Wo steht das Requirements-Engineering?

Bewertung und Gegenüberstellung von RE-Frameworks

GI-Arbeitskreis „Requirements-Engineering-Frameworks für Produktlinien“
http://refpl.gi-ev.de/

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Jahrestreffen der GI-Fachgruppe „Requirements Engineering“, Essen
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Topics

- Introduction & Overview
- RE Frameworks
- Evaluation Criteria
- Selected Evaluations
- RE Frameworks and Software Product Lines
- Summary & Outlook
Our Approach: Frameworks, Scenarios & Landscape

Develop List of RE-Frameworks
- REM
- RAM
- Volere
- ...

Develop Framework Characterization Schema
- Process- vs. Artefact-oriented
- Maturity and dissemination
- Address SPL-specific aspects
- ...

Discussion & Evaluation of Selected Frameworks
- What is a framework?
- What does the framework contain?
- What is the framework’s purpose?
- ...

Scenarios of How to Use the Frameworks
- Improve RE for development of technical software product lines
- Train product managers in the domain of standard software
- Develop and assess suggestions for RE process improvement
- ...

Rate the Frameworks & Develop Landscape
- Report containing landscape and ratings of frameworks
- Evaluation from a SPL perspective
- ...

RE-Frameworks considered by AK REFPL

Evaluated:
- Requirements Abstraction Model (RAM) (Gorschek & Wohlin, 2006)
- Volere (Robertson & Robertson, 2006)
- ITIL V3 Service Design (OGC, 2007)
- Business Analysis Body of Knowledge (BABoK) (IIBA, 2008)
- Rational Unified Process (RUP)
- Use Case Maps
- Negotiation Constellations (Fricker & Grünbacher, 2008)
- IREB Certified RE professional

Not yet formally evaluated:
- RE Reference Model (REM) (Geisberger et al., 2006)
- Product Management Reference Framework (Brinkkemper & van de Weerd, 2006)
- Family Evaluation Framework (FEF) (van der Linden et al., 2007)
- V-Modell XT
- Use Cases
- ReqMan (www.re-wissen.de, 2006)
- CMMI (SEI, 2006)

Additional candidates:
- IEEE 830: Guide for developing SRS
- ISO/IEC 9126 (ISO/IEC 25000)
### Criteria for Framework Characterization

<table>
<thead>
<tr>
<th>ID</th>
<th>Category</th>
<th>Attribute</th>
<th>Attribute Values</th>
<th>Rate / Check Mark</th>
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<td>Available Support Material</td>
<td>Process / Method Definition</td>
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#### Incremental Development of Characterization Schema

*Grounded Theory Approach*

- **Framework Characteristics**
  - Initial Set
  - Consolidated Set
  - Final Set

- **Characterization of Frameworks**
  - Initial Char.
  - Consolidated Char.
  - Final Char.

- **Increasing number of frameworks covered**

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*26 November 2009*  
GI RE Jahrestagung 2009
Category: Scope of Framework Application

<table>
<thead>
<tr>
<th>Framework</th>
<th>RE Disciplines</th>
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<td>RAM</td>
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<td>IREB CRE</td>
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>> Disclaimer: All framework evaluations (on this and the following slides) are preliminary. – Work in progress.

Category: Framework Orientation
Category: Context of Framework Application

- Inside this category we identified 7 attributes
  - Industry Type
  - System Type
  - Product Development Type
  - Product Lifecycle Type
  - Process Strategy Relation
  - Distributed Development
  - Separation of Parties

- Product development
- Custom development
- IT service development

System Type Coverage

Frameworks can be applied for many environments

- ITIL V3: 7
- RUP: 10
- Volere: 8
- ISO 12207: 10
- Use Case Maps: 8
- RIF: 10
- BABoK: 10
- RAM: 7
- IREB: 10

Example System Types:
- Embedded / HW/SW Systems
- Business Information Systems
- Technical Applications
- Desktop Applications
- Other
Product Development Type

Product development type is refined into:
- Product development
- Custom development
- IT service development

Most frameworks are generic, but there are exceptions:
- ITIL Service Design was produced for IT service development
- RAM focuses on product development
- ISO 12207 best practices support product development and not IT services

Project Duration

Frameworks are suitable for projects with duration of:
- ITIL V3: less than 2 years
- RUP: all
- Volere: more than 6 months
- ISO 12207: all
- Use Case Maps: all
- RIF: all
- BABoK: more than 6 months
- RAM: all
- IREB: less than 2 years
## Size Summary

Frameworks are suitable for projects with size of:

<table>
<thead>
<tr>
<th>Framework</th>
<th>Duration</th>
<th>Effort</th>
<th>Team Size</th>
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<tr>
<td>Volere</td>
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<td></td>
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<tr>
<td>ISO 12207</td>
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<tr>
<td>RIF</td>
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</tbody>
</table>

- suitable
- not suitable

## Category: Degree of Formality

**Attributes:**

- Approach to Modeling Requirements
  - Does the framework explicitly refer to specific approaches to modeling requirements? (multiple answers allowed)
  - Natural Language
  - Structured Language (e.g. Use Cases, Tables)
  - Formal Language & Diagrams
  - Informal Diagrams
  - Semi-Formal Diagrams & Graphics

- System Aggregation Hierarchy
  - Does the framework explicitly address different levels of system aggregation or decomposition?
  - Example RAM:
    - product level $\Rightarrow$ component level
Category: Degree of Formality

Example: Approach to Modeling Requirements

<table>
<thead>
<tr>
<th></th>
<th>ISO 12207 (SPICE)</th>
<th>BABoK</th>
<th>RAM</th>
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<td>(e.g. Use Cases, Tables)</td>
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<td>❌</td>
</tr>
</tbody>
</table>

1 just referenced, but no specific consideration
2 possible on RAM function level, but no advice provided

RE Frameworks and Software Product Lines

SPL issues are widely neglected by RE frameworks

- Among the frameworks analyzed so far, only one framework addresses SPL issues sufficiently well: Families Evaluation Framework (FEF)

- A few other frameworks address SPL issues, but not at a fully satisfactory level:
  - Example: Product Management Reference Framework (Brinkkemper & van de Weerd, 2006)
  - Lacks variant modelling
Summary & Outlook

- Characterization schema available and being used
- Framework characterization ongoing
- Publications and final report being addressed
  - Research: RE fundamentals (e.g., characteristics)
  - Practice: Recommendations for RE application and SPI
- Results will be available summer 2010 (plan)

Wanted: Persons interested in characterizing additional frameworks or interested in supporting consolidation of characteristics

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