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NDIA

21st Annual Systems & Mission Engineering Conference
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SECollab

Collaborative Systems Engineering Platform

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Agenda

- **Sodius, background of company and SECollab tool**
- **SECollab, Traceability and Review at Scale**
  - **How SECollab supports the use of heterogenous Digital Engineering data to communicate, collaborate, trace and perform model-driven lifecycle activities**
- **Questions/Answers**

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- A **product** company, selling directly and through OEM's
  - A **global company** with representation in the US, France and Germany.
    - Specializing in **data integration** solutions with a goal to ease and accelerate collaboration processes
    - Expertise with ALM, MBSE, MBSW artifacts including **requirements**, architecture **models**, engineering models, software **development artifacts**
    - **Solutions Provider** to markets such as Defense, Aerospace & Automotive
    - **Custom Services** to extend and integrate our solutions
    - **Data Integration and OSLC** Experts

Data Formats

Partners & OEM

Customers

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Digital Engineering and MOSA challenges…

- Both **Digital Engineering** and **Modular Open Systems Approach** approaches bring many benefits to manage complexity and risks, improve the quality, cost and delay in complex engineering activities. However, there are still many challenges to access and manage produced data. Using effective modular design and digital approaches require to integrate various assets, authored by various teams in various workbenches.

- Engineering data often consists of a mix of
  - **Models/Data of different types**,
  - **Produced in heterogenous sets of tools**,
  - **With high volume and complexity of data integration**
  - **Managed by different teams that need to connect their processes**

- **Managing this data** and **intellectual/organizational challenges** makes the need for getting **common shared views and transversal traceability** support ever more important.

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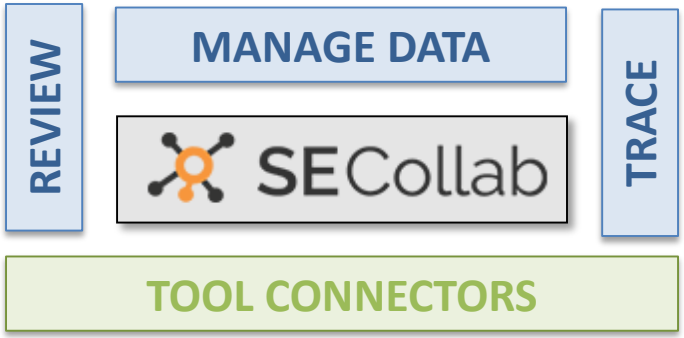
SECollab, Web-based Collaboration and Traceability

SECollab is a **collaborative tool for sharing, tracing and reviewing heterogeneous system or software engineering data in a Web interface**. By collecting heterogeneous data/models in a single, shared workspace, you are able:

- To **simplify the management of a system architecture workspace**
  - An identical Web UI for all users
  - Publication of data located in a single repository independent of tools and versions
- To **ensure data consistency**
  - Configuration Management across all tools and all artifacts
  - Global Traceability & Impact Analysis
  - Centralized search across all sources and unified documentation
- To **collaborate effectively**
  - Collaborative review organization



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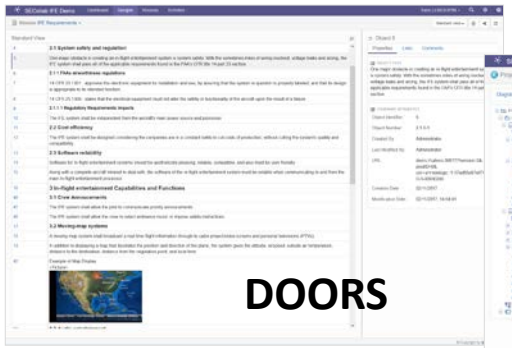
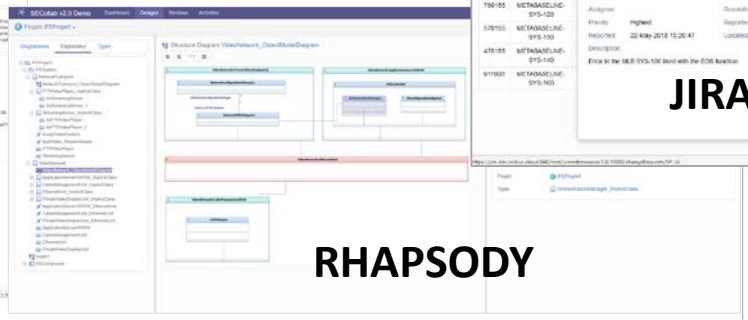
One Platform for all your Models

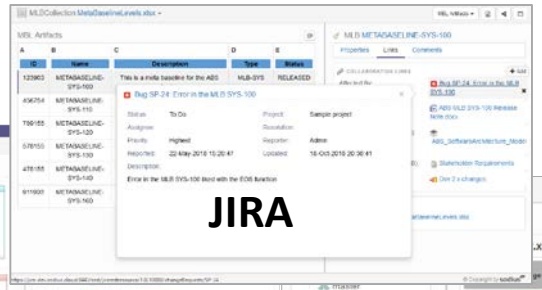
- SECollab is a web platform that federates engineering design, requirement and change data.



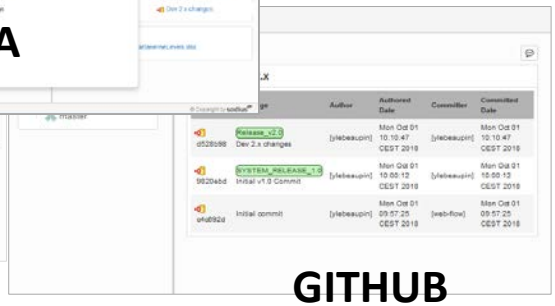
DOORS



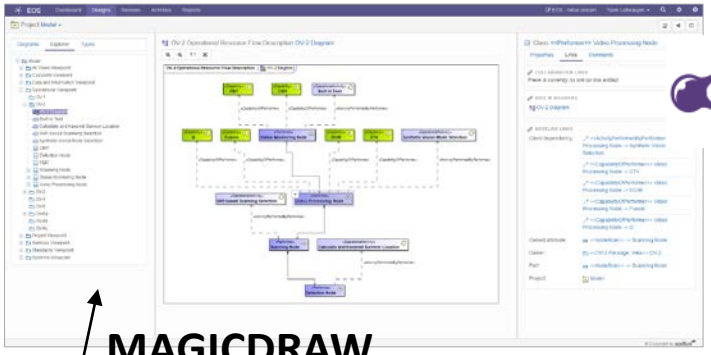
RHAPSODY



JIRA

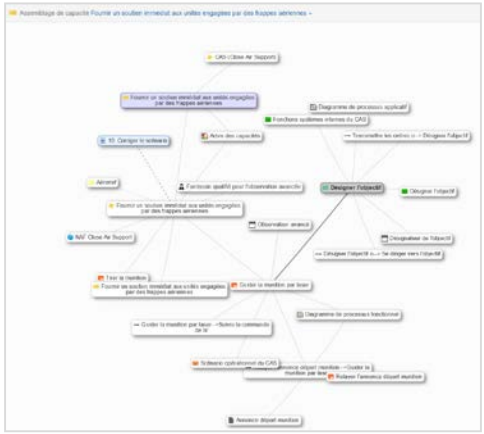


GITHUB



MAGICDRAW

SECollab Model Navigation and Links Graph Visualization



GRAPH DATA

SECollab Web Interface : Navigate in all your data, including diagrams and modeling links

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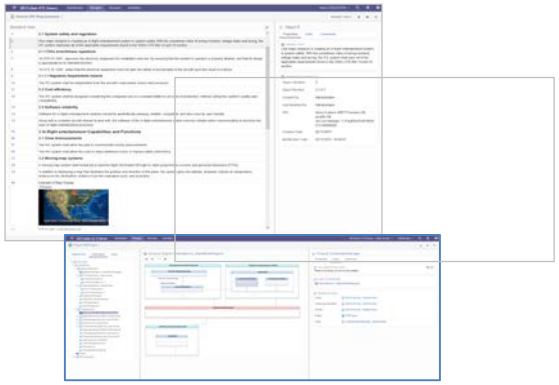
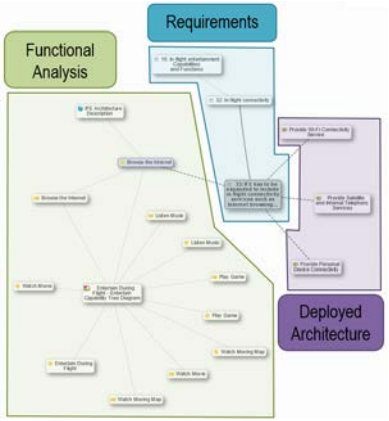
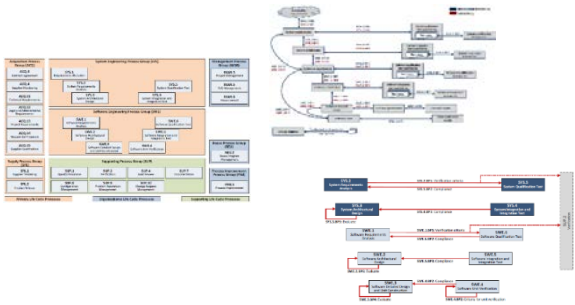
SECollab & Value of Connected Engineering

- With our **SECollab solution**, we want to link processes and data across teams to have a **Connected Engineering** approach:
  - Using a **transversal configuration of connected engineering data** providing a **unified context** to engineering activities
  - And providing
    - **early detection of problems through technical collaborative reviews**
    - **end-to-end traceability**
    - **coordination of change processes**
    - **support for compliant processes**

Share and Review ⟷ **Link and follow impact** ⟷ **Improve standard compliance**







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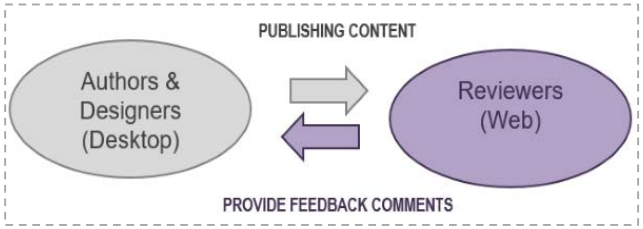
Collaborate in internal AND external reviews …

- **Problems encountered internally and between organizations**
  - Not all stakeholders have knowledge/license of the tools
  - Not all tools can manage reviews and no inter-tool review workflow
  - Disconnected review cycle adding significant delays (no numerical continuity)
  - Problems with different tools, specific versions and customizations between industrial partners, need to focus a engineering data added-value not only tools management

- **With SECollab, the objective is to quickly focus the reviewers on the parts that concern them while having a collaborative approach**
  - Share only the content you want (publish mechanism)
  - Review content from partners even if you do not have the native authoring tool
  - With the disconnected import mode, data extracted from one network can be shared into SECollab Instances hosted in another one
  - Lead architects and the stakeholders can view the comments in progress, thus avoiding redundancy and encouraging collaboration via discussion threads



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RÉPUBLIQUE FRANÇAISE
MINISTÈRE DES ARMÉES

We've worked on SECollab with French MoD since 2012 and already deployed on large Defence programs to support collaborative reviews since 2 years

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SECollab High-Level View

Traceability and linking capabilities

RDF repository handling multi-model workspaces

Cross-Artifact **Configuration Management**

Reviews across heterogeneous data

ENGINEERING DATA MANAGEMENT

SECollab

Semantic Federation Platform

RDF Java OSLC OSGi

Extensible set of tool **connectors**

TOOL CONNECTORS

ALM/PLM Corporate Repository Interfaces

DOORS Word Excel

RM

Capella EA SA mega MagicDraw Rhapsody

AM

OSLC Inspired by the web JIRA Rational Team Concert

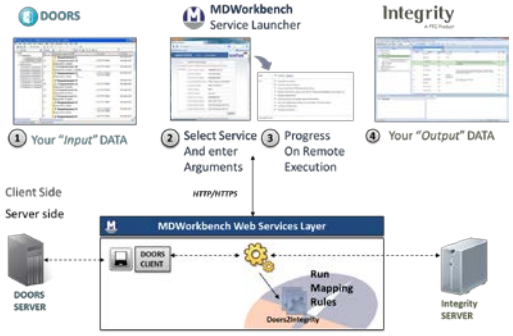
CM

Publisher SDK for extensions, new formats and custom metadata…

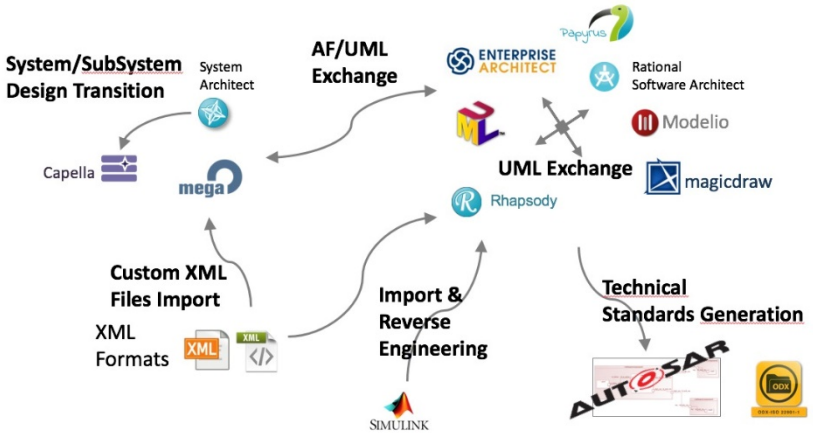
About Connectors

- SODIUS is creating and maintaining tool connectors since 2001
  - Providing OEMs products (IBM, NoMagic, Ansys, Jama,etc.)
  - For many large organizations, we support both tool connectors DOORS, UML, SA, MEGA, MATLAB Simulink, RTC, DNG, Jama, PTC Integrity, etc. and custom integrations (products & custom services) to handle specific needs

RM Conversion Services



Connectors and Exchange flows



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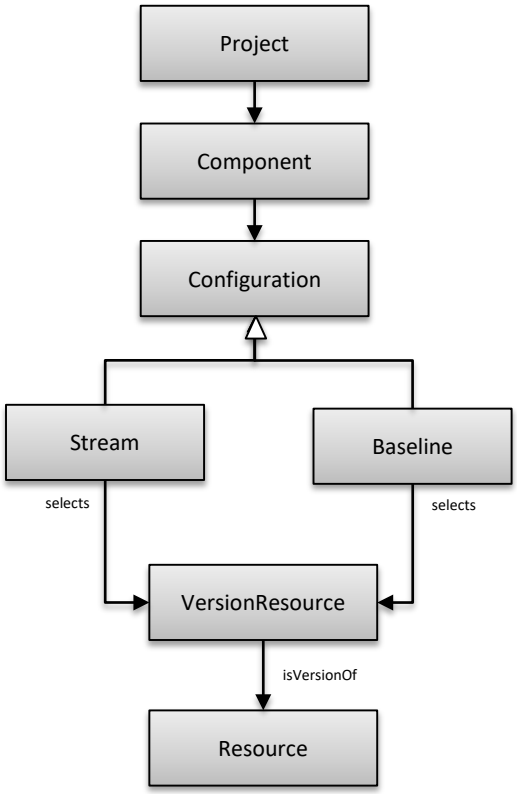
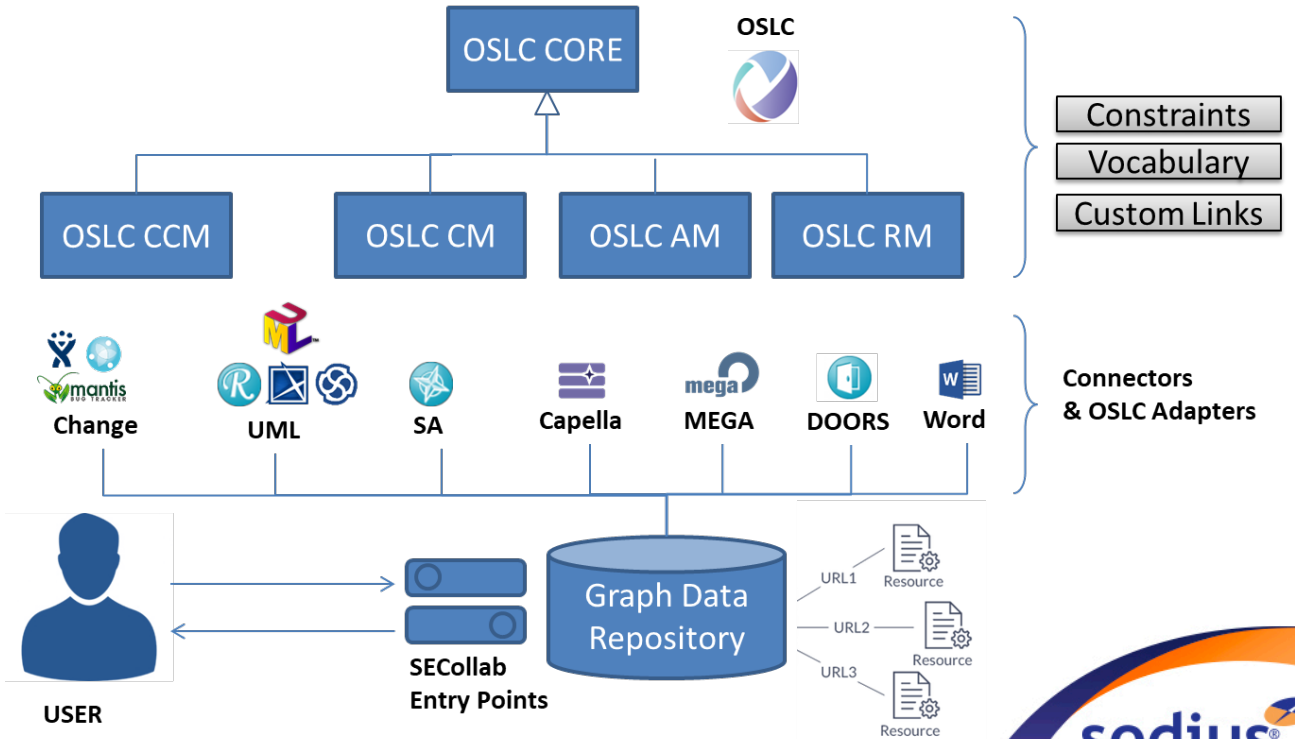
OSLC & Configuration Management

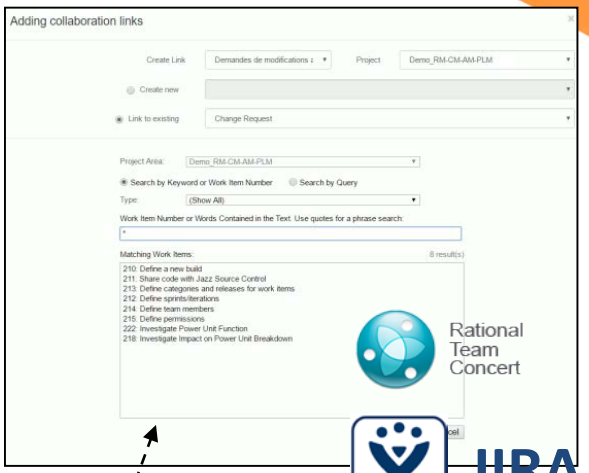
- A configuration management solution across the set of disconnected engineering tools to manage evolutions of each design artifact in relation to the overall project.
  - Instead of manually mapping and communicating individual artifact versions, the target is a common baseline linking together the individual design artifact versions and OSLC native support (Consumer & Provider).



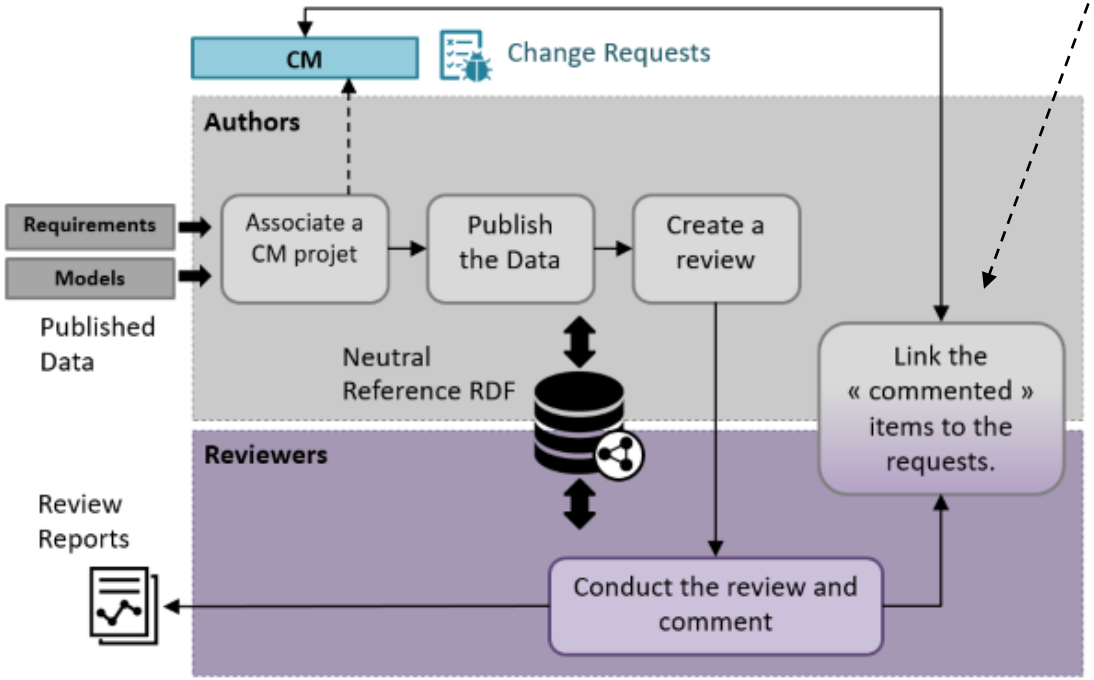


Trace to external systems

- SECollab's sharing and review functions can be combined with a **Change Management (CM) tool**.
- The data published are in a common space, enabling different actors to link and consolidate the results of the reviews with the demands for change.



OSLC



SECollab Space

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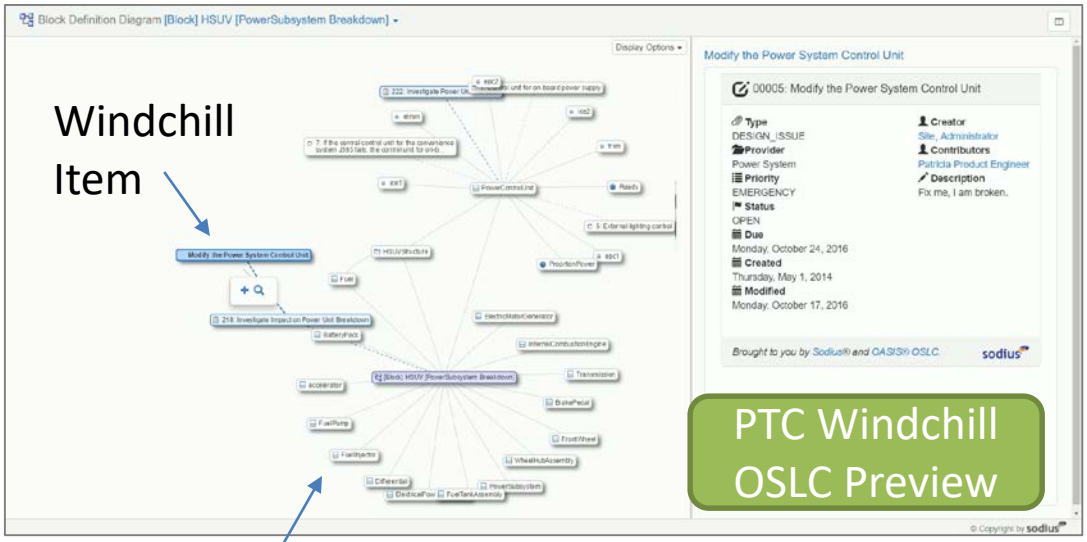
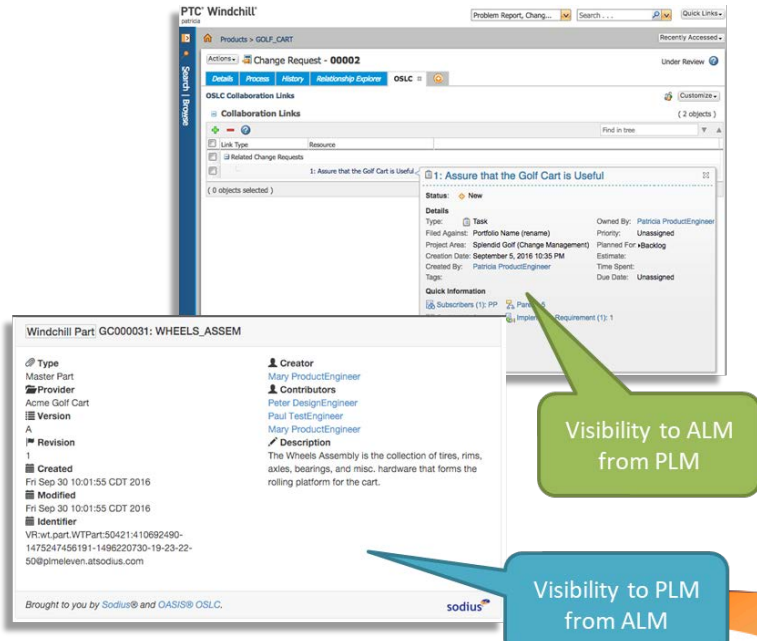
Extensions to others OSLC adapters

- OSLC linking opens the capability to link SECollab with others sources. For example, Sodius is developing PTC Windchill adapter allowing CR and Parts (BOM) links.





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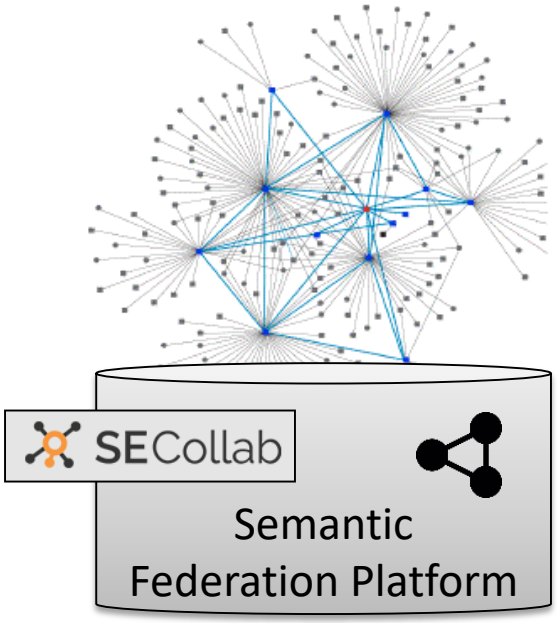
… and new opportunities

- Using a **RDF data-centric** approach, there are many opportunities to get a **deeper understanding of your data** for navigation, search, dependency analysis and verification.



SECollab RDF Graph Database, to focus on data semantics and relations between tools

- On one hand, **traceable and annotatable data** can stored in a common repository and enable rapid, efficient, lightweight engineering data traceability across a distributed team.

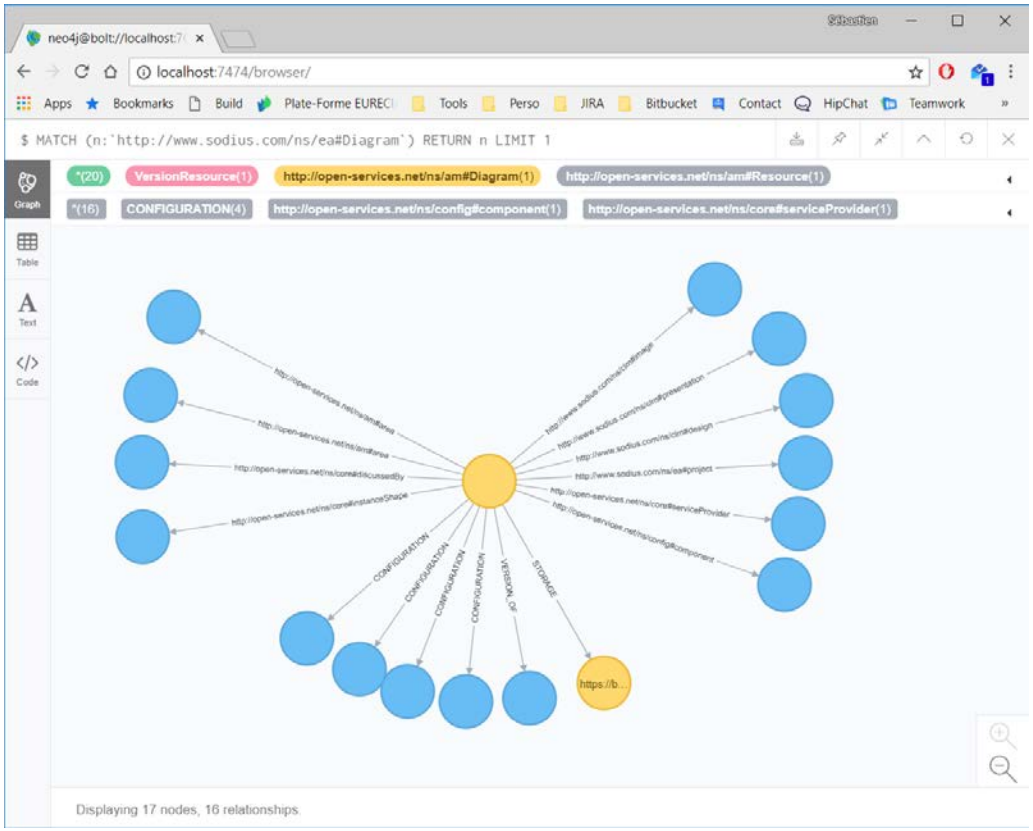
- On the other hand, along with **formal reviews and verification**, the traceability links can be used for differencing **reports, metrics and impact analysis** purposes.

SECollab Neo4j Graph Database

With our neo4j implementation (OEM), SECollab will provide on a live, real-time evaluation of connected data.

We've focused on:

- integrity,
- performance,
- efficiency
- and scalability as key attributes.



SECollab Configuration

- Why do we need transversal configuration ?
  - Provides a **unified context**
    - Establish the working (or static) set of elements
    - Provide the selected versions of the assets in the configuration
  - Enables a **logical way to operate**
    - For engineers to assemble work
    - For configuration management to align work
  - While **enabling flow in each domain of work**
    - Managing their own assets
    - Setting their relationships

- The SECollab configuration provides this unified context and establishes the working set of elements/versions to operate with/between several applications

  - SECollab manages this **transversal configuration level for heterogenous set of tools** that do not offer such global management systems (file-based, server without version management, etc...) **through a publication mechanism**

    - Doesn't replace raw data/native configuration management
    - Compatible with Jazz, the other system managing configuration for its own ALM applications

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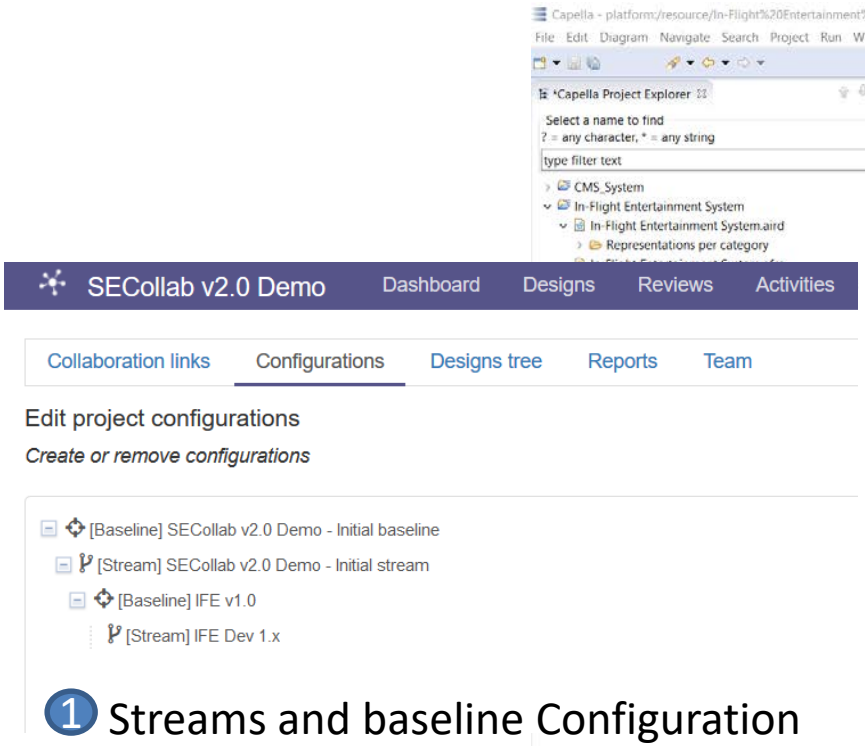
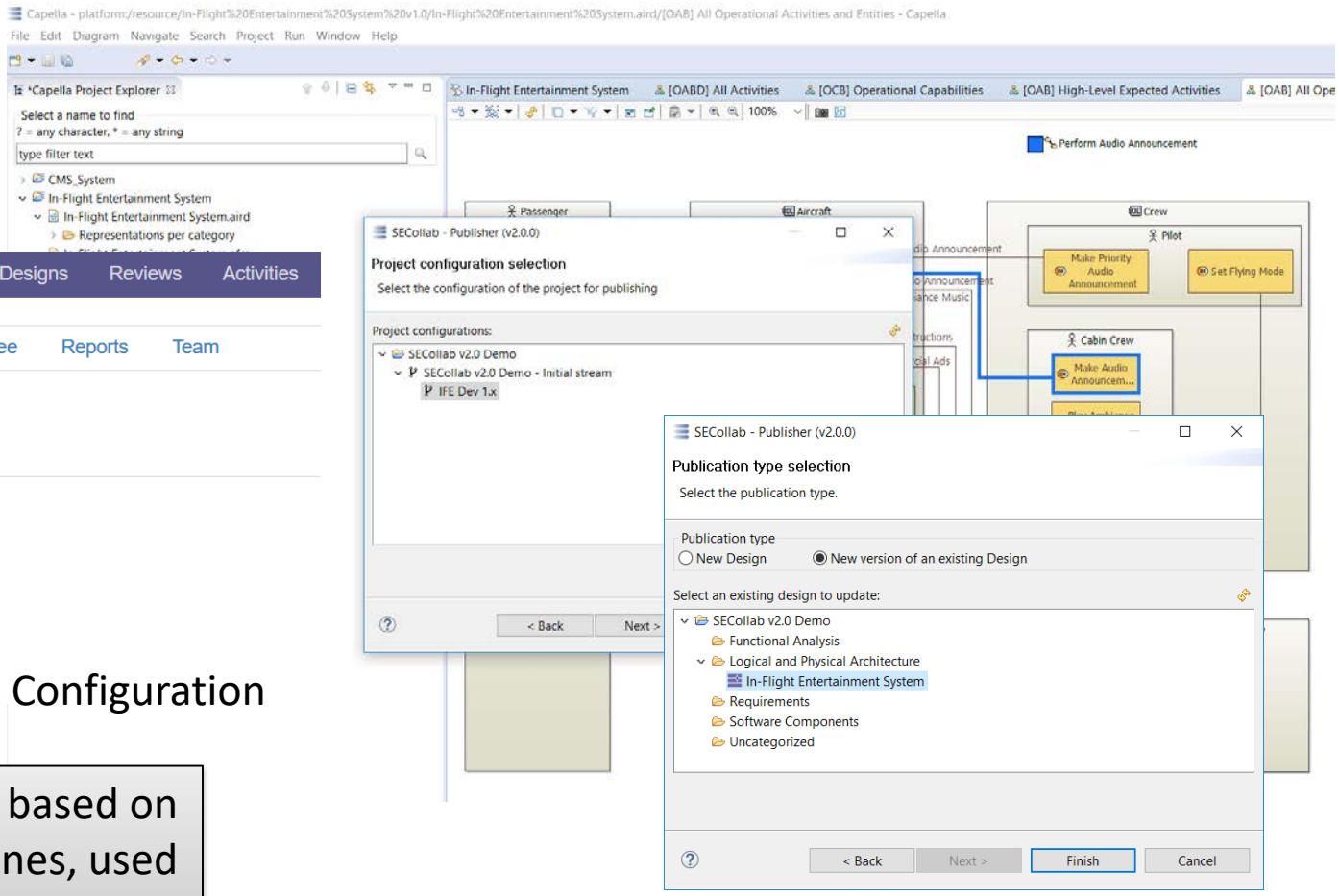
Configurations Usage



1 Streams and baseline Configuration

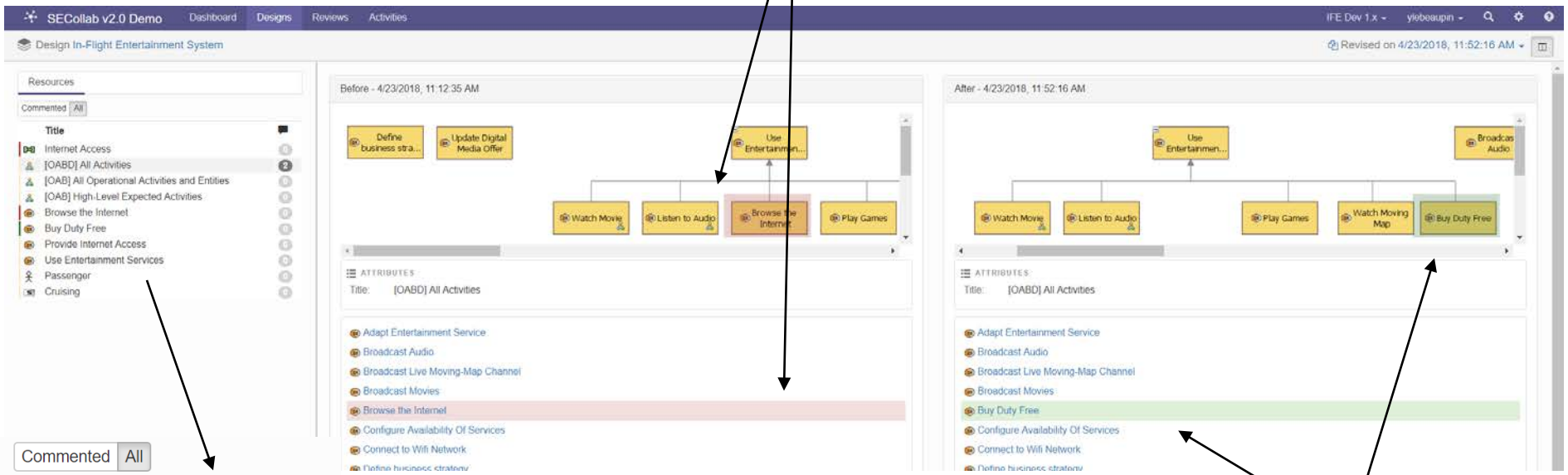
Configurations are based on streams and baselines, used when publishing and browsing the data

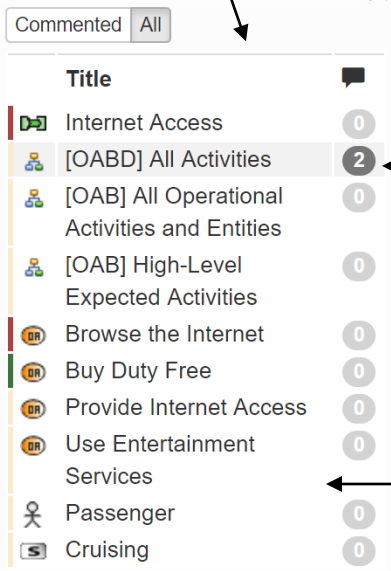


2 Stream Selection when publishing

Version Diff

Removed Element





Filter on ready reviewed (commented) elements

List of changes between 2 versions (modified, added, removed)

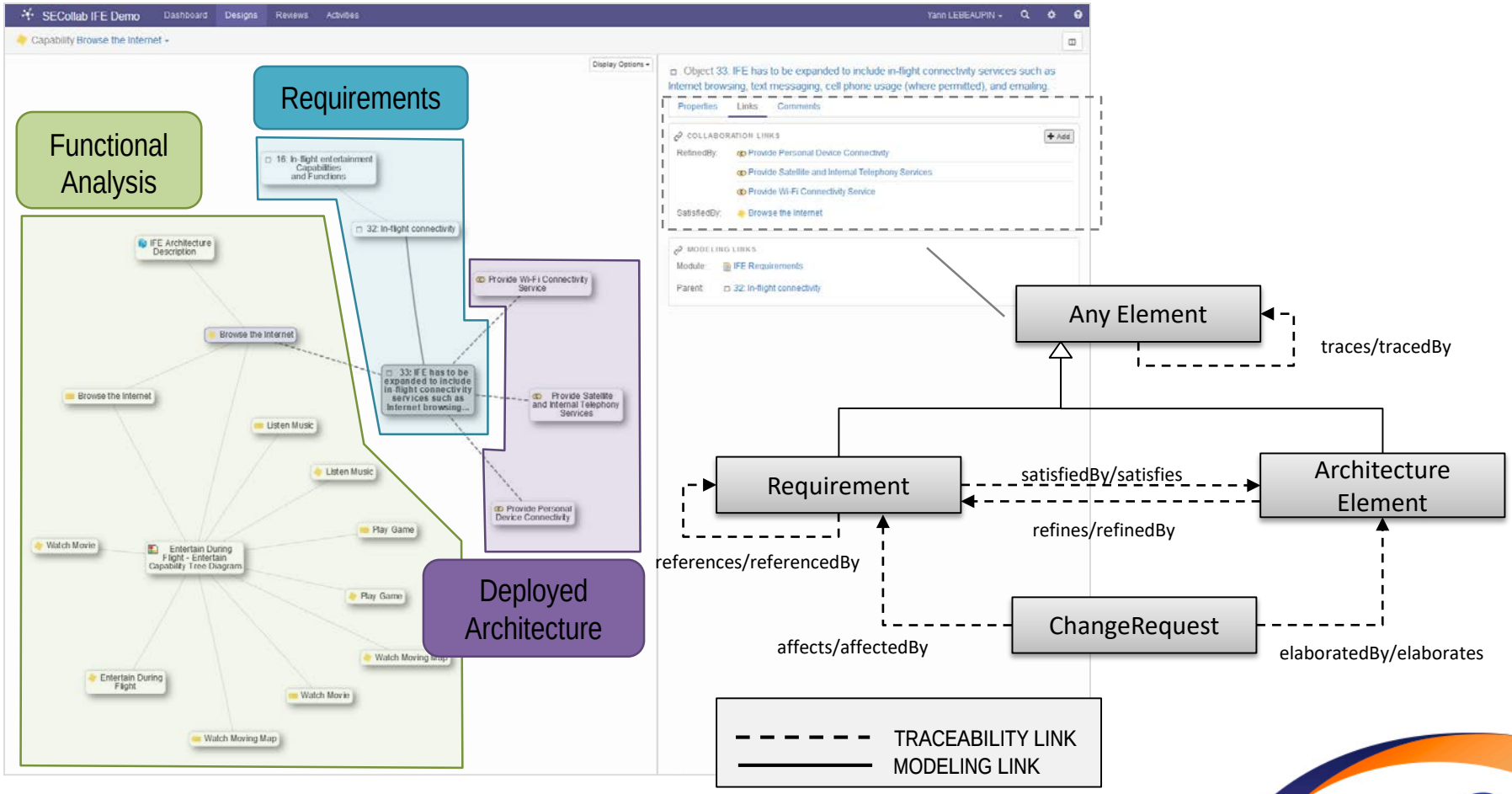
Added Element

Achieving Traceability

- Traceability shows
  - An impactful relationship between two objects
  - A role description
  - A need to assert consistency/validity across the relationship
- Traceability at Scale means
  - Support for managing large numbers of relationships
  - Support for classifying allowable relationships
  - Support for navigating these relationships

Transversal Traceability

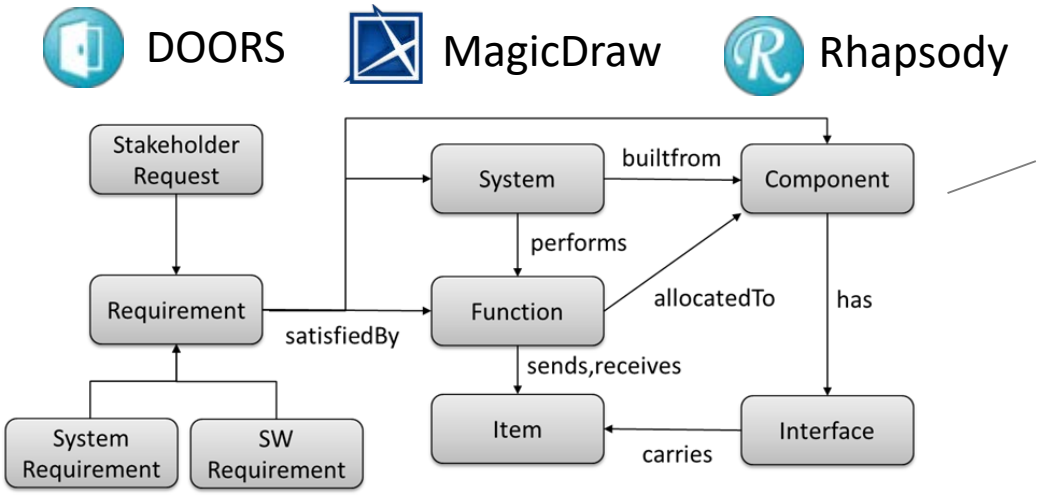
– By using your semantics to describe the information coming from the engineering tools, any version of design or requirement element can be linked to any other element whether or not it is originated in the same application.



SECollab Graph Data Explorer

Manage your Traceability Model

- SECollab helps you to define a **transversal traceability architecture model** above the various (and heterogenous) data coming from the published tools
  - Custom Types will be defined by an Alias Name and a filter request
  - Custom Links will be constrained by those new Types

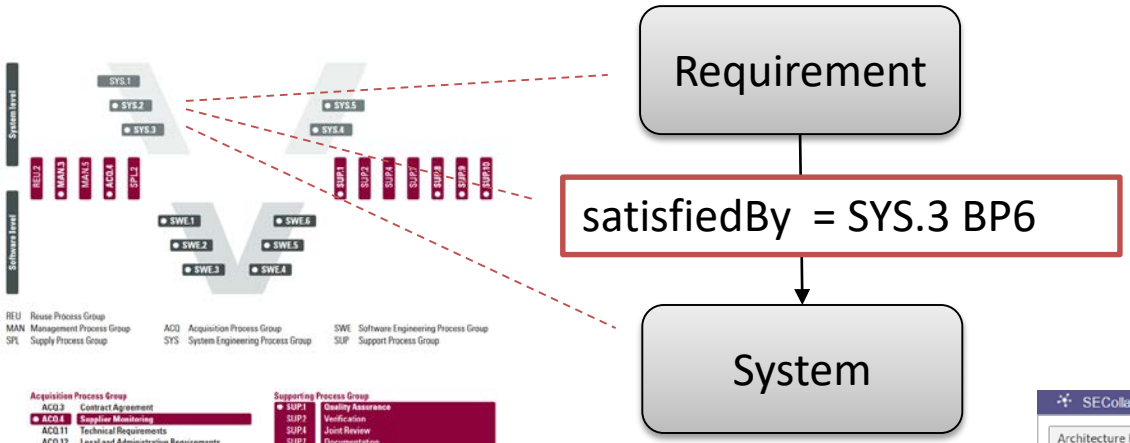


Custom Traceability Model

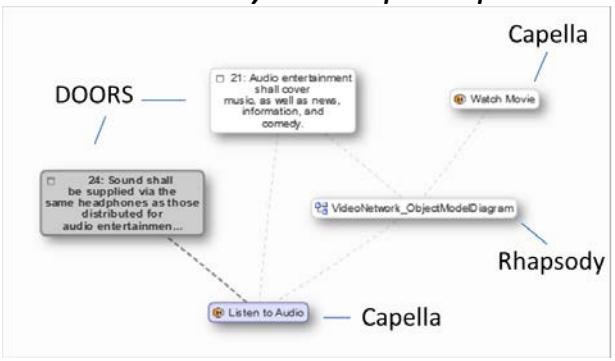
With this mechanism, the same data can be considered under several aspects (architecture, safety, etc.) and a single concept can match data coming from several tools

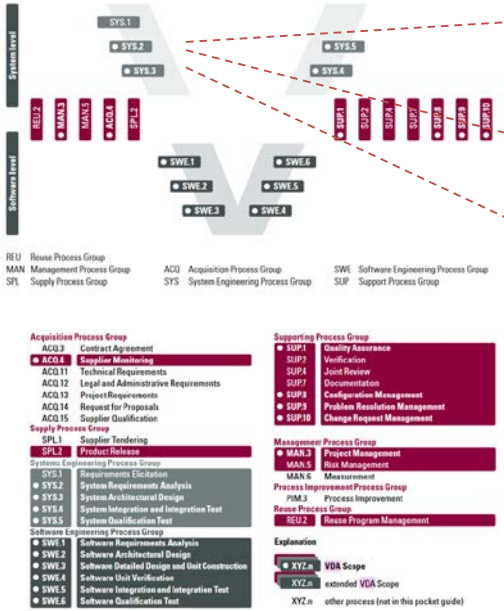
Application to Standard Traceability

- With the traceability model, it is possible to documents the link types to trace the Standard (e.g APSICE) links managed by SECollab

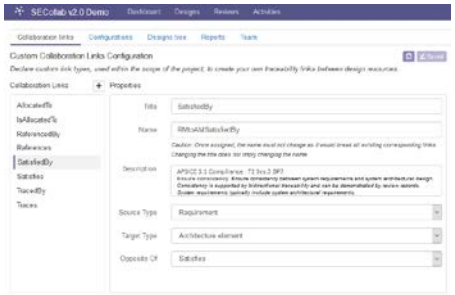


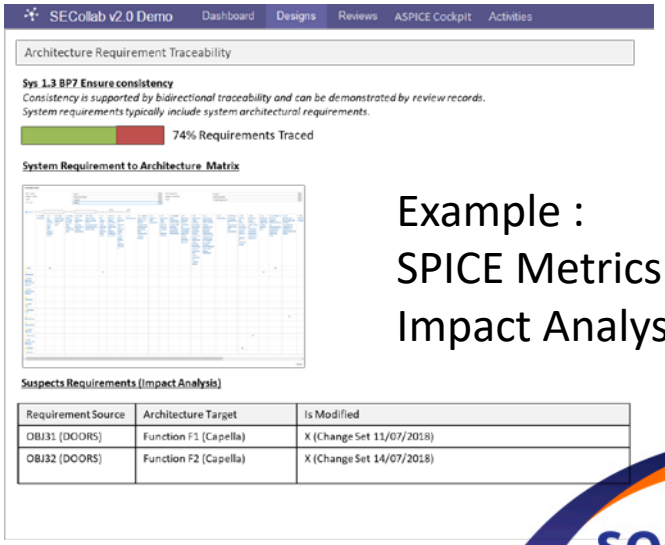
ASPICE Query in Graph Explorer





Compliance Standard

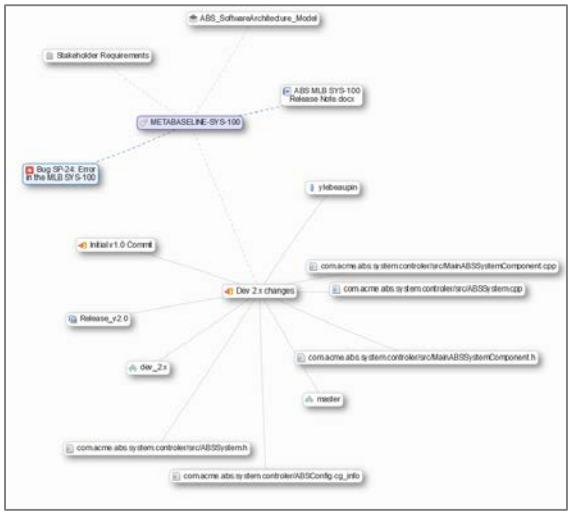




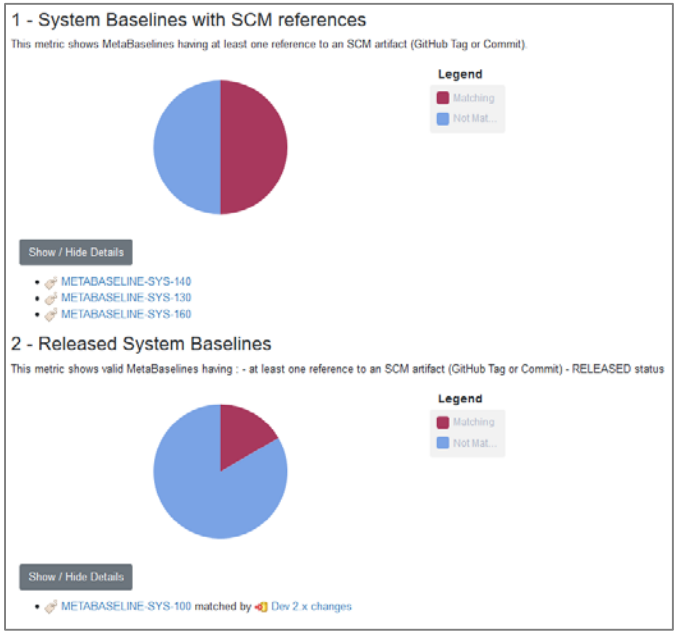
Example :
SPICE Metrics and
Impact Analysis

Reports

- SECollab provides metric capabilities for the SECollab platform, including automatic building of web reports



- Web Reports are based on queries and propose various display patterns (coverage, lists of filtered objects, matrices, trends, etc.)



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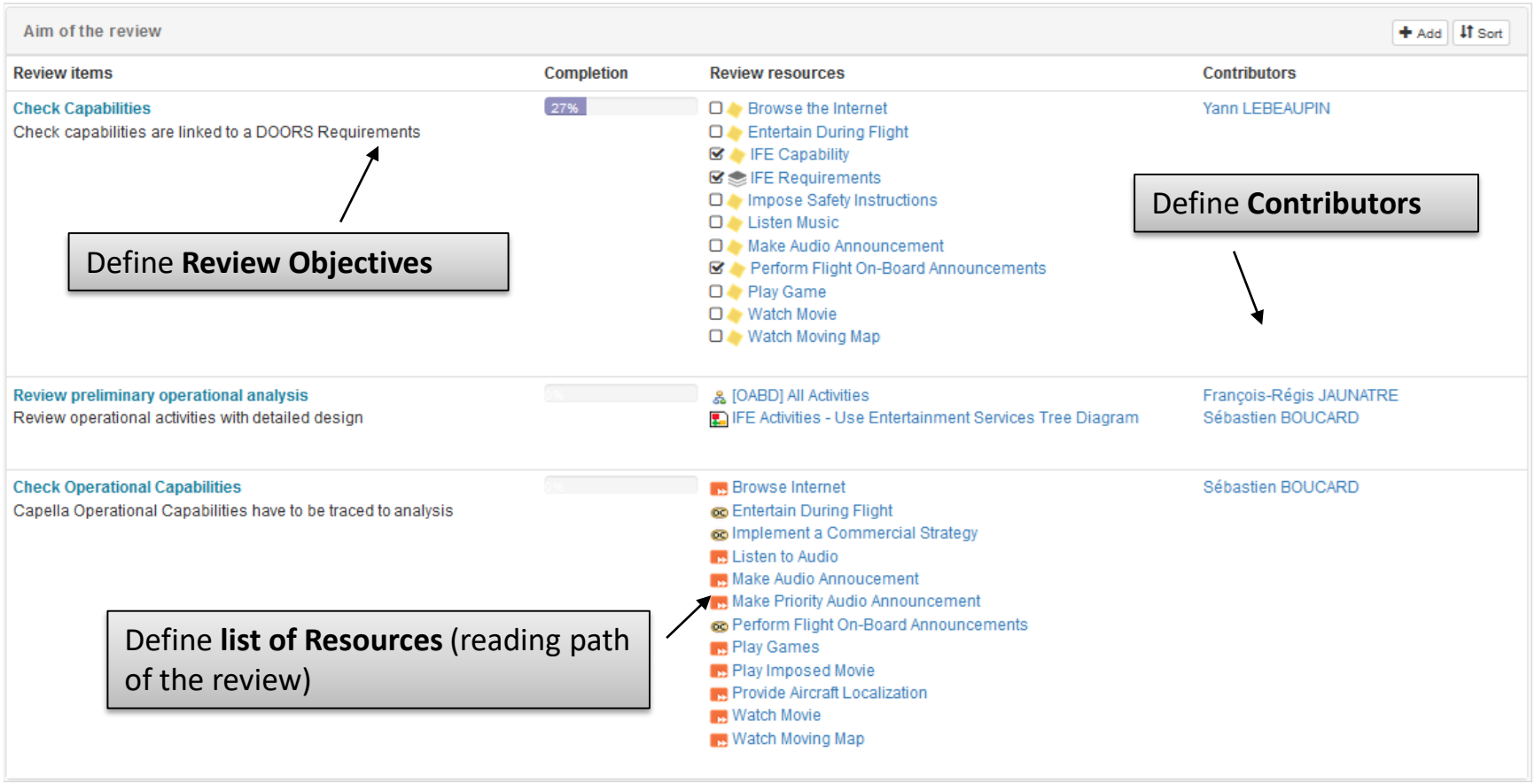
Reviews

- Standards mandate Review of assets
  - Must be done for a set of static assets
  - May span several tools
  - Require capturing findings
  - Must trigger actions
  - Must record results

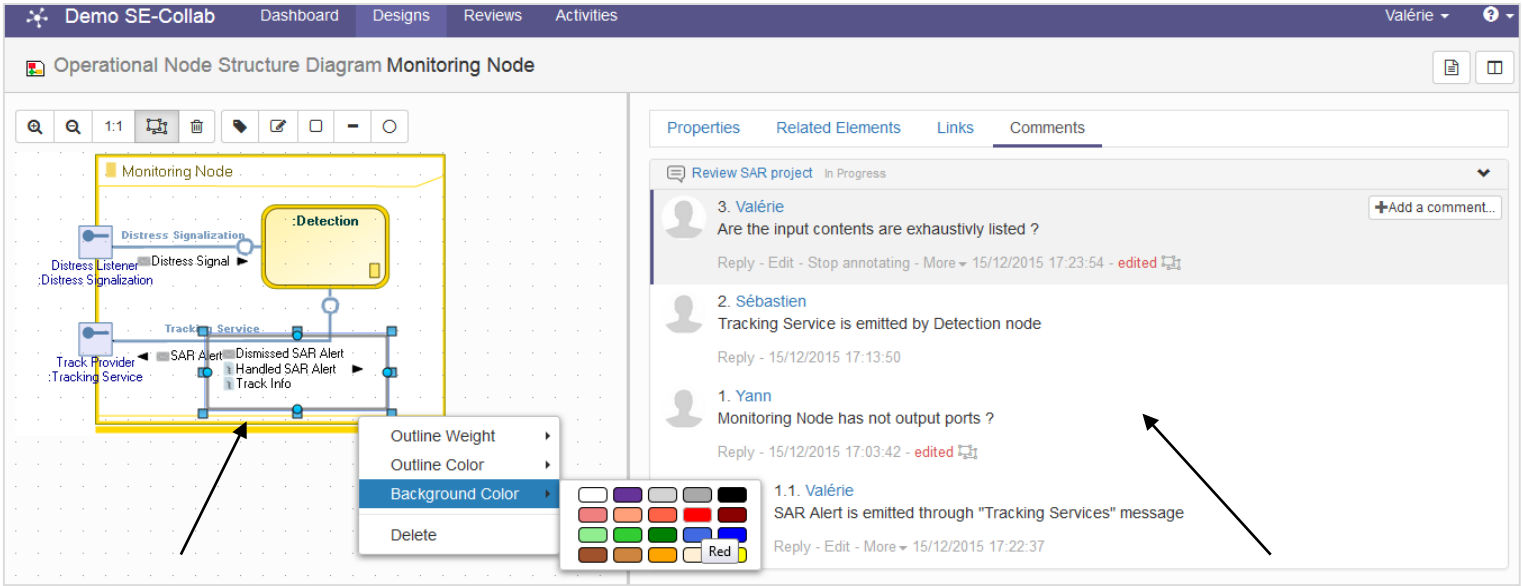
Review & Comment Diagrams and resources

The **review manager** defines the review content with objectives, list of resources and contributors).



Review & Comment Diagrams and resources

The **team can review a set of artifacts at once**, to ensure consistency across the team and across deliverables.



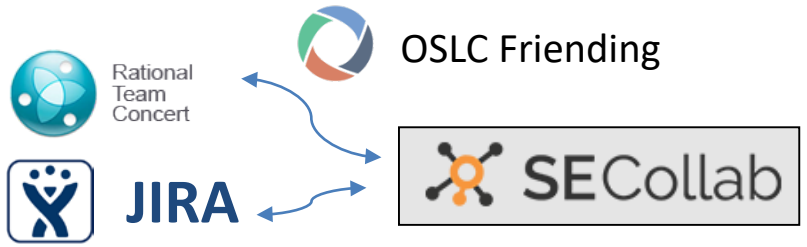
Add **Graphical Annotations** on Diagrams

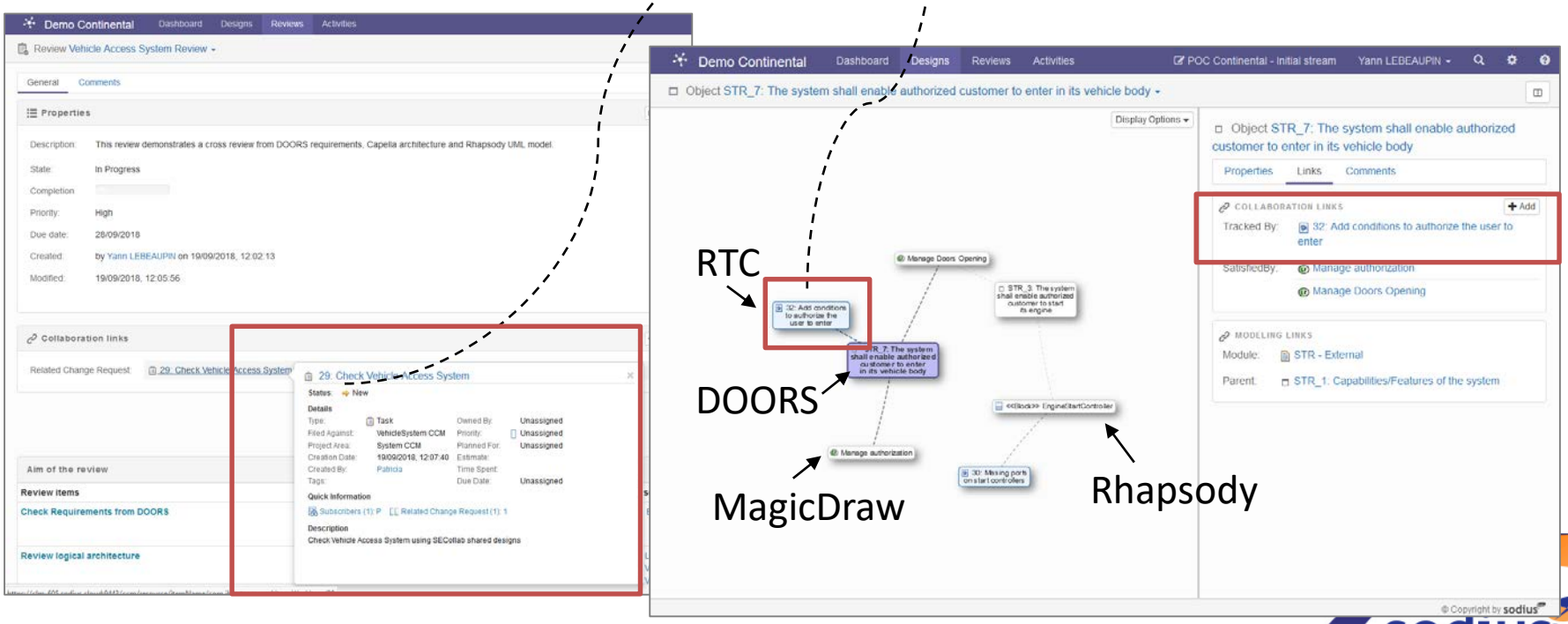
Comment in context with **Collaborative Discussions** on Design items

Association with CM

Findings can be linked and traced to CM items. Collaboration links create connections to the change management workflow

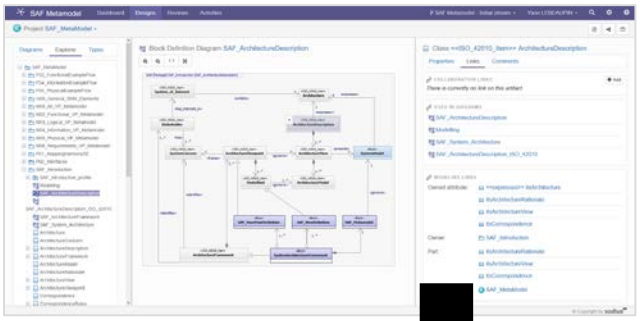
- Triggers to the modification of assets
- Connections to the process flow (link back to Stages)
- All driven by OSLC

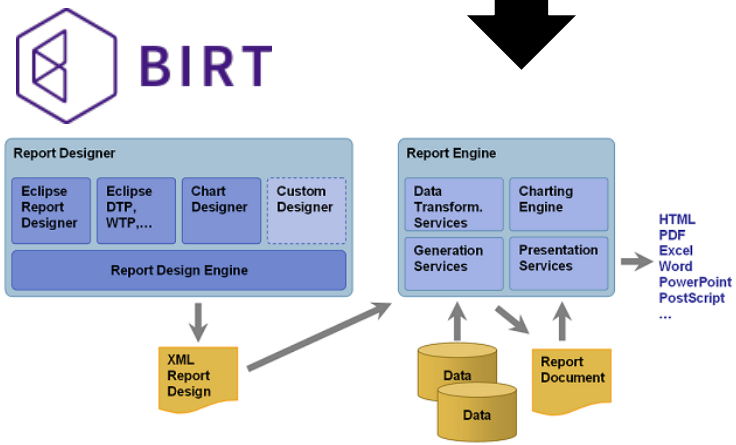


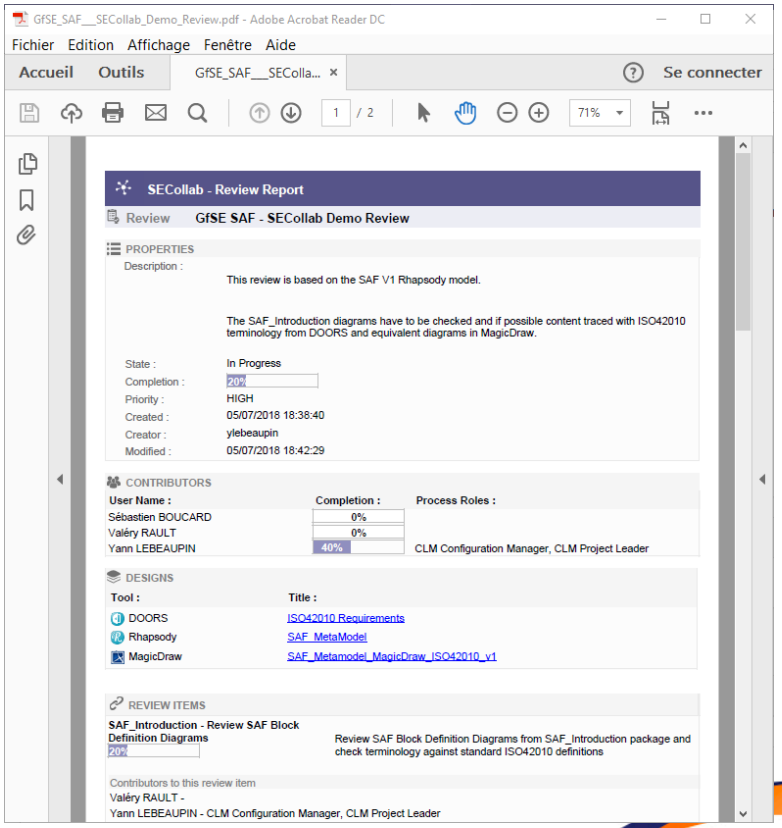


Export

In addition of OSLC APIs, reviews/designs/links can be exported in various formats from the web application and outputs customized using BIRT (Eclipse-based open source technology platform used to create data visualizations and reports that can be embedded into rich client and web applications). Default reports are provided with the platform.







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Conclusion

- With SECollab, many required features to handle Digital Engineering challenges find innovative, extensible and open answers.
  - **With its sharing capability, you can better support the use of models to communicate, collaborate, and perform your model-driven lifecycle activities**
  - **SECollab Configuration Management helps the teams to support the integration of heterogenous models and acts as source & unified context for various engineering activities**
  - **Acting as a traceability hub, SECollab provides unique capabilities to link domains and minimize silos effects (RM, AM, ALM, PLM, Legacy, etc..)**
  - **With templates capturing standard best practices, SECollab provides various means to facilitate consistency checking between engineering assets and measure quality of linked data**

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