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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**

# Sodius

- 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



# 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.

# SECollab, Web-based Collaboration and Traceability

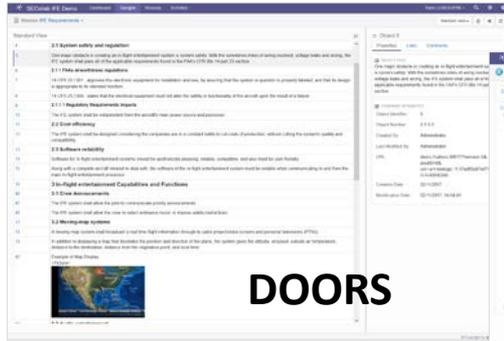
SECollab is a **collaborative tool for sharing, tracing and reviewing heterogeneous system or software engineering data in a Web interface**. By collecting heterogeneous data/models in a single, shared workspace, you are able:

- 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

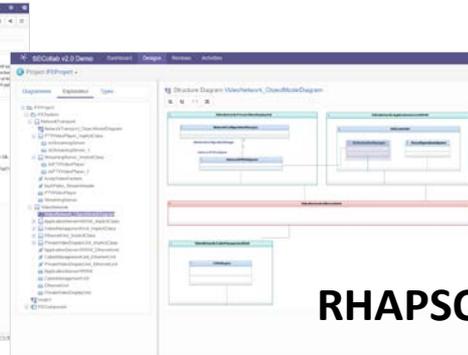


# One Platform for all your Models

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



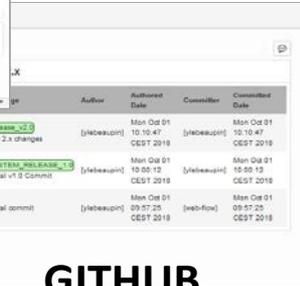
**DOORS**



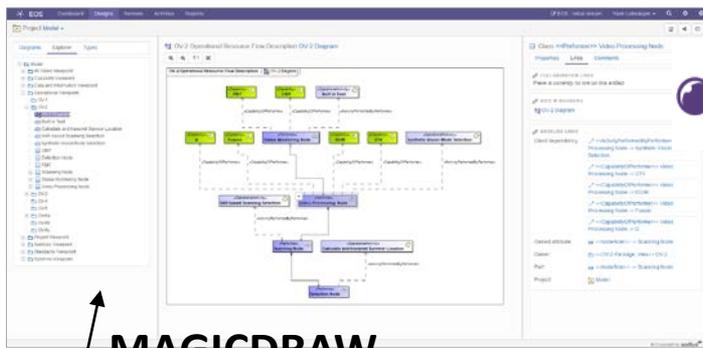
**RHAPSODY**



**JIRA**



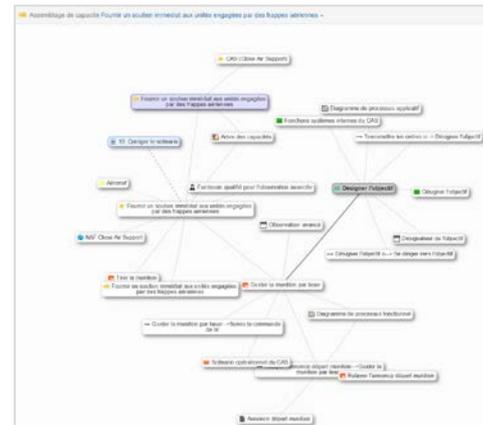
**GITHUB**



**MAGICDRAW**



SECollab Model Navigation and Links Graph Visualization

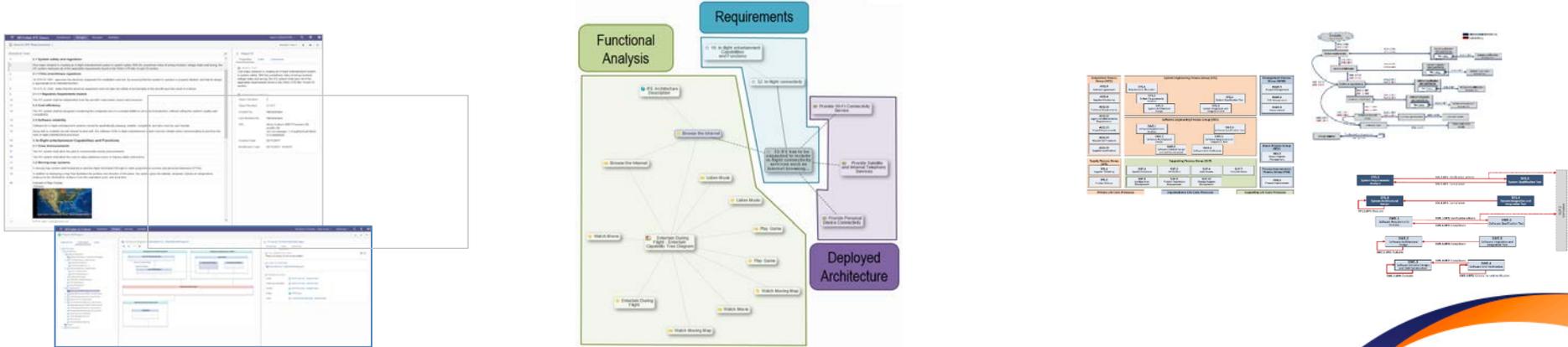


**GRAPH DATA**

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

# 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**



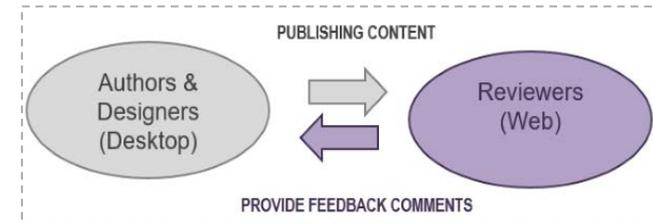
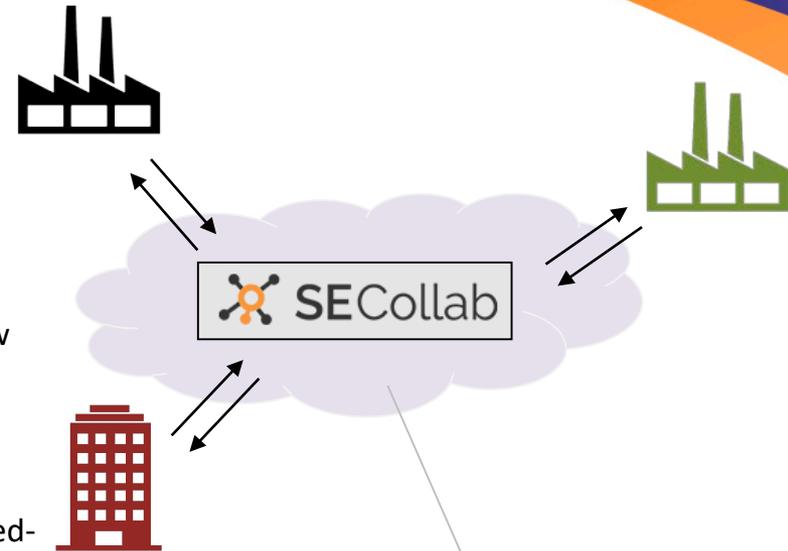
# Collaborate in internal AND external reviews ...

## ■ 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

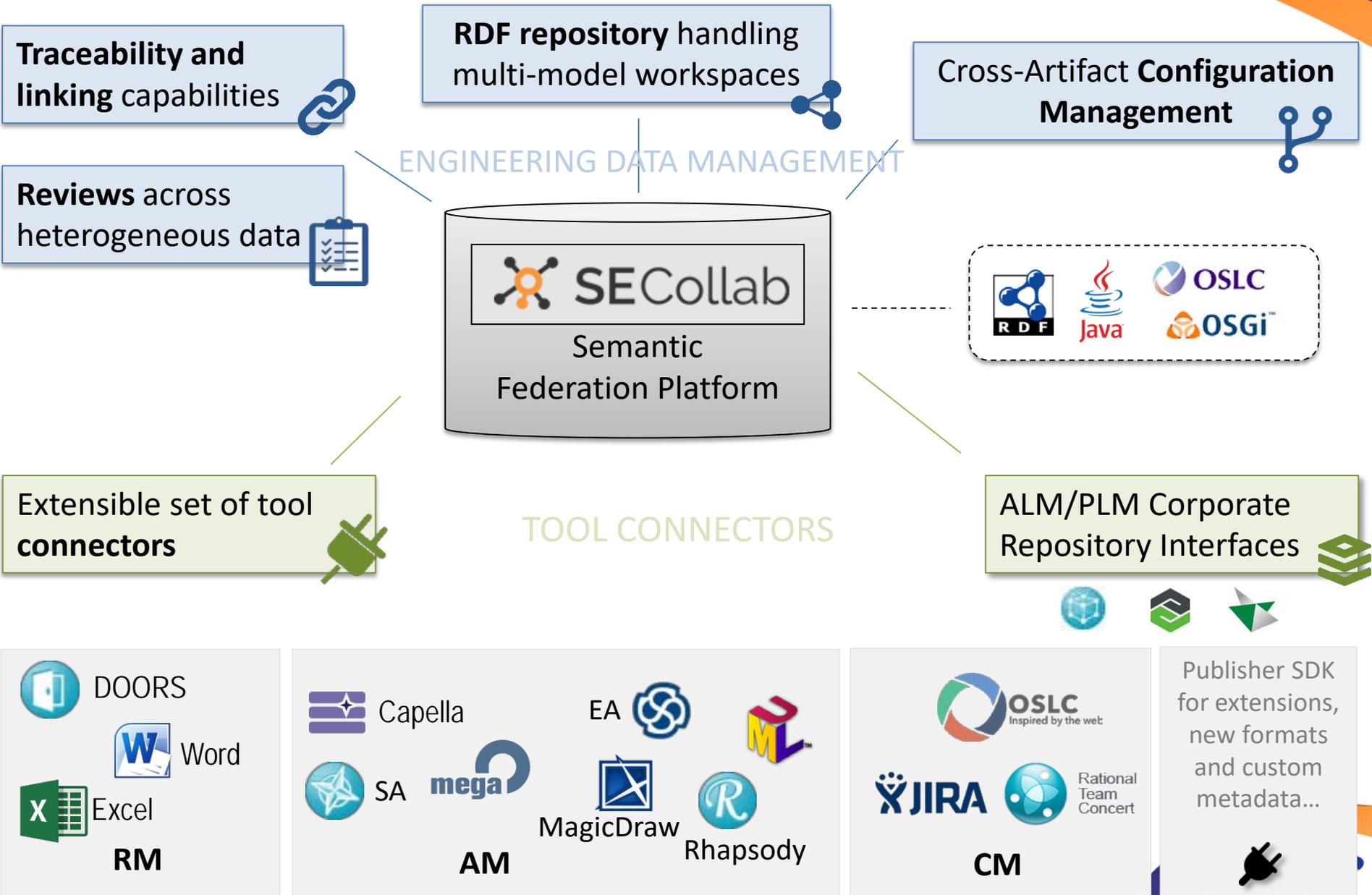
## ■ With SECollab, the objective is to quickly focus the reviewers on the parts that concern them while having a collaborative approach

- 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



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

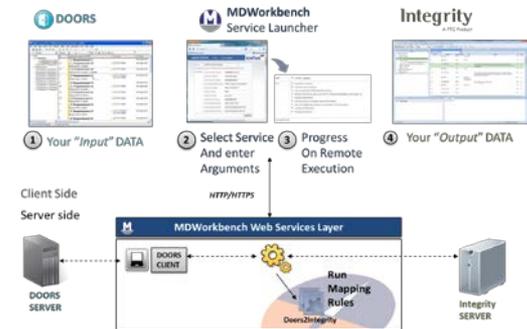
# SECollab High-Level View



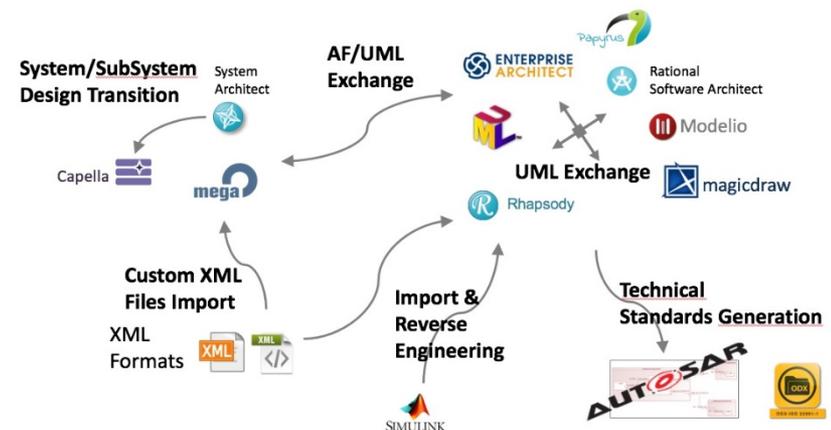
# About Connectors

- 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

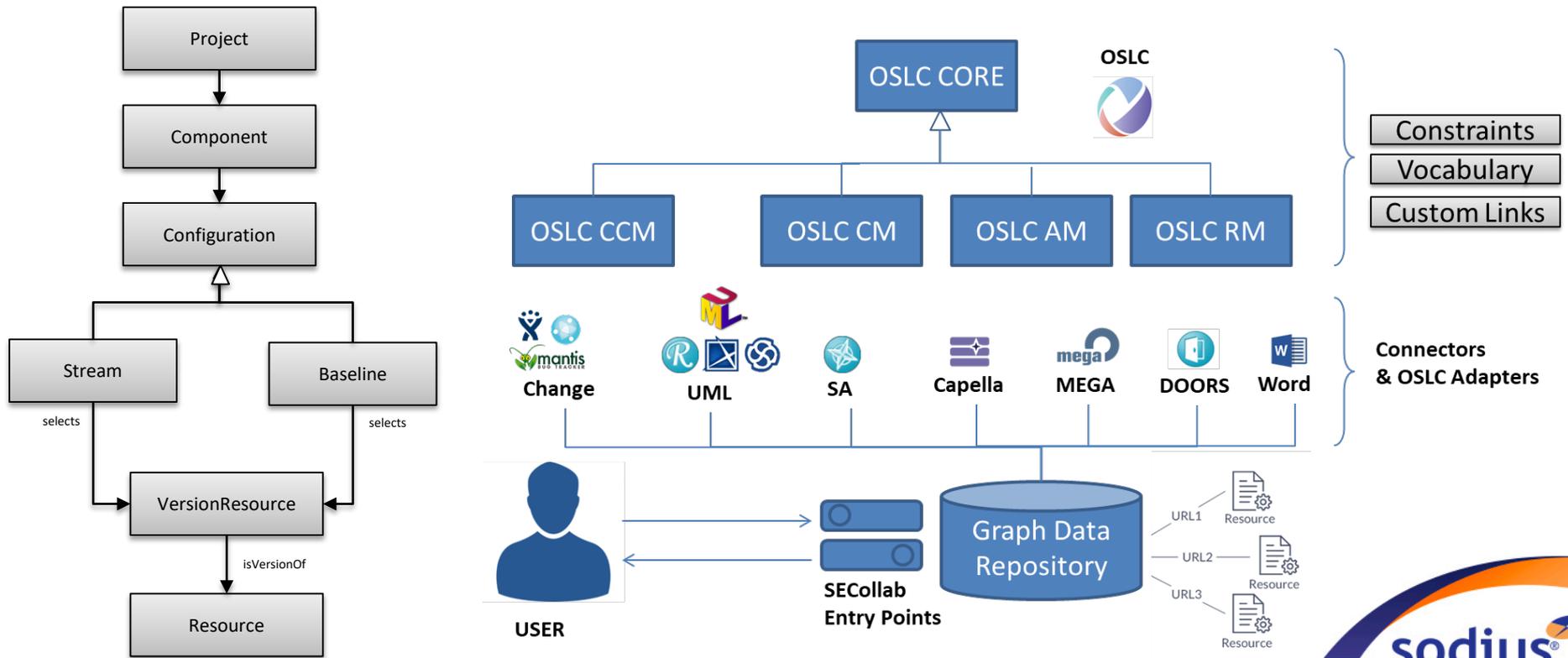


## Connectors and Exchange flows



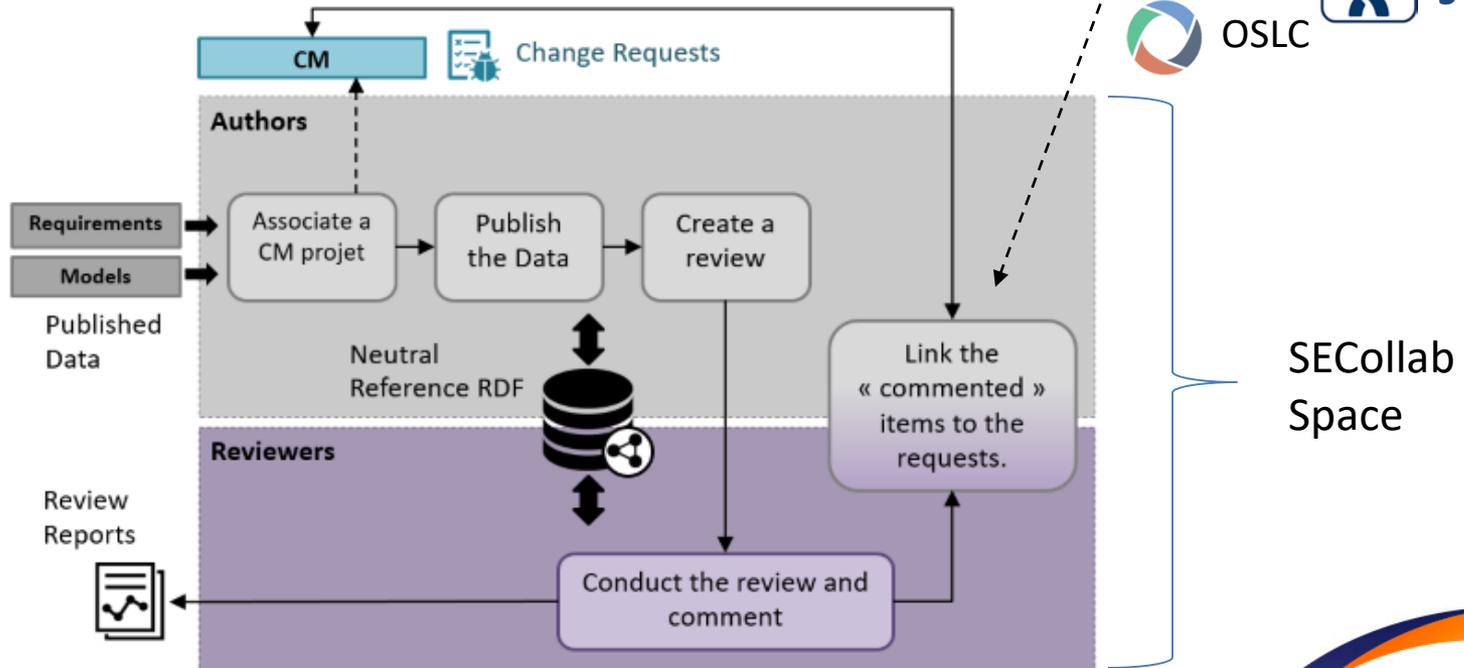
# OSLC & Configuration Management

- 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.



# 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.

Windchill Item

SysML Model published in SECollab

PTC Windchill OSLC Preview

PTC Windchill

OSLC Collaboration Links

1: Assure that the Golf Cart is Useful

Visibility to ALM from PLM

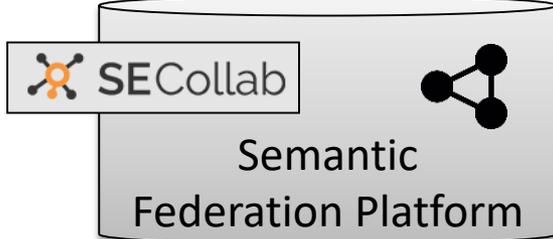
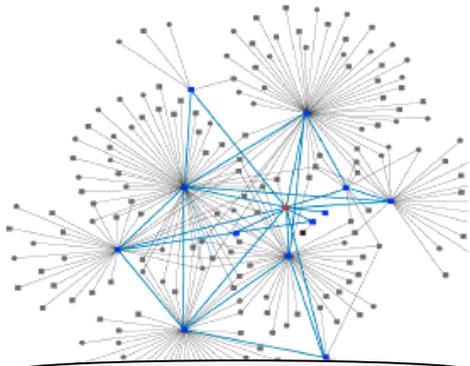
Windchill Part: GC000031: WHEELS\_ASSEM

Visibility to PLM from ALM

# ... 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.



- On one hand, **traceable and annotatable data** can be 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.

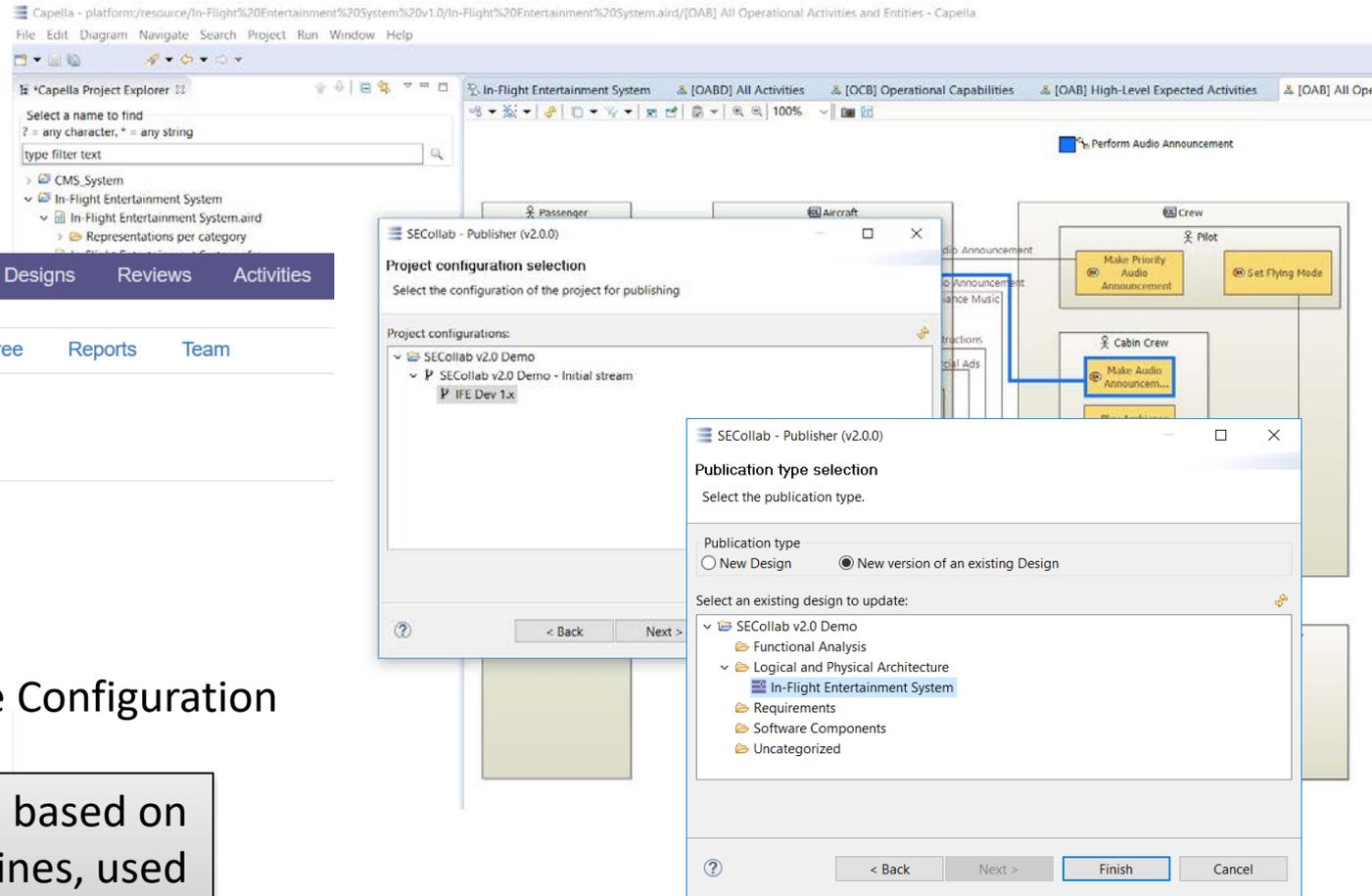
*SECollab RDF Graph Database, to focus on data semantics and relations between tools*



# 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

# 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

The screenshot displays the SECollab v2.0 interface for a 'Design In-Flight Entertainment System'. It shows a comparison between two versions of the element '[OABD] All Activities'.

- Left Panel (Resources):** A list of system components with counts. The 'Browse the Internet' component has a count of 2, highlighted by a callout box: **Filter on ready reviewed (commented) elements**.
- Center Panel (Before - 4/23/2018, 11:12:35 AM):** A flowchart showing the state of the system. The 'Browse the Internet' activity is highlighted in red, with a callout box: **Removed Element**.
- Right Panel (After - 4/23/2018, 11:52:16 AM):** A flowchart showing the updated state. The 'Buy Duty Free' activity is highlighted in green, with a callout box: **Added Element**.

Arrows indicate the flow of information: from the 'Browse the Internet' callout to the 'Before' version, from the 'Buy Duty Free' callout to the 'After' version, and from the 'Filter on ready reviewed' callout to the resource list.

Filter on ready reviewed (commented) elements

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

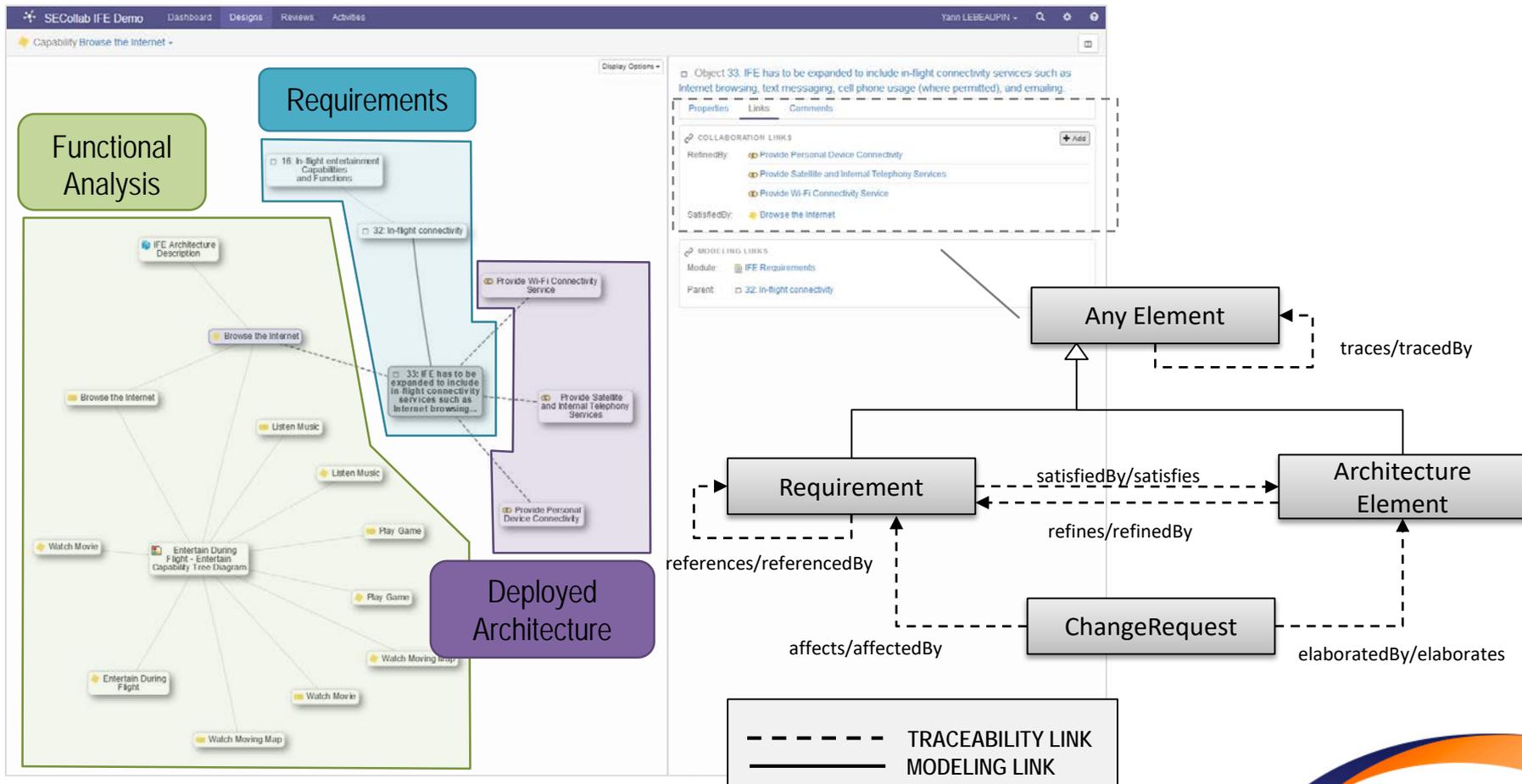
Added Element

# 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

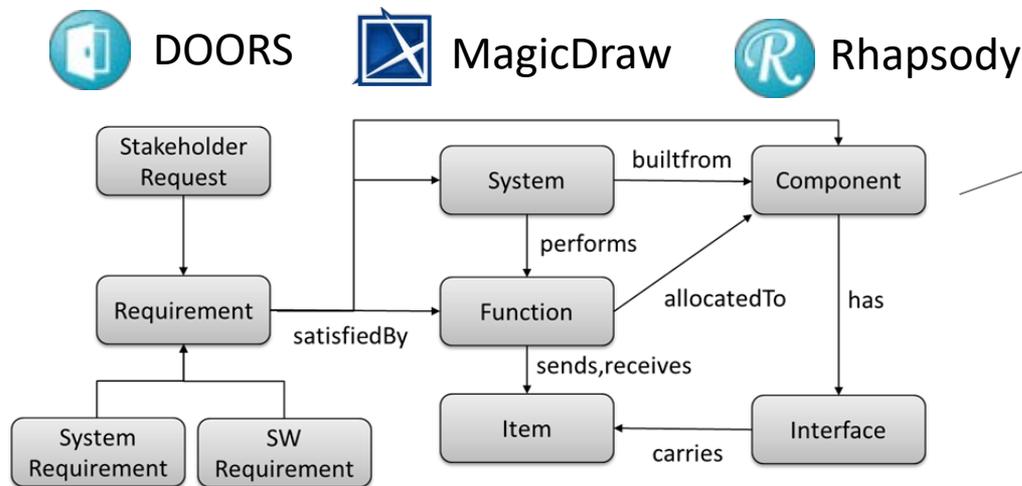
# Transversal Traceability

- 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.



# 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

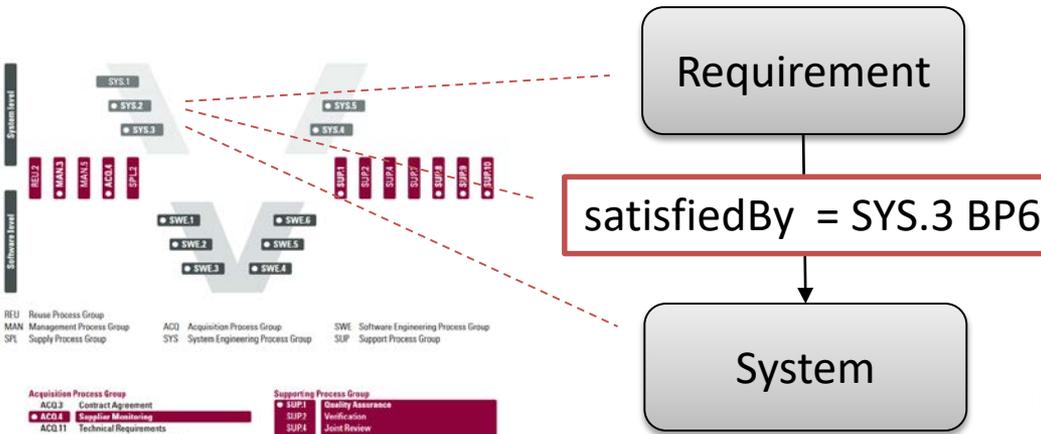


*With this mechanism, the same data can be considered under several aspects (architecture, safety, etc.) and a single concept can match data coming from several tools*

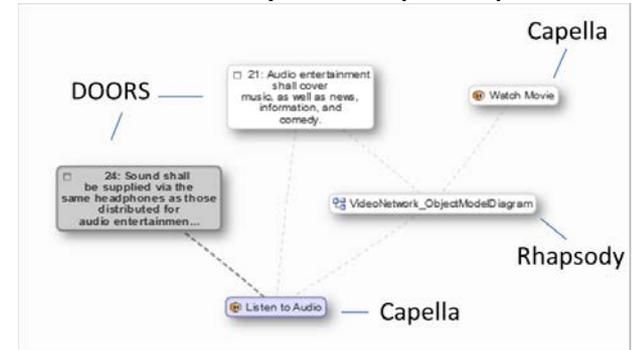
Custom Traceability Model

# 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



- Acquisition Process Group**
- ACO3 Contract Agreement
  - ACO11 Technical Requirements
  - ACO12 Legal and Administrative Requirements
  - ACO13 Project Requirements
  - ACO14 Request for Proposals
  - ACO15 Supplier Qualification
- Supply Process Group**
- SPL1 Supply Tendering
  - SPL2 Product Release
- Systems Engineering Process Group**
- SYS1 Requirements Elicitation
  - SYS2 System Requirements Analysis
  - SYS3 System Architectural Design
  - SYS4 System Integrative and Integration Test
  - SYS5 System Qualification Test
- Software Engineering Process Group**
- SWE1 Software Requirements Analysis
  - SWE2 Software Architectural Design
  - SWE3 Software Detailed Design and Unit Construction
  - SWE4 Software User Verification
  - SWE5 Software Integration and Integration Test
  - SWE6 Software Qualification Test
- Supporting Process Group**
- SUP1 Quality Assurance
  - SUP7 Verification
  - SUP4 Joint Review
  - SUP7 Documentation
  - SUP8 Configuration Management
  - SUP9 Problem Resolution Management
  - SUP19 Change Request Management
- Management Process Group**
- MAN3 Project Management
  - MAN5 Risk Management
  - MAN6 Measurement
  - PM6.1 Process Improvement
  - REU2 Release Program Management
- Explanation**
- XYZ.n extended VBA Scope
  - XYZ.n other process (not in this pocket guide)

SECollab v2.0 Demo Dashboard | Designs | Reviews | Activities

Architecture Requirement Traceability

**Sys 1.3 BP7 Ensure consistency**  
Consistency is supported by bidirectional traceability and can be demonstrated by review records. System requirements typically include system architectural requirements.

74% Requirements Traced

**System Requirement to Architecture Matrix**

**Suspects Requirements (Impact Analysis)**

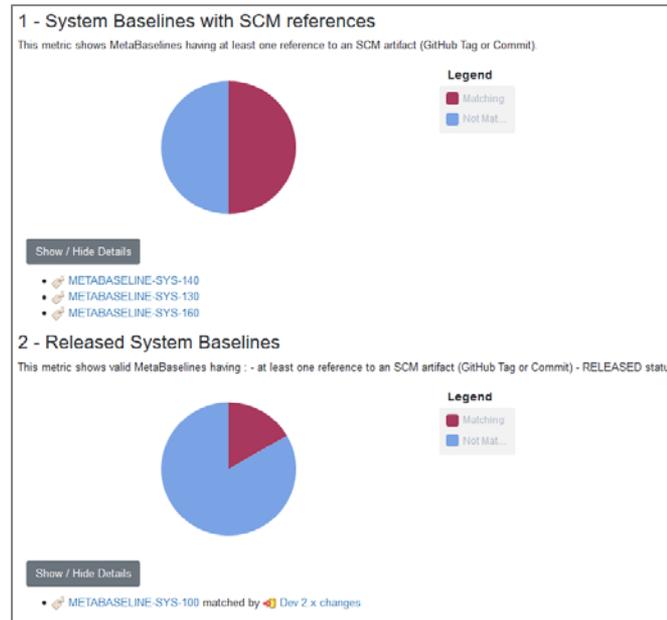
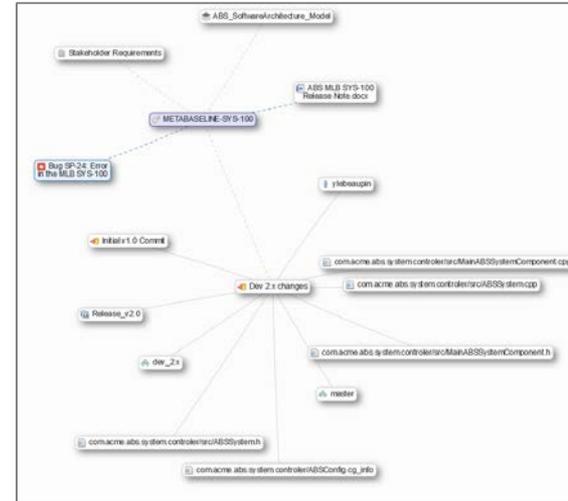
Requirement Source	Architecture Target	Is Modified
OBJ31 (DOORS)	Function F1 (Capella)	X (Change Set 11/07/2018)
OBJ32 (DOORS)	Function F2 (Capella)	X (Change Set 14/07/2018)

Compliance Standard

Example :  
SPICE Metrics and  
Impact Analysis

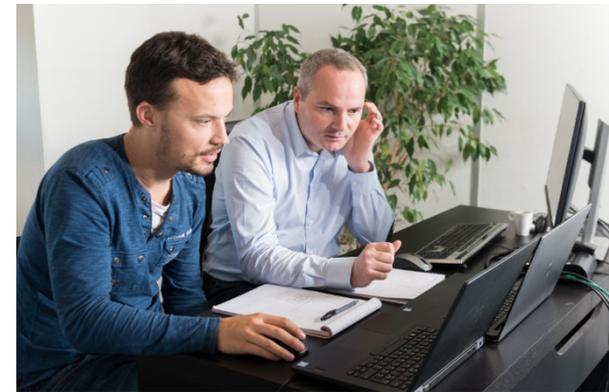
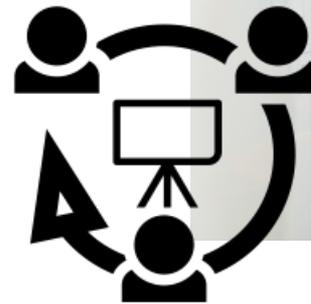
# Reports

- 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.)



# 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).

Aim of the review + Add | Sort

Review items	Completion	Review resources	Contributors
<b>Check Capabilities</b> Check capabilities are linked to a DOORS Requirements	27%	<ul style="list-style-type: none"><li><input type="checkbox"/> Browse the Internet</li><li><input type="checkbox"/> Entertain During Flight</li><li><input checked="" type="checkbox"/> IFE Capability</li><li><input checked="" type="checkbox"/> IFE Requirements</li><li><input type="checkbox"/> Impose Safety Instructions</li><li><input type="checkbox"/> Listen Music</li><li><input type="checkbox"/> Make Audio Announcement</li><li><input checked="" type="checkbox"/> Perform Flight On-Board Announcements</li><li><input type="checkbox"/> Play Game</li><li><input type="checkbox"/> Watch Movie</li><li><input type="checkbox"/> Watch Moving Map</li></ul>	Yann LEBEAUPIN
<b>Review preliminary operational analysis</b> Review operational activities with detailed design	0%	<ul style="list-style-type: none"><li>[OABD] All Activities</li><li>IFE Activities - Use Entertainment Services Tree Diagram</li></ul>	François-Régis JAUNATRE Sébastien BOUCARD
<b>Check Operational Capabilities</b> Capella Operational Capabilities have to be traced to analysis	0%	<ul style="list-style-type: none"><li>Browse Internet</li><li>Entertain During Flight</li><li>Implement a Commercial Strategy</li><li>Listen to Audio</li><li>Make Audio Announcement</li><li>Make Priority Audio Announcement</li><li>Perform Flight On-Board Announcements</li><li>Play Games</li><li>Play Imposed Movie</li><li>Provide Aircraft Localization</li><li>Watch Movie</li><li>Watch Moving Map</li></ul>	Sébastien BOUCARD

**Define Review Objectives** (points to 'Check Capabilities')

**Define list of Resources (reading path of the review)** (points to 'Make Priority Audio Announcement')

**Define Contributors** (points to 'Yann LEBEAUPIN')

# Review & Comment Diagrams and resources

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

The screenshot displays the 'Demo SE-Collab' interface. The main window shows an 'Operational Node Structure Diagram Monitoring Node'. The diagram features a 'Monitoring Node' containing a ':Detection' node and a 'Track Provider' node. A context menu is open over the 'Monitoring Node', showing options for 'Outline Weight', 'Outline Color', 'Background Color', and 'Delete'. A color palette is visible below the menu. On the right, the 'Comments' tab is active, showing a discussion thread. The thread includes three comments: 1. Yann asks 'Monitoring Node has not output ports?'; 1.1. Valérie replies 'SAR Alert is emitted through "Tracking Services" message'; 2. Sébastien replies 'Tracking Service is emitted by Detection node'; 3. Valérie asks 'Are the input contents are exhaustivly listed?'. Arrows point from the comment boxes below to the corresponding comments in the thread.

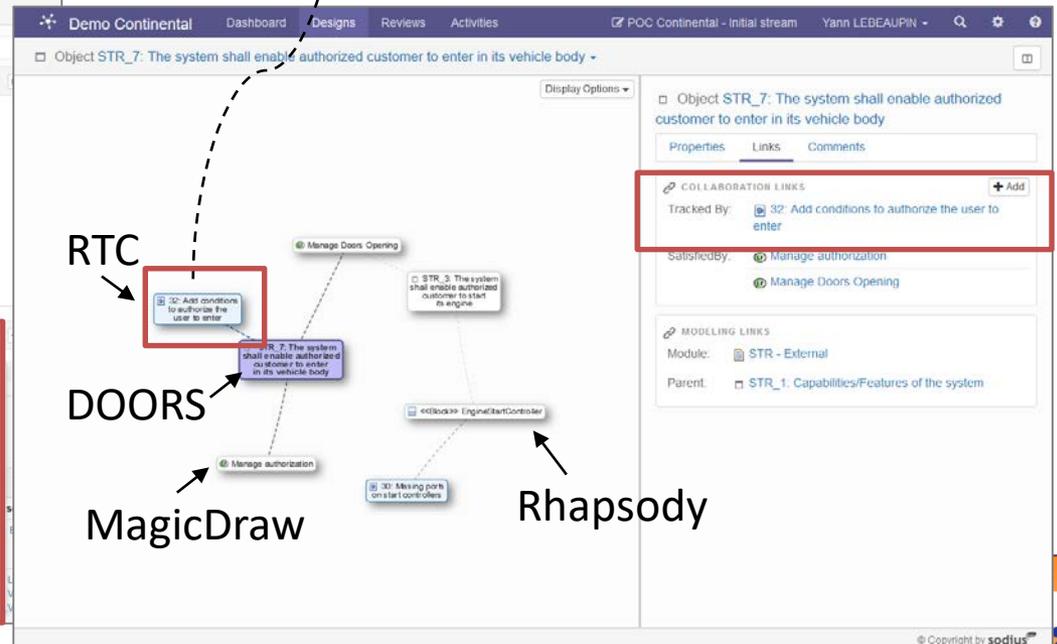
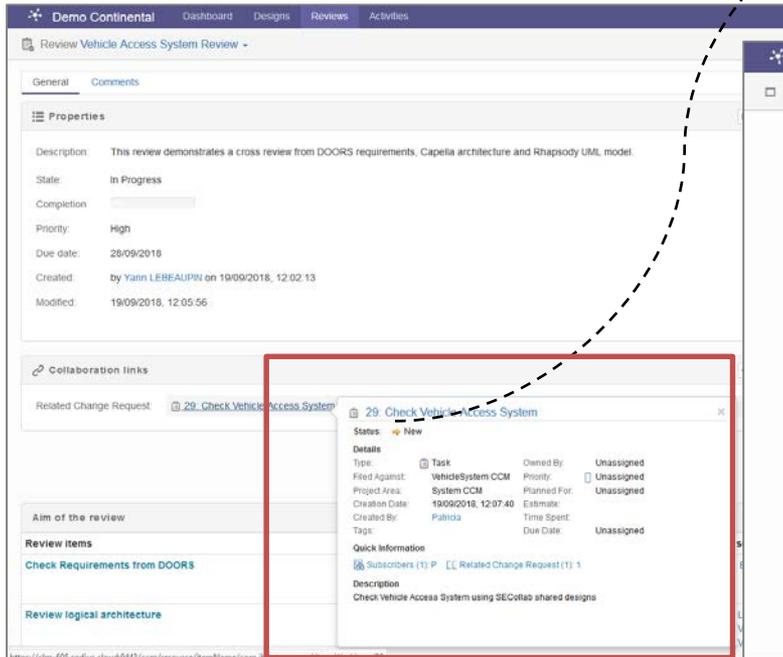
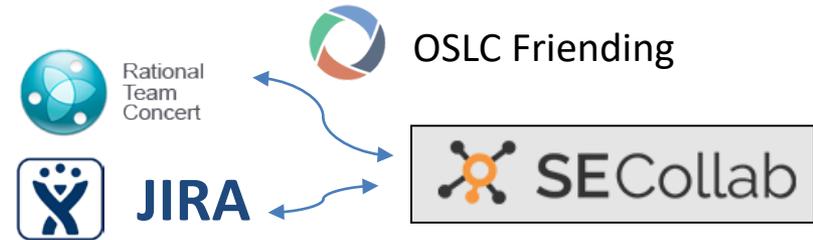
Add **Graphical Annotations** on Diagrams

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

# Association with CM

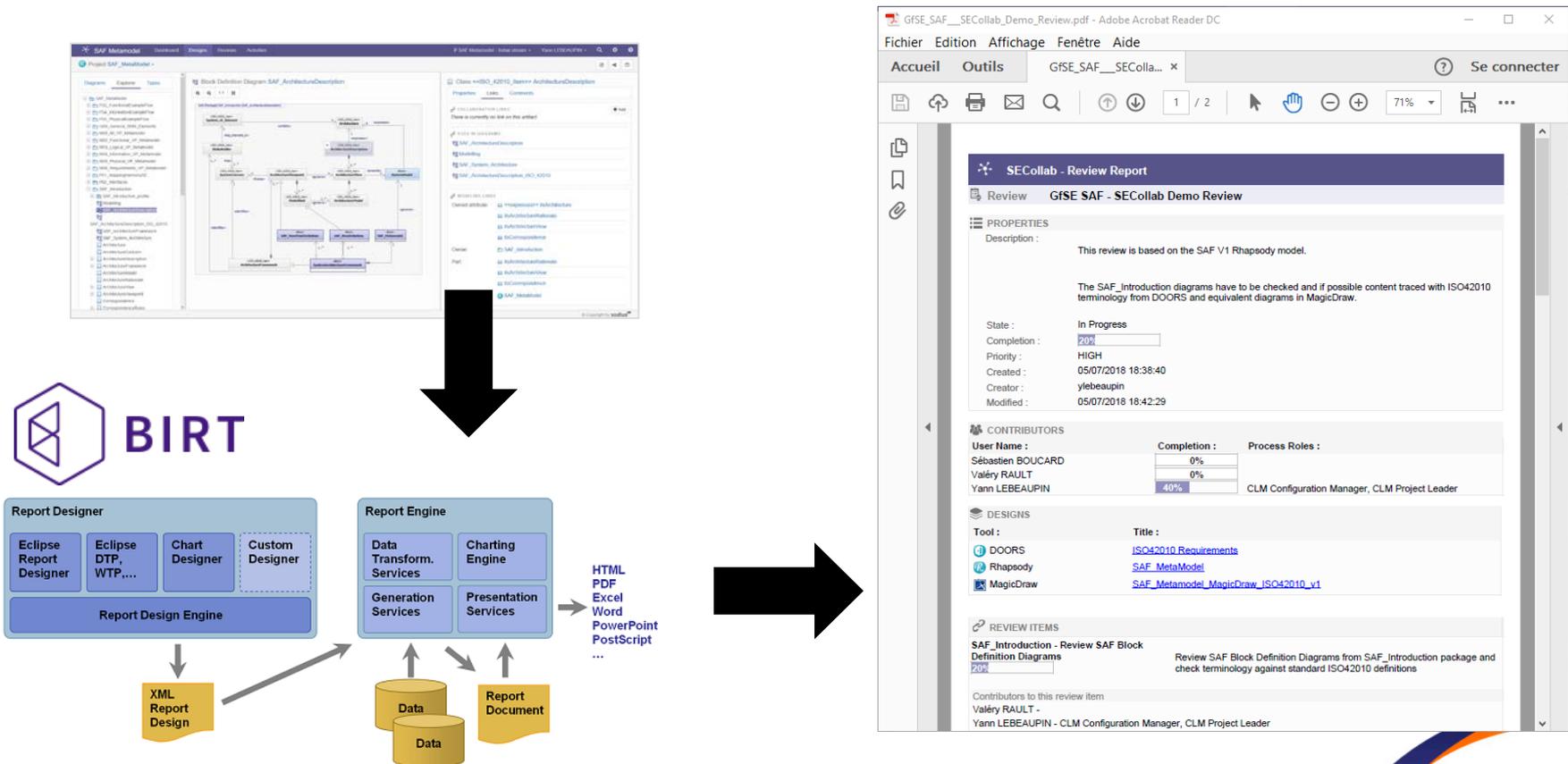
**Findings can be linked and traced to CM items.** Collaboration links create connections to the change management workflow

- 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.



# 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**



# Contact us

To get more information about our  
automation & interoperability solutions...

[contact@sodius.com](mailto:contact@sodius.com)

[www.sodius.com](http://www.sodius.com)

