Modeling@SAP
Why class models are rarely used

Achim D. Brucker
achim.brucker@sap.com

SAP AG, Vincenz-Priessnitz-Str. 1, 76131 Karlsruhe, Germany

Dagstuhl Seminar 13211: “Automated Reasoning on Conceptual Schemas”
http://www.dagstuhl.de/13211
19.05.2013 – 24.05.2013
Abstract

In 1999, SAP started to combine the Unified Modeling Language (UML) and the Fundamental Modeling Concepts (FMC) language. The result is an SAP internal standard for modeling, called Technical Architecture Modeling (TAM). TAM comprises block diagrams, component diagrams, package diagrams, class diagrams, activity diagrams, sequence diagrams, state diagrams, and use case diagrams. TAM is used for both conceptual modeling as well as design modeling.

While many works on reasoning on conceptual schemas focus on class diagrams and state diagrams, the most often used diagram type at SAP is the block diagram. For example, class models are used rarely, as they are “too close to real code.” In general, developers and architects prefer structural diagrams (e.g., block diagrams), thus we need to ask ourselves the questions, if we can reason over such models and what kind of properties help to improve the software development.
## Conceptual Modeling at SAP

### Technical Architectural Modeling (TAM)

<table>
<thead>
<tr>
<th>Block Diagram</th>
<th>Component Diagram</th>
<th>Package Diagram</th>
<th>Class Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity Diagram</td>
<td>Sequence Diagram</td>
<td>State Diagram</td>
<td>Use Case Diagram</td>
</tr>
</tbody>
</table>

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Observations

Academia

- Many works reasoning over
  - Class models (e.g., with OCL constraints)
  - ER models
  - State charts

At SAP

- Most common diagram type:
  - Block diagram
- Also used
  - State diagram
  - Activity diagram (BPMN)
  - ...

Quotes from architects and developers:

- Class models (and ER models) are not conceptual, they are code
- Behavioral modeling is only done for complex behavior (incomplete)
Idea-to-Market

Management processes

- Manage solution strategy
- Manage solution portfolio
- Manage releases
- Improve processes (CIP)
- Manage Product Standard compliance

Core processes

Idea-to-Portfolio
- Define first release
- Evaluate with customers
- Generate & manage ideas
- Create prototype
- Define portfolio
- Define next release
- Define solution business cases for next release portfolio

Portfolio-to-Solution
- Planning & Setup
  - Engineer requirements
  - Create and document architecture
  - Write and translate product document
- Development
  - Develop software
  - Plan and execute testing
  - Assemble product
  - Validate product
  - Deliver product
- Release Preparation
  - Create Service
  - Package solutions for products in default release
  - Validate solution
  - Manage Development Landscape
  - Manage development program

Solution-to-Market
- Launch and Ramp-up

Market-to-Sunset

Support processes

- Provide patches for security vulnerabilities detected by external security researchers
Conclusion and Next Steps

Many open questions:

• How to make class models “more abstract” to use them early in development
• How to integrate reasoning at later steps (e.g., datatype definitions in a PL)
• How to link the different models (diagrams) for reasoning (behavioral models)
  Ultimately: How to reason over different model types
• What kind of reasoning can be done on block diagrams
• ...

What we are currently starting

• Motivate the use of “refined” block diagrams (including technical details)
• Development of “light-weight” reasoning techniques supporting threat-models
  • Exclude certain threats/countermeasures
  • Propagate threats/countermeasures
  • Infer requirements for models/implementation in later development steps

Goal: Reduce effort necessary for passing production quality checks/validation
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