Traceability @ Scale
For Standards, By Standards

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Sodius

- A **product** company, selling directly and through OEM’s
  - A **global company** with representation in France, Germany, and the U.S.
    - 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**
      - Strong integration and partnership with Willert Software Tools Team in Germany (SE and Embedded Software Experts)

**Data Formats**
- SIMULINK
- PTC
- ENTERPRISE ARCHITECT
- Willert

**Partners & OEM**
- IBM
- TASKTOP SYNC
- ANSYS
- No Magic
- BTC
- WILBERT
- mega
- jama

**Customers**
- NORTHROP GRUMMAN
- DAIMLER
- GM
- RENAULT
- MBDA
- THALES
- NAVY
- BOEING
- Continental
- Panasonic Automotive
- AIRBUS DEFENCE & SPACE
- MINISTRY DEFENSE
- MINISTRY RESOURCING
(Some of) Our Standards
Traceability in the Standards

"Traceability refers to the existence of references or links between work products thereby further supporting coverage, impact analysis, requirements implementation status tracking etc."

* © VDA Quality Management Center – ASPICE PAM 3.0
Traceability in Practice

- Excel has been the standard for cross-reference index

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- Pros
  - Accessibility
  - Ease
  - Cross-tool

- Cons
  - Tedious & Error Prone
  - Difficult Link to source assets
  - Usefulness
  - Versioning & Scale
Traceability in Practice

• **DOORS** has been synonymous with traceability

![Image of DOORS interface]

• **Pros**
  • Built for traceability
  • Unique object identification
  • Common usage
  • Some versioning

• **Cons**
  • Focus on a single tool
  • Barrier of entry
When Traceability is Failing

“We do the minimal that is necessary to pass the gate.”

“Creating the traceability is easy, maintaining accurate information is difficult.”

“We have a special group that just maintains this information.”

“The most important part of traceability? That it can be labeled ‘done’.”

“I never use the index because I can’t trust that it’s been updated correctly.”
Our Objective

• Make Traceability a First Order Engineering Practice
  – Make it valuable to the engineer and the organization
    • Easier to create
    • Easier to maintain
    • Easier to answer engineering questions
  – Make it visible to the organization
    • As an asset
    • As a metric of quality
    • As a visual to understand
    • As a demonstration of compliance
Traceability @ Scale

• Simple Definition
  – Assets & Relationship Perform Roles
  – Named Relationship Between Assets
  – Traceability is valid for a configuration

• Success when
  – Unified Environments/Boundary Free
  – Managed Configuration of Assets
  – Accessible to create, leverage, review, and report
Visualizing Traceability
Visibility and Accessibility
Accessing Data

• 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
OSLC (Open Services for Lifecycle Collaboration)

- Web technologies
- Framework to link information between repositories
- Graph of relationships between artifacts
- Industry standard for describing assets
Projecting your Engineering Data

- Eliminating the boundaries to access and visualize your engineering data
- One (web) platform to access your Engineering data
Context is imperative in an engineering process.

Context is required for reviewing engineering assets.
Linking with Versions
Simplistic View

Requirements

Validates

Tests

Requirements – Release 1

Testing – Release 1

Release 1

Graphics Courtesy Daniel Moul - IBM
Configurations in Practice

• Allow us to speak to a consistent set of artifacts
  – In a working state (as a stream)
  – In a static state (as a baseline)
  – As a collection across many domains

• Represent the common elements of the engineering process
  – Gate reviews
  – Releases
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).
Achieving Traceability

• **Traceability shows**
  – An impactful relationship between two objects
  – A role description
  – A need to assert consistency/validity across the relationship

• **Traceability @ 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.
Our Traceability Model

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

- For example, a **SystemRequirement** will be defined by:
  - Its generic type = Requirement (OSLC RM)
  - A constraint **“System Requirement Constraint”**
    - TOOL=DOORS
    - METATYPE=OBJECT
    - PROPERTY LIST
      - attrType = “ArchitectureRelevant”

With this mechanism, a same data can be considered under several aspects (architecture, safety, etc...) and a single concept can match data coming from several tools
Once we have the traceability model, it will be possible to document the link types to trace the Standard links. 

ASPICE Query in Graph Explorer

ASPIECE Metrics and Impact Analysis

Compliance Standard
Performing Traceability @ Scale

- **We need accessibility**
  - Provide **visibility to assets**
    - See the project assets without special tooling
    - See attributes and diagrams
  - Enable **navigation of assets**
    - See the native relationships (modeling links)
    - See the cross domain relationships (transversal traceability links)

- **We need configurations**
  - 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

- **We need supports**
  - Provide the **relationship constraints**
    - Filter the sources and targets
    - Provide flexible identification
  - Provide the **reports & metrics**
    - Show compliance & coverage status
    - Show trends and progressions
A Quick Review
Collaboration Links

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

**Define Review Objectives**

**Define list of Resources** (reading path of the review)

**Define 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.
Final Thoughts
Value of Connected Engineering

• We want to link processes and data across teams to have in 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
    • help coordinating change processes
    • support for compliance processes
Sodius Portfolio based on OSLC

- **RDF repository** handling multi-model workspaces
- **Traceability and linking** capabilities
- **Reviews** across heterogeneous data
- Extensible set of tool connectors

**ALM/PLM Corporate Repository Interfaces**

- SECollab
- OSLC Adapter for PTC Windchill

Supporting technologies:
- Java
- OSGi
- Rational Team Concert
- JIRA
Contact us

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

contact@sodius.com

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