A framework used to bridge between the language of business and PLCS

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2007

PDM, ERP, LOG

4%

US Army and AMG

CDO?
Eurostep

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- Eurostep is the company
- PLCS is the ISO Standard
- ShareAspace is the software
Need for data quality

- Speed
- Volume
- Accuracy
- Automation

- 40%
- 20%
- Important!
“Data quality is a perception or an assessment of data's fitness to serve its purpose in a given context.”
Complex environment

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1. Support Data
2. Maintainers Viewing Tool
3. Stock Mgmt
4. Maintenance Mgt Data
5. Requirements Management
6. LSAR
7. FMECA
8. CAD
9. Product Data
10. IETM
11. Parts Supplier Database
12. Depot Maint Mgmt
13. Distribution, Transportation
14. Defects and Failure Reporting

- LSA Data
- FMECA Results
- Design Data
- Support Data
- CM Data
- Defects and Failures
- Maintenance Mgt Data
- Tech Pubs Data
As-Is Architecture
A System of Systems at incredible scale

Comprised of
~ 2,500 Applications

On
~5,000 Servers

Affected by
~ 900 changes annually

Impacting
~ 40,000 Users

With
~ 12 copies of the data

And maintaining
~ 9.1 PB of data

Across
7 Countries

Source: Boeing, from PDT Europe 2016 in Paris
Pragmatic approach to information management

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• Define domain model
• Least-common-denominator
• Canonical Model

+ Easy to understand
+ Human readable
+ Quick to execute

- Less flexible
- Hard to extend
- Re-invent the wheel
- Not according to standard
Standards approach to information management

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- Rich information model
- Detailed enough to capture all aspects of a product over its complete lifecycle
- Developed by the end users to fit their requirements
- Map customer model to standard
So, which one is the best?
Focus on your domain, not technical details
How to make this happen, in reality

• Concepts are not new, templates in PLCS have been around for years

• What is new is the realization:
  • Modelling language and constructs, SysML & containment
  • Datastore
Softtyping in ShareAspace
Product data collaboration approaches

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Common tools

Transactional file exchange

Hub based collaboration
Templates and Soft typing

Soft typing

ShareAspace

Soft typing

Other systems
SoftType Abstraction

Part SoftType

- **ID:**
- **Name:**
- **VersionId:**
- **Weight:**
- **Height:**

Simplified Model Representation

- **Part**
  - **ID**
  - **Name**
  - **Version ID**

- **Part View Definition**
  - **Weight Value**
  - **Height Value**

- **Context Organization**
- **Property**
- **Property**
## Typical data

### PDM System

<table>
<thead>
<tr>
<th>ID</th>
<th>V</th>
<th>NAME</th>
<th>NSN</th>
<th>WEIGHT</th>
<th>HAZMAT</th>
<th>CRITICALITY CODE</th>
<th>OBSL</th>
<th>APPRVDATE</th>
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<tbody>
<tr>
<td>13827-LT</td>
<td>4</td>
<td>HEADLIGHT</td>
<td>3055-00-721-4790</td>
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<td>13782-LT</td>
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<td>12974-ST</td>
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<td></td>
<td></td>
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<tr>
<td>13654-FR</td>
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<td>FRAME, MALE</td>
<td>3055-00-721-4766</td>
<td>2.465</td>
<td>A</td>
<td></td>
<td></td>
<td>201605</td>
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### CAD Management

<table>
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<tr>
<th>PART</th>
<th>Rev</th>
<th>CAD Model</th>
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</thead>
<tbody>
<tr>
<td>13827</td>
<td>A</td>
<td>\bike\headlight.jt</td>
</tr>
<tr>
<td>12974</td>
<td>B</td>
<td>\bike\saddle.jt</td>
</tr>
<tr>
<td>13654</td>
<td>A</td>
<td>\bike\frame.jt</td>
</tr>
</tbody>
</table>

### Standard Parts DB

<table>
<thead>
<tr>
<th>PART_ID</th>
<th>SUPPLIER</th>
<th>CAGE</th>
<th>SUPP_PART_ID</th>
<th>SUPP_PART_NAME</th>
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</thead>
<tbody>
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<td>K1930</td>
<td>HDL27</td>
<td>HEADLIGHT X27</td>
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<tr>
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<td>232-L82</td>
<td>SUPER BEAM HEADLIGHT</td>
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<tr>
<td>12974</td>
<td>BIKE’N’ALL INC</td>
<td>K1932</td>
<td>345-L21</td>
<td>MALE SADDLE BX</td>
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<tr>
<td>12974</td>
<td>SAD INC</td>
<td>K1933</td>
<td>34 45 65</td>
<td>SOFTCUSHION SADDLE</td>
</tr>
</tbody>
</table>
Business Object Model
Configuring Soft Types

Default presentation, language, icons, ...

Settings

Soft Type

Data
SAs Mapping

Consist of

Views

Input Schemas

Output Schemas

Maturity Systems
Tools available
Configuring Soft Types - API

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Soft Type
- Settings
- Data SAs Mapping

Consist of
- Views
- Input Schemas
- Output Schemas
- Maturity Systems

API
REST APIs

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- Open and Documented
- oAuth 2.0
  - Industry standard REST authorization approach
- The User Interface is only using the REST APIs
- Dynamic based on configuration
- Stateless
  - Industry standard REST approach
- Using HATEOAS, Hypermedia as the Engine of Application State

SoftType REST API

GET /project/{projectName}/softtype/{definitionId}/swagger
headers:
  definitionId : String

GET /project/{projectName}/softtype/{name}.schema.json
headers:
  name : String

GET /project/{projectName}/softtype/{objectId}
headers:
  objectId : String

GET /project/{projectName}/softtype/{definitionId}/{objectId}
headers:
  definitionId : String
  objectId : String

GET /project/{projectName}/softtype/{definitionId}/{outputSchemaId}/{objectId}
headers:
  definitionId : String
  outputSchemaId : String
  objectId : String

POST /project/{projectName}/softtype/{definitionId}
headers:
  definitionId : String
  data : [FromBody] JObject

POST /project/{projectName}/softtype/{definitionId}/{inputSchemaId}
headers:
  definitionId : String
  inputSchemaId : String
  data : [FromBody] JObject

PUT /project/{projectName}/softtype/{definitionId}/{objectId}
headers:
  definitionId : String
  objectId : String
  data : [FromBody] JObject

PUT /project/{projectName}/softtype/{definitionId}/{inputSchemaId}/{objectId}
headers:
  definitionId : String
  inputSchemaId : String
  objectId : String
  data : [FromBody] JObject
Configuring Soft Types - UI

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Consist of:
- Views
- Input Schemas
- Output Schemas
- Maturity Systems

Soft Type
- Data SAs Mapping
- Settings

Web UI

API
Example of configured UI
Example of configured UI
Summary

• Data quality is very important!

• Use standard data layers (e.g. PLCS) to ensure data consistency and quality, but…

• …focus on the business processes to build your differentiator.

• You can have the best of both worlds!
Thank you!

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