EMF Diff / Merge

an engine for syntactically consistent merged models

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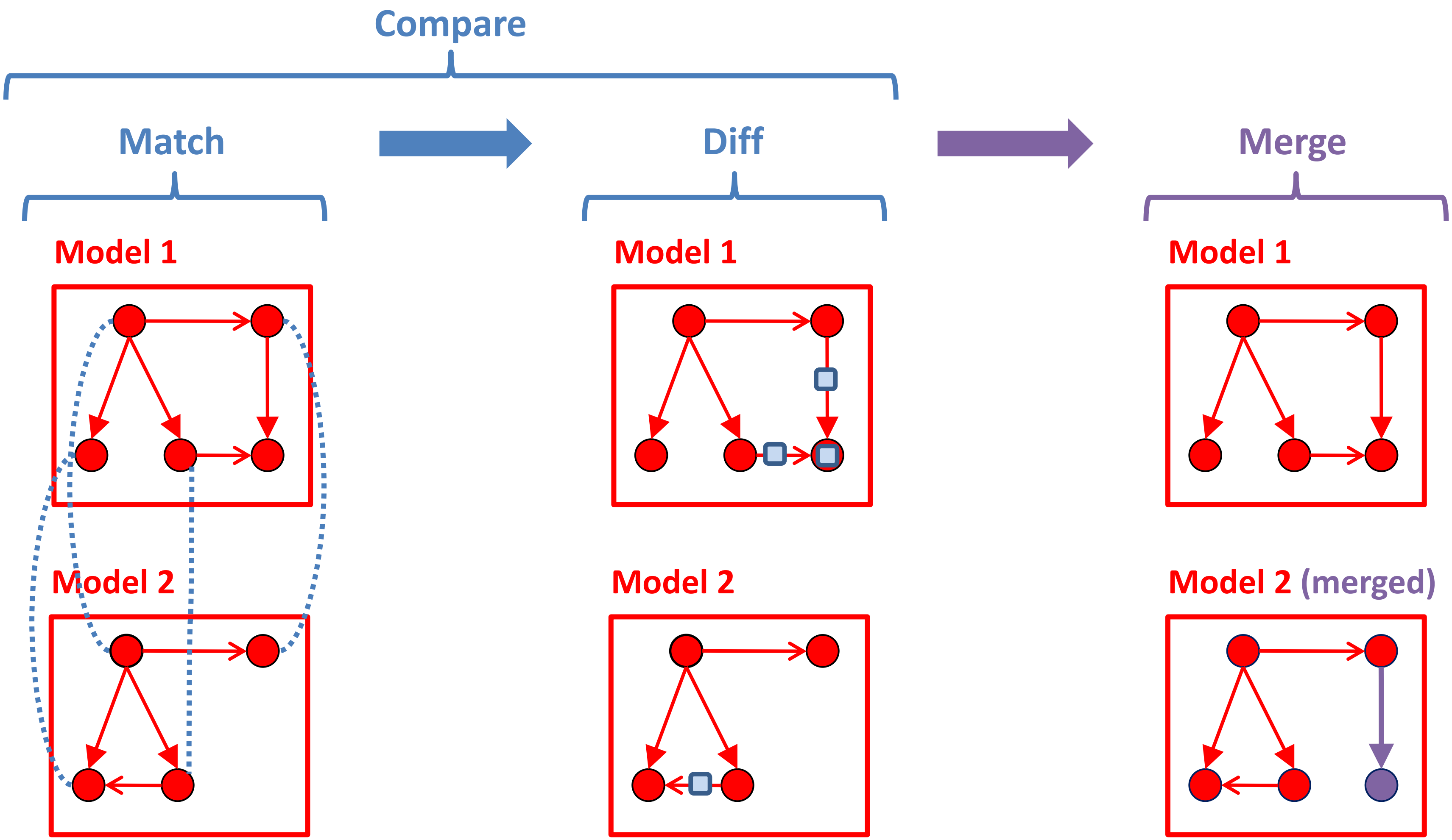
Background – Merging Models



Why Merging Models?

A recurrent need

- Version control
- Iterative model transformation
- Model refactoring
- Bridge between model-based tools
- Others …

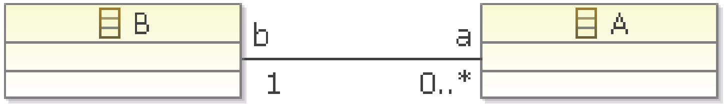
➔ « Merge » as a fundamental feature when developing model-based tools

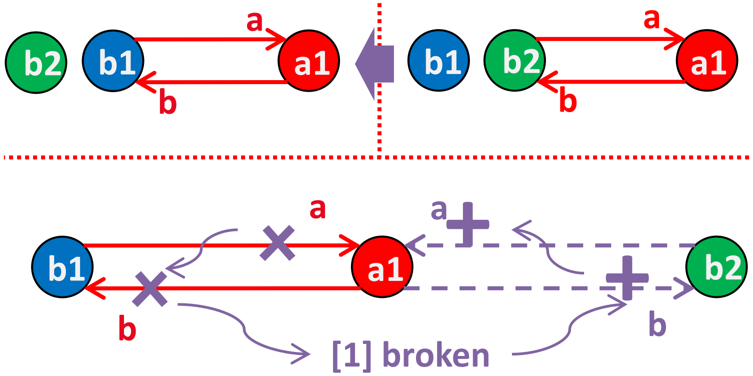
- But… that can be hazardous

Problem

An erroneous merge can break a model

- ◆ A difference is local to a model element
- ◆ A model is globally constrained by its metamodel
- ➔ Some differences are semantically related and should be merged together

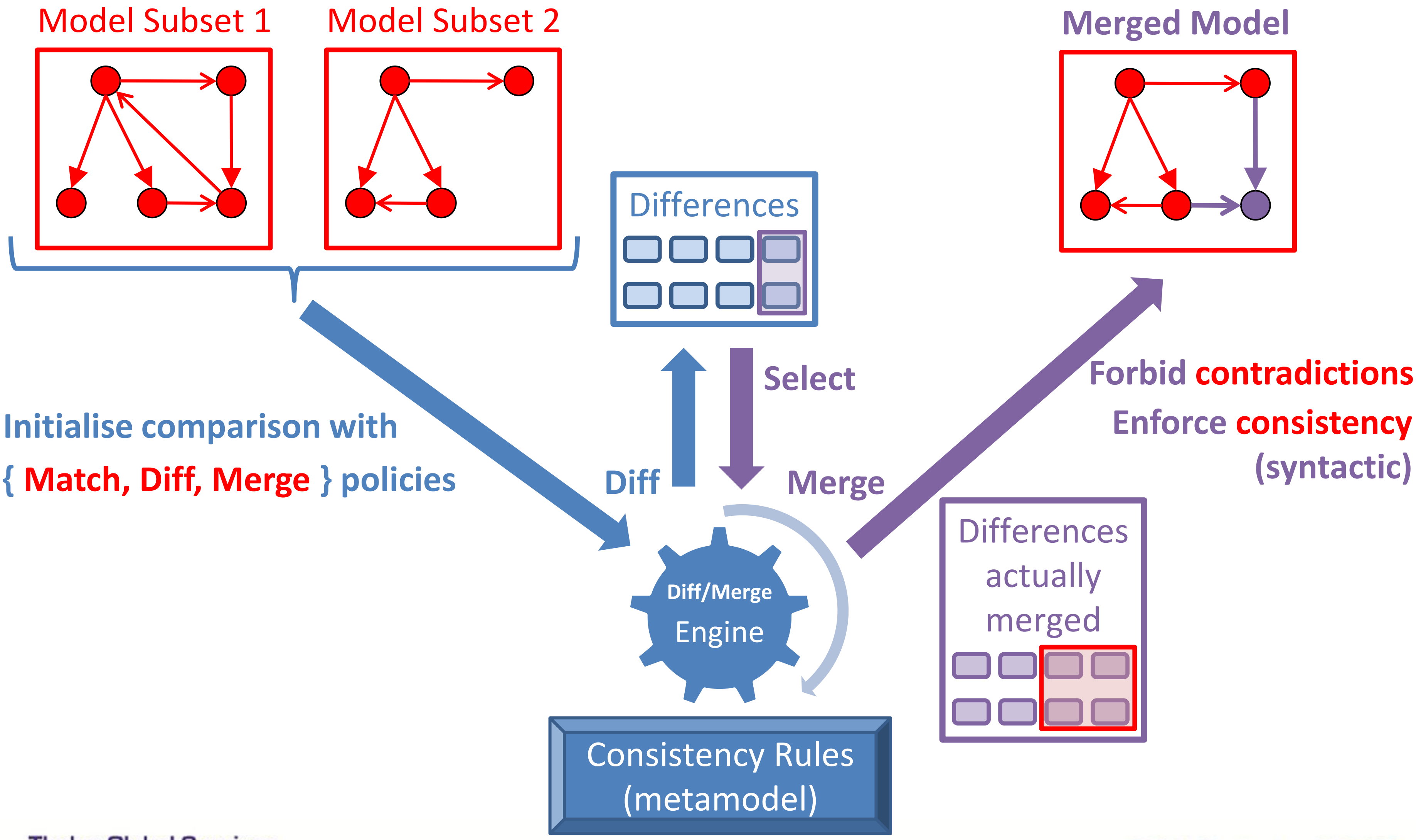




What can be done?

- ◆ If metamodel is known, develop specific merging rules
- ◆ But what if: metamodel evolves, is unknown, or there are too many metamodels? Can we provide minimal guarantees?

Principle of EMF Diff/Merge



Model Subset 1

Model Subset 2

Merged Model

Differences

Initialise comparison with

{ **Match, Diff, Merge** } policies

Diff

Select

Merge

Forbid **contradictions**

Enforce **consistency**

(syntactic)

Diff/Merge

Engine

Differences actually merged

Consistency Rules (metamodel)

The EMF Diff/Merge Project

Origin at Thales Global Services

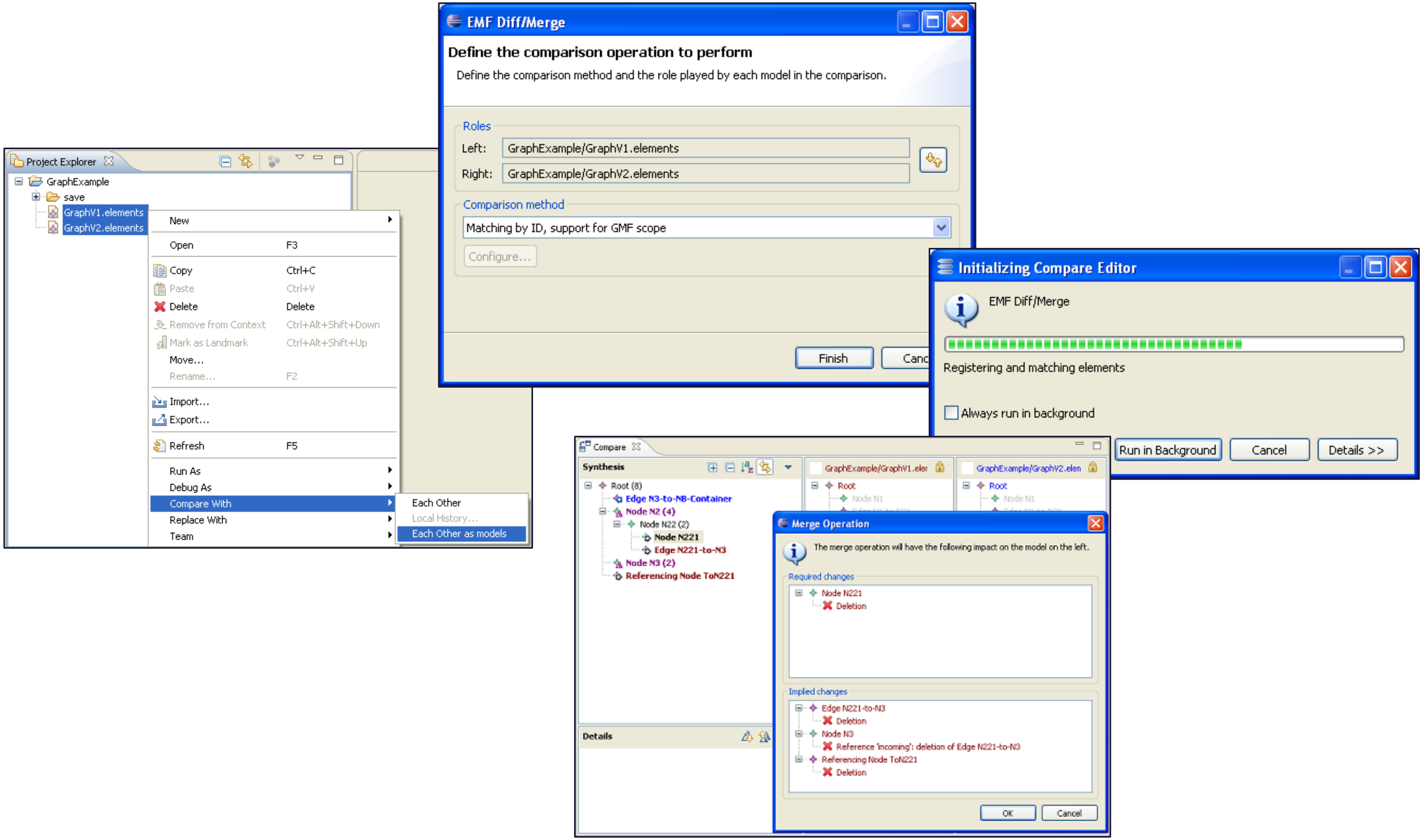
- Spring 2010: the need is becoming too strong for us
- Summer 2010: definition of a conceptual basis
- Autumn 2010: start of prototyping phase
- Since then: operational usage for certain scenarios, integration into higher-level tools

Now at Eclipse

- Useful to us ➔ certainly useful to others
- Spring–Summer 2012: project creation (EMF sub-project)
  - In the context of the AGeSys project (French "System@tic" ICT cluster) AGeSys
- Intent: sound basis for helping develop higher-level tools

- Now available! Come and try it ☺ http://wiki.eclipse.org/EMF_DiffMerge

Demo



EMF Diff/Merge

Define the comparison operation to perform

Define the comparison method and the role played by each model in the comparison.

Roles

Left: GraphExample/GraphV1.elements

Right: GraphExample/GraphV2.elements

Comparison method

Matching by ID, support for GMF scope

Initializing Compare Editor

EMF Diff/Merge

Registering and matching elements

□ Always run in background

Merge Operation

The merge operation will have the following impact on the model on the left.

Required changes

- Node N221
  - Deletion

Implied changes

- Edge N221-to-N3
  - Deletion
- Node N3
  - Reference 'incoming': deletion of Edge N221-to-N3
- Referencing Node ToN221
  - Deletion

Typical Usage

Programmatic

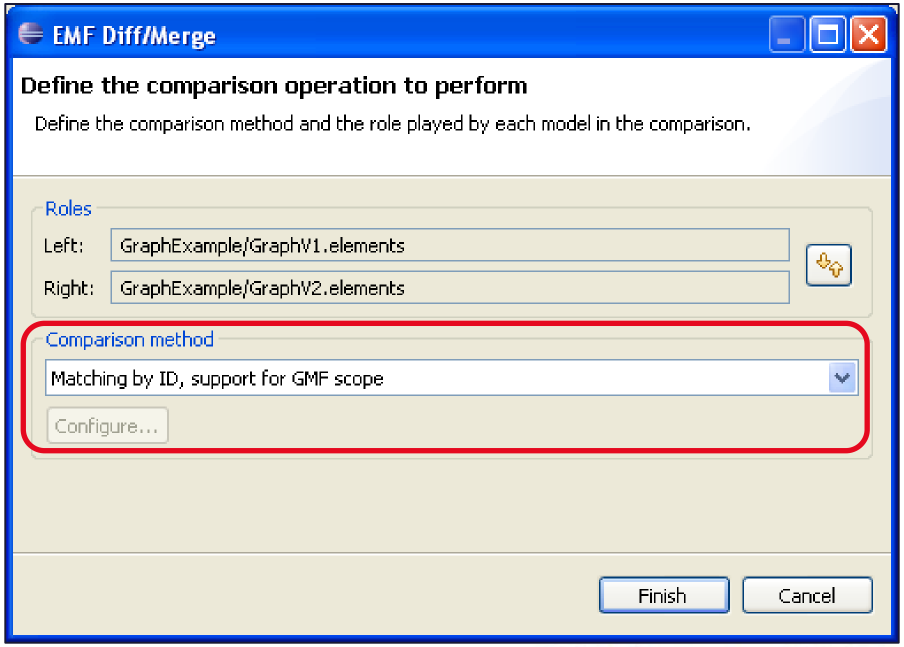
```
IComparison c = new EComparisonImpl(scope1, scope2);

c.compute(matchPolicy, diffPolicy, mergePolicy, progressMonitor);

c.merge(differenceSelector, progressMonitor);
```

Contributive (sample GUI)

- **Definition of selectable comparison methods**
- **Comparison method =**
  - Applicability conditions
  - Model scope definition
  - Match, Diff, Merge policies



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