The Road to Interoperability

GLOBAL PRODUCT DATA
INTEROPERABILITY
SUMMIT
2019

Sodius Corp.

A global product company in the U.S., France, and Germany.

- Specialized in data integration solutions to accelerate collaboration within engineering organizations
- Expertise with PLM, ALM, MBSE, and MBSW artifacts
- Solutions Provider into markets such as Defense, Aerospace and Automotive
- Data Integration focus and OSLC Experts

Data Formats

Partners & OEM

Customers

Mission

Make Engineering Data Work for Systems Engineers

- Access Data wherever it was authored

- Transform Data to enhance its value and leverage team expertise

- Integrate Data for consumption across the engineering team

- Link Data across domains for compliance and regulation

Reference Your Data Wherever it Resides
Data Linking

Get Your Data to Where it is Needed
Data Integration

Reuse Your Data in the Format You Need
Data Transformation

Get Your Data No Matter Where it was Authored
Data Access
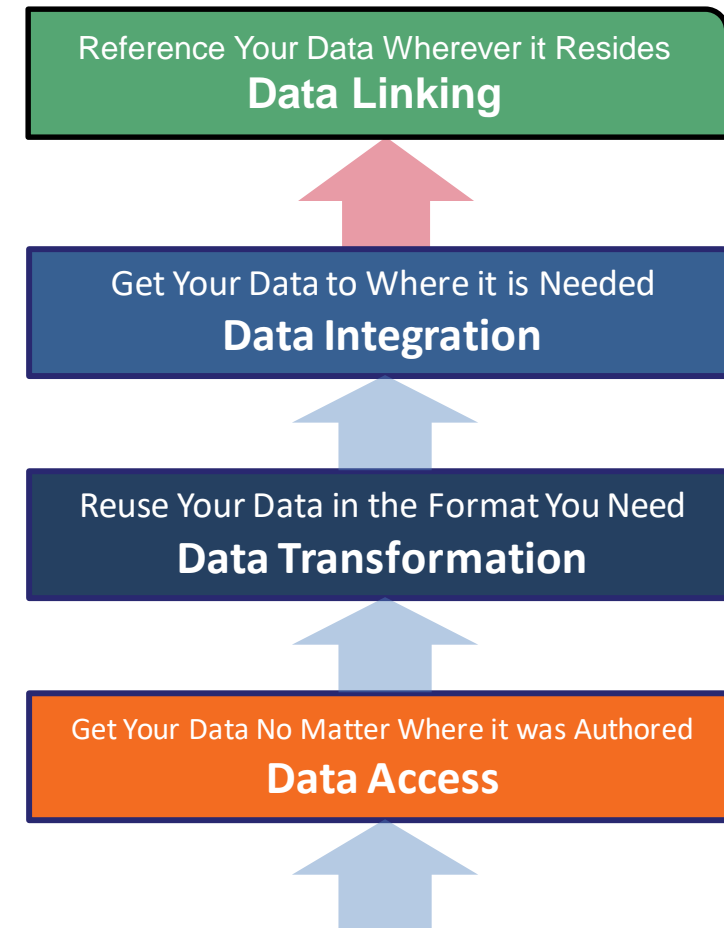
Journey to Interoperability

Sodius Products are founded on pillars of expertise solving today's Engineering Challenges
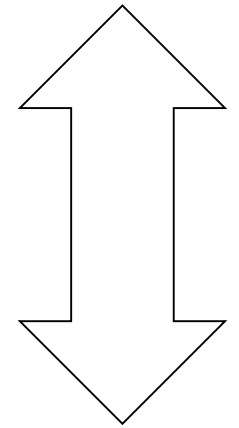
Exchange

- **Model and Data Transformation**
  - Semantic and Syntax conversion of data from one engineering repository format to another.

- **Enterprise Interoperability**
  - Standards-based integration focusing on connecting repositories of record to enable lifecycle management of artifacts. The objective is to support scalable enterprises making data accessible, reportable, and reusable all while preserving enterprise constraints of replication, security, and retention.

Interoperability

Interoperability was once used for the ability to exchange information between tools.
The preferred definition is <u>the ability to interconnect tools</u>.

Transformation

Historical – Tool Integration

- **For nearly 20 years SODIUS has been providing data accessors and converters**
  - 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

- **Tool Integrations/Connectors are valuable for**
  - Format Migration
  - Reference/Data exchange
  - Publishing/Export
  - Single user/transformation flow
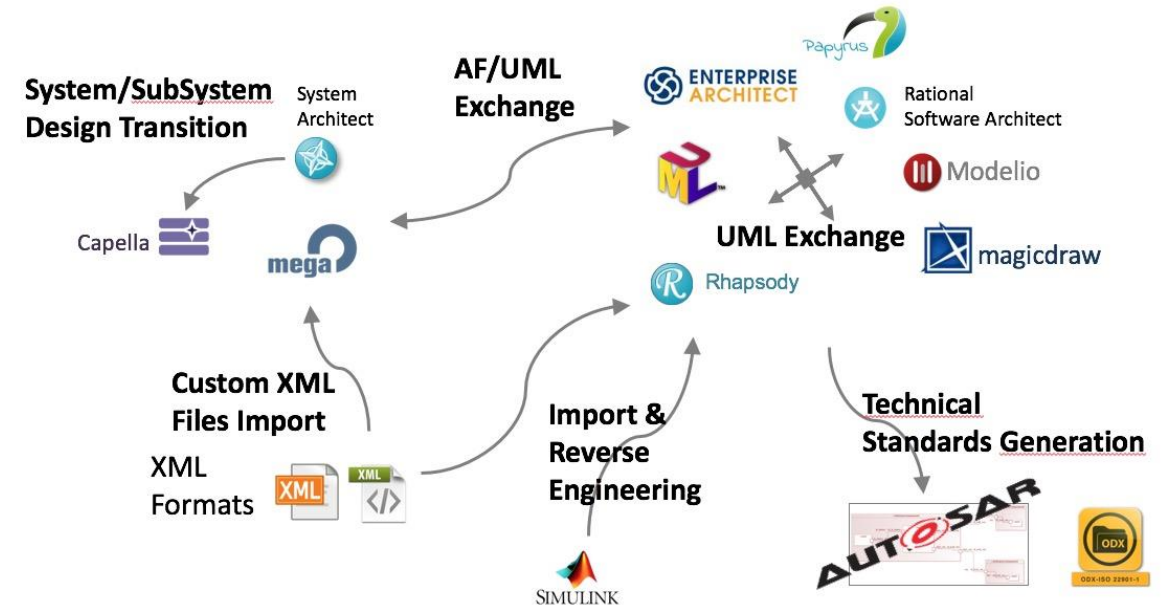
The value of integrations has been focused on the ability to exchange/translate information from one format to another. These transformations are almost always in the same domain.

MDWorkbench & MDAccess

Our foundational technology for transformation is MDWorkbench

MDWorkbench provides
- A specially designed platform to design, debug, and trace transformations
- Enables the selection of Java-based connectors (MDAccess) that access applications, repositories and the file formats commonly observed in systems and software engineering

- **MDWorkbench is used in industry to build**
  - Custom transformations
  - Code generators
  - Report builders

- **MDAccess is used in industry to build**
  - OEM Tool Connections (e.g. DOORS, DNG, Rhapsody, MagicDraw, etc.)
  - Internal tool integration team, i.e. internal import/export tools

MagicDraw Publisher

- **Tools to primarily address the needs of the DoD suppliers to transform models into MagicDraw**

- **Address the desire to migrate both the data and the diagrams (preserving modeling intent)**

- **Enables workflows of choice**
  - Remain in the legacy tool and publish/export on-demand
  - Migrate to the new format and continue to extend your models

- **Available for Rhapsody, RSA, and Vitech CORE**

- Package Diagrams
- Use Case Diagrams
- Requirements Diagrams
- Activity Diagrams
- Sequence Diagrams
- Statecharts
- Block Definition Diagrams
- Internal Block Diagrams
- Parametric Diagrams
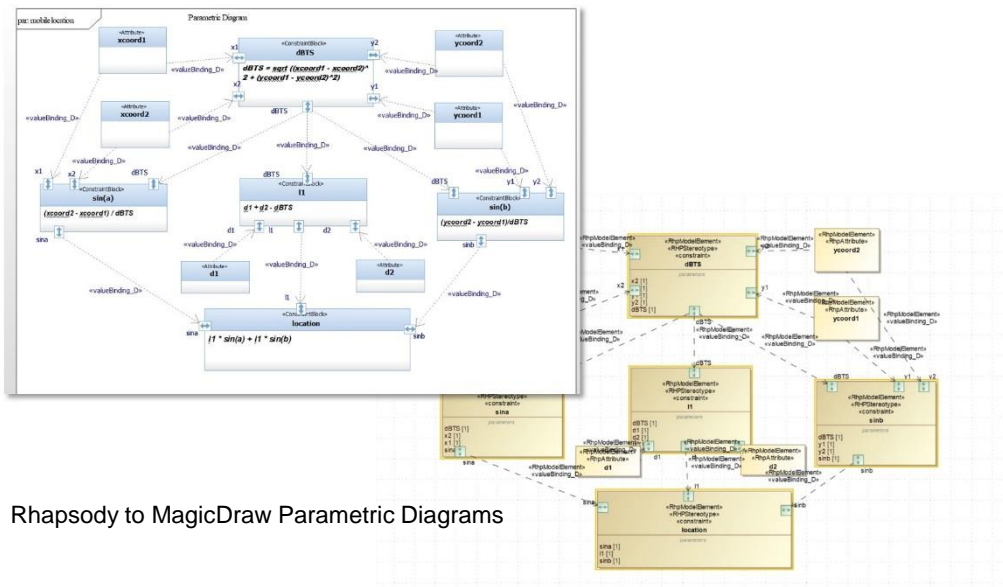
Rhapsody to MagicDraw Parametric Diagrams
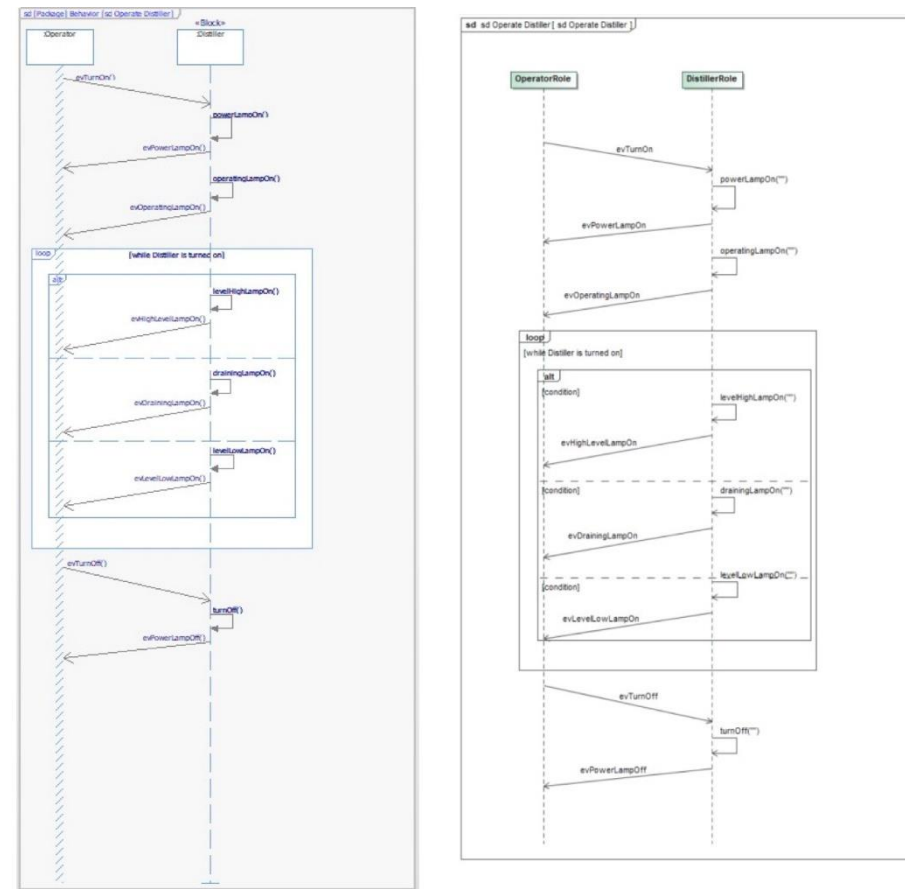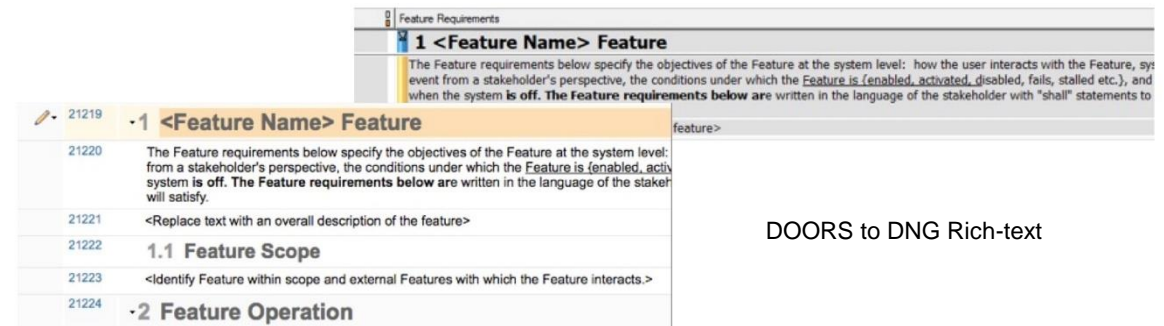
Rhapsody to MagicDraw Sequence Diagrams

DOORS to DNG Migration

- **Targets the marketplace need to migrate legacy assets from DOORS to DOORS Next Gen (DNG.)**

- **Retains the IP from your existing repository and extends it in DNG**
  - Data conversion for Rich-Text, OLEs, tables, schemas, and datatypes

- **Allows for management of multiple streams leveraging Global Configuration.**

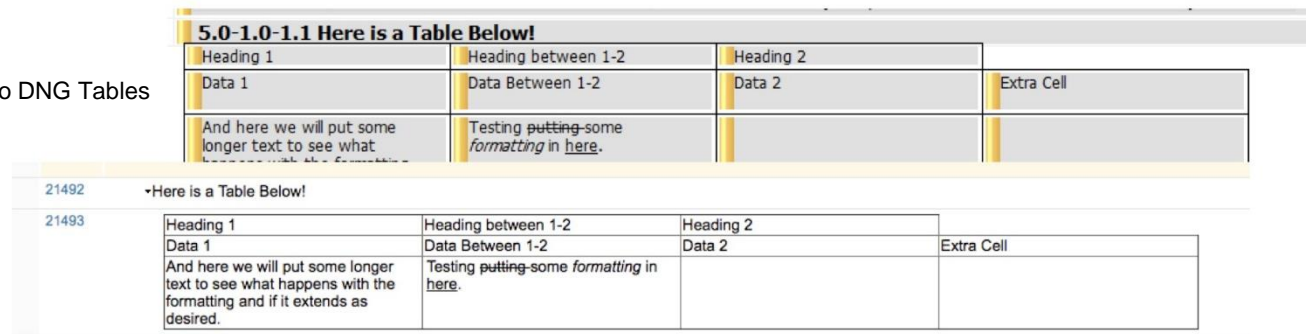- **Provides a simplified workflow to incrementally and automatically migrate to Configuration Managed DOORS Next Generation.**

DOORS to DNG Rich-text

DOORS to DNG Tables

Unpacked OLE objects

Enterprise Interoperability

Enterprise Interoperability

Enterprise Interoperability is the foundation for enabling the digital thread. It provides the ability to integrate across domains by focusing on key enablers and concepts that <u>unify</u> the engineering flow.

- **Enterprise Interoperability Unifies the concepts of**
  - Engineering Assets
  - Asset Repositories
  - Configurations (versions) of Assets
  - Relationships (Links) between the Assets

- **Enterprise Interoperability Requires**
  - Data Access Rights are respected
  - No Data Replication
  - Data and Links are managed together
  - Repository configurations are editable only in the local repository

- **Enterprise Interoperability Enables**
  - Creation of the full product engineering design configuration
  - Navigation of the web of the engineering assets
  - Inspection and Review of collections of engineering assets
  - Triggering the flow of Engineering across the Lifecycle
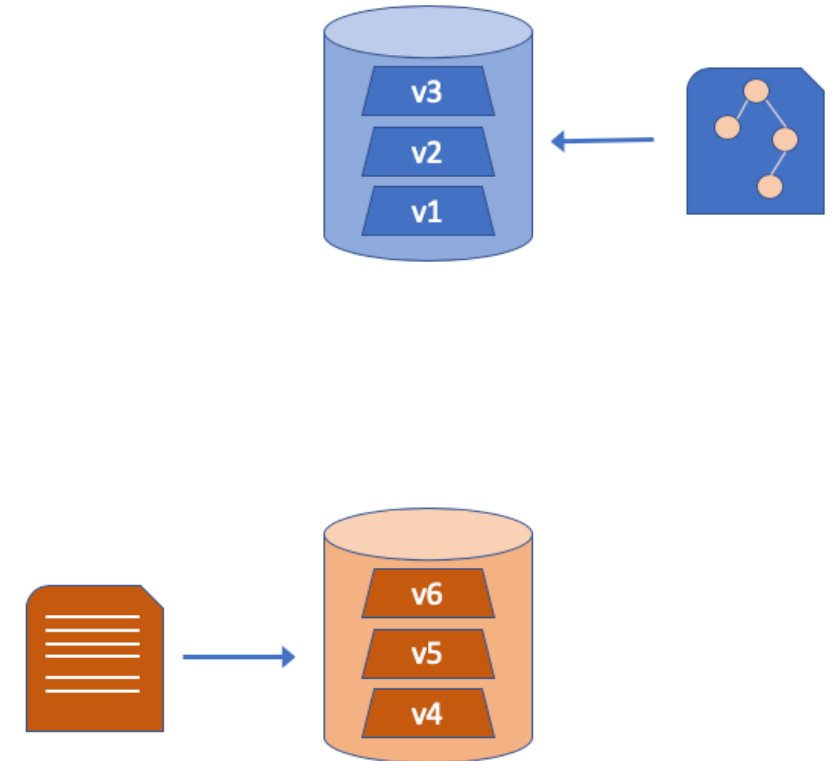 - Reporting over the enterprise of assets

The answer for "What requirements were used to design this part?" should be simple and be addressed by the enterprise. Engineers should focus on the content rather than on the finding the right versions of assets.

Realizing Enterprise Interoperability

Global Product Data Interoperability Summit | **2019**

Enterprise Interoperability requires key components and consistent standards implemented in the enterprise.

- Each domain must use *Enterprise Engineering Repositories*

  - Provide a local configuration management (containers and configurations)
  - Can consume an external enterprise configuration manager for external resources
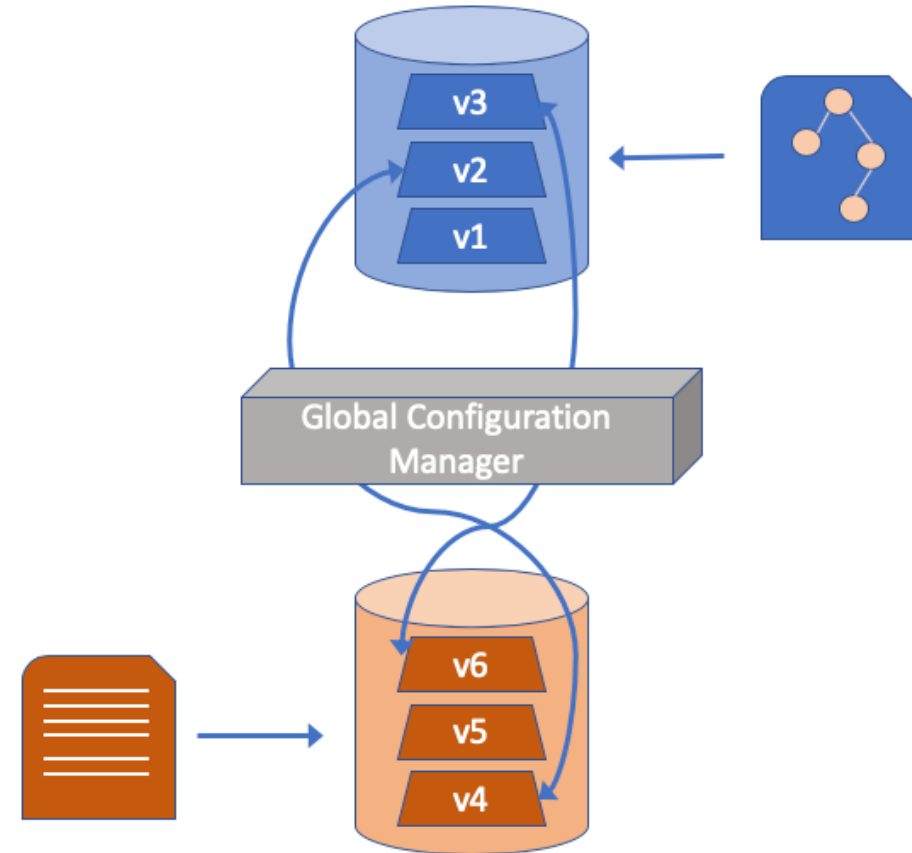 - Can expose uniquely identified assets to the enterprise

Enterprise Interoperability requires key components and consistent standards are implemented in the enterprise.

- Each domain must use an *Enterprise Configuration Manager*

  - Provides the unified selection of cross-repository configurations. This delivers the ability to optimize configuration management in the domain but enable referencing across domains.

Realizing Enterprise Interoperability

Enterprise Interoperability requires key components and consistent standards are implemented within the enterprise.

- Each domain must leverage an *Enterprise Linking Standard*

  - This builds on the existence of uniquely identified objects and utilizes the Enterprise Configuration Manager to identify the proper version of the asset the link is targeting. Links between assets are references to elements, but the version of the elements is defined by the current Enterprise Configuration.

  The foundational standard for this exists in OSLC. Sodius brings the realization which requires skill and craftmanship for you to operate at scale.
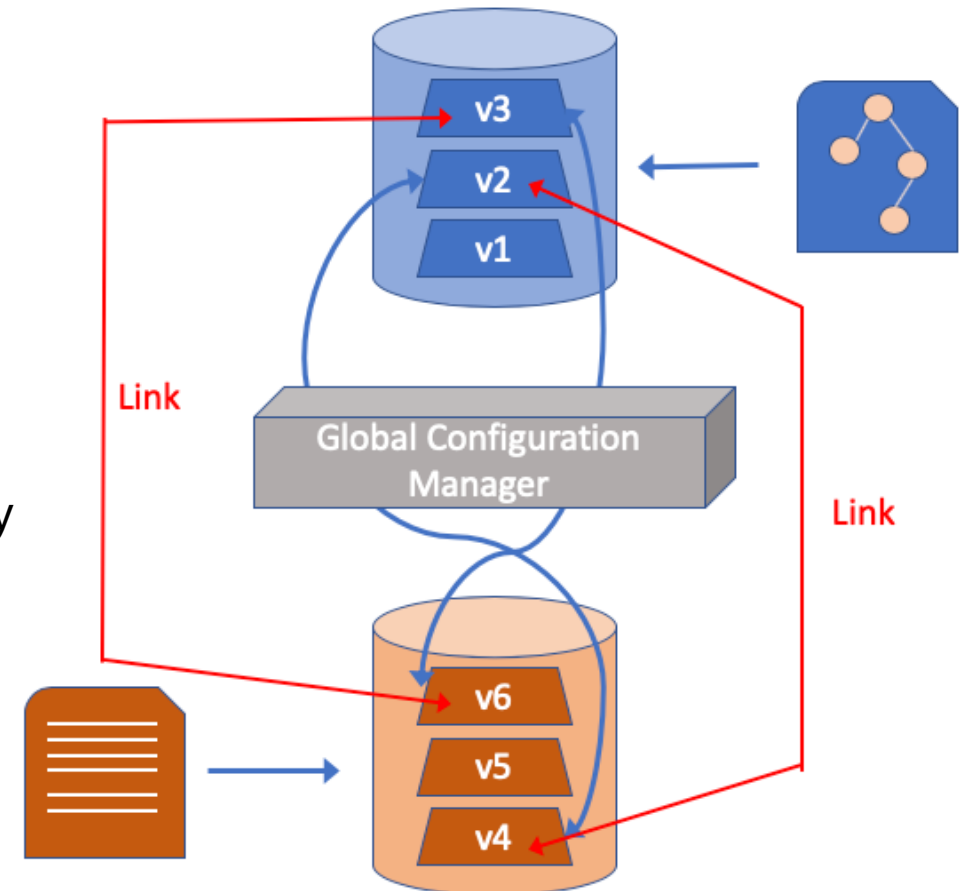
Building (OSLC) Connect(ions)

The challenge is that the capability of the source repository constrains the ability to provide a unified experience.

- **Strong dependence on the source repository for capabilities**
    - RESTful APIs
    - Authentication Technology
    - Unique object identifications
    - Configuration Management
    - APIs to extend the repository

- **Determining factors for the complexity & effort**
    - Customer use cases (and compatibility to OSLC standards)
    - Endpoint complexity (multiple OSLC profiles IE: RM, CM, AM, etc.)
    - Support for Global Configuration
    - Directionality (is it bi-directional) for link creation and access

- **Inclusion in full Enterprise Interoperability depends on**
    - Ability to reflect local and enterprise configurations
    - Ability to export to the index and change notification support
   - Ability to provide access to assets via RESTful APIs

OSLC Connect for Windchill

- **Targets the need to connect PLM & ALM**
  - Connect systems and software change requests
  - Connect requirements to your BOM

- **Provides OSLC Capabilities to an Existing Enterprise Repository**
  - Delegated UI and Object Selectors
  - Link Storage and Discovery
  - Support for providing Change and Architecture Management
  - Consumption of Change and Requirements Management
  - Provides Tracked Resource Set feeds to enable reporting
  - Support for connecting to Configuration Managed repositories

- **Provides a foundation to grow additional services for the future**
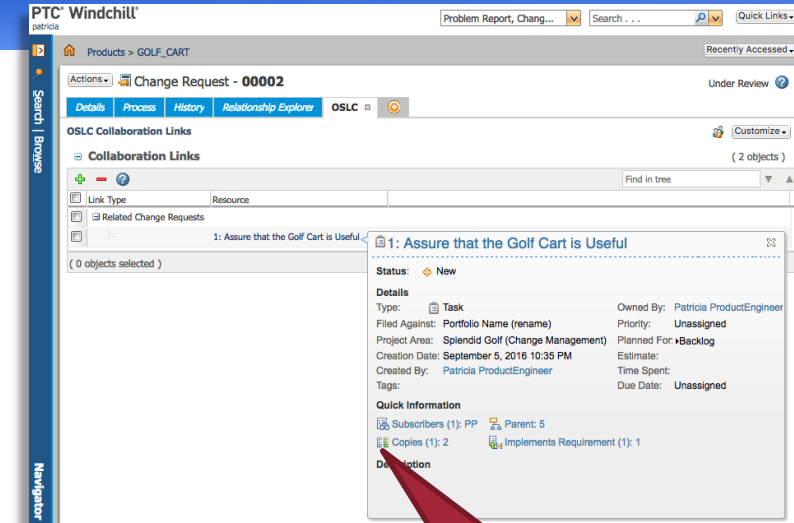
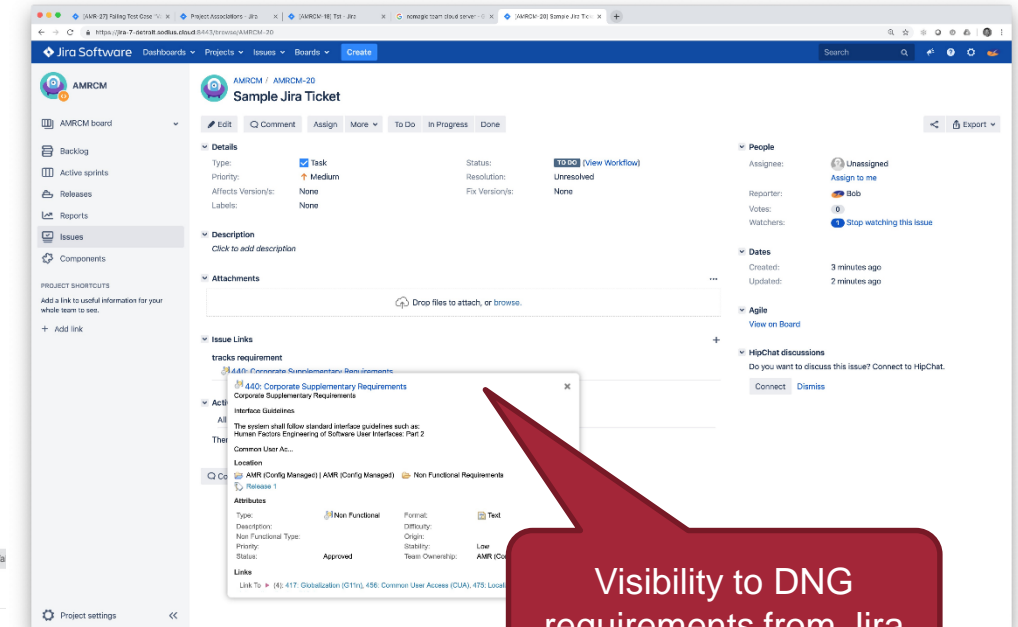Visibility to DNG Requirements world from PLM
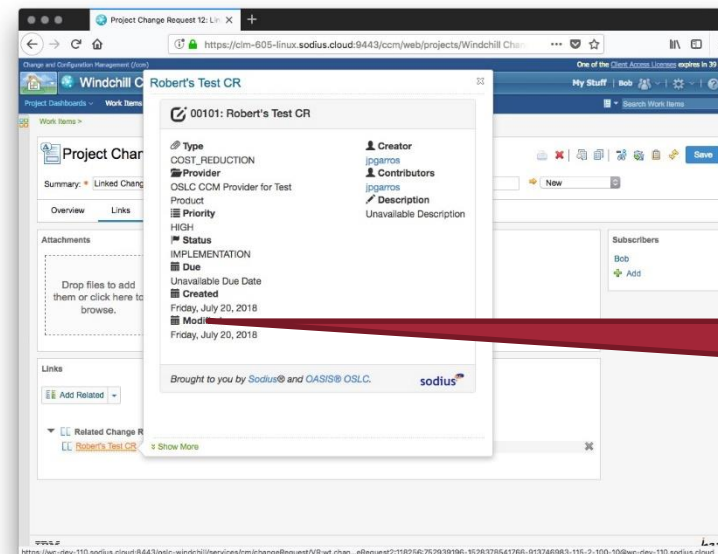
Visibility to Change Requests from RTC
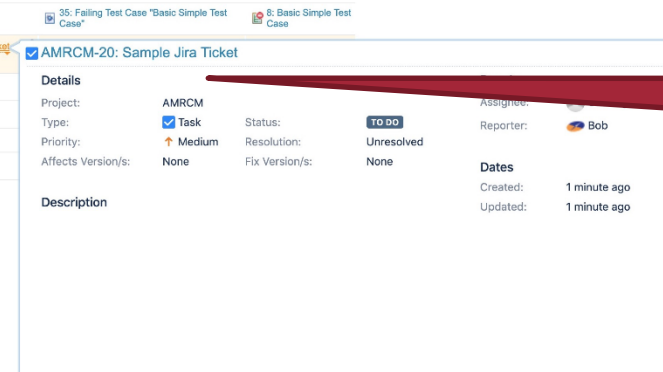
OSLC Connect for Jira

- **Connects islands of Jira users into the engineering enterprise**
- **Enables market leading Jira to work seamlessly with the IBM CLM Suite**
- **Provides an OSLC link based solution instead of a synchronization-based solution**
  - Consumes CM, QM, and RM
  - Provides CM
  - Supports Global Configuration Management
- **Provides OSLC in the way that Jira users require**

Visibility to DNG requirements from Jira

Visibility to Jira from DNG

**OSLC Bonus . . . Jira now connects to Windchill too!**

SECollab

- **Targets the need to share and review engineering design artifacts**
- **Enables the publishing of models & documents to be shared, annotated, and linked**
- **Provides a forum for gate or collaboration review including issue management**
- **SECollab is an OSLC Repository**
  - Provides Requirement Management & Architecture Management
  - Consumes CM (RTC or Jira)
  - Supports Configurations, Streams, and Baselines

Published assets into an OSLC repository
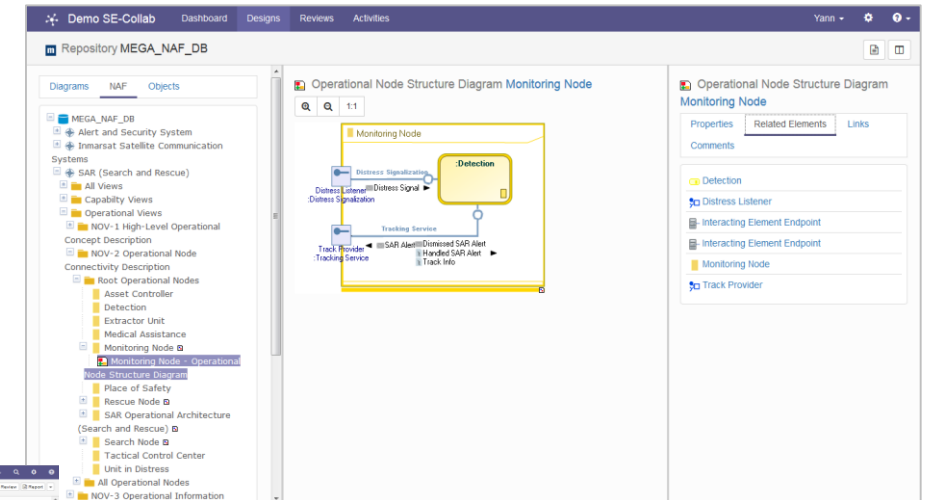
Review team with associated tasks

Formal Review allowing for insertion of comments
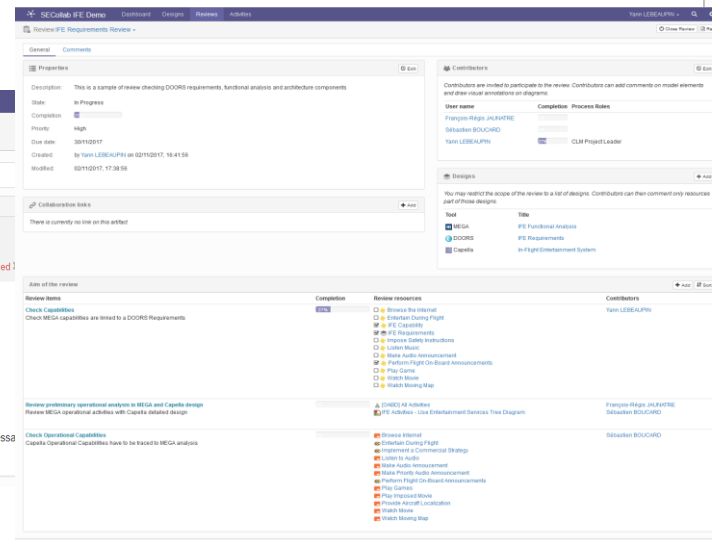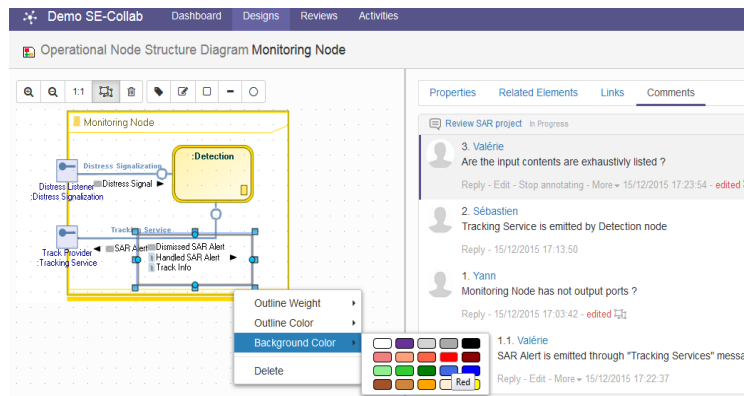
Spider diagram showing relationships

Applications in the Enterprise

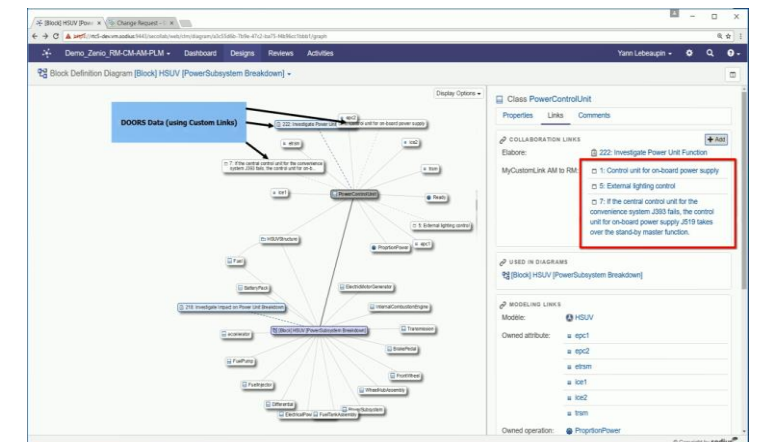**Interoperability in the Enterprise enables the creation of a greater set of capabilities to the organization, because a uniform, scalable, set of asset descriptors in the index enables the ability to build these tools for the enterprise.**

- **Derived Value**
  - Enterprise Asset Search across all domains (RM, AM, PLM, etc.)
  - Enterprise Reporting Services
  - Asset Navigation and Impact Assessment
  - Smarter Advisors
  - Full Reviews across all the elements of my slice of the design

Enabled Use Cases

Customer Use Cases enabled by Enterprise Interoperability

- **Enterprise (Organizational) Use Cases**
    - Traceability for Compliance (ASPICE, ISO 26262, FDA, DO178, …)
    - Enterprise Product Line Engineering
    - Enterprise Configuration Management to Enable the Digital Thread
    - Warranty/Defect Impact Analysis
    - Overall product management, reporting, and status

- **Engineering (Individual) Use Case**
    - Establishing Design Configurations (creating personalized context)
    - Exploring Design Change Impacts
    - Searching for reusable designs and knowledge
    - Providing Advisors to improve quality
    - Establishing Design Completeness
    - Reporting to support reviews and gates

The Future

- **Increasing complexity is guaranteed.**

- **The only way to manage complexity is to formally identify the previously hidden dependencies existing between your engineering assets.**

- **Enterprise Interoperability is the framework to open your engineering assets and capture the relationships.**

- **Realizing enterprise interoperability in your organization will unleash the next wave of productivity.**

Contact Information

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