HIS

Software Systems Engineering

Stiftung Universität Hildesheim 2003

The Feature Pack Approach

Systematically Managing Implementations in Software Ecosystems

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Agenda

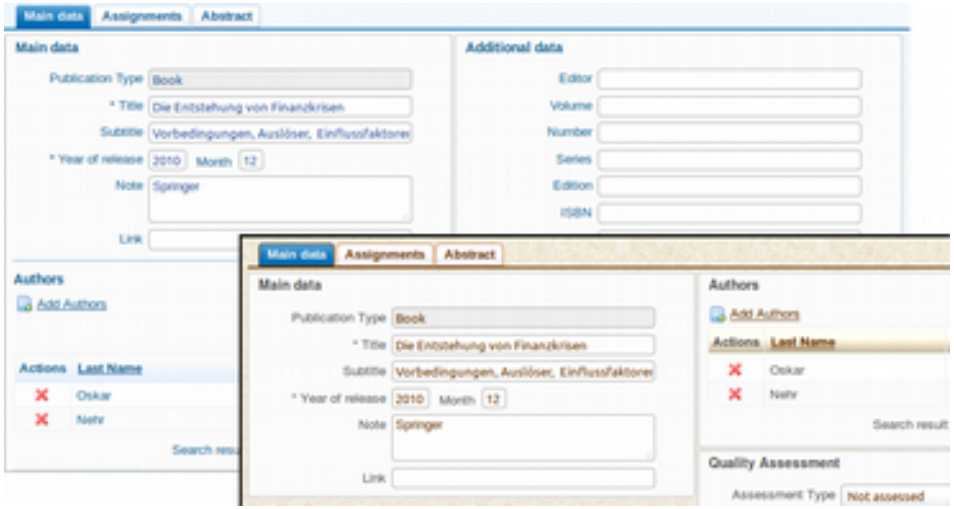
- Context
- Problem
- Approach
- Conclusion

Context - HIS

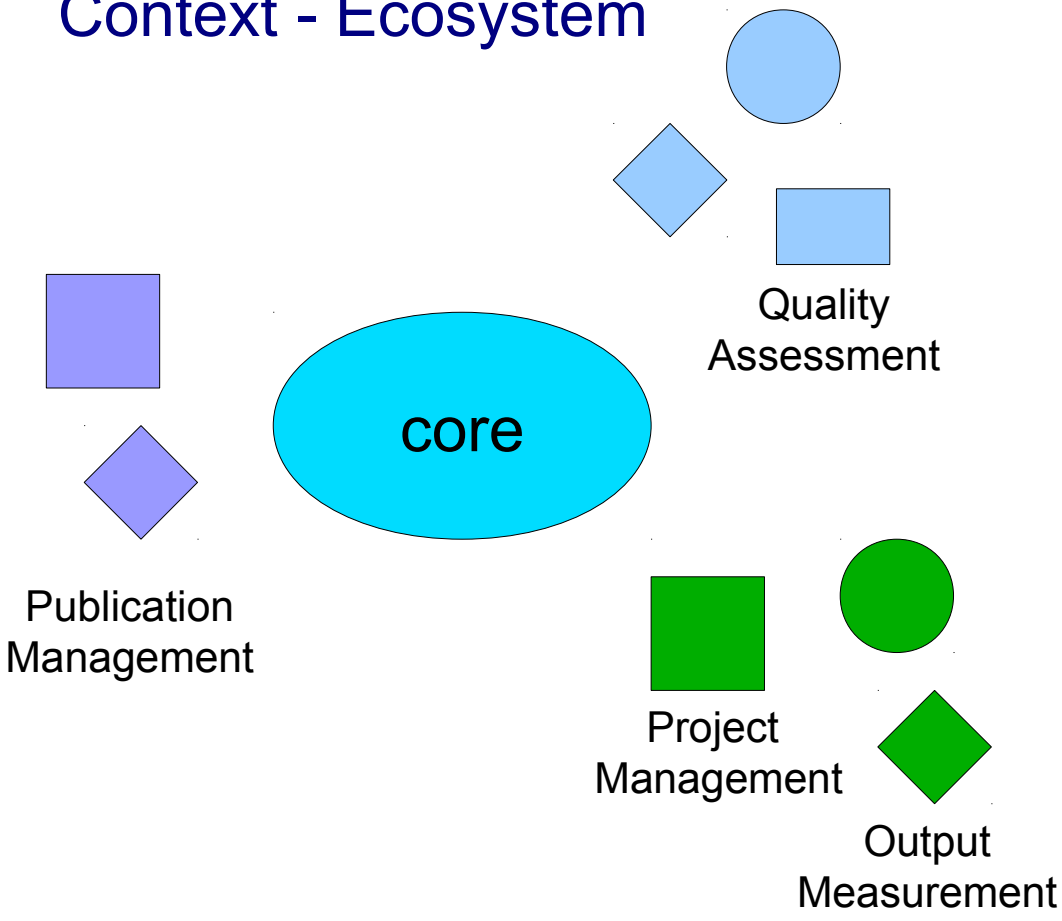
- HIS is a non-profit company
- Jointly owned by the Federal States of Germany
- Founded 45 years ago
- Currently about 200 employees / 30 core developers
- Most German universities use HIS software

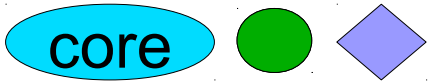
Context - HISinOne

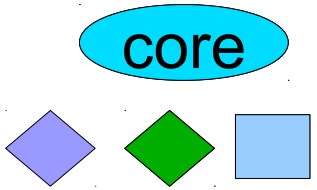
- University Management System called “HISinOne”
- Development started 2007
- 9 major releases up to now
- Large system
  - > 5 Mio LoC
  - > 800 database tables
  - > 6000 columns
- is an ecosystem



Context - Ecosystem





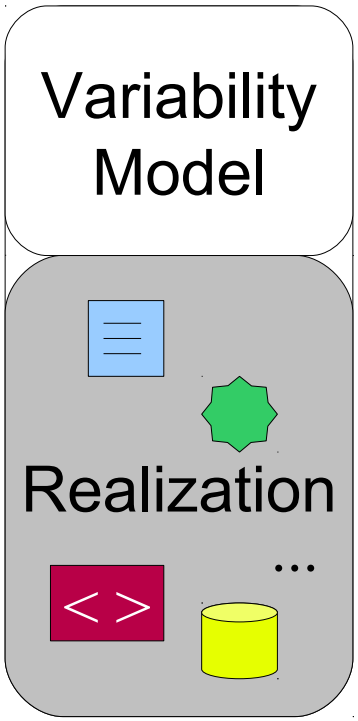


Problem

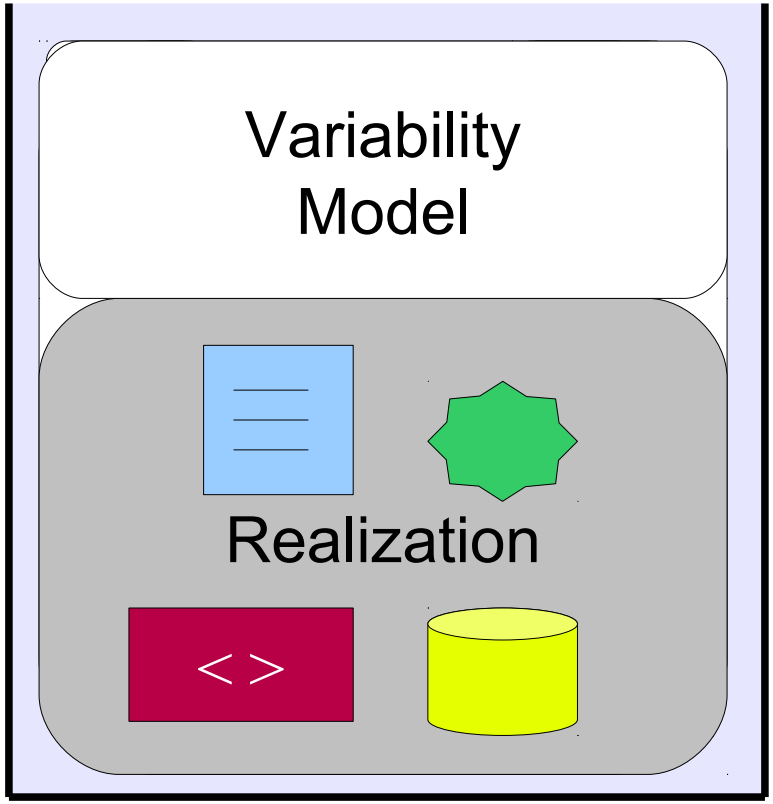
- Heterogeneous implementation elements
  (e.g., UI, business logic, database elements, webservice definitions)
- Distributed implementation of features
  (e.g. feature developed by customers)

- No knowledge of complete variability model
- Composition of features from different sources by customers
- Detection of inconsistencies arising from combinations

Approach - Feature Pack Definition



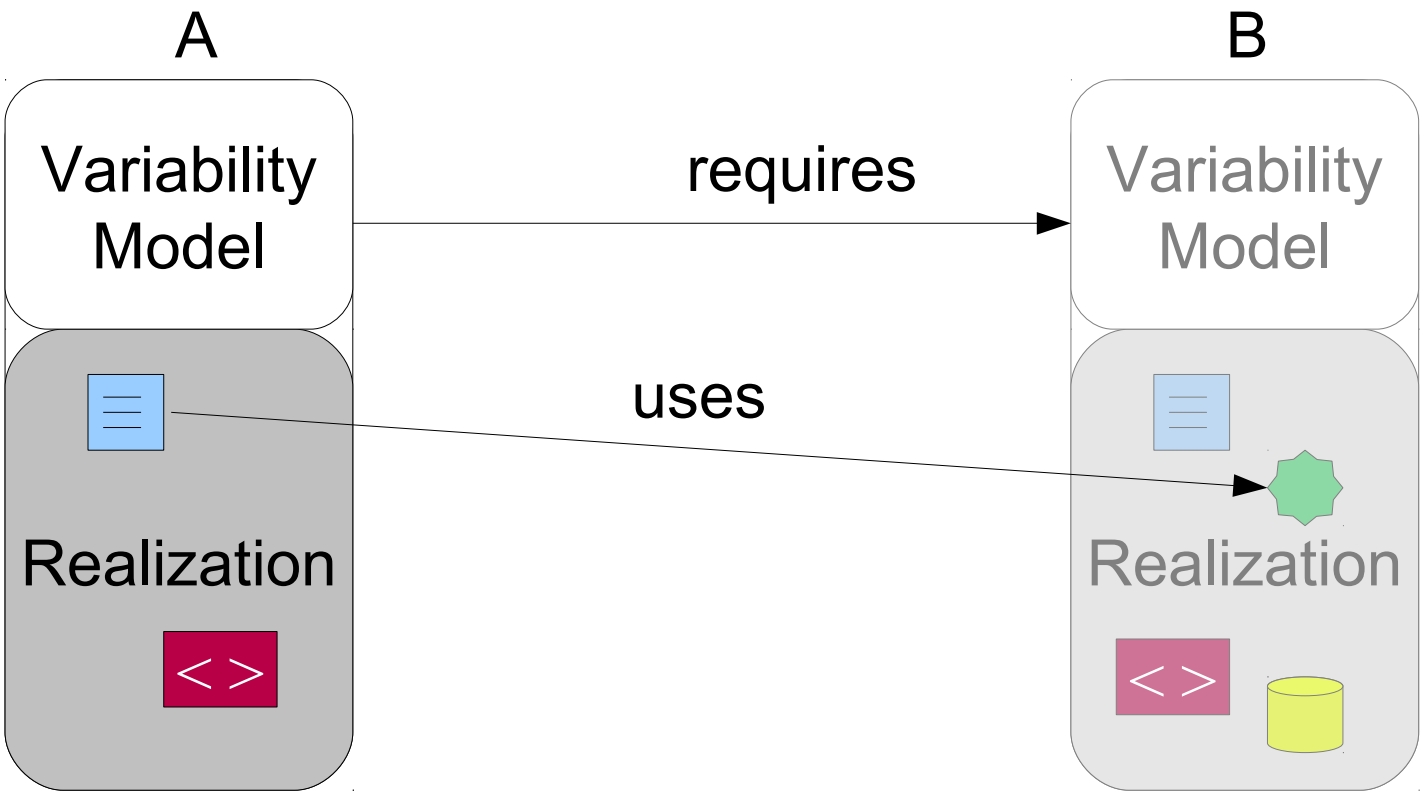
Approach - Installation Definition



Approach – Quality Criteria

- Variability-model vs. asset consistency
- Referential consistency
- Type consistency
- Behaviour consistency
- Configuration completeness
- Reference data completeness

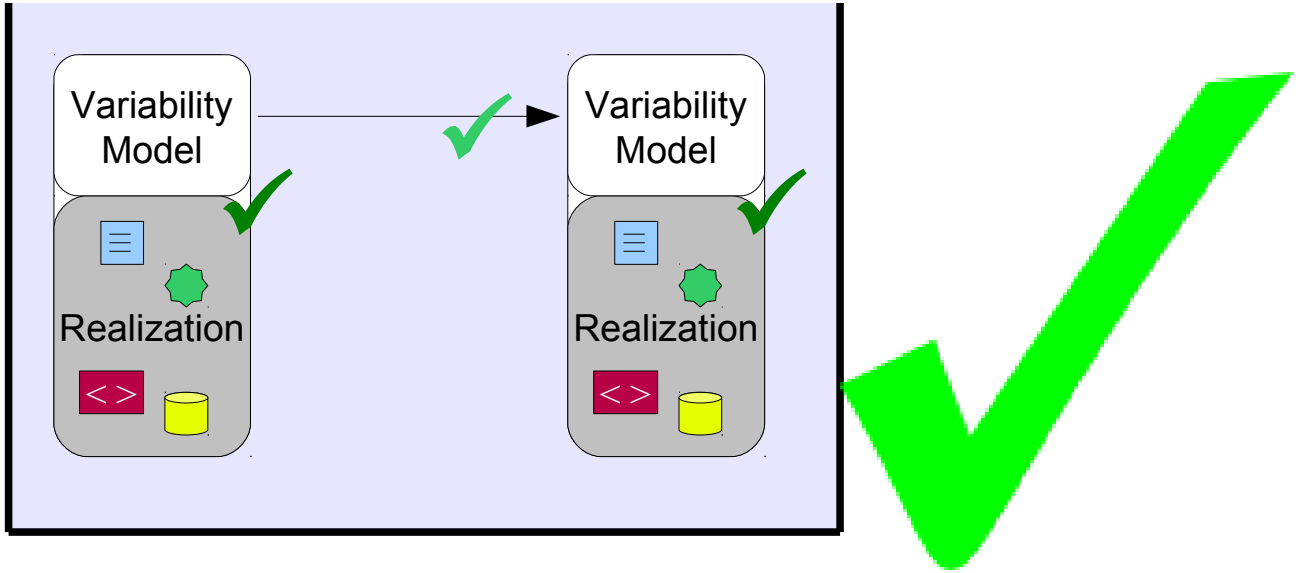
Approach – Variability-Model Asset-Consistency



Approach – Referential Consistency

- All Feature Packs Variability-Model Asset-Consistent ✓
- All dependencies resolved ✓

  → Installation is referential consistent ✓



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?