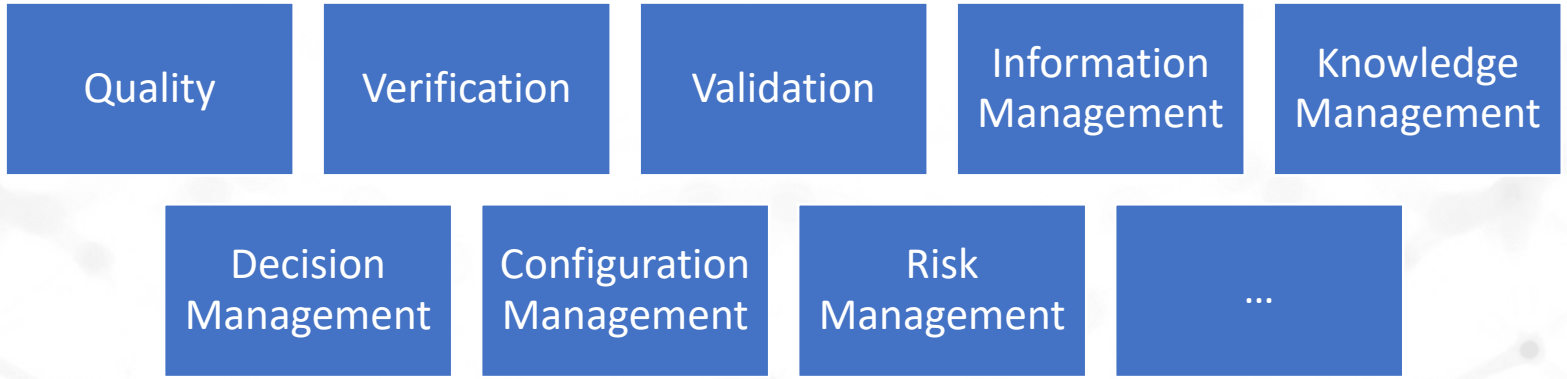
SES ENGINEERING Studio

- A modern tool to leverage activities developed on other tools
- Not aiming at replacing the concept of SoT
- But including connectivity to Codebeamer and +50 tools:
  - RM, MBSE, ALM, PLM, MS Office, PDF…
- Featuring traceability and interoperability among all these tools:
  - Thus allowing the seamless definition of your *Digital Thread*



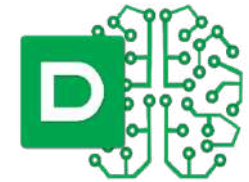
SES ENGINEERING Studio

- A modern tool to leverage activities developed on other tools
- …
- And implementing a series of Technical and Technical Management Processes on top of all those tools:



SES ENGINEERING Studio

- Implemented on top of an ontology
  - Featuring classic Natural Language Programming techniques
- Now implementing plenty of AI methods
  - Including a LLM/SLM



- All this leads to **Neuro-symbolic AI**
- Providing an outstanding treatment of textual artifacts
- And **Requirements** is a great candidate for enhancement

STRONGER TOGETHER

Stronger together

- The REUSE Company and PTC are now **Technology Partners**
- This Partnership covers all the PTC portfolio, but a special focus has been given to the integration with Codebeamer
- 100% of the ENGINEERING Studio capabilities have been integrated with PTC Codebeamer

- **Resulting into an outstanding integration and mix of features**

ARTIFICIAL INTELLIGENCE TECHNIQUES

SES ENGINEERING Studio includes a component called: **Decision Management**

This module is loaded with plenty of AI core techniques, ready to be used

Users need to set up their own *DMS Flows* to reach their goals, using as input the information in your Digital Thread, in this case, a Codebeamer project

- Automatic population of an ontology based on patterns

Examples of flows:

- Implementation of AHP (Analytic Hierarchy Process) to assess pros and cons of a set of candidate architectures

- Requirements classification

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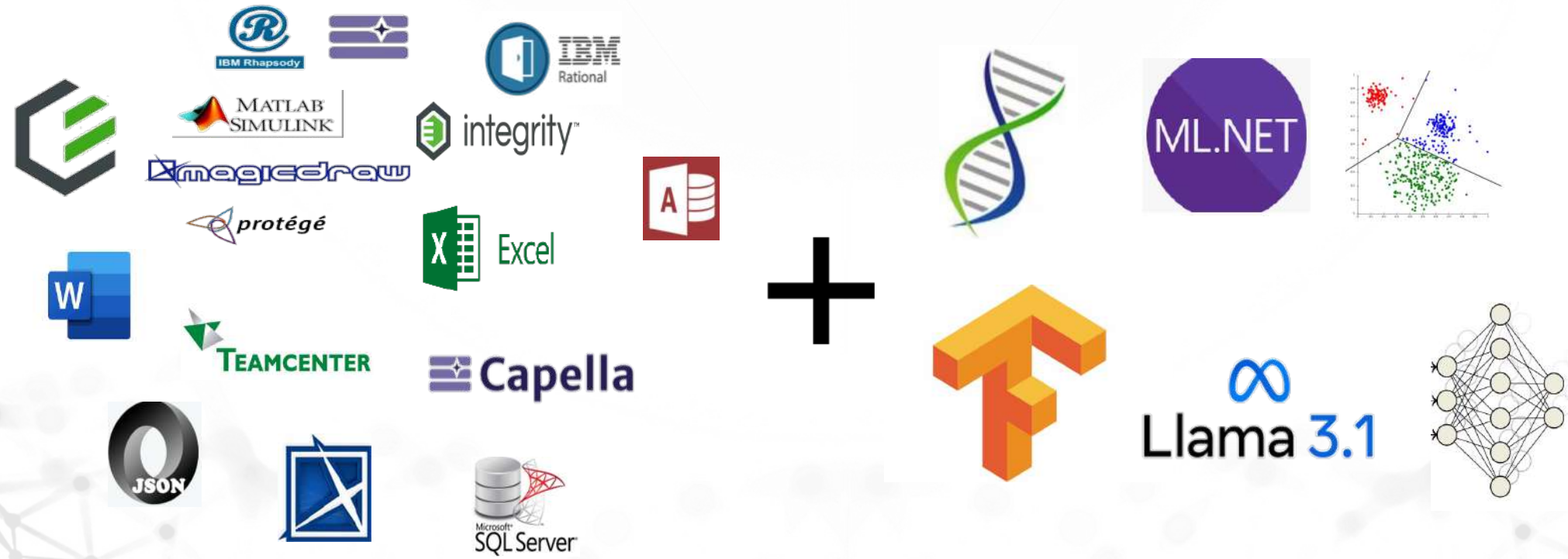
DMS approach



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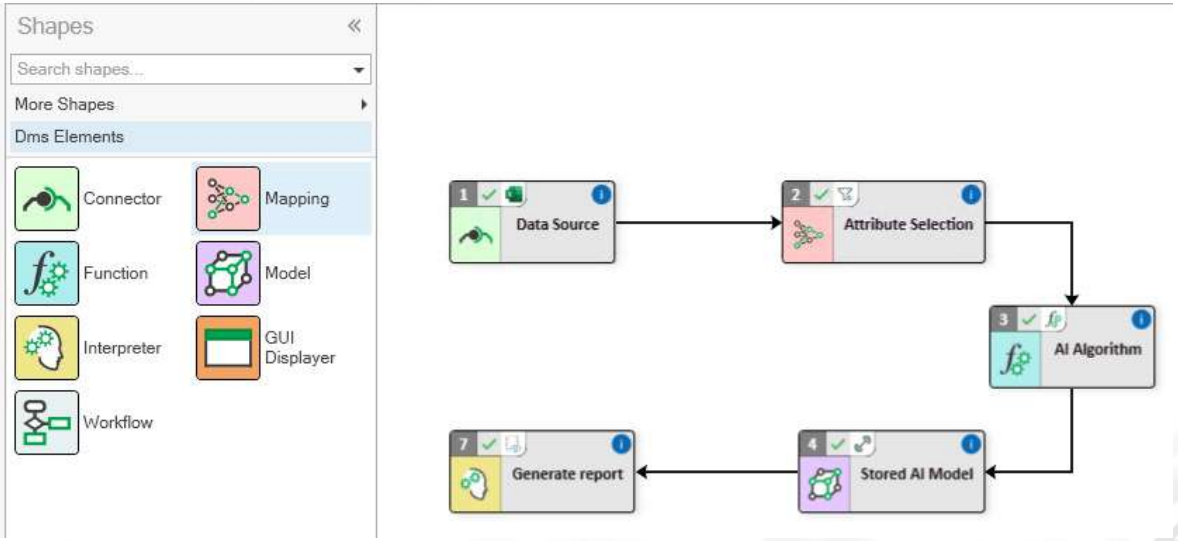
Executing AI workflows

- The requirements in a Codebeamer project can be used to extract the main entities of the project:
  - Name of systems, entities, actions, states/modes…
  - Based on a series of pre-existing requirements patterns (EARS..)

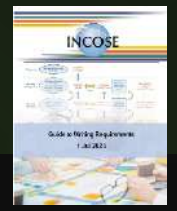


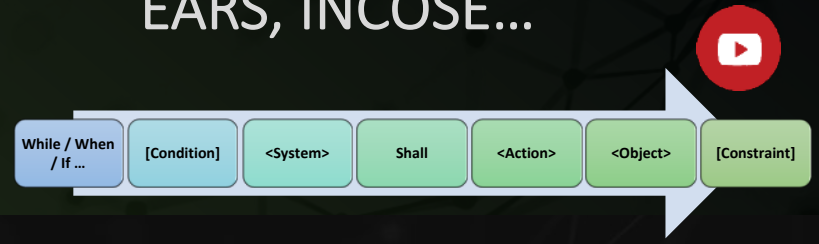
REQUIREMENTS QUALITY

Tools and add-ins to **customize sets of requirements** quality rules, assist during the **authoring** process, and provide customizable **quality reports**.

Implements the notion of CCC: correctness for individual requirements, and **consistency** and **completeness** among requirements a models.

- Fully integrated with Codebeamer, including a web extension
- Implementing the rules in the INCOSE GtWR and many other guidelines
- Implementing catalogues of patterns like EARS, INCOSE…





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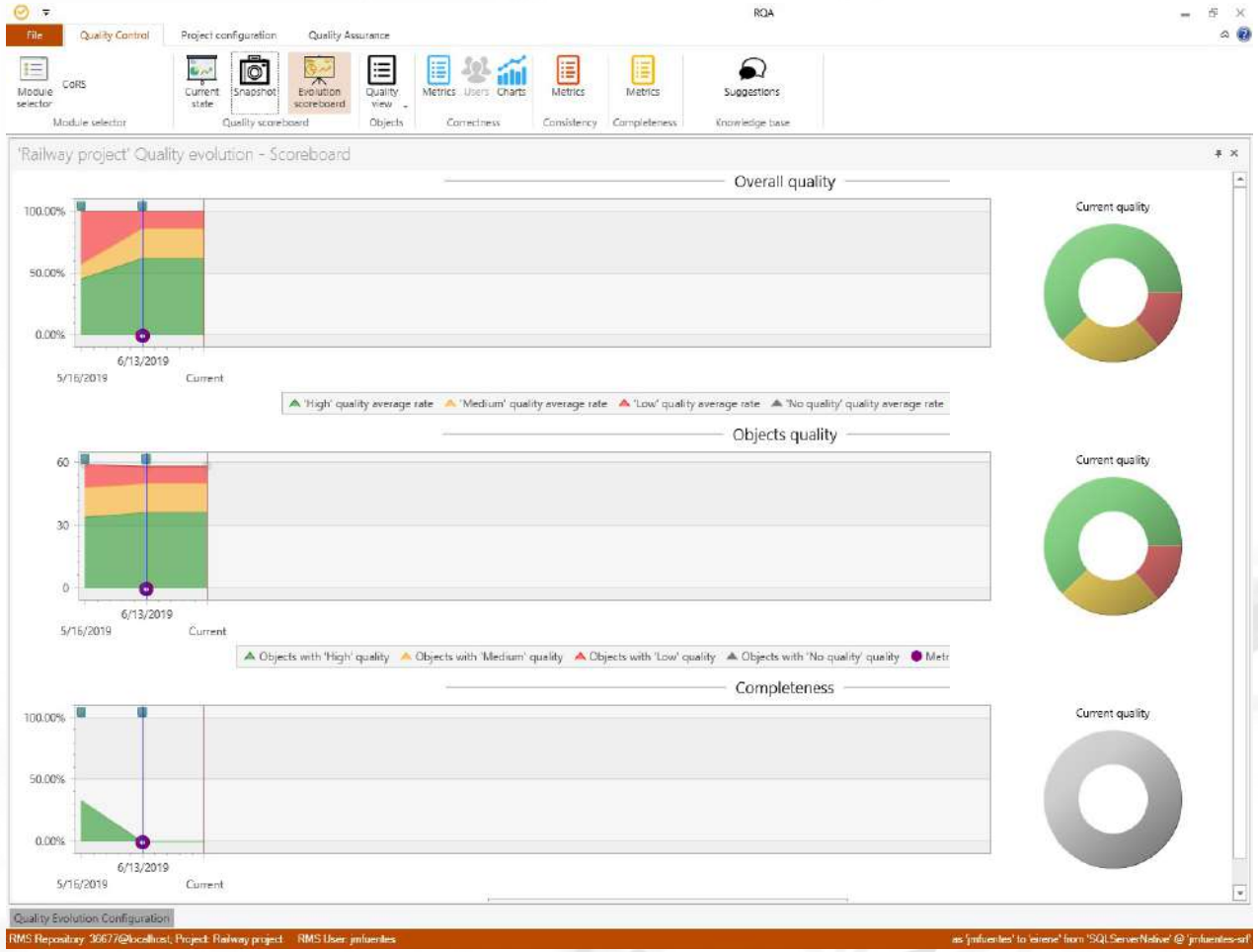
check of consistency with your models

- Complete quality report of Codebeamer documents, including:
  - Correctness of your requirements with regards to your writing rules: INCOSE GtWR or others
  - Completeness and consistency of your documents vs models and domain ontology
  - Detection of duplicates



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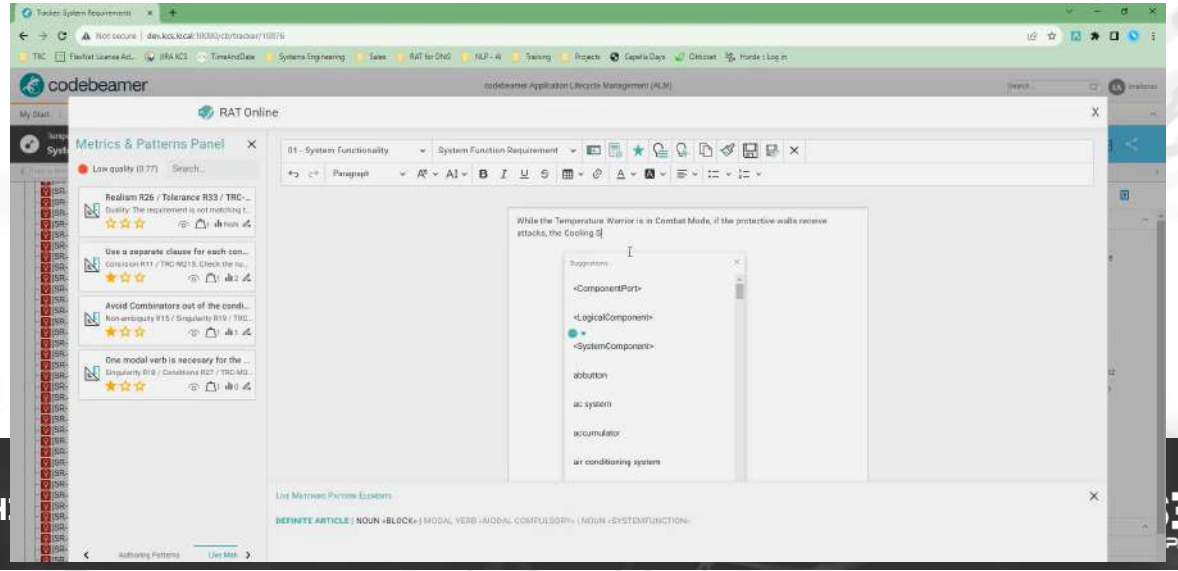
with a semantic writing assistant

- A SMART assistant is helping authors, in real-time:
  - Follow a set of agreed patterns such as those defined by EARS, INCOSE, the MASTER …
  - Real-time checking of the agreed rules: INCOSE GtWR…
  - Search for duplicates

EARS

- Ubiquitous
- State-driven
- Event-driven
- Optional feature
- Unwanted behaviour
- Complex pattern



INTEROPERABILITY HUB

Connect and synchronize your documents in **Codebeamer** with any other tool in your systems engineering ecosystem.

+50 different connectors available

- Traceability between Codebeamer and other SE tools: RMs, MBSEs, MS Office, PDF…

- Exchange requirements between Codebeamer and other RM and MBSE tools

- Collaborative development using different sets of tools, keeping your Sources of Truth always synchronized

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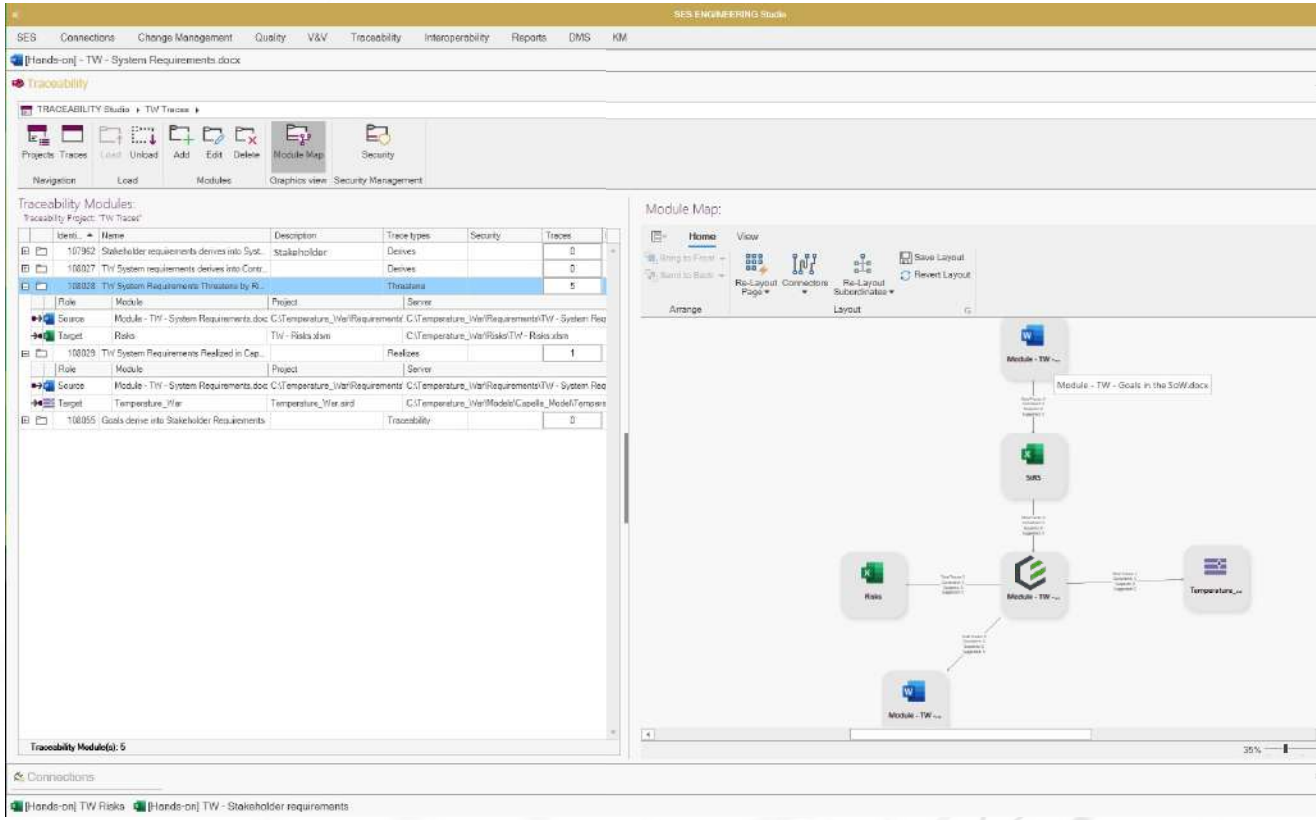
extending the end-to-end traceability

- What about connecting your requirements in Codebeamer with:
  - Regulation that has been parsed in a PDF file
  - External requirements in MS Word, Excel, or other formats
  - Models in an MBSE tool
  - …



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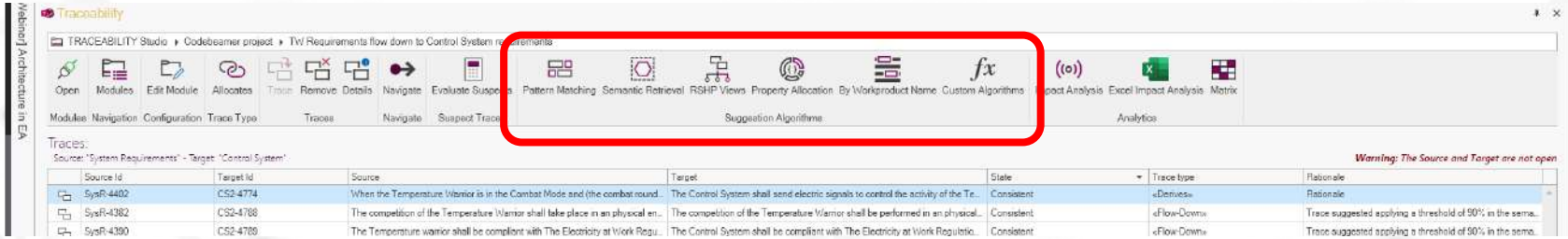
Semantic traceability

- But, if you consider traceability a tedious task…:
  - Ask your traceability assistant to identify traces for you
  - Different algorithms that consider the text in your requirements, and the information in the ontology and the connected models
  - Custom methods so that you can develop other means to identify traces
  - Sync the detected traces to your RMS



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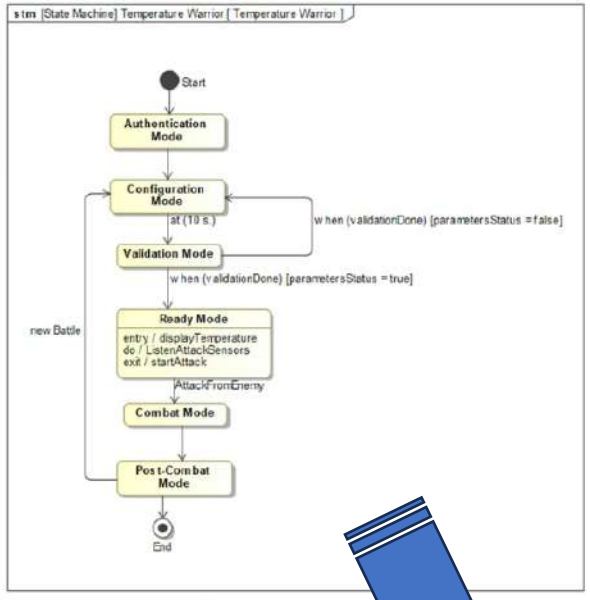
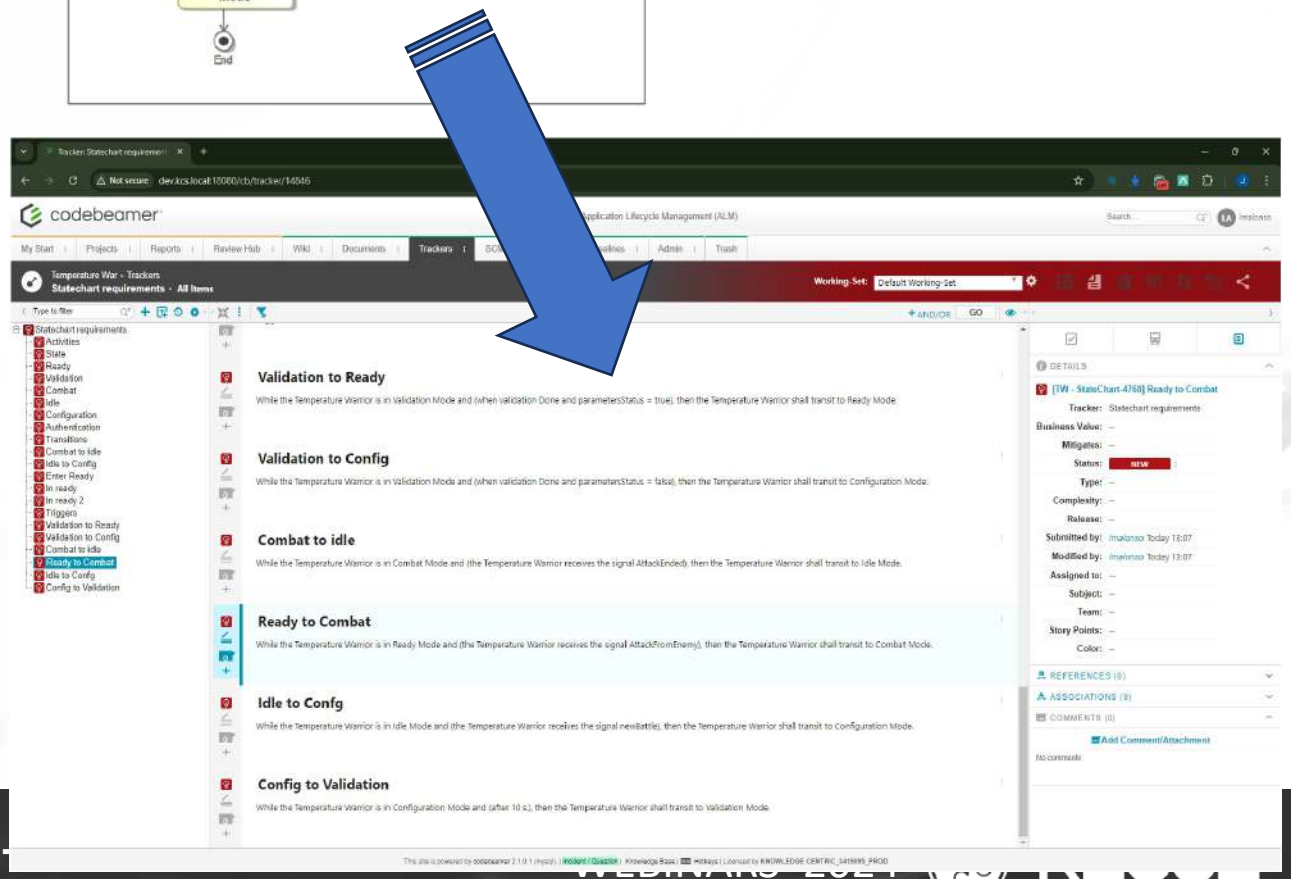
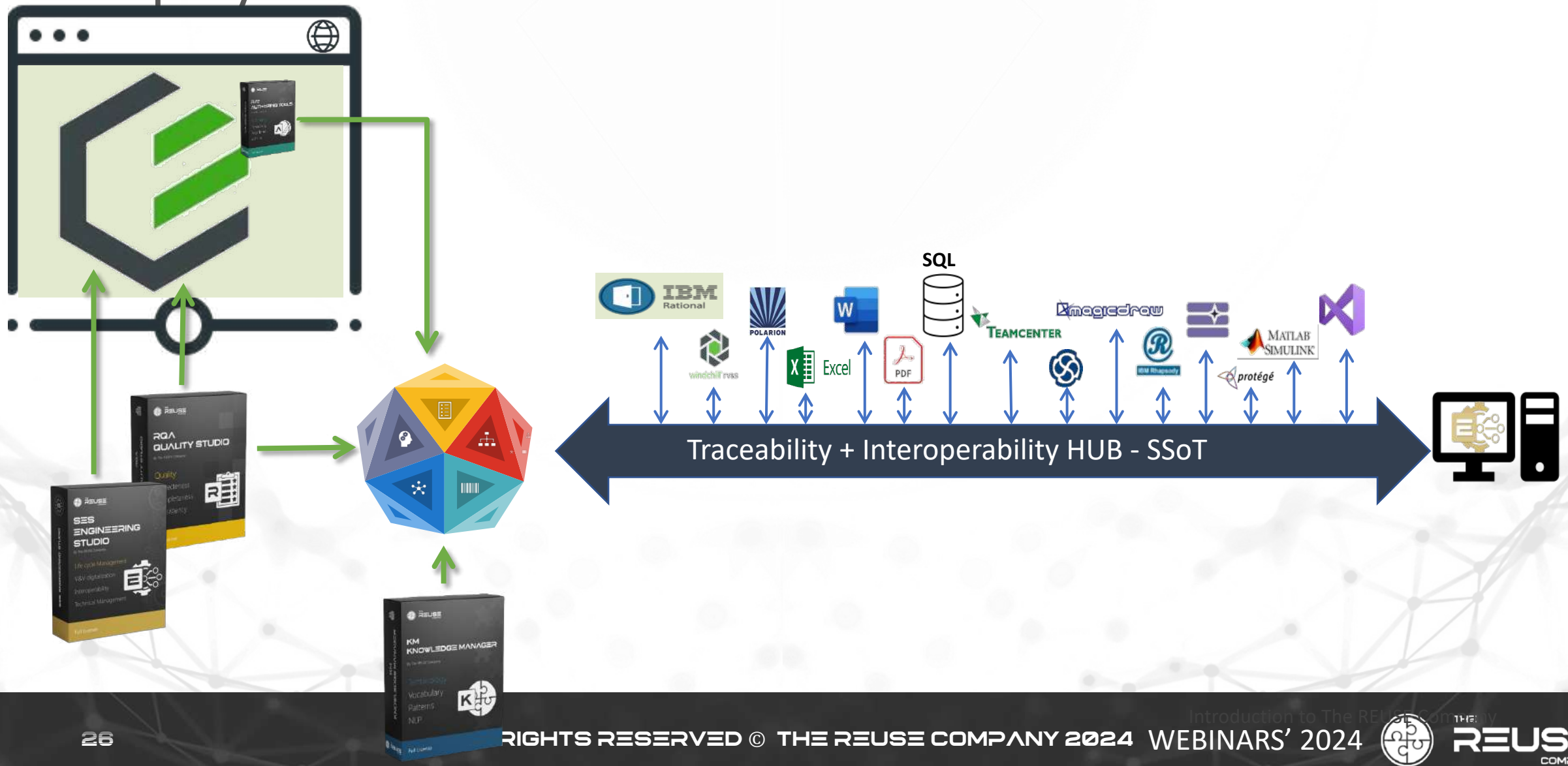
interoperating with other tools, within or without your IT infrastructure





- Synchronize, and roundtrip your artifacts and their traces in Codebeamer into:
  - Requirements in another RM tool
  - Requirements into a MBSE tool
- Generate models from requirements and vice-versa

Deployment architecture

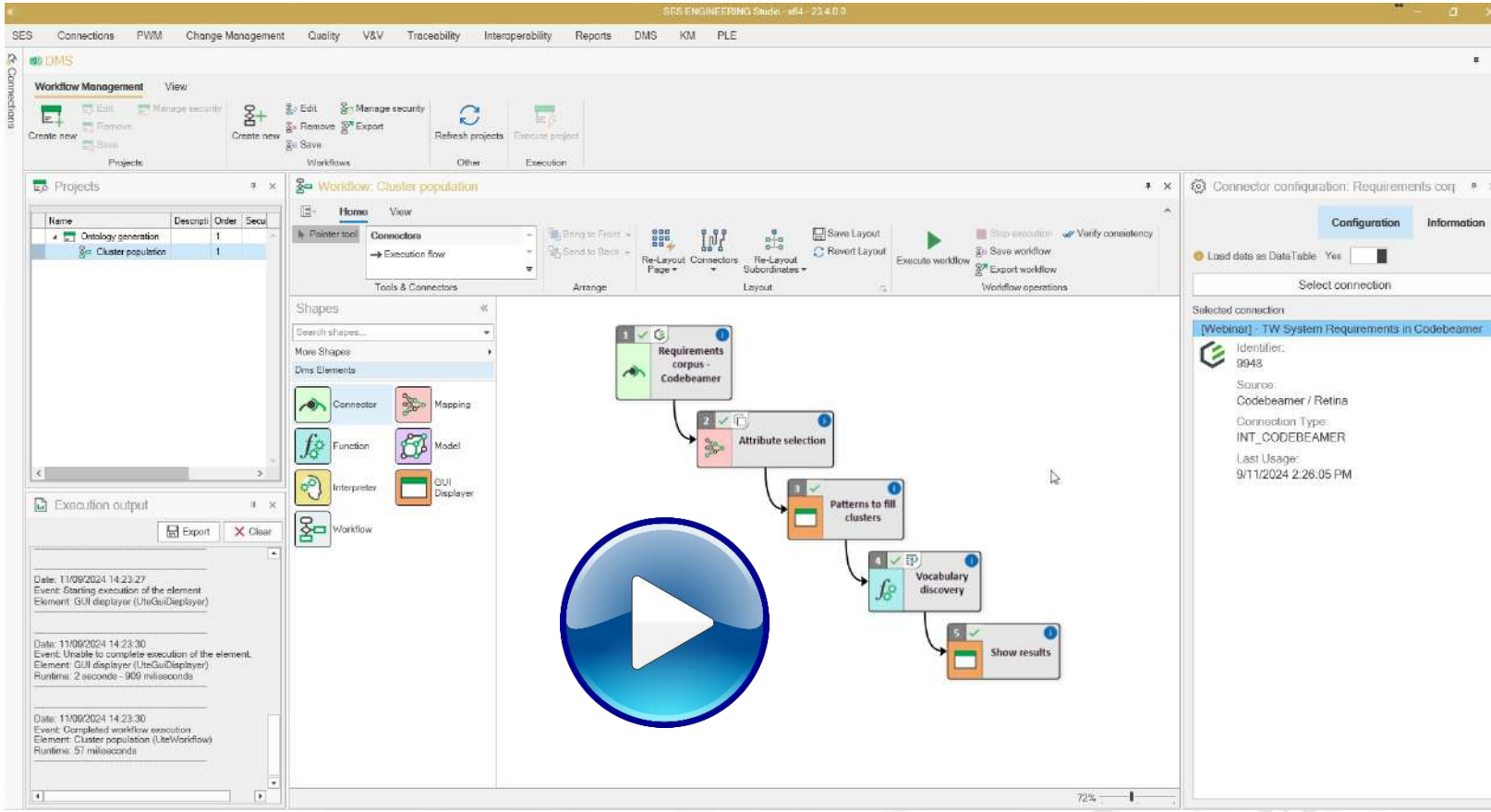


DEMOS

Demo: vocabulary extraction

Steps:

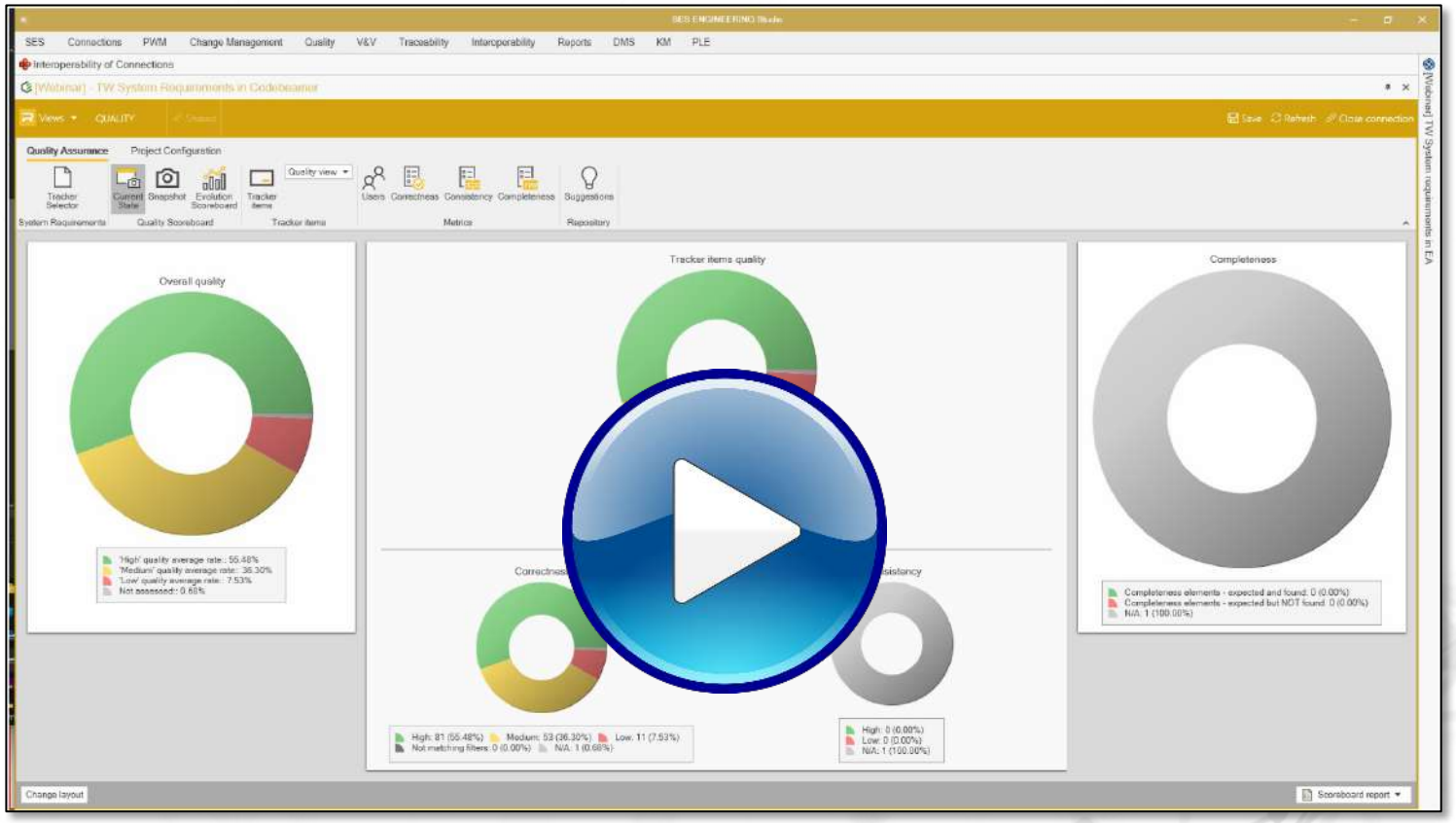
1. Open a Codebeamer document
2. Select a pattern
3. Find content for the vocabulary
4. Save in the ontology



Demo: Requirements quality

Steps:

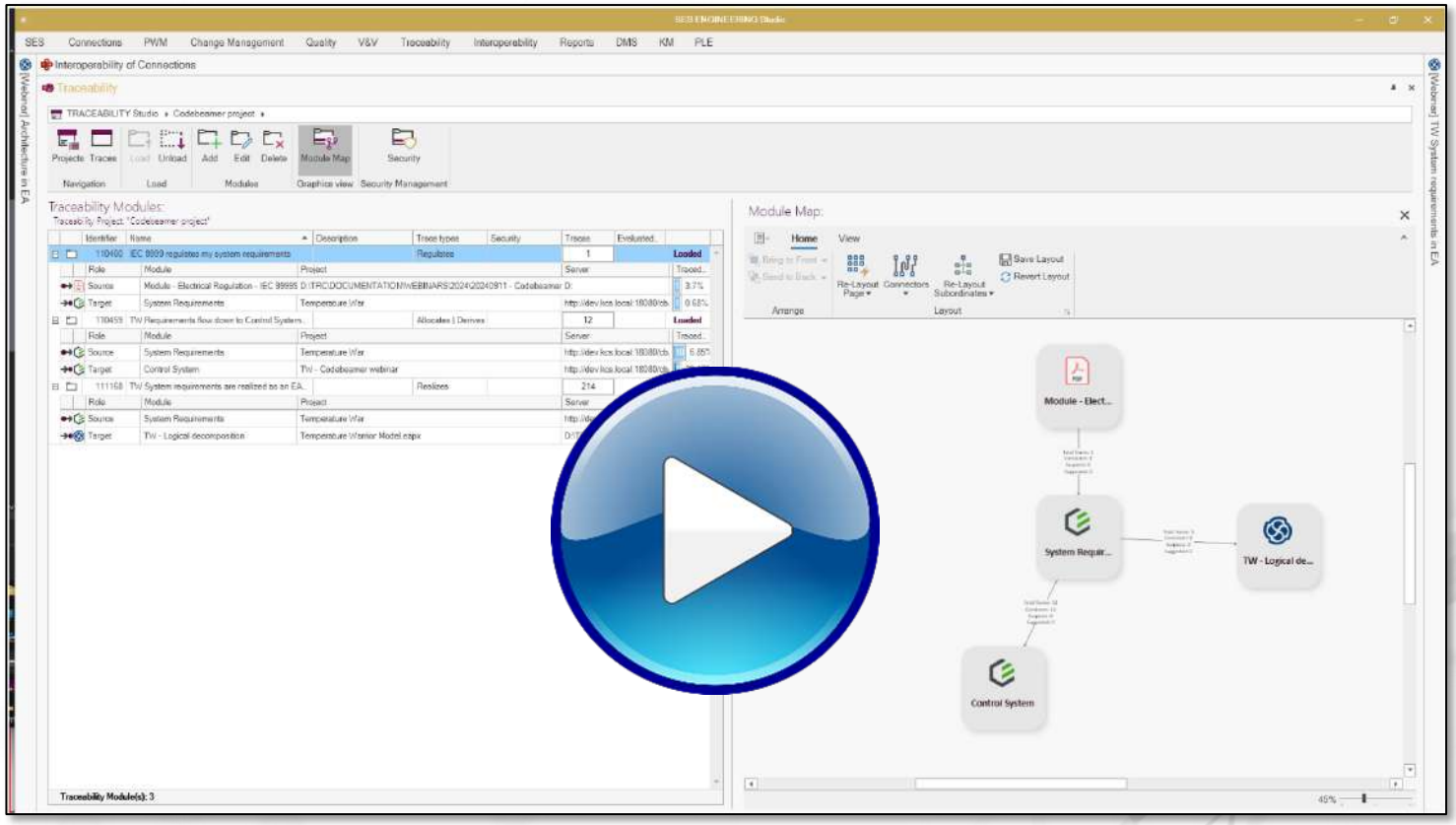
1. Create a connection to Codebeamer
2. Assign writing patterns and metrics
3. Write a new requirement with the Requirements Assistant (RAT)
4. Analyze quality in RQA



Demo: Requirements traceability

Steps:

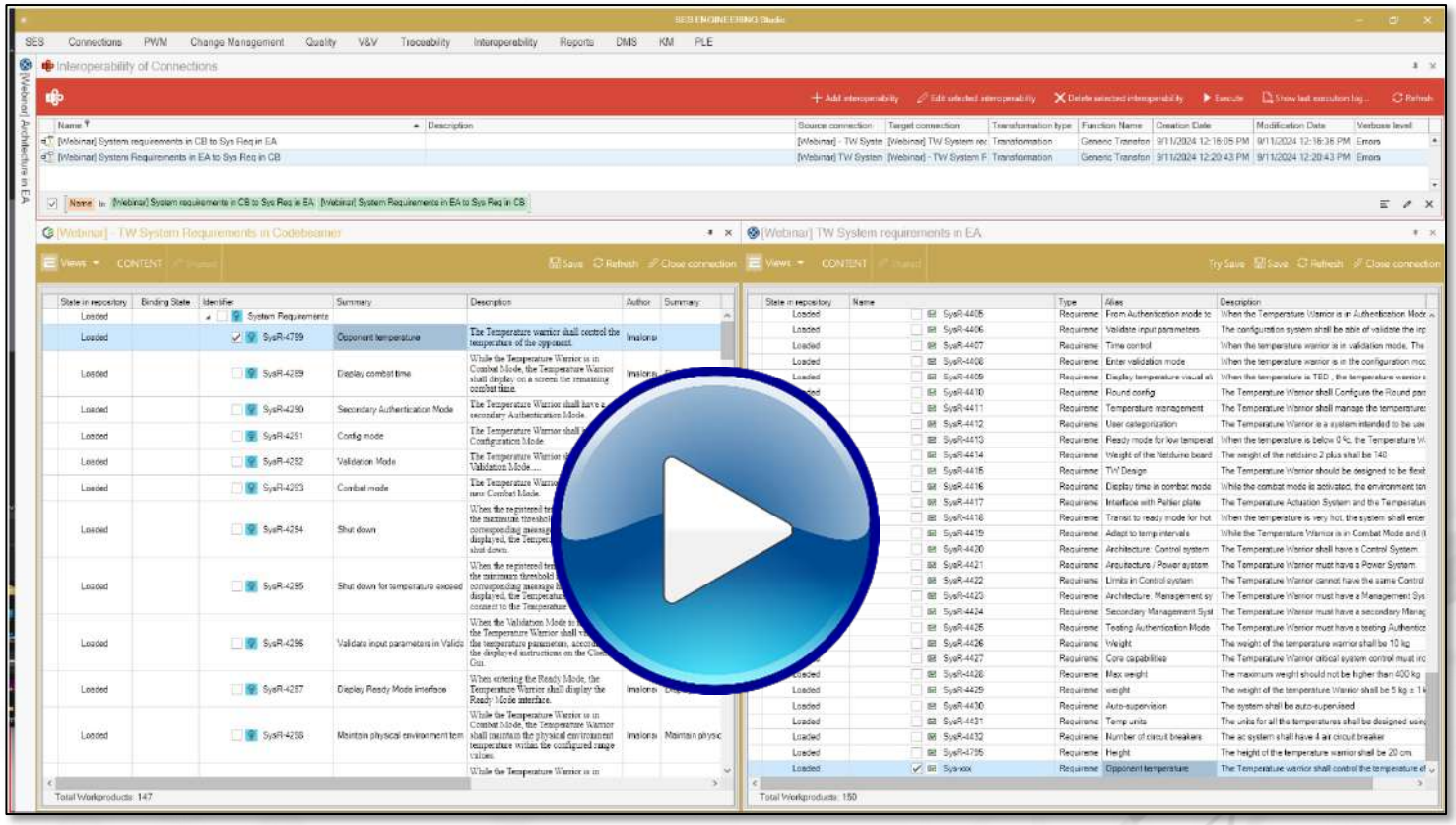
1. Suggest traces between 2 Codebeamer documents
2. Connect to regulation in PDF and establish traces
3. Connect to architecture in EA and generate traces
4. Show the impact of a change in regulation



Demo: Requirements interoperability

Steps:

1. Create a Requirements connection to EA
2. Create the Interop operation
3. Execute the way CB → EA
4. Add and modify requirements in EA
5. Execute the way back EA→CB




Q&A

Next webinar

NASA vs INCOSE:

Do NASA specifications follow the rules defined by INCOSE in the GtWR?

Dates:

Tuesday, October 22, 2024, 5:00 PM CEST (Madrid) / 8:00 AM PST (Los Angeles)/11:00 AM EST (Detroit)

Thursday, October 24, 2024, 9:00 AM CEST (Madrid) / 4:00 PM JST (Tokyo)/ 6:00 PM AEDT (Sydney)

NASA develops hundreds of projects every year and, as expected every project starts with requirements documents at different levels. The question is, are those documents following a set of rules.
NASA includes some rules in the NASA Systems Engineering guide. Are those rules followed by their own documents? What about the INCOSE rules in the GtWR?
This webinar will show the results of an automatic assessment done with RQA, as well as a manual more thorough assessment done by one of our experts.

Next events

First Systems Engineering Interoperability Conference

Date:
13-14 November 2024

Venue:
Carlos III University
Madrid (SPAIN)

+info & registration:
https://se-interoperability.org/

Join us to find dozens of different use cases related to Interoperability in the context of Systems Engineering tool ecosystem to seamlessly enable Digital Thread.


Q&A

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