



GESELLSCHAFT FÜR INFORMATIK E.V.  
*Zukunft gestalten.*

## Wo steht das Requirements-Engineering?

Bewertung und Gegenüberstellung von RE-Frameworks

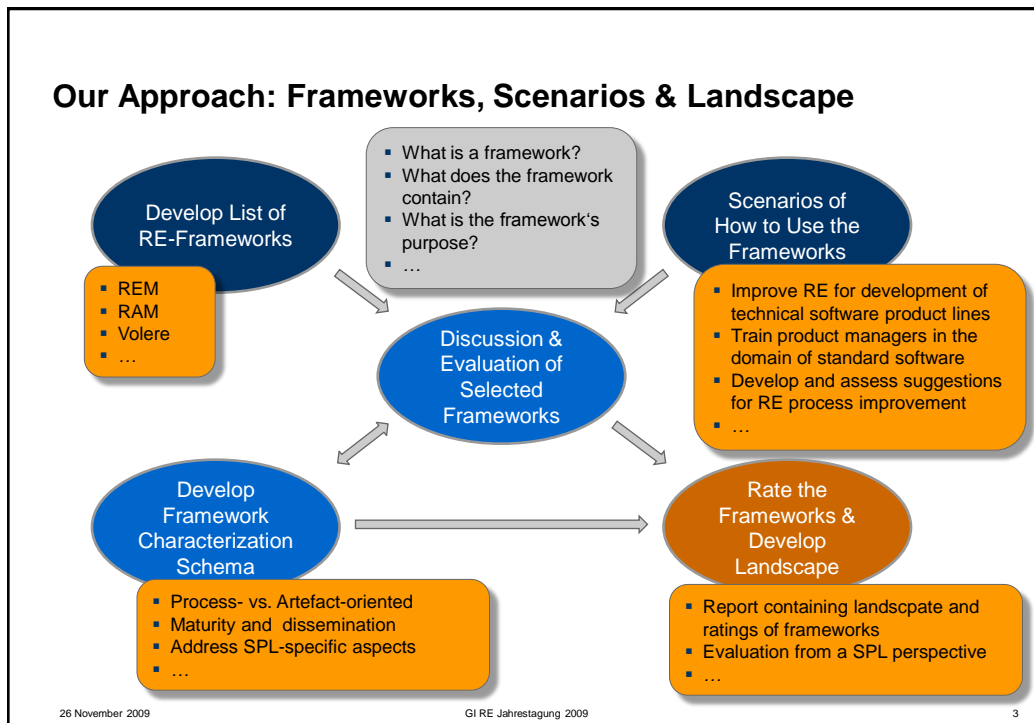
GI-Arbeitskreis „Requirements-Engineering-Frameworks für Produktlinien“  
<http://refpl.gi-ev.de/>

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## Topics

- Introduction & Overview
- RE Frameworks
- Evaluation Criteria
- Selected Evaluations
- RE Frameworks and Software Product Lines
- Summary & Outlook



## RE-Frameworks considered by AK REFPL

### *Evaluated:*

- **Requirements Abstraction Model (RAM)** (Gorschek & Wohlin, 2006)
- **Volere** (Robertson & Robertson, 2006)
- **ISO 12207** (ISO/IEC, 2003-2008)
- **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

ID	Category	Attribute	Attribute Values	Rate / Check Mark	Comment
1.1	Objectives	Objectives	---	---	<Text>
2.1	References	References	---	---	<Text>
3.1	Framework Orientation	Activity Orientation	---	<Rate: 10..0>	<Text>
4.1	Scope of Framework Application	RE Disciplines	--	---	<Text>
5.1	Context of Framework Application	Industry Type	---	---	<Text>
6.1	Implementation Preparation	Tailoring	Need for tailoring	<Rate: 10..0>	<Text>
7.1	Project and Product Size	Project and Product Size	Duration	Up to 6 Months ; Between 6 and 24 months; More than 24 Months	<Text>
8.1	Degree of Formality	Approach to Modeling Requirements	Natural Language	<Y/N>	<Text>
9.1	Effectiveness & Maturity	Available Support Material	Process / Method Definition	<Rate: 10..0>	<Text>
10.1	Product Line Support	Integrated Variant Modeling	---	<Y/N>	<Text>

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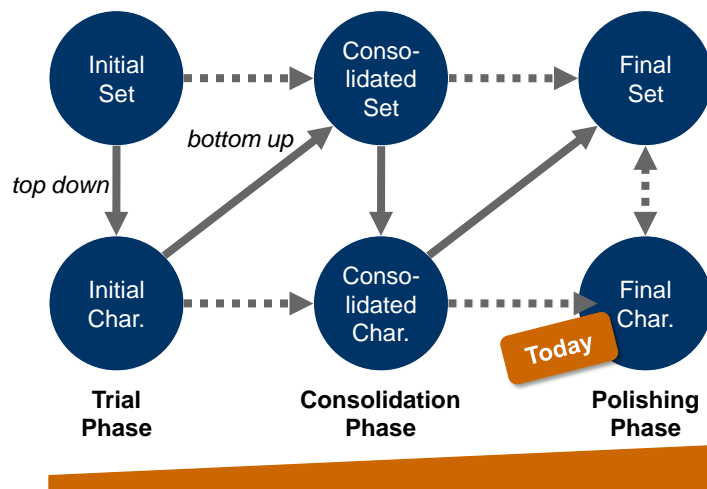
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## Incremental Development of Characterization Schema (Grounded Theory Approach)

**Framework Characteristics**

**Characterization of Frameworks**

**Increasing number of frameworks covered**



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## Category: Scope of Framework Application

Framework	RE Disciplines				
	Management	Elicitation	Analysis	Specification	Validation & Verification
RAM	x		x		
RIF	x			x	
RUP		x	x	x	
Use Case Maps		x	x	x	
Volere		x	x	x	x
ITIL V3	x	x	x	x	x
ISO 12207	x	x	x	x	x
BABoK	x	x	x	x	x
IREB CRE	x	x	x	x	x

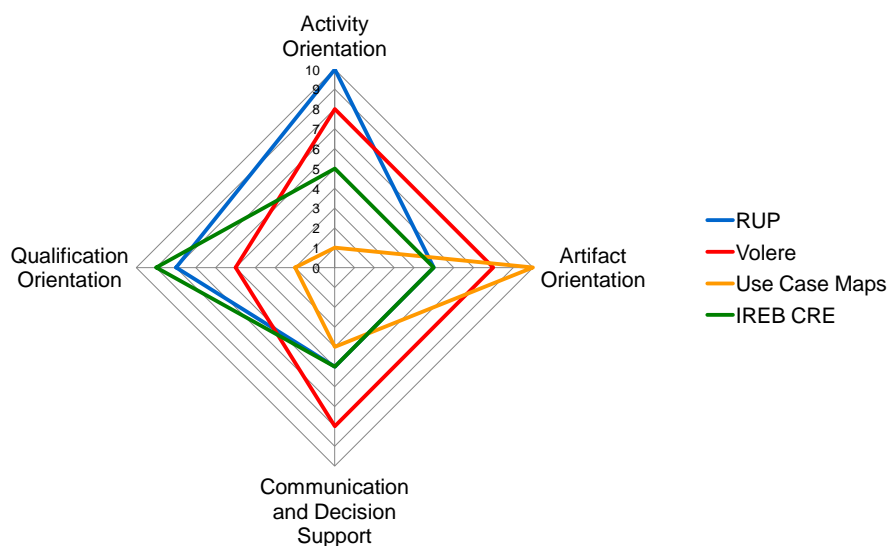
>> Disclaimer: All framework evaluations (on this and the following slides) are preliminary. – Work in progress.

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## Category: Framework Orientation



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## 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

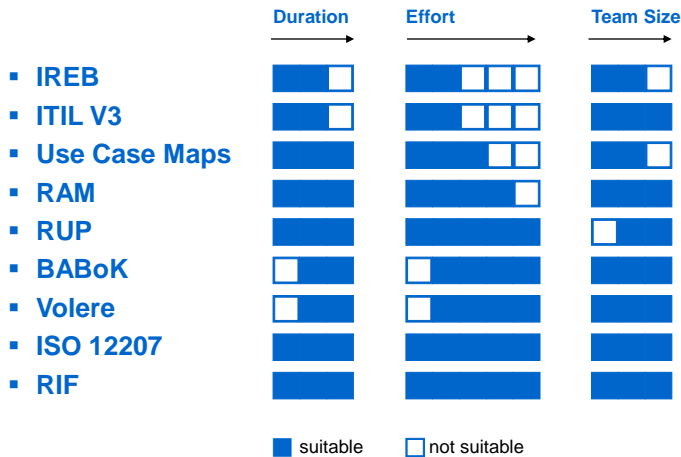
## Project Duration

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:



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## 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 ↔ component level

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## Category: Degree of Formality

Example: Approach to Modeling Requirements

	ISO 12207 (SPICE)	BABoK	RAM
▪ <b>Natural Language</b>	✗	✓	✓
▪ <b>Structured Language</b> (e.g. Use Cases, Tables)	✗	✓	✗ <sup>2</sup>
▪ <b>Formal Language &amp; Diagrams</b>	✗	✗ <sup>1</sup>	✗
▪ <b>Informal Diagrams</b>	✗	✓	✗
▪ <b>Semi-Formal Diagrams &amp; Graphics</b>	✗	✓	✗

Too generic !

<sup>1</sup> just referenced, but no specific consideration

<sup>2</sup> 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

## Contact

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<http://refpl.gi-ev.de>

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