Leveraging UML 2.0 and Open Source Technologies to Build Next Generation Modeling Tools and IDEs

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What is Eclipse?

- A kind of universal tool platform
- Open, extensible IDE for anything and nothing in particular
- The basis for a variety of tools and products
Benefits of Using Eclipse

- Facilitates seamless integration of tools within and across different content types and tool providers
- Supports
  - both GUI and non-GUI-based application development environments
  - the construction of a variety of tools
  - an unrestricted set of tool providers
  - tools to manipulate arbitrary content types
- Runs on a wide range of operating systems
What is EMF?

- *Eclipse Modeling Framework*
- A modeling framework and code generation facility for building tools and other applications based on a structured data model
- Provides
  - tools and runtime support to produce a set of Java classes for the model
  - a set of adapter classes that enable viewing and command-based editing of the model
  - a basic editor
- Provides the foundation for interoperability with other EMF-based tools and applications
Benefits of Using EMF

- Integration with Eclipse
- Eclipse-independent core APIs
- Compatibility with EMOF (Essential MOF), an OMG standard
- Customizable serialization/deserialization to/from XMI
- Edit command framework for undo/redo support
- Extensible validation framework
- Interoperability with other EMF-based components
What is GEF?

- **Graphical Editing Framework**
- Allows developers to create a rich graphical editor from an existing application model
- Provides
  - a layout and rendering toolkit for displaying graphics
  - many common operations which can be extended for a specific domain
- Employs MVC (model-view-controller) paradigm which enables simple changes to be applied to the model from the view
Benefits of Using GEF

- *Integration* with Eclipse
- Eclipse-independent core APIs
- *Extensible* palette with built-in tools
- Handles for resizing objects and bending connections
- *Extensible* controller framework for mapping model to view
- Edit command framework for undo/redo support
- Common look and feel with other GEF-based components
What is UML2?

- **Unified Modeling Language 2.0**
- An EMF-based implementation of the UML 2.0 metamodel for the Eclipse platform
- Provides
  - a useable implementation of the metamodel to support the development of modeling tools
  - a common XMI schema to facilitate interchange of semantic models
  - test cases as a means of validating the specification
  - validation rules as a means of defining and enforcing levels of compliance
Benefits of Using UML2

- *Integration* with Eclipse
- Eclipse-independent core APIs
- *Compliance* with UML (Unified Modeling Language) 2.0, an OMG standard
- Validation rules based on OCL constraints
- *Interoperability* with other UML2-based components
Anatomy of a Next Generation Modeling Tool

- Product Level UI (Actions, Dialogs, Wizards)
- Product Level Editors
- UML Diagram Plug-ins
- UML Notation model
- Modeling Diagram Framework
- Notation model
- Service Layer
- OMG UML
- OMG DI
- UML2
- EMF
- GEF
- Eclipse
Thank You
Backup Slides
UML2: Overview

- An Eclipse Tools subproject at http://www.eclipse.org/uml2
- An EMF-based implementation of the UML 2.0 metamodel for the Eclipse platform
- Project lead is Kenn Hussey (khussey@ca.ibm.com)
- Users include IBM (Rational Software Architect) and Omondo (EclipseUML2)
UML2: Goals

- Provide a useable implementation of the metamodel to support the development of modeling tools
- Provide a common XMI schema to facilitate interchange of semantic models
- Provide test cases as a means of validating the specification and implementation
- Provide validation rules as a means of defining and enforcing levels of compliance
UML2: Challenges

- Since the specification isn’t finalized, the API is a moving target

- Aspects of the standard metamodel (redefinition, subsets/supersets) make the mapping to Java and XMI difficult

- There are a number of errors in the specification which, until fixed, make the API and XMI schema difficult to use

- Compliance points for UML 2.0 are a subject of much debate within the modeling community
UML2: Status – Metamodel

- EMF-generated API based on a collapsed version of the metamodel in which package merges and a majority of the redefinitions have been factored out
- Includes mechanisms to support derived union, redefines, and subsets constraints
- Generated using a customized Ecore “builder” and JET templates
UML2: Status – Interchange

- Default XMI schema generated using EMF
- Defines one namespace (http://www.eclipse.org/uml2/1.0.0/UML) for all elements, thus supporting interchange
- Elements identified using Universally Unique Identifiers (UUIDs)
- Will support import/export from/to OMG XMI for UML 2.0 once the specification is finalized
UML2: Status – Specification

- UML 2.0 Superstructure FTF has delivered final draft and report to OMG

- Errors discovered while using the API and/or XMI schema are now being fixed and submitted as issues to the UML 2.0 Superstructure and Infrastructure Revision Task Force (RTF)

- UML 2.0 Superstructure and Infrastructure RTF already has a number of open issues, available at http://www.omg.org/issues/uml2-rtf.open.html

- Finalization date for UML 2.0 Specification is TBD (soon!)
UML2: Status – Compliance

- Validation rules evaluated using EMF validator mechanism
- Validators implemented based on sets of OCL constraints
- Correspond to compliance levels
UML2: Milestones

- Maintenance release 1.0.2 to coincide with Eclipse 3.0.2 and EMF 2.0.2
- Release 1.1 to coincide with Eclipse 3.1 and EMF 2.1
- Release 2.0 to coincide with Eclipse 3.2 and EMF 2.x
UML2: Development Plans – 1.1

- **Theme: Release Currency**
  - Eclipse 3.1 / EMF 2.1 Compatibility

- **Theme: Built To Last**
  - Migration Framework
  - Resource Localization
UML2: Development Plans – 1.1 (Continued)

- Theme: Simple To Use
  - Update Site Support
  - Instance Creation Support
  - More Examples
  - EMF Generator Extensions
  - Improved Documentation
UML2: Development Plans – 2.0

- Theme: Release Currency
  - Eclipse 3.2 / EMF 2.x Compatibility

- Theme: Completeness
  - UML 2.0 Conformance
  - UML 2.0 Interchange
  - Validation Rules
  - Unit Tests

- Theme: Built To Last
  - Reduced Memory Footprint
UML2: Development Plans – 2.0 (Continued)

- Theme: Simple To Use
  - Resource Fragments
  - Derived Features
  - Javadoc
  - Improved Convenience Methods
  - Enhanced Icons

- Theme: Broadening The Community
  - Tools
UML2: How Can You Help?

- Develop tools based on UML2
- Report bugs
- Participate in newsgroup discussions
- Write articles
- Become a UML2 contributor!