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**Heterogeneous and federated PLM – is it feasible?**

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PLM Road Map™ EMEA & PDT Europe 2022  
 Digital Transformation and PLM – a call for PLM professionals to re-define and re-position the benefits and value of PLM  
 18 & 19 October  
 CIMdata **europstep**

## Saab Aeronautics – the product domain



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# The Heliple project

- Swedish Vinnova funded research project for investigating
  - Genesis a federated PLM architecture pattern
  - OSLC as an integration standard
- 18 months duration
- Participants
  - Eurostep
  - KTH
  - Saab

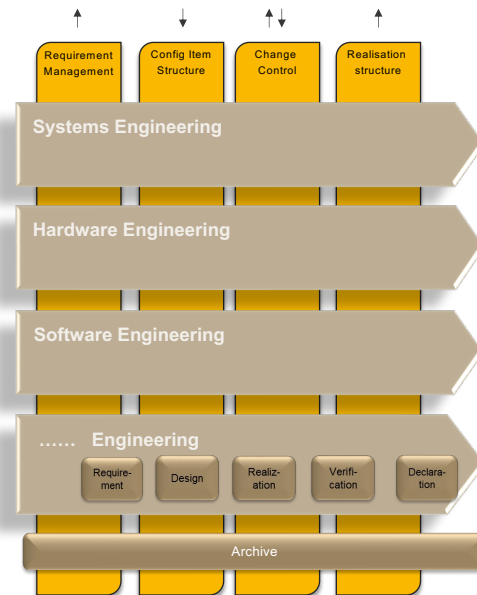


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# Genesis PLM Model

- Engineering Disciplines
  - Fine granularity product data
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- Design Traceability Dimensions
    - We believe there are four of them only
  - Archiving

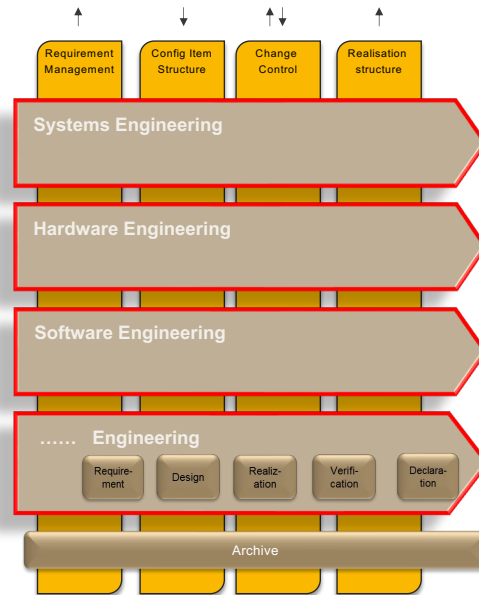


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# Modularity

- Optimise support for each **engineering discipline**
  - **Maximise automation**, as provided by the supplier
  - Minimise application family **switching**
- Bring together **management and engineers** in a single environment
  - E.g., Change management and Status reporting
- **Redundant** capabilities accepted
- Ability to **upgrade or replace** environments without upsetting the complete PLM landscape

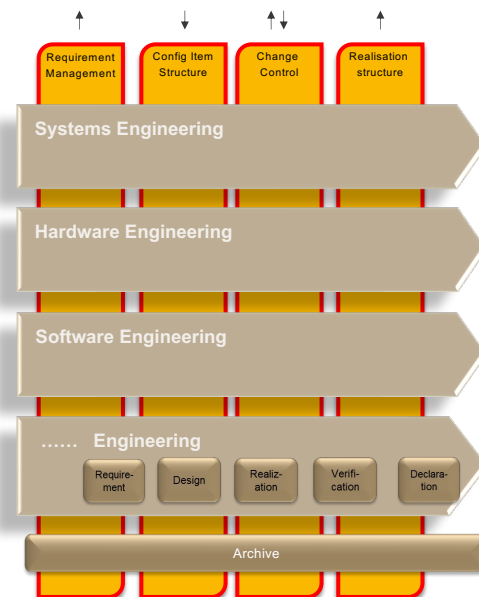


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# Traceability

- Need capability to ensure **traceability** and **integrity** of product data
- Traceability dimensions between engineering discipline environments – the integration points
  - **Requirements**
  - **Configuration item structure**
  - **Change management**
  - **Realization**
- Configuration Management capability required for Requirements Traceability, Configuration item structure and Realization structure
  - **Versions and baseline** capabilities
- The **OSLC standard** offers the desired capabilities
  - Exploit for **low cost** and **high quality** integrations

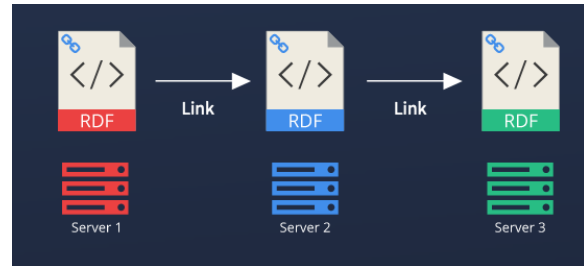


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## OSLC overview

- Based on Web standards and REST
  - Not reinventing the wheel!
  - Cloud-ready and real-time
  - OASIS Standard
- **Link, don't sync**
  - Tools control data lifecycle
  - Links are globally unique IDs
  - IDs with locations further reduce the need to copy data.
- OSLC-specific proposition:
  - Less variability than REST
  - Support for Configuration Management
  - Vocabularies and shapes for standard domains:
    - Requirements Management,
    - Change Management,
    - Quality Management, and
    - Architecture Management.
- Empowers architects at the enterprise to extend domains and introduce new ones
- Additional capabilities like embeddable UIs and published logs of changes.



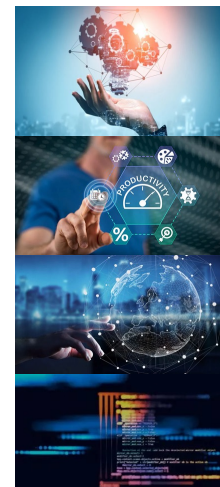
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## Evaluation criteria

### Federated PLM – feasibility dimensions

- Technical feasibility
  - Does OSLC offer industrial strength solutions for integrating stand-alone PLM systems?
- Development efficiency
  - Does a federated PLM environment offer improved productivity potential in the short and long term compared to a monolithic, single supplier solution?
- Operational feasibility
  - Can a federated PLM environment be maintained over time?
- Realisation effectivity
  - Can OSLC interfaces be implemented and maintained at a reasonable cost?



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# Technical feasibility

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# Technical feasibility

IBM Engineering Workflow Management (ELM)

JKE Banking (Change Management)

Defect 35

Summary: Running out of SWT handles

Attachments

Drop files to add them or click here to browse.

Subscribers

Manage Add

Links

Add Disabled

Depends On

37: SWT Exception

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## Scenario:

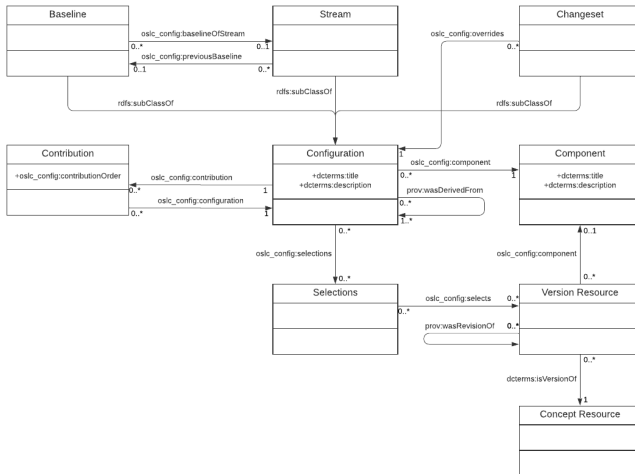
1. Link an existing requirement in Siemens Polarion to a Defect in IBM ELM
2. Create a new requirement in Polarion and link to the same Defect

## Features demonstrated

- Information is linked – not duplicated
- Delegated UI – no need to define a dedicated interface
- Navigation between applications



# OSLC Configuration management



## OSLC Config approach:

- Domain-agnostic
- Versioning - very different approach to STEP
- Many optional and imprecise definitions in the standard – leading to differing interpretations
- **Need to mature the standard!**



# Development feasibility



## Development feasibility

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### Federated solution

- Delegated User Interfaces
  - Non-harmonised interfaces
  - Acceptance of redundant capabilities
- Possible to traverse information following links
- Linking capabilities restricted by interface availability
- Need to maintain a meta-model ensuring a common terminology
- Flexibility to choose and upgrade

### Monolithic solution

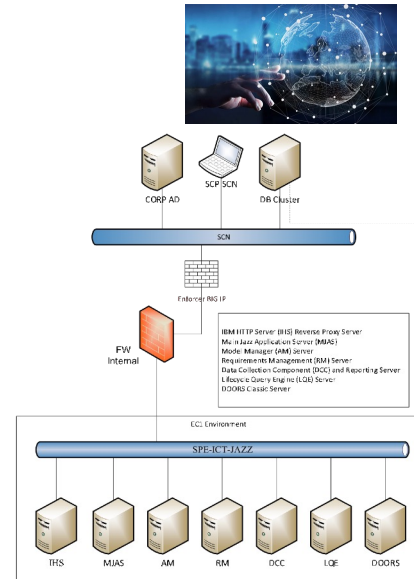
- Homogeneous look and feel
- Possible to traverse information following links within the monolith
- Linking capabilities restricted by meta model and supplier
- Meta model integration in the tool
- Select tools based on supplier partnership program
  - Or manage proprietary integrations

## Operational feasibility

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## Operational feasibility

- Lifecycle benefits
  - Duplication is minimised
  - Need for data transformations is also minimized
  - Access control over copies not a problem
- Two-way linking support not complete in OSLC
  - Creation of two links is discouraged.
  - OSLC is working to standardise a link lookup capability.
- Reliance on persistent URIs
  - Corporate IT strategies must guarantee this
  - What happens when there is a corporate URI name change?
- Information migration must be resolved on a case by case basis
- End user responsible for federated PLM capability



## Realisation effectivity



# Realisation effectivity

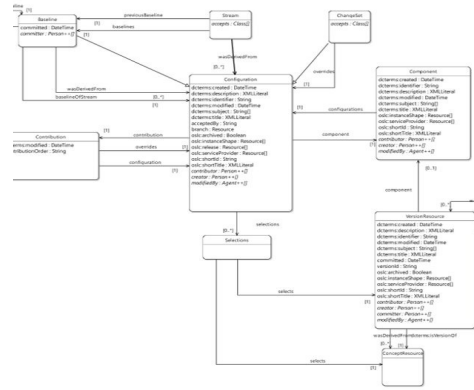


## OSLC development aids:

- Useful test clients and servers
- Most developers use Java so SDK for other languages not mature/maintained.

## Experiences:

- Steep learning curve – the first interface is the hardest to implement
- Initially a significant amount of effort is spent on connecting systems
  - E.g. certificates expire, authentication, browser security restrictions
  - But this true of any machine-machine connection
- More public examples would help implementation
  - Need to promote active implementation community
- OSLC is working to standardise Profiles (Conformance Classes) with well-defined capabilities
  - Simplifies out of the box connectivity



# Conclusions



## Conclusions – From Heliple’s point of view

- **Federated PLM – feasibility dimensions**

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