Design and Prototypical Implementation of a Dashboard System for Visualizing Semi-Structured Data in a Traceable Way

Final Presentation

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Project Context

**UMBRELLA PROJECT**

**Spreadsheet 2.0** – User-oriented tools for analyzing complex linked data

Addresses shortcomings of existing spreadsheet applications, e.g.:

- Lack of transparency of a spreadsheet’s design
- Lack of support for complex linked data
- No support for custom visualizations

**FOUNDATION**

**SocioCortex** – A Social Content Hub

- Integrates data from various sources
- Dynamic information models
- Typed query language: **MxL**
“A Dashboard System for Visualizing Semi-Structured Data in a Traceable Way”

Visualization Environment
- Custom Visualizations
- Complex Linked Data

Traceability Environment
Who? What? When?

Outlook: Network Analysis
Approach
Methods & Tools

ENVIRONMENT

KNOWLEDGE BASE

DEVELOP / BUILD

JUSTIFY / EVALUATE

• Exploratory Case Studies with Two Industry Partners
• Preliminary: Discussions within the Research Group + Monitored Usage
EXCERPT: PRODUCTS IN WORKSPACE NORTHWIND

<table>
<thead>
<tr>
<th>Product</th>
<th>Category</th>
<th>Price</th>
<th>Supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alice Mutton</td>
<td>Meat and Poultry</td>
<td>5</td>
<td>Pavlova, Ltd.</td>
</tr>
<tr>
<td>Boston Crab Meat</td>
<td>Seafood</td>
<td>18.4</td>
<td>New England Seafood Cannery</td>
</tr>
<tr>
<td>Computer Tiramis</td>
<td>Seafood</td>
<td>63.5</td>
<td>Pavlova, Ltd.</td>
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</tr>
<tr>
<td>Copper River Tuna</td>
<td>Seafood</td>
<td>89.5</td>
<td>Pavlova, Ltd.</td>
</tr>
</tbody>
</table>
A functional, **statically type-safe** language, which can be used for **query formulation** and data transformation within SocioCortex.

**Expression Examples**

```plaintext
find Product /* returns Sequence<Product> */

find Product
  .select(Price)
  .sum() /* returns Number */
```

`Sequence<Product> is Sequence<Sequence> /* true */`

`Sequence<Product> is Sequence<Object> /* true */`

`Sequence<Product> is Sequence<Structure<Price: Number>> /* true */`
**Case 1: EAM**

**Background & Scenario**

<table>
<thead>
<tr>
<th>ENVIRONMENT</th>
<th>EXEMPLARY VISUALIZATION TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cluster Map</strong></td>
<td></td>
</tr>
<tr>
<td>Personal</td>
<td>Kundenbetreuung</td>
</tr>
<tr>
<td>SAP HR</td>
<td>Siebel Addon</td>
</tr>
<tr>
<td>Mitarbeiterinformationssystem...</td>
<td>Sales Force</td>
</tr>
<tr>
<td>Finanzen</td>
<td>Risikosteuerung</td>
</tr>
<tr>
<td>SAP FI</td>
<td>MaRiskIT</td>
</tr>
</tbody>
</table>

- Focus on Manual Assessments
- Flexible Information Models

**IT Service Provider**

- 5000-10000 Employees

**Enterprise Architect**

- 9Y Professional Experience

Image Source: SITM Slides: 3.1 Motivation - WS 14/15
Case 1: EAM
Findings

**USE CASES**
- Usage Analysis
- Stakeholder Identification
- Impact Analysis

**LIKES**
- Graph Exploration
- UX
- Interactivity

**IMPROVEMENTS**
- Analyze User Behavior
- Advanced Code Management
- Filtering & Interactivity
Case 2: Financial Services

Background & Scenario

**ENVIRONMENT**

**EXEMPLARY VISUALIZATION TYPE**

- **Highstock Line**

**SCENARIO**

- Focus on Time Series Data
- Complex Transformations

**Insurance & Investment Group**

10001+ Employees

**IT Infrastructure Manager**

Branch: Investment & Risk Strategy

Image Source: By Allan Ajifo [CC BY 2.0], via Wikimedia Commons
Case 2: Financial Services

Findings

**DASHBOARD**

- **Likelihood of Failure:** 0.72

**GRAPH**

- **Use Cases:**
  - Support Data Exchange
  - Impact Analysis
  - Address Compliance Demands

- **Likes:**
  - UX
  - Customizability
  - Vision

- **Improvements:**
  - Analyze Transformations
  - Integration & Scalability
  - Filtering & Interactivity
Results

MAIN CONTRIBUTIONS

1. Concepts & Models
2. Prototypical Implementation
3. Case Study Report

BYPRODUCTS

sebischair
- sc-angular

angular-widget-grid
A flexible grid layout for responsive dashboards
BACKUP
Models
Visualization Type

- **VisualizationType**
  - parameters: *many-to-one* relationship with **DataParameter**
  - settings: *many-to-one* relationship with **VisualSetting**
  - visualizationLogic: one-to-one relationship with **MetadataElement**

- **DataParameter**
  - expectedType: one-to-one relationship with **Type**

- **Type**
  - NumberSetting
  - StringSetting
  - BooleanSetting
  - ColorSetting

- **VisualSetting**
  - BasicVisualizable
  - ...
"A Dashboard System for Visualizing Semi-Structured Data in a Traceable Way"