A Comparison of Ecore and GOPPRR through an Information System Meta Modeling Approach

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First Workshop on Graphical Modeling Language Development
Agenda

- Motives and Goals
- Modeling concepts comparison
- Ease of use
- Further research
- Conclusion
Motives and Goals

• *Integrated Information Systems CASE Tool (IIS*Case)*
  – Model driven software tool that provides generation of executable application prototypes
  – Provides the generation of database schemas and fully operational application prototypes
  – We have created a number of modeling, meta-level concepts and formal rules that are used in the design process
    • in order to provide design of various platform independent models (PIM) by IIS*Case
Motives and Goals

• Current research
  – IIS*CDesLang
    • textual DSL
    • developed using attribute grammars
    • formalization of PIM concepts
      – modeling in a formal way
    • formal correctness and semantical analysis of models
Motives and Goals

• Current research
  – MOF approach
    • Ecore
      – Eclipse’s implementation of MOF
    • specification of PIM concepts
    • developing textual DSL
  – MetaEdit+ approach
    • GOPPRR
    • specification of PIM concepts
    • developing graphical DSL
Motives and Goals

• Main research goals
  – Comparison of Ecore and GOPPRR
    • concepts used
    • ease of use
  – Basis for the better understanding of the meta-languages
    • further development of textual and graphical DSLs
Agenda

• Motives and Goals
• **Modeling concepts comparison**
• Ease of use
• Further research
• Conclusion
### Modeling concepts comparison

<table>
<thead>
<tr>
<th>Concept</th>
<th>Ecore</th>
<th>GOPPRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
<td>EClass</td>
<td>Object</td>
</tr>
<tr>
<td>Relationship</td>
<td>EReference</td>
<td>Relationship</td>
</tr>
<tr>
<td>Role</td>
<td>-</td>
<td>Role</td>
</tr>
<tr>
<td>Port</td>
<td>-</td>
<td>Port</td>
</tr>
<tr>
<td>Grouping</td>
<td>EPackage</td>
<td>Graph</td>
</tr>
<tr>
<td>Attribute</td>
<td>EAttribute</td>
<td>Property</td>
</tr>
</tbody>
</table>
## Modeling concepts comparison

<table>
<thead>
<tr>
<th>Relationship concepts</th>
<th>Concept</th>
<th>Ecore</th>
<th>GOPPRR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Arity</td>
<td>binary</td>
<td>n-ary</td>
</tr>
<tr>
<td></td>
<td>Cardinality</td>
<td>(lower, upper)</td>
<td>(may be specified in a role)</td>
</tr>
<tr>
<td></td>
<td>Dependency</td>
<td>EClass</td>
<td>Project</td>
</tr>
<tr>
<td></td>
<td>Attributes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>Inheritance</td>
<td>multiple</td>
<td>single</td>
</tr>
<tr>
<td></td>
<td>Inheritable</td>
<td>EClass</td>
<td>Object, Relationship, Role, Port, Graph</td>
</tr>
</tbody>
</table>
# Modeling concepts comparison

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<thead>
<tr>
<th>Concept</th>
<th>Ecore</th>
<th>GOPPRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept as an attribute</td>
<td>$EClass$</td>
<td>$Object, Relationship, Role, Port, Graph$</td>
</tr>
<tr>
<td>Cardinality</td>
<td>(lower, upper)</td>
<td>-</td>
</tr>
<tr>
<td>Value pattern</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Dependency</td>
<td>$EClass$</td>
<td>$Project$</td>
</tr>
</tbody>
</table>
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Ease of use
Ease of use
Ease of use

• Restricting meta-concept’s **number of instances** in a model
  – GOPPRR allows the definition of object’s possible instances number
    • \{0\}, \{1\} and \{N\}
  – Ecore does not have this option
    • possible solution – use of OCL

![Project diagram]
Ease of use

• Mandatory properties
  – GOPPRR has regular expressions
    • powerful mechanism
      – value patterns
    • experienced users
    • „.+“ for mandatory property
  – Ecore has cardinalities
    • easy specification of mandatory properties
    • has an upper bound
Ease of use

• Relationship attributes
  – One of the main advantages of GOPPRR
  – *Referenced form type* modeled in both meta-languages
    • *CallFT* vs several EClasses
Ease of use
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Further research

• Some ideas/goals
  – Code generator
    • import the code into IIS*Case
  – Mapping between the meta-models using GOPPRR and Ecore specification
    • development of our own bridge
    • using EMF-MetaEdit+-Bridge
    • transformations between models in EMF
      – Epsilon or Xpand
  – Textual and visual editors
    • over the same IIS*Case repository
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Conclusion

• **Ecore**
  – EMF only for abstract syntax development
  – De facto standard
  – XMI

• **GOPPRR**
  – MetaEdit+ environment for graphical DSL creation
  – More expressive power
  – Easily extensible graphical representation
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End of presentation

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