Comparing and Merging Models with Eclipse

An update on EMF Compare ...

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Working with models in Eclipse?
EMF / GMF: modeling support

- Modeling, Meta-modeling
- Editors and modelers

```
platform:/resource/fr.obeo.dsl.mindmap/mindmap
- mindmap
  - DocumentRoot
    - map: Map
  - Map
    - title: EString
    - author: EString
    - ownedTopics: Topic
    - ownedRelationships: Relationship
  - Topic
  - Thread
  - ThreadItem
  - Relationship
```
M2T / Acceleo: generate text from models
M2M : transform models to models

- UML Tools, Query/Transaction/Validation, ...
Have a try?
No team-work support
Back in 2006...
Eclipse Summit Europe 2006

- Modeling symposium lighten the fact that this component is essential and missing.
- Obeo and Intalio contribute their own initial implementations
Result?

- differencing
- merging
- team API integration
- diff export
- extensibility
History

- October 2006: Eclipse Summit Europe
- November 2006: EMF Compare Proposal
- March 2007: IP approval
- June 2007: First builds on Eclipse.org
- September 2007: Stable builds for 0.7.0
- January 2008: 0.8.0 is « feature complete »
Why should you bother?
As an Eclipse user

- develop using models!
As an RCP developer

- compare your own business objects
- do not depend on Eclipse IDE
- « in memory » comparison
- produce history reports
As an « development tools » developer

- incremental processing
- « mymodel » support
- XML based file comparison

```xml
<extension
    point="org.eclipse.core.contenttype.contentTypes">
  <content-type
    id="org.eclipse.emf.compare.ui.contenttype.ModelContentType"
    name="Model File"
    priority="normal"
    file-extensions="mymodel">
  </content-type>
</extension>
```
As a researcher

- testbed for models/graphs comparison algorithms
How does it work?
Principles: models everywhere
Phase 1: matching elements

The diagram illustrates a process involving two versions (version 1 and version 2) of a model, which are matched by a generic match engine. The matched models are then used to build a diff (difference) model. This diff model is further refined and extended. The final result is exported and presented to the user interface for display and interaction.
Match engine

- are « a » & « b » similars ?
- produce a match model

version 1

match model

version 2
Generic matching engine

- heuristic based
- metamodel agnostic
- 4 metrics
  - name
  - content
  - type
  - relations
Phase 2: differencing
Differencing engine

- produces the diff model from the match model

- 70 changes in model
  - 70 changes in gmfgen
    - 3 changes in LinkLabelAlignment
      - 1 changes in MIDDLE
      - 1 changes in TARGET
      - 1 changes in SOURCE
    - 3 changes in TypeModelFacet
      - 3 changes in modelElementInitializer
        - GenElementInitializer has been removed from reference eType in modelElementInitializer
        - typeModelFacet has been removed from reference eOpposite in modelElementInitializer
        - EGenericType has been removed
  - 4 changes in ViewmapLayoutType
  - 2 changes in Palette
    - 2 changes in groups
Phase 3 : extending the diff model
Diff model export
Diff model export

- export a model containing « diff » and « match » model : emfdiff file
Extensibility
Performances : figures

- **UML model**
  - UML2.0, 130+ elements : 0.3 second
  - UML2.0, 4600+ elements : 1 second
  - UML1.3, 65 000+ elements : 4 minutes

- **Ecore model**
  - gmfgraph.ecore, 450+ elements : 1 second
  - gmfgen.ecore, 1200+ elements : 3 seconds
  - 6000+ elements, very flat model : 20 seconds
  - 45 000+ elements : 4 minutes
Performances parameters

Quantity of information

Unstructured model

Number of differences

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Current status

- 0.7.0 stable release
  - merge/differencing
  - reference documentation
  - « 2 way » comparison
  - Ecore/XMI Id handling
  - metamodel agnostic
  - match engine extensibility
  - export API

- 0.8.0 interim builds
  - « 3 way » comparison
  - diff engine extensibility
  - diff model extension
  - performances enhancements

Community

- « up-to-date » doc is in the wiki
- great feedbacks
- bugs and enhancements requests
- patches
- coming soon : release review

Eclipse.org

- automated builds
What's next?
Roadmap

- 0.8.0 release
  - 3 way comparison
  - diff model extension
  - diff engine extensibility
  - tutorial documentation

- Ganymede simultaneous release
  - stability/efficiency
  - other tools integrations
  - API validation
Alternatives engines and settings

- specific properties (big models...)
- performances
- weight-based engine
Proxy resolving on version control systems
Integration in modelers
Thanks for your attention, any question?

- Further information:
  - http://www.eclipse.org/modeling/emft/?project=compare#compare