The Feature Pack Approach

Systematically Managing Implementations in Software Ecosystems

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# Agenda

- Context
- Problem
- Approach
- Conclusion
## Context - HIS

- HIS is a non-profit company
- Jointly owned by the Federal States of Germany
- Founded 45 years ago
- Currently about 200 employees / 30 core developers
- Most German universities use HIS software
## Context - HISinOne

- University Management System called “HISinOne”
- Development started 2007
- 9 major releases up to now
- Large system
  - > 5 Mio LoC
  - > 800 database tables
  - > 6000 columns
- is an ecosystem
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**Context - Ecosystem**

- Publication Management
- Quality Assessment
- Project Management
- Output Measurement

**Customer 1**
- core

**Customer 2**
- core
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<table>
<thead>
<tr>
<th>Context</th>
<th>Problem</th>
<th>Approach</th>
<th>Conclusion</th>
</tr>
</thead>
</table>

**Problem**

- Heterogeneous implementation elements (e.g., UI, business logic, database elements, webservice definitions)
- Distributed implementation of features (e.g., feature developed by customers)
- No knowledge of complete variability model
- Composition of features from different sources by customers
- Detection of inconsistencies arising from combinations
### Approach - Feature Pack Definition

<table>
<thead>
<tr>
<th>Context</th>
<th>Problem</th>
<th><strong>Approach</strong></th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Variability Model</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Realization</strong></td>
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<table>
<thead>
<tr>
<th>Context</th>
<th>Problem</th>
<th>Approach</th>
<th>Conclusion</th>
</tr>
</thead>
</table>

Approach - Installation Definition

Variability Model

Realization
## Approach – Quality Criteria

- Variability-model vs. asset consistency
- Referential consistency
  - Type consistency
  - Behaviour consistency
  - Configuration completeness
  - Reference data completeness
Approach – Variability-Model Asset-Consistency

<table>
<thead>
<tr>
<th>Context</th>
<th>Problem</th>
<th>Approach</th>
<th>Conclusion</th>
</tr>
</thead>
</table>

A

Variability Model

Realization

<<>

B

Variability Model

Realization

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**Approach – Referential Consistency**

- All Feature Packs Variability-Model Asset-Consistent ✓
- All dependencies resolved ✓
  → Installation is referential consistent ✓
<table>
<thead>
<tr>
<th>Context</th>
<th>Problem</th>
<th>Approach</th>
<th>Conclusion</th>
</tr>
</thead>
</table>

**Approach – Implementation for Referential Consistency**

- Open Source Project plugfy
- Checks Java Byte Code, Spring Configuration
- Prototype
- In production use at HIS
Conclusion - Results

• Presented approach for systematic management of implementations:
  • Feature Packs bundle variability model and realization
  • Heterogeneous implementation assets
  • Formalized two quality criteria (in our paper)
  • Instantiated approach for a specific system
  • Implemented a tool for verification of referential consistency for specific technology
Conclusion - Further Work

- Extend approach to evolution
- Formalize remaining quality criteria
- Describe “instantiation” of feature packs for systems
Questions?