DSMLs for Enterprise Architecture Management - An Analysis of Selected Approaches

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Motivation
– Current Situation

- IT management – a task of remarkable complexity
- “IT strategic planning” and “IT/Business Alignment” are (still) two of the major issues for IT executives
- Analysis and assessment of IT requires knowledge:
  - about IT artifacts, heterogeneous IT infrastructures, ever changing technologies, manifold interdependencies
  - … and about the business!
- Requires people with different professional backgrounds

Need to reduce complexity, increase transparency, foster communication and thereby support IT management
Enterprise Architecture Management (EAM) provides a promising foundation:

- aims at capturing the essential organization of a system,
- provides purposeful abstractions of IT and the surrounding action system,
- captures as-is and to-be states to guide transformations,
- and supports various visualizations for analyses.
Motivation – Example

Increase customer satisfaction through an attractive value proposition

Legend:
- Value Chain
- Core
- Enterprise
- Activity
- Goal
- Business Process Type
- Aggregated Business Process
- Business Process
- Event (Message)
- Information System
- Software
- IT hardware resource
- Memo
- Part of
- Comprises
- Perspective
- Principle
- Levels of Analysis
EAM makes extensive use of modeling languages, but:

- it requires high effort to create and maintain an EA,
- maturity of used modeling languages uncertain,
- connection to other modeling approaches unclear,
- further use of models/architectures, e.g., for code generation, unknown.
**Motivation**

– Objectives

- **Underlying hypothesis:** EAM could benefit from a (more) comprehensive use of DSMLs

- **Objectives:**
  - What are requirements of the EAM domain?
  - How do selected approaches for EAM fulfill these requirements?
  - What are promising directions for future research?

**Goals of this presentation:**
1. Present *preliminary results* of the analysis
2. Foster *discussion* about *potentials* and *limits* of DSMLs in the context of EAM – *What are the boundaries of DSML applicability?*
Design of the Analysis – Basic Requirements
1. Manage transformation projects
2. Support for architecture governance
3. Support flexible visualizations
4. Enable cross-disciplinary analyses
5. Account for different perspectives
Design of the Analysis
– Basic Requirements
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Design of the Analysis
– Modeling Specific Requirements

1. **Model usage** in addition to documentation

2. **Integration & reuse** of existing models and modeling languages

3. **Adapt complexity** to different professional backgrounds and interests of the users

4. **Enterprise-specific adaptations** to handle different structures and needs

5. **Meta model evolution** to support changes over time

6. **Integration with instance data** to bridge the gap between build-time and run-time
Selection criteria:
- meta-modeling approach
- published meta models
- cover several layers of an EA
- popular in academia & practice

Results:
- The Open Group Architecture Framework (TOGAF)
- ArchiMate
- Multi-Perspective Enterprise Modeling (MEMO)
- (analysis will be extended)
## Analysis
– Preliminary Results

<table>
<thead>
<tr>
<th>Specific Requirements</th>
<th>TOGAF</th>
<th>Archimate</th>
<th>MEMO</th>
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<tbody>
<tr>
<td>(1) Model usage</td>
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<td>(2) Integration &amp; reuse</td>
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<td>(3) Adaptable complexity</td>
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<td>(5) Meta model evolution</td>
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<td>(7) Integration with instance data</td>
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See paper for a more detailed assessment!
Overall impression:

- Organizational issues are of pivotal relevance
- Graphical representations primarily used for analyses
- Focus on documentation and guiding transformations of the enterprise
- Modeling languages remain on a rather generic level
- Lack of integration with other approaches and tools
- No code generation

Most requirements are not fulfilled – room for improvement(?)
Future Work

- Improve Analysis:
  - refine requirements,
  - increase number of frameworks,
  - and include modeling tools.

- Use of DSMLs for EAM:
  - foster closer collaboration,
  - establish common terminology,
  - identify promising scenarios for code generation,
  - and develop / improve DSMLs.
Questions, Answers & Discussion
– Thank you for your attention!

Enterprises and their professional languages

Family of integrated DSMLs

Generated Code / Software (?)

ERP Configuration
Access Control
Process Automatization
CMDB

... ?
Questions, Answers & Discussion – Thank you for your attention!

- What are the boundaries of DSML applicability?
- What should / could be generated?
- How practicable is (full) code generation for a moving and ever changing domain (= enterprise)?