



NDIA

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SECollab

Collaborative Systems Engineering Platform

Yann LEBEAUPIN – CTO
ylebeaupin@sodius.com

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



DAIMLER



MBDA
MISSILE SYSTEMS

THALES



Panasonic
Automotive



AIRBUS
DEFENCE & SPACE

NAVAL
GROUP

sodius®

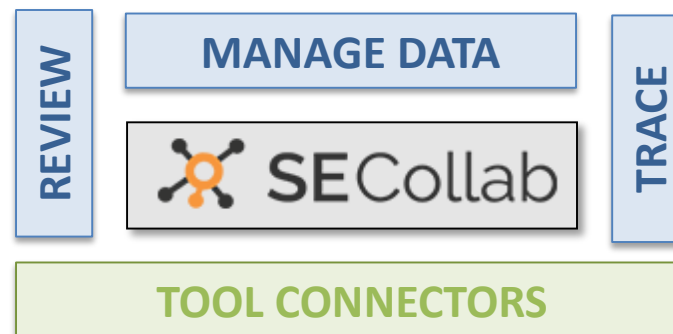
Digital Engineering and MOSA challenges...

- 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

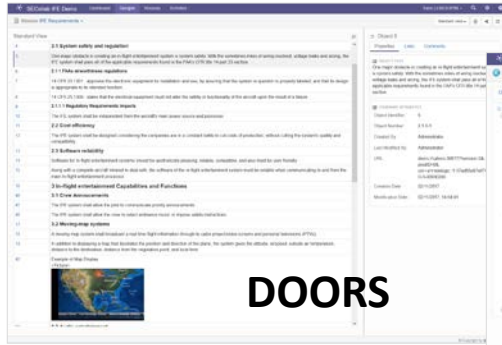
SECollab is a **collaborative tool for sharing, tracing and reviewing heterogeneous system or software engineering data in a Web interface**. By collecting heterogeneous data/models in a single, shared workspace, you are able:

- 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

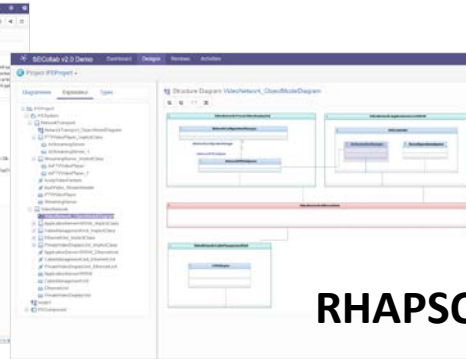


One Platform for all your Models

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



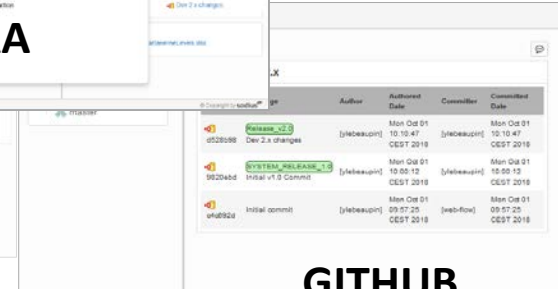
DOORS



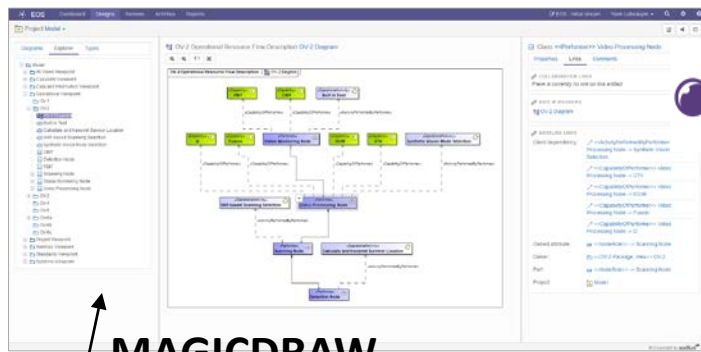
RHAPSODY



JIRA



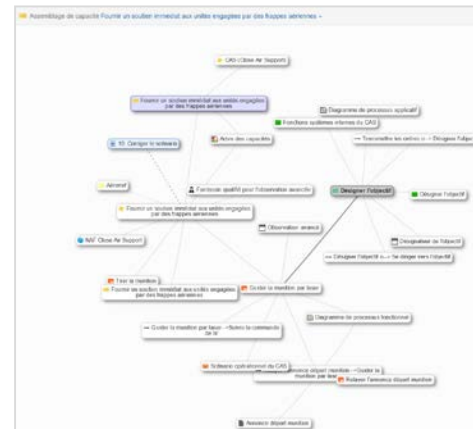
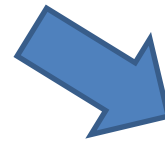
GITHUB



MAGICDRAW



SECollab Model Navigation and Links Graph Visualization

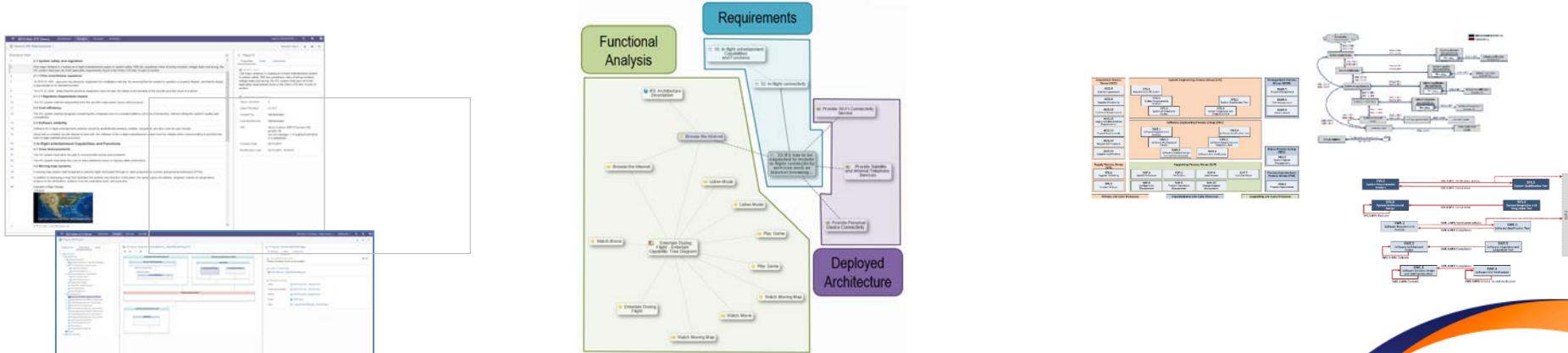


GRAPH DATA

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**



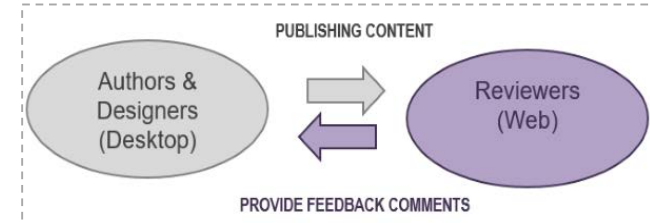
Collaborate in internal AND external reviews ...

■ 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

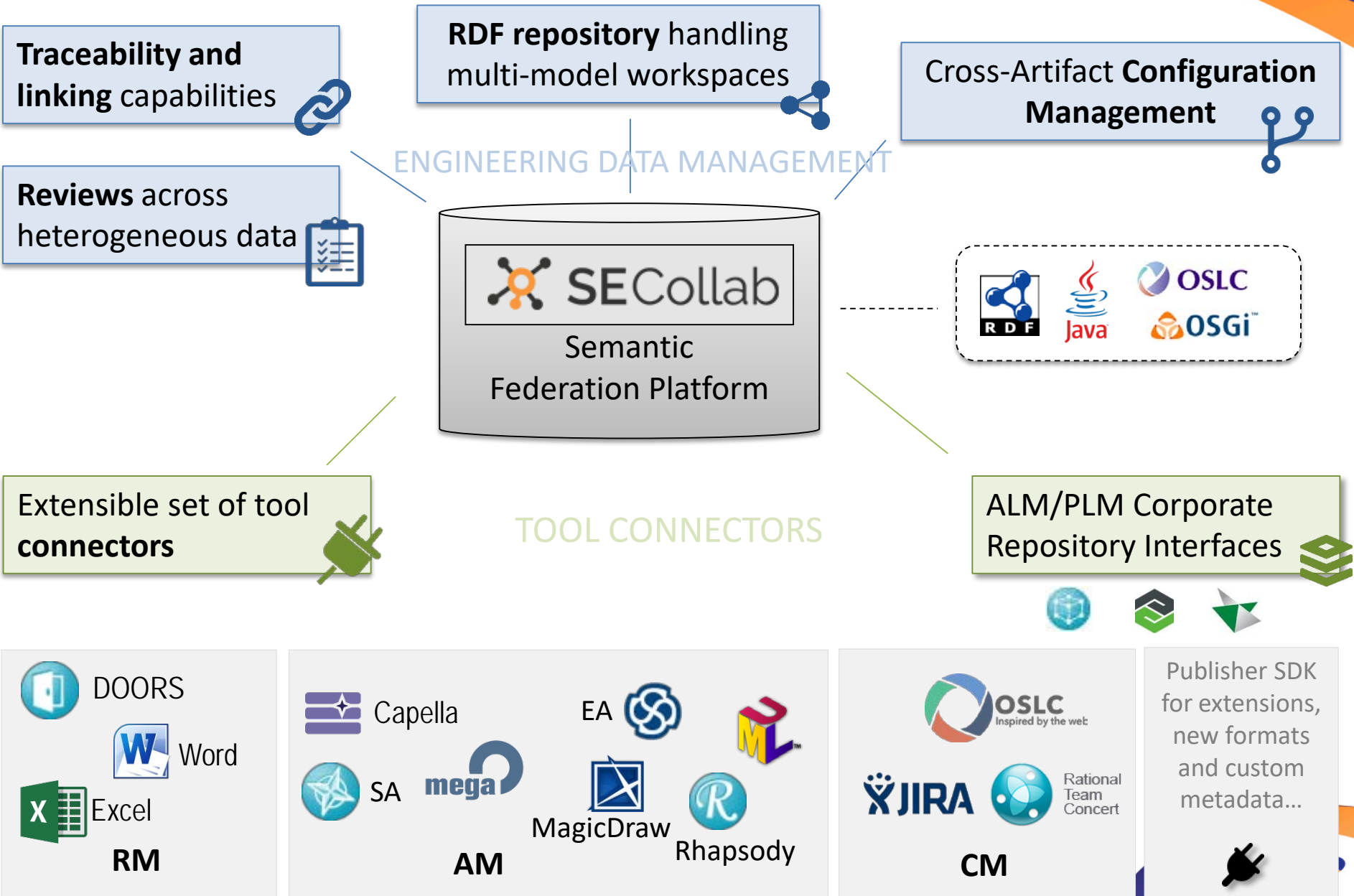
■ With SECollab, the objective is to quickly focus the reviewers on the parts that concern them while having a collaborative approach

- 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

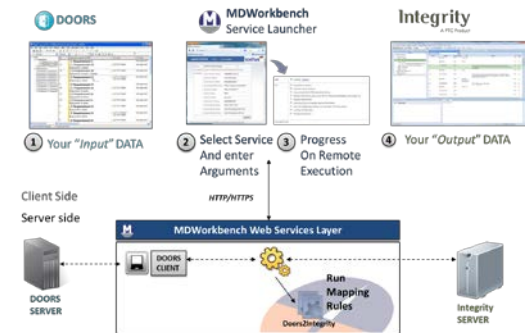
SECollab High-Level View



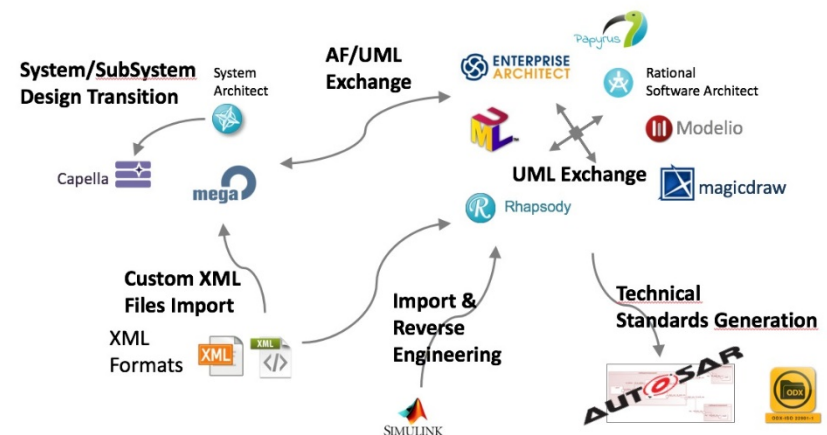
About Connectors

- 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

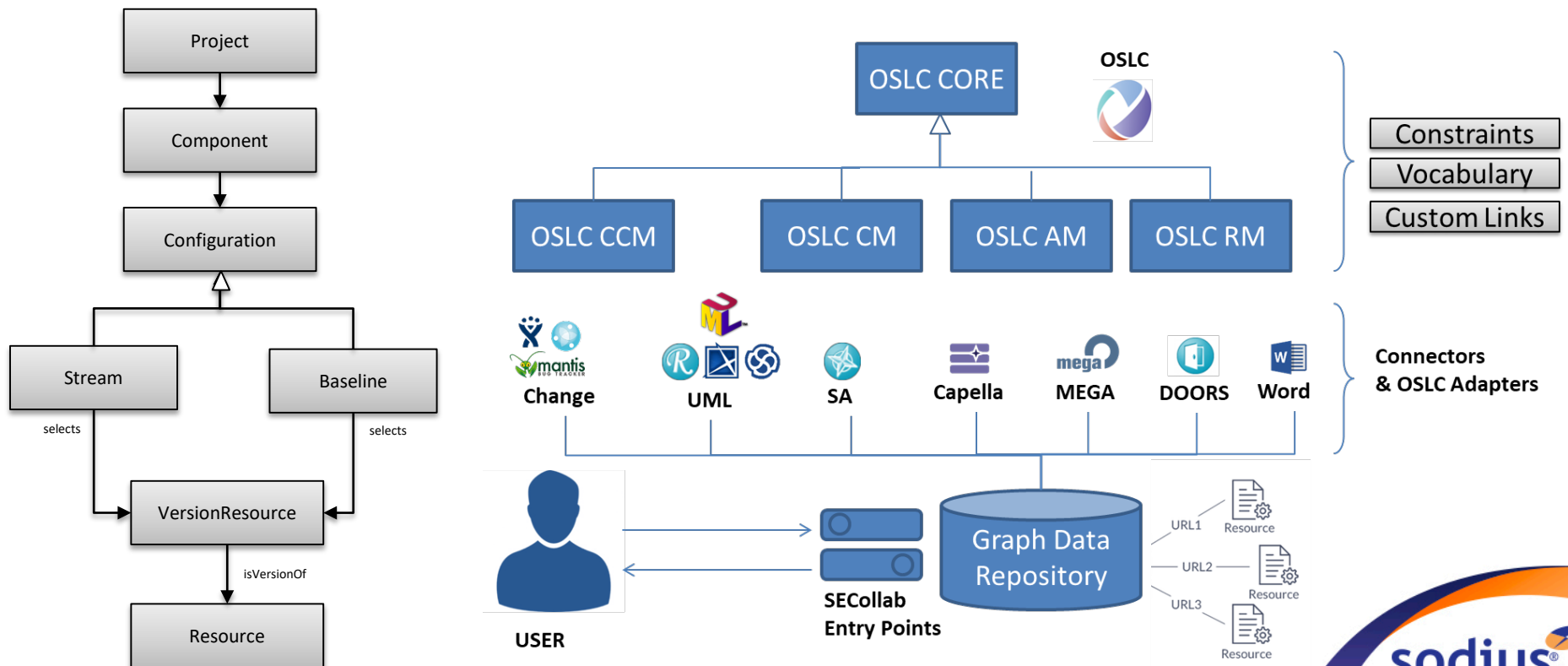


Connectors and Exchange flows



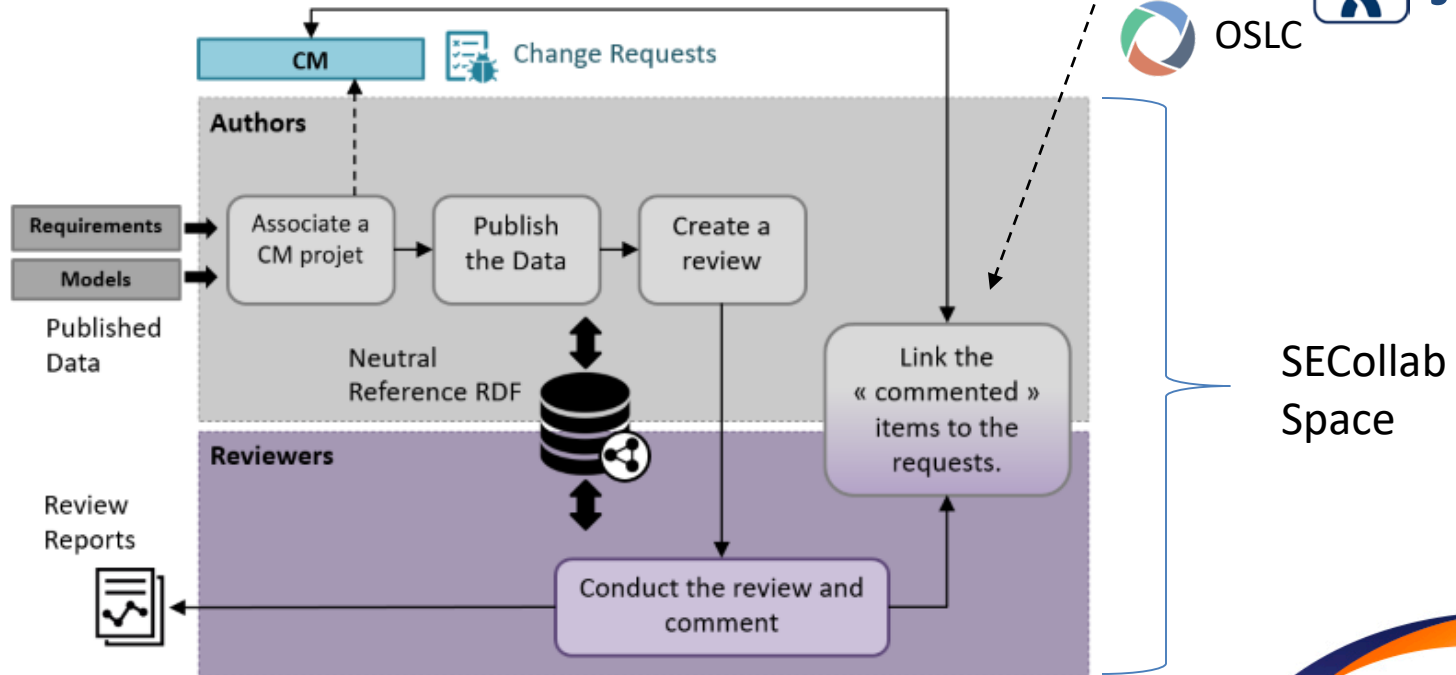
OSLC & Configuration Management

- 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.



SECollab Space

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

Visibility to ALM from PLM

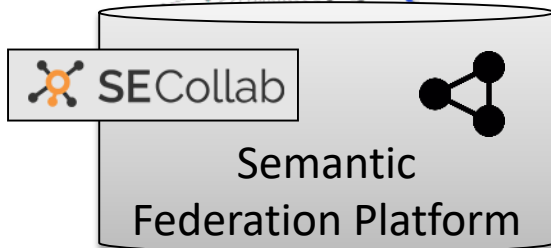
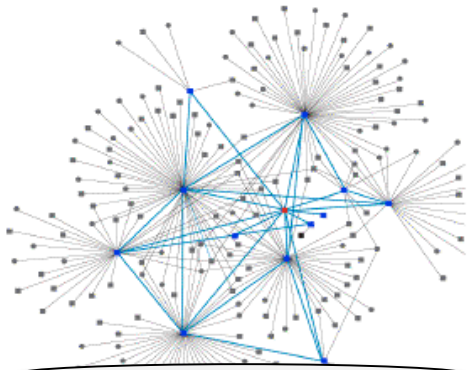
Wheels Part: GC000031: WHEELS_ASSEM

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.

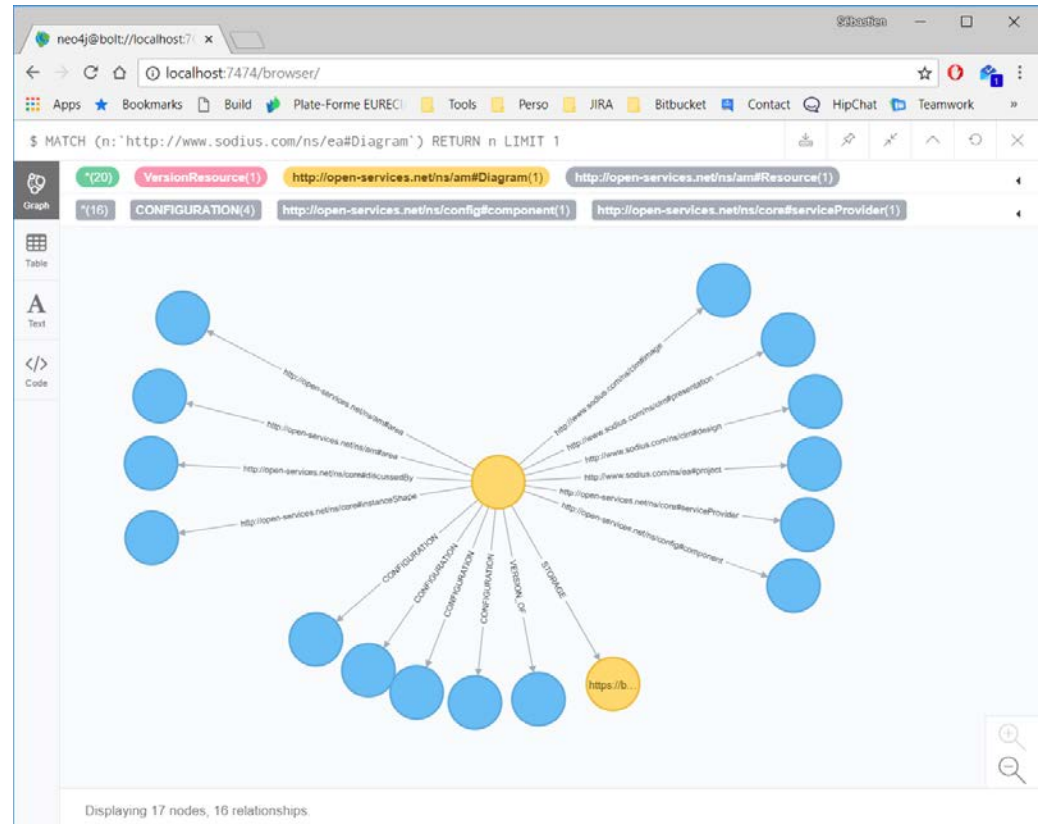
SECollab RDF Graph Database, to focus on data semantics and relations between tools

SECollab Neo4j Graph Database

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

We've focused on:

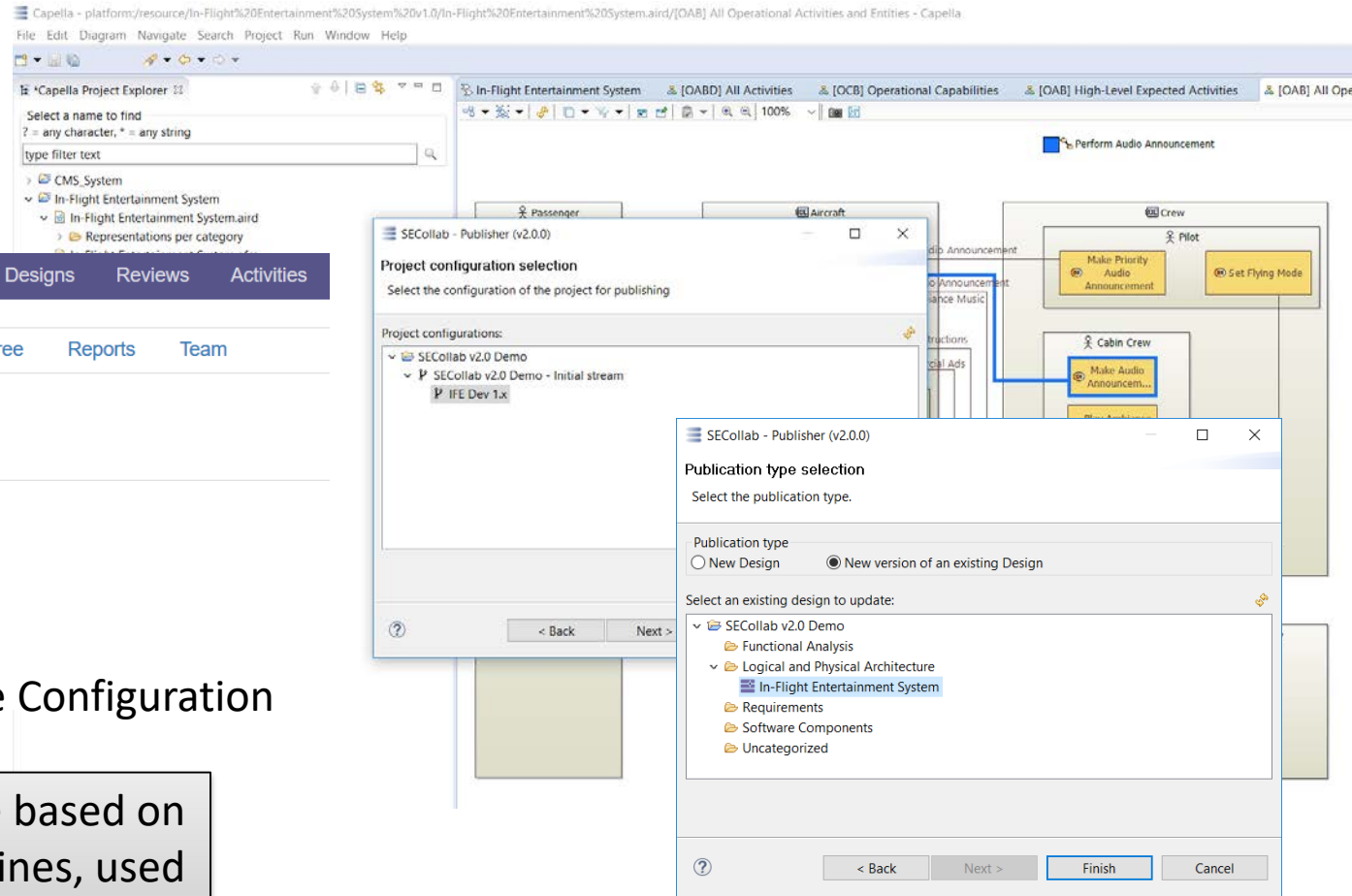
- integrity,
- performance,
- efficiency
- and scalability as key attributes.



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

Configurations Usage



Edit project configurations
Create or remove configurations

- [Baseline] SECollab v2.0 Demo - Initial baseline
- [Stream] SECollab v2.0 Demo - Initial stream
- [Baseline] IFE v1.0
- [Stream] IFE Dev 1.x

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

Resources

Commented All

Title

- Internet Access
- [OABD] All Activities
- [OAB] All Operational Activities and Entities
- [OAB] High-Level Expected Activities
- Browse the Internet
- Buy Duty Free
- Provide Internet Access
- Use Entertainment Services
- Passenger
- Cruising

Commented All

Title

- Internet Access
- [OABD] All Activities
- [OAB] All Operational Activities and Entities
- [OAB] High-Level Expected Activities
- Browse the Internet
- Buy Duty Free
- Provide Internet Access
- Use Entertainment Services
- Passenger
- Cruising

Before - 4/23/2018, 11:12:35 AM

After - 4/23/2018, 11:52:16 AM

Removed Element

Added Element

Filter on ready reviewed (commented) elements

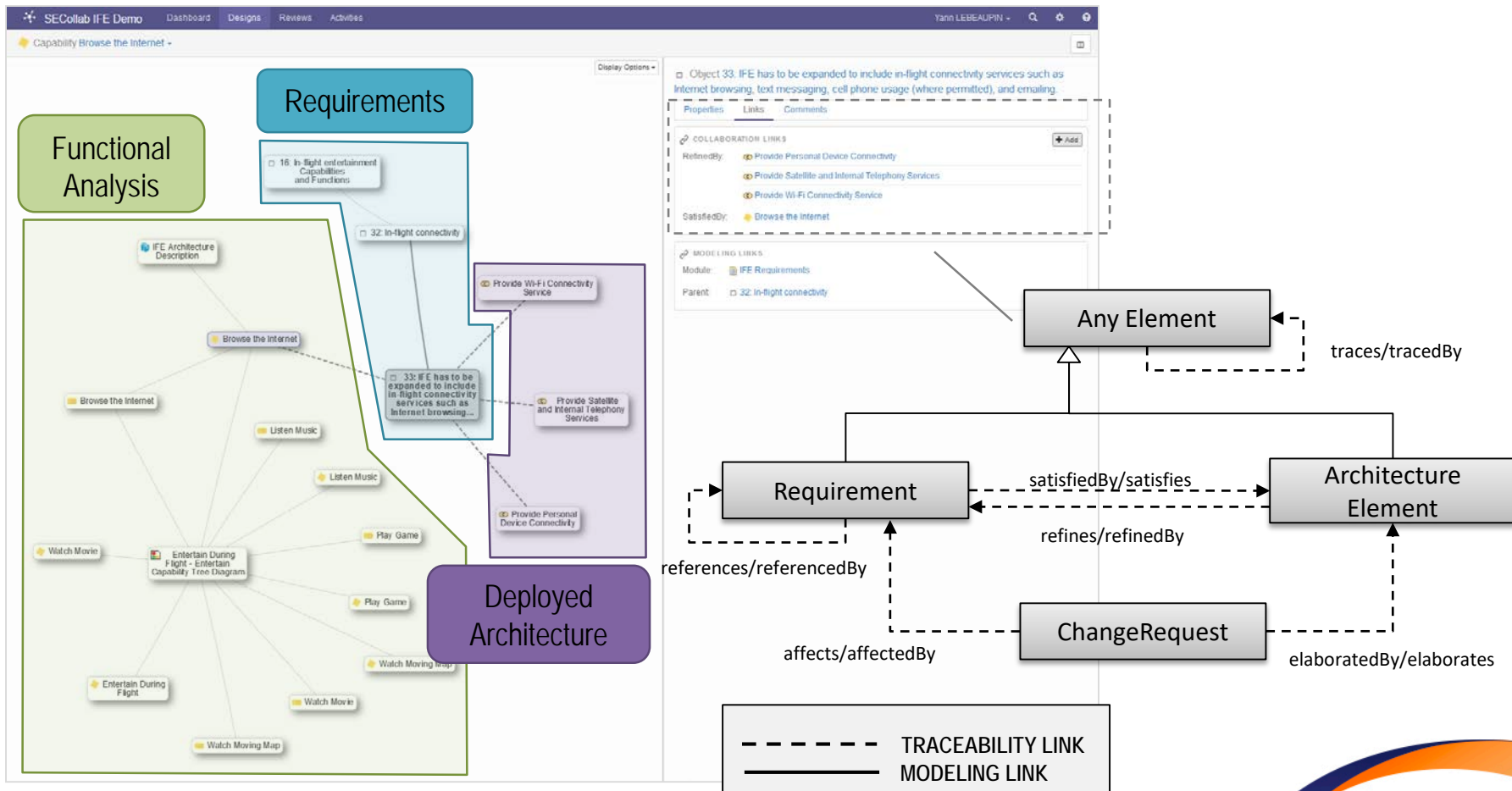
List of changes between 2 versions (modified, added, removed)

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

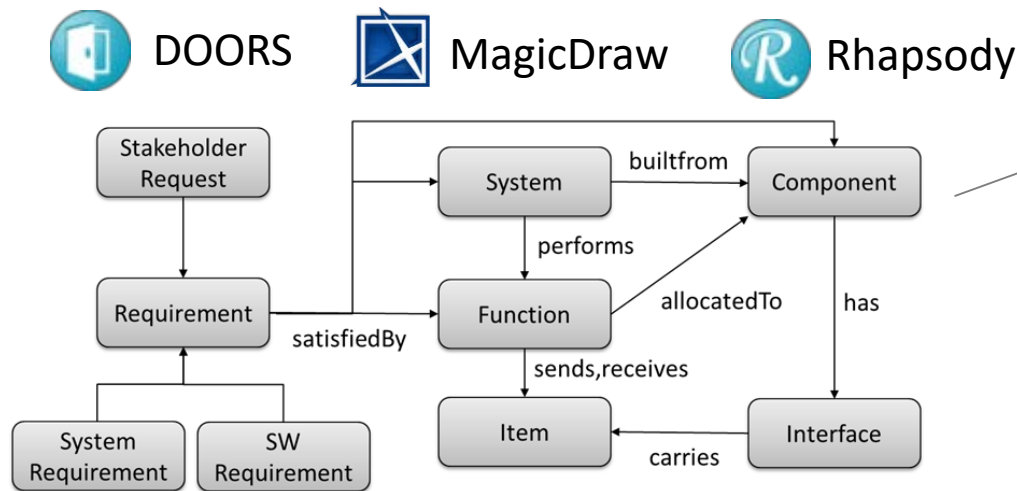
Transversal Traceability

- 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

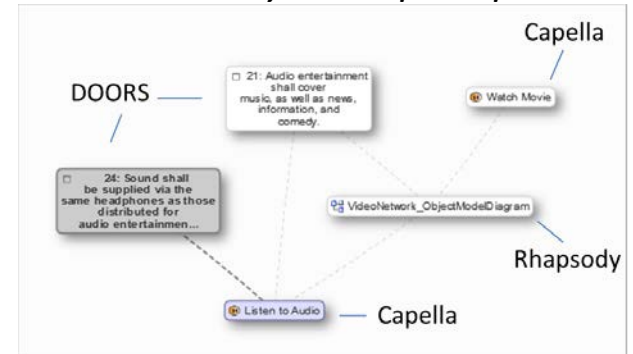
Custom Traceability Model

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
- PMI3 Process Improvement
- REU2 Release Program Management

Explanation

- XYZn VDA Scope
- XYZm extended VDA Scope
- XYZn other process (not in this pocket guide)

SECollab v2.0 Demo Dashboard

Collaboration Links

Collaboration Links	Properties
Altkaveit's	Title: Satisfiability
IsAltkaveit's	Name: IBM-AM Satisfiability
References:	Description: Caution: Once assigned, the name should not change as it would break all existing corresponding links. Changing the title does not stop changing the name.
Satisfiability:	Description: APSICE 3.3 Compliance - F2 Bus 2 BP6
Satisfies:	Source Type: Requirements
Target Type:	Target Type: Architecture element
Opposite Of:	Opposite Of: Satisfies

Compliance Standard

SECollab v2.0 Demo Dashboard

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

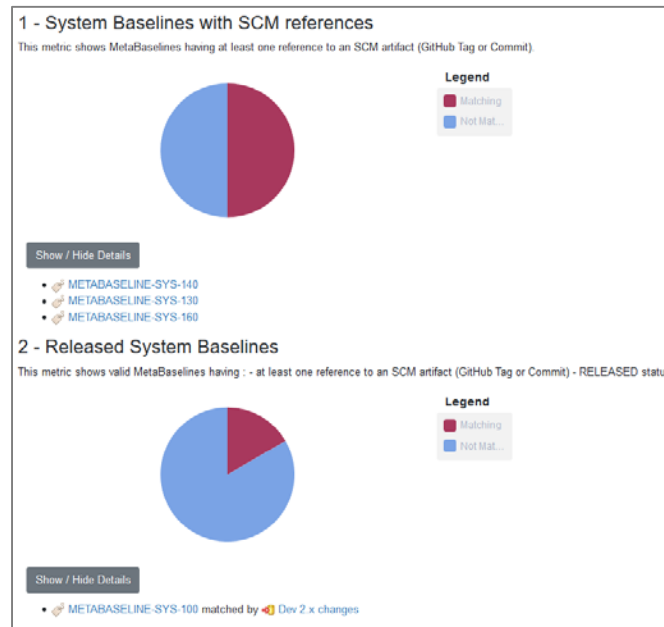
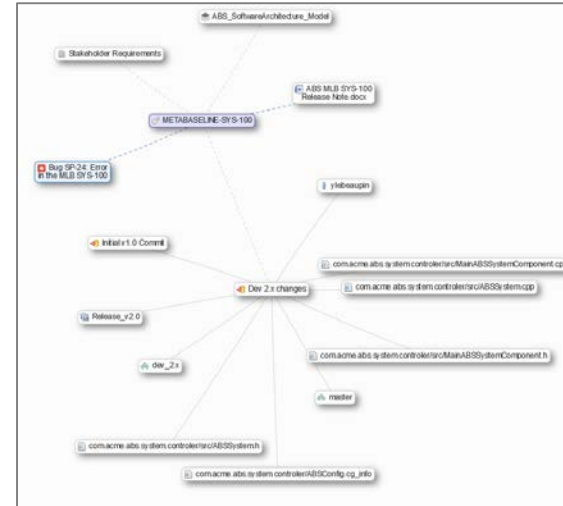
Suspects Requirements (Impact Analysis)

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)

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).

The screenshot displays a software interface for managing reviews. At the top, there is a header 'Aim of the review' with '+ Add' and 'Sort' buttons. Below this is a table with four columns: 'Review items', 'Completion', 'Review resources', and 'Contributors'. Three review items are listed, each with a callout box pointing to a specific part of the interface.

Review items	Completion	Review resources	Contributors
Check Capabilities Check capabilities are linked to a DOORS Requirements	27%	<input type="checkbox"/> Browse the Internet <input type="checkbox"/> Entertain During Flight <input checked="" type="checkbox"/> IFE Capability <input checked="" type="checkbox"/> IFE Requirements <input type="checkbox"/> Impose Safety Instructions <input type="checkbox"/> Listen Music <input type="checkbox"/> Make Audio Announcement <input checked="" type="checkbox"/> Perform Flight On-Board Announcements <input type="checkbox"/> Play Game <input type="checkbox"/> Watch Movie <input type="checkbox"/> Watch Moving Map	Yann LEBEAUPIN
Review preliminary operational analysis Review operational activities with detailed design	0%	<input type="checkbox"/> [OABD] All Activities <input checked="" type="checkbox"/> IFE Activities - Use Entertainment Services Tree Diagram	François-Régis JAUNATRE Sébastien BOUCARD
Check Operational Capabilities Capella Operational Capabilities have to be traced to analysis	0%	<input checked="" type="checkbox"/> Browse Internet <input checked="" type="checkbox"/> Entertain During Flight <input checked="" type="checkbox"/> Implement a Commercial Strategy <input checked="" type="checkbox"/> Listen to Audio <input checked="" type="checkbox"/> Make Audio Announcement <input checked="" type="checkbox"/> Make Priority Audio Announcement <input checked="" type="checkbox"/> Perform Flight On-Board Announcements <input checked="" type="checkbox"/> Play Games <input checked="" type="checkbox"/> Play Imposed Movie <input checked="" type="checkbox"/> Provide Aircraft Localization <input checked="" type="checkbox"/> Watch Movie <input checked="" type="checkbox"/> Watch Moving Map	Sébastien BOUCARD

Define Review Objectives (Callout for 'Check Capabilities')

Define Contributors (Callout for 'Check Capabilities')

Define list of Resources (reading path of the review) (Callout for 'Check Operational Capabilities')

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' application interface. The top navigation bar includes 'Dashboard', 'Designs', 'Reviews', and 'Activities'. The main window is titled 'Operational Node Structure Diagram Monitoring Node'. On the left, a UML diagram shows a 'Monitoring Node' containing a ':Detection' node and a 'Tracking Service' node. A context menu is open over the 'Monitoring Node', showing options for 'Outline Weight', 'Outline Color', 'Background Color', and 'Delete'. On the right, the 'Comments' tab is active, showing a thread of three comments. Comment 1 (Yann) asks 'Monitoring Node has not output ports?'. Comment 2 (Sébastien) replies 'Tracking Service is emitted by Detection node'. Comment 3 (Valérie) asks 'Are the input contents are exhaustivly listed?'. A color palette is visible below the diagram, and arrows point from the callout boxes to the diagram and comment sections.

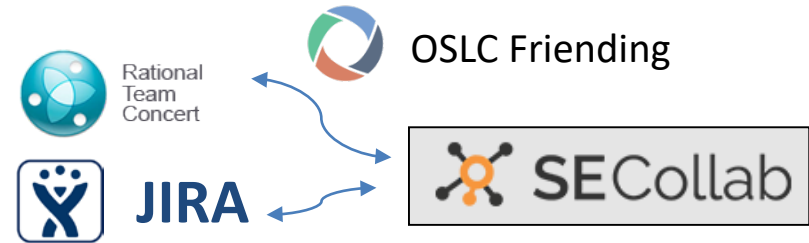
Add **Graphical Annotations** on Diagrams

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

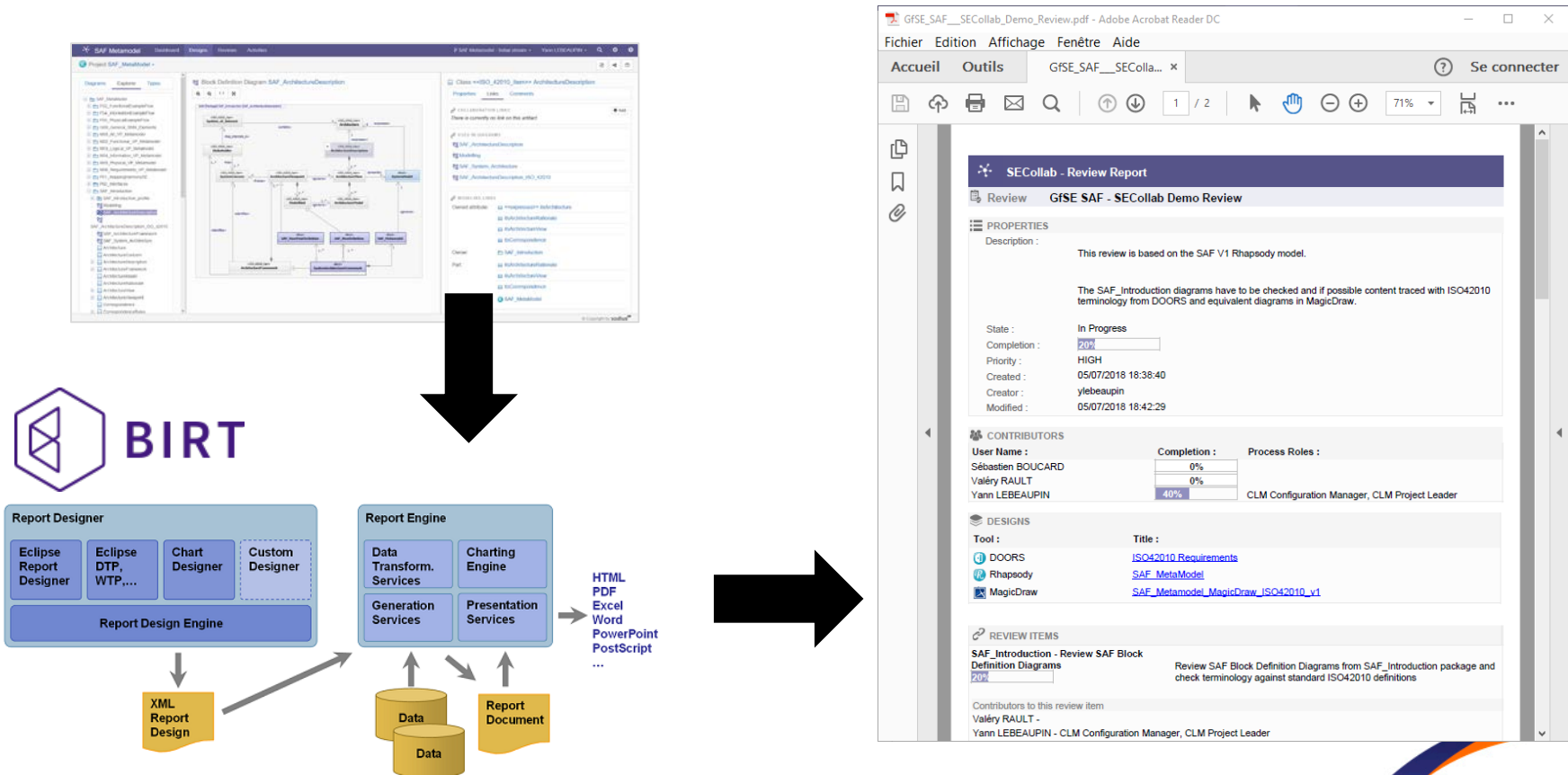


This screenshot shows a JIRA review page for 'Review Vehicle Access System'. The 'Properties' section includes details such as 'Description: This review demonstrates a cross review from DOORS requirements, Capeta architecture and Rhapsody UML model', 'State: In Progress', 'Priority: High', and 'Due date: 28/09/2018'. The 'Collaboration links' section is highlighted with a red box, showing a list of related change requests, including '29 - Check Vehicle Access System'.

This screenshot shows a JIRA design page for 'Object STR_7: The system shall enable authorized customer to enter in its vehicle body'. The page displays a UML diagram with elements like 'Manage Doors Opening', 'Manage authorization', and 'EngineStartController'. Annotations include 'RTC' pointing to a requirement box, 'DOORS' pointing to a requirement box, and 'MagicDraw' and 'Rhapsody' pointing to diagram elements. The 'Collaboration Links' section is highlighted with a red box, showing 'Tracked By: 32: Add conditions to authorize the user to enter'.

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

www.sodius.com

