itemis & geensys

The Eclipse Modeling Platform

Dr. Martin Mandischer
Dr. Stephan Eberle
Agenda

• itemis & geensys

• Vision and Goals of The Eclipse Modeling Platform

• The Eclipse Modeling Platform Industry Working Group

• Key Requirements and Architecture of the MP

• Gaps and Eclipse Projects

• Next Steps
Dr. Martin Mandischer
itemis
Head of Project Management
Prokurist, CSM, CSP, PMP®

Dr. Stephan Eberle
geensys
Development Manager
Lead of Artop Core and Validation
Sphinx project co-lead
itemis

- Specialist for model driven software development
- Founded in 2003
- Offices in Germany, France, Swiss and Canada
- 140 employees
- Strategic Member of Eclipse Foundation
- Close cooperation with research facilities
itemis Portfolio

- Model Driven Software Development
- Eclipse Modeling
- Enterprise Applications
- Embedded Systems
- Business Applications for mobile Devices
- Agile Projectmanagement
- Consulting and Coaching for Enterprise Application Development
Geensys

Engineering
E/E & mechatronics projects, SW IP modules

Custom Tools
Model-based solutions

Professional Services
Consulting services for E/E projects & processes
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Eclipse Modeling Project as of Today
Vision

“The Eclipse Modeling Platform (EMP) is an industrial quality integrated software platform designed to enable a complete tool chain of model-centric tools.

It will be based on existing Eclipse modeling technologies but focus on better integration, quality, scalability and usability for use in the enterprise“
Eclipse Modeling Project ➔ Eclipse Modeling Platform
Goals

- Identification, refinement and prioritization of key requirements
- Architecture
- Gap analysis and roadmap definition
- Planning and organization of an IWG
- Funding of development in selected Eclipse Modeling projects
- Project management and integration of platform
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The Modeling Platform IWG

• Started: Q4, 2009

• Current phase: Proposal

• User Companies
  • Alcatel-Lucent
  • Ericsson
  • Swift
  • UBS

• Solution Companies
  • itemis, Geensys,
  • Zeligsoft, Obeo
Current status

- MPIWG goals are clear
- High level requirements are understood
- Architecture draft exists
- Gaps in Eclipse Modeling projects analyzed
- Roadmap for requirements to be implemented in 2011
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Key Requirements (functional)

- **Model Version Management (Life-cycle Support)**
  - Versioning of metamodels and instances
  - Support of multi-user and distributed development teams

- **Model Migration**
  - Support for automatic application of metamodel changes to model instances

- **Model-level Compare and Merge**
  - Comparison/merge of model elements or fragments instead of entire resources/files
  - Model repository support

- **Traceability**

- **Model Auditing**
  - Support for review cycles and approvals
Key Requirements (non-functional)

• **Scalability**
  - Support for models containing 500,000+ model objects
  - 300,000 model objects in 7000 resources

• **Multi Modeling Language Support**
  - Support for different types of models during different steps of the software development lifecycle
  - Support for different versions of a metamodel in the same environment
  - Out of the box support of industry standards UML, BPMN and SysML
  - All MP services must be applicable to user-defined domain specific modeling languages
Feature vs. Architecture-driven Approach

Requirement/Use Cases

Architecture

Existing Eclipse (Modeling) Technology

To be provided Eclipse (Modeling) Technology
Architecture Objectives

• To **overcome fragmentation and duplication** of the Eclipse Modeling projects
  • Not driven by existing Eclipse Modeling technologies and their decomposition

• To **identify the services** the MP should provide ("20 Modeling Things")
  • Features and scope of each service
  • Dependencies between services
  • Layers regrouping services in meaningful subsets

• To provide a common **frame for alternative implementations**
Architecture

Coverage

Requirements

Required Services

Implied Services

Additional Services
Required Services

• Persistence (partially)
• Metamodel Management
• Version Management
• Access Control
• Compare & Merge
• Traceability
• …

▶ Mandatory, i.e., must be considered in effort estimation/planning
Implied Services

- Persistence (partially)
- Scoping
- Workspace Management
- Commands & Complex Operations (partially)
- Query & Indexing

▶ Mandatory,
i.e., must be considered in effort estimation/planning
Additional Services

- Navigation
- Editor Management
- Validation
- Workflow & Build Support
- Dynamic Modeling & Scripting
- Search & Replace
- Provisioning

► Optional, i.e., can be omitted in effort estimation/planning
Tentative Architecture Layers

- **Core Services**
  - Essential services (i.e., hardly possible to create any modeling applications without these)
  - Cross-cutting nature (i.e., impact all aspects of modeling applications)
  - Applicable to any kind of modeling application (i.e., modeling tools and non-tool applications)

- **Platform Services**
  - Extended services (i.e., provide support for important additional aspects but possible to create modeling applications without these)
  - Cross-cutting nature (i.e., impact multiple aspects of modeling applications)
  - Primarily used in for modeling tools (but not so much in non-tool applications)
Tentative Architecture Layers (cont’d)

- Application Services
  - Services supporting individual aspects of modeling applications (i.e., not all of them are necessarily required by any modeling application)
  - Applicable to any kind of modeling application (i.e., modeling tools and non-tool applications)
“Instantiation” of Modeling Platform Architecture: **Sphinx**

New Eclipse MDT project providing an integrated modeling tool platform

Main use case:

Modeling language(s) + Sphinx

⇒ Industrial strength integrated modeling tool environment

**Origins**

- AUTOSAR-independent layer (ECL) of **Artop**
- Backbone of **Papyrus**
Current Sphinx Architecture
Out-of-the-box UML Support: Papyrus

For standards:

• Papyrus is a graphical modeling tool for UML2 and SysML.
• Papyrus targets to implement 100% of the OMG specification!

For DSL:

• Papyrus provides a very advanced support for UML profiles enabling support for "pure" DSL.
• Papyrus support may be fully customized: model explorer, diagram editors, property editors, etc.

Main contributors: (Credit to Sébastien Gérard)
Papyrus is not a toy!

Papyrus and Airbus

• Airbus supports Papyrus by a concrete involvement in specification and validation activities and by funding developments.

• Papyrus will be the UML/SysML modeler of Topcased in Q3 2011: http://www.topcased.org

Papyrus and Esterel

• Joint labs between CEA and Esterel Technologies to collaborate and commercialize critical systems and software development tools and processes (http://www.listerel.org).

• Based on a Papyrus customization, Scade System Designer provides the system view on top of SCADE.

(Credit to Sébastien Gérard)
Papyrus snapshot

(Credit to Sébastien Gérard)
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## Requirements and Gaps

<table>
<thead>
<tr>
<th>High Level Requirement Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Model Version Management (Life-cycle Support)</td>
</tr>
<tr>
<td>B. Model Audit Support</td>
</tr>
<tr>
<td>C. Core Platform Features for Enterprise Use</td>
</tr>
<tr>
<td>D. Flexible Content Support</td>
</tr>
<tr>
<td>E. Governance</td>
</tr>
<tr>
<td>F. Host and Target Debugging</td>
</tr>
</tbody>
</table>
GAP Analysis
## Result of gap analysis

<table>
<thead>
<tr>
<th>Modeling Platform Requirement</th>
<th>Requirement effort for 2011 [PM]</th>
<th>Total requirement effort [PM]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total overall effort</td>
<td>446</td>
<td>1211</td>
</tr>
<tr>
<td>Management</td>
<td>25 %</td>
<td>72</td>
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<tr>
<td>Platform Integration</td>
<td>5 %</td>
<td>14</td>
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<tr>
<td>Integration Testing</td>
<td>25 %</td>
<td>72</td>
</tr>
<tr>
<td>Overall efforts</td>
<td>288</td>
<td>781</td>
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<tr>
<td>A. Model Version Management (Life-cycle Support)</td>
<td>125</td>
<td>287</td>
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<tr>
<td>B. Model Audit Support</td>
<td>12</td>
<td>27</td>
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<tr>
<td>D. Flexible Content Support</td>
<td>151</td>
<td>352</td>
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<tr>
<td>E. Governance</td>
<td>0</td>
<td>42</td>
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<tr>
<td>F. Host and Target Debugging</td>
<td>0</td>
<td>73</td>
</tr>
</tbody>
</table>
Potential Eclipse projects

Evaluation Criteria
• Functionality
• Customizability
• Extensibility
• Scalability
• Usability
• Interoperability
• Documentation

<table>
<thead>
<tr>
<th>Project</th>
<th>Tool</th>
</tr>
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<tbody>
<tr>
<td>Acceleo</td>
<td>MTF</td>
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<tr>
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<td>EMF Compare</td>
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<td>EMF Transaction</td>
<td>UML 2</td>
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<td>EMF Validation</td>
<td>Xpand</td>
</tr>
<tr>
<td>Yakindu</td>
<td>Xtend</td>
</tr>
</tbody>
</table>
## Next Steps

- Roadmap
- Process
- Funding
- Formal approval of IWG at Eclipse Foundation
- Development & **Integration**
Information

Links: www.eclipse.org
      wiki.eclipse.org/ModelingPlatform
      wiki.eclipse.org/Eclipse_MDD_Day
      “20 Modeling Things”

Mail: mpwg@eclipse.org

itemis: www.itemis.de

g eensys: www.geensys.com
Questions & Discussion