Modeling and Analysis of Boundary Objects and Methodological Islands in Large-Scale Systems Development

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The Challenge of Agile Inter-Team Coordination

- Large-scale companies commonly face coordination problems
- Boundary Objects can support inter-team coordination and explicit knowledge sharing

“It feels like we are an agile island in a waterfall”
Not only an agile issue
→ use the term “methodological islands”
Boundary Objects

“Boundary objects are objects which are both plastic enough to **adapt to local needs and constraints** of the several parties employing them, yet robust enough to **maintain a common identity across sites.**” [1]

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Initial Elicitation of Boundary Objects
Research Method

• Create a method to systematically capture Boundary Objects and Methodological Islands (BOMI)

• Design science approach with a conceptual model as the design artifact

• Four participating system development companies
  (telecommunications, mechanical products, automotive)
Workshop (with 4 companies)
Example Instance Models from Workshop
## BOMI Smells Examples

<table>
<thead>
<tr>
<th>Smell Type</th>
<th>Description</th>
<th>OCL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Within BO</strong></td>
<td>Low Modularity</td>
<td>context BoundaryObject inv LowModularity: self.Modularity = &quot;Low&quot;</td>
</tr>
<tr>
<td></td>
<td>High level of detail, frequent change</td>
<td>context BoundaryObject inv DetailedHighChange: self.LevelofDetail = &quot;High&quot; and self.FrequencyofChange = &quot;High&quot;</td>
</tr>
<tr>
<td><strong>Within Usage</strong></td>
<td>Not fit for purpose</td>
<td>context Usage inv NotFit: self.FitForPurpose = &quot;Low&quot;</td>
</tr>
<tr>
<td></td>
<td>High criticality, low stability</td>
<td>context Usage inv CriticalUnstable: self.Criticality = &quot;High&quot; and self.Stability = &quot;Low&quot;</td>
</tr>
<tr>
<td><strong>Presence of...</strong></td>
<td>No governance team</td>
<td>context BoundaryObject inv Governed: self.Governed-&gt;size &gt; 0</td>
</tr>
<tr>
<td></td>
<td>No one responsible for BO</td>
<td>context BoundaryObject inv Responsible: self.Responsible-&gt;size &gt; 0</td>
</tr>
<tr>
<td><strong>Across Elements</strong></td>
<td>Governing roles should use BO</td>
<td>context BoundaryObject inv GovernsUses: self.Governs -&gt; forAll(g</td>
</tr>
</tbody>
</table>
Conclusion

• Proposed a conceptual model for boundary objects and methodological islands and a list of bad smells over the instances

• Based on a study with four system development companies

• Future work
  • Development of a domain-specific visual language and tool support
  • Proactive method for coordination issues:
    Now that we can identify problems, how can we suggest fixes?