

Collaborative Modeling

Papyrus and Modeling Technologies
Developer Summit

Collaboration on EMF- based models

Why support for collaborative modeling is **Important**

Industrial application of model-based engineering (MBE)

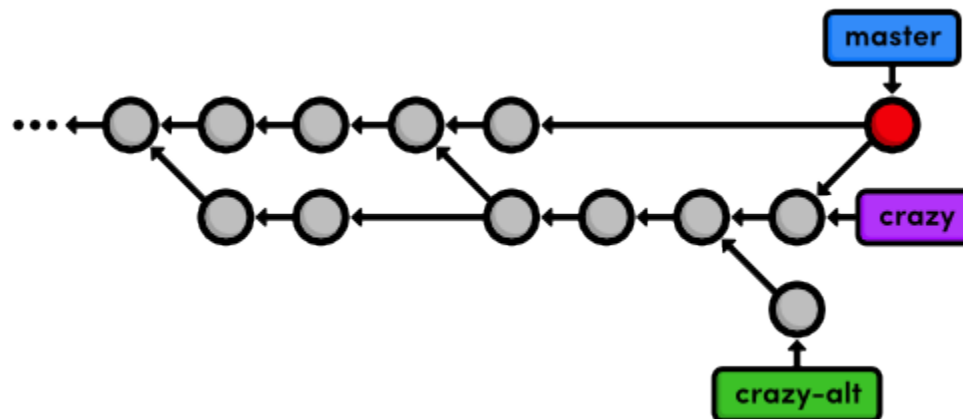
- Industrial projects are large
- Teams of developers need to collaborate



Why support for collaborative modeling is Important

Efficient collaboration in MBE

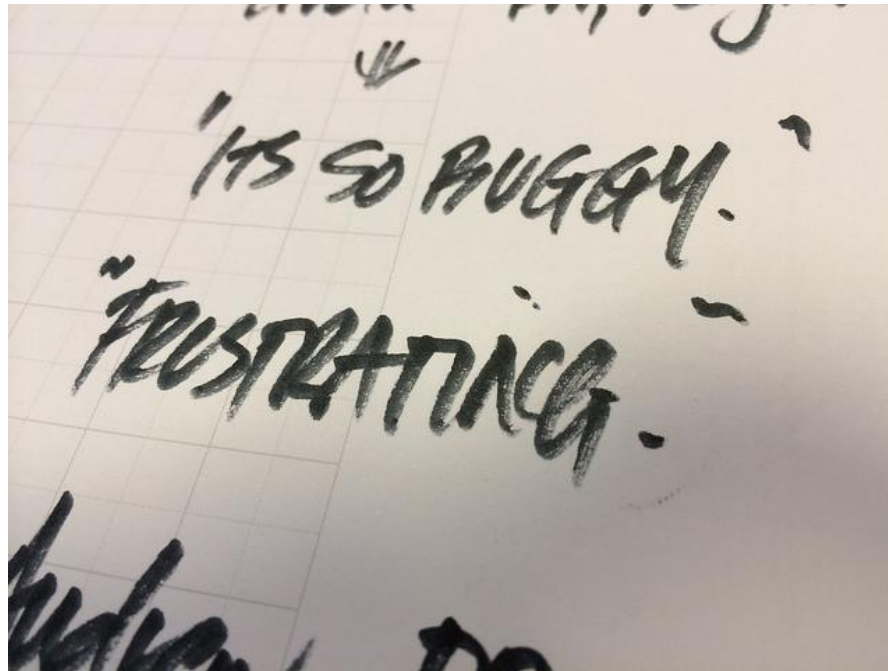
- Concurrent changes on models
- Multiple versions of models
- Compare, review, and merge model versions



Why support for collaborative modeling is Important

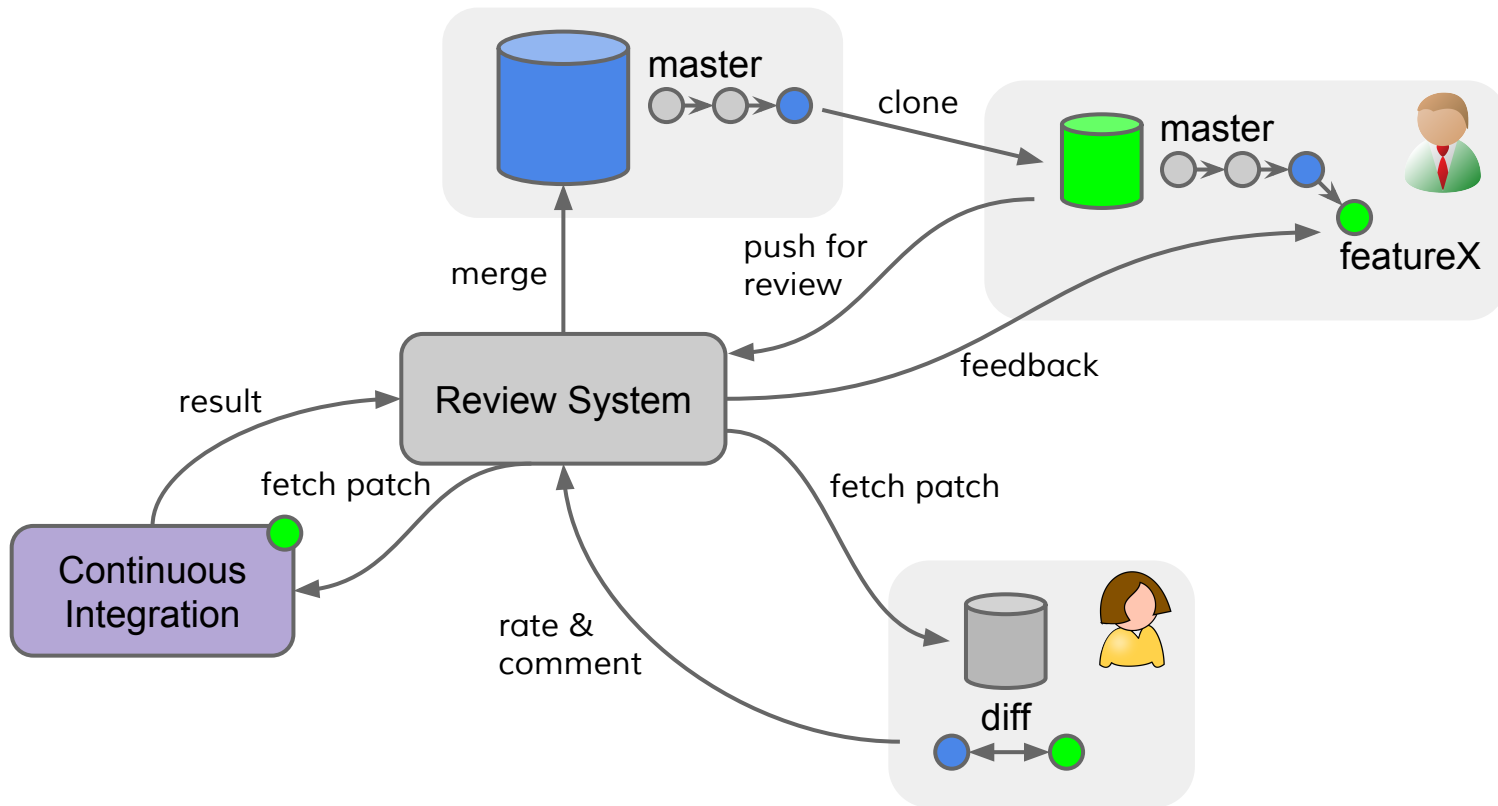
No proper collaboration support: no efficient work

- Inefficiency hurts the benefits of MBE
- Success of model-based projects is at stake



Gerrit process for

Collaborative Development



Why support for collaborative modeling is Challenging

Graph structure instead of flat text

- Graph matching and differencing
- Combinatorial complexity (change types, languages)

Diagrams, logical models, files

- Graphical differencing
- Multiple views (diagrams) on one or more models
- Model may spread multiple files

Models serve diverse purposes for different stakeholders

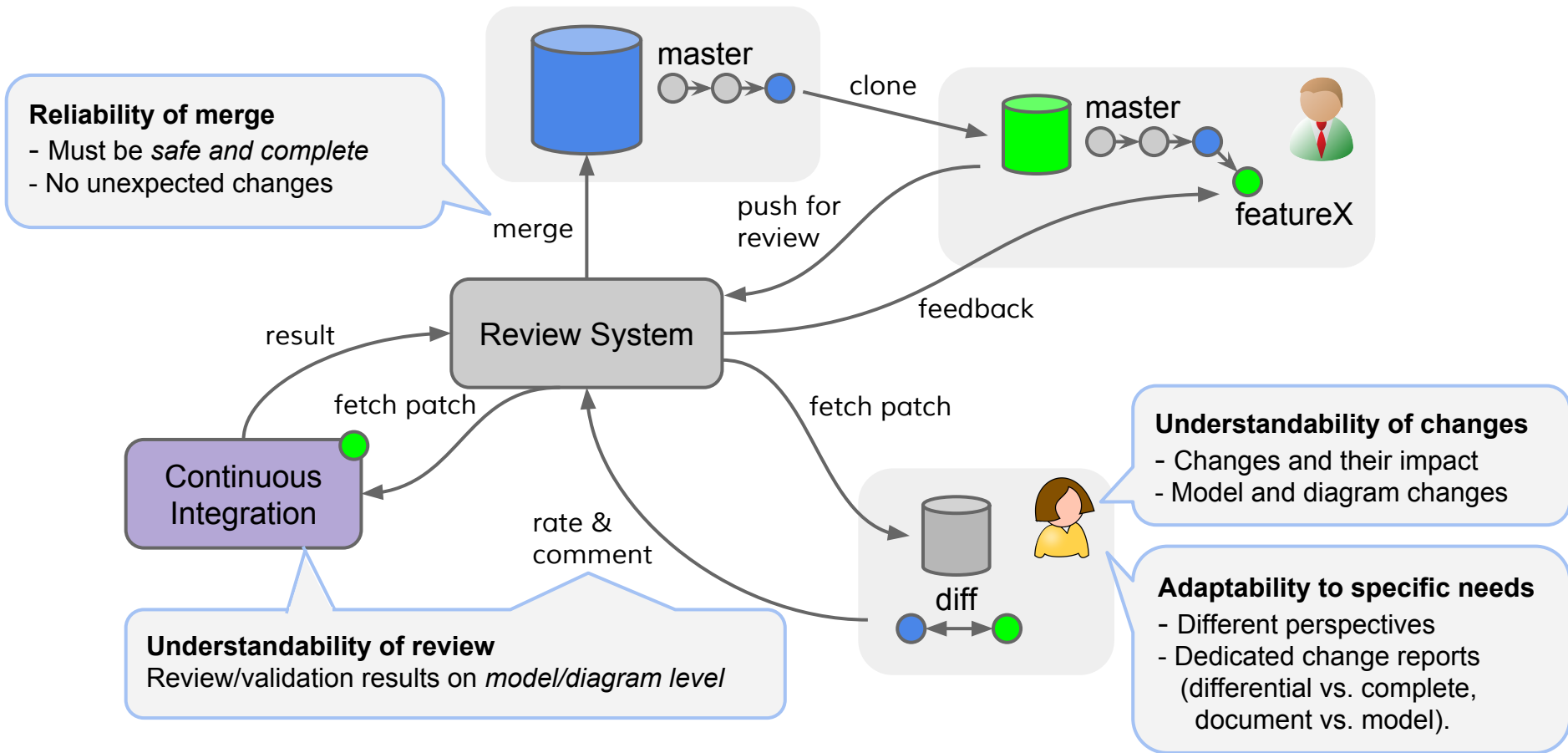
- Sketch, design, implementation
- Different requirements
e.g., for visualizing changes, validation, reviewing

Why support for collaborative modeling is Challenging

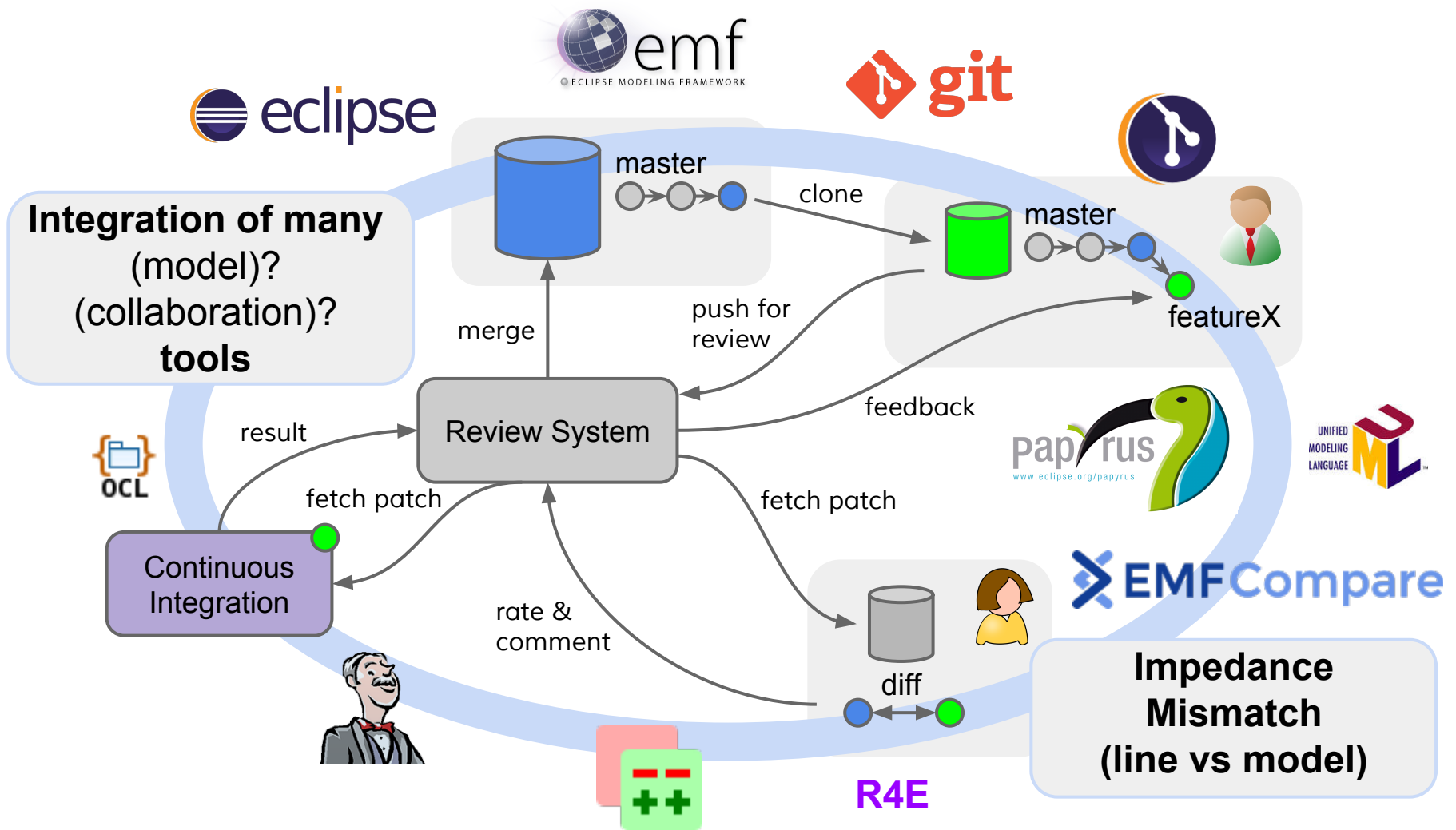
Critical non-functional requirements

- **Reliability**
 - Error destroys work and time
 - Risk of losing the users' trust
 - Mitigates potential benefits of MBE
- **Understandability**
 - Models are the most valuable assets of the project
 - Users have to understand the models' evolution
 - Communication (e.g., comments) must be on model level
- **Tool integration and efficient workflows**
 - Collaboration tools need to be tightly integrated
 - Easy for plain text, hard for diagrams and models
 - Modeling editors, diffing tools, reviewing platforms, ...

Why support for collaborative modeling is Challenging



Why support for collaborative modeling is Challenging



What we cover today in

This Session

- Comparing models with EMF Compare
 - Model and diagram comparison
 - Comparing models split across resources
 - Reliability of differencing and merging
- Versioning models with Git
 - Integration of EGit and EMF Compare
 - Logical model resolution and merging
- Model review and workflow support
 - Plans on integration with Gerrit connector
 - Plans on integration with Papyrus

Comparing Models with EMF Compare

So far

Comparing Models

```
Local: compare.ecore
189 ..... eType="#//Diff" eOpposite="#//Diff/requirement"
190 ..... <eAnnotations source="http://www.eclipse.org/em
191 ..... <details key="documentation" value="This will
192 ..... </eAnnotations>¶
193 ..... </eStructuralFeatures>¶
194 ..... <eStructuralFeatures xsi:type="ecore:EReference"
195 ..... eType="#//Diff" eOpposite="#//Diff/requiredBy"
196 ..... <eStructuralFeatures xsi:type="ecore:EReference"
197 ..... eType="#//Diff" eOpposite="#//Diff/implies"/>
198 ..... <eStructuralFeatures xsi:type="ecore:EReference"
199 ..... eType="#//Diff" eOpposite="#//Diff/refinedBy"
200 ..... <eAnnotations source="http://www.eclipse.org/em
201 ..... <details key="documentation" value="This can
202 ..... </eAnnotations>¶
203 ..... </eStructuralFeatures>¶
204 ..... <eStructuralFeatures xsi:type="ecore:EReference"
205 ..... eType="#//Diff" eOpposite="#//Diff/refines"/>¶
206 ..... <eAnnotations source="http://www.eclipse.org/em
207 ..... <details key="documentation" value="This will
208 ..... </eAnnotations>¶
209 ..... </eStructuralFeatures>¶
210 ..... <eStructuralFeatures xsi:type="ecore:EReference"
211 ..... changeable="false" transient="true" derived="
212 ..... <eStructuralFeatures xsi:type="ecore:EAttribute"
213 ..... <eAnnotations source="http://www.eclipse.org/em
214 ..... <details key="documentation" value="Describes
215 ..... </eAnnotations>¶
216 ..... </eStructuralFeatures>¶
217 ..... <eStructuralFeatures xsi:type="ecore:EAttribute"

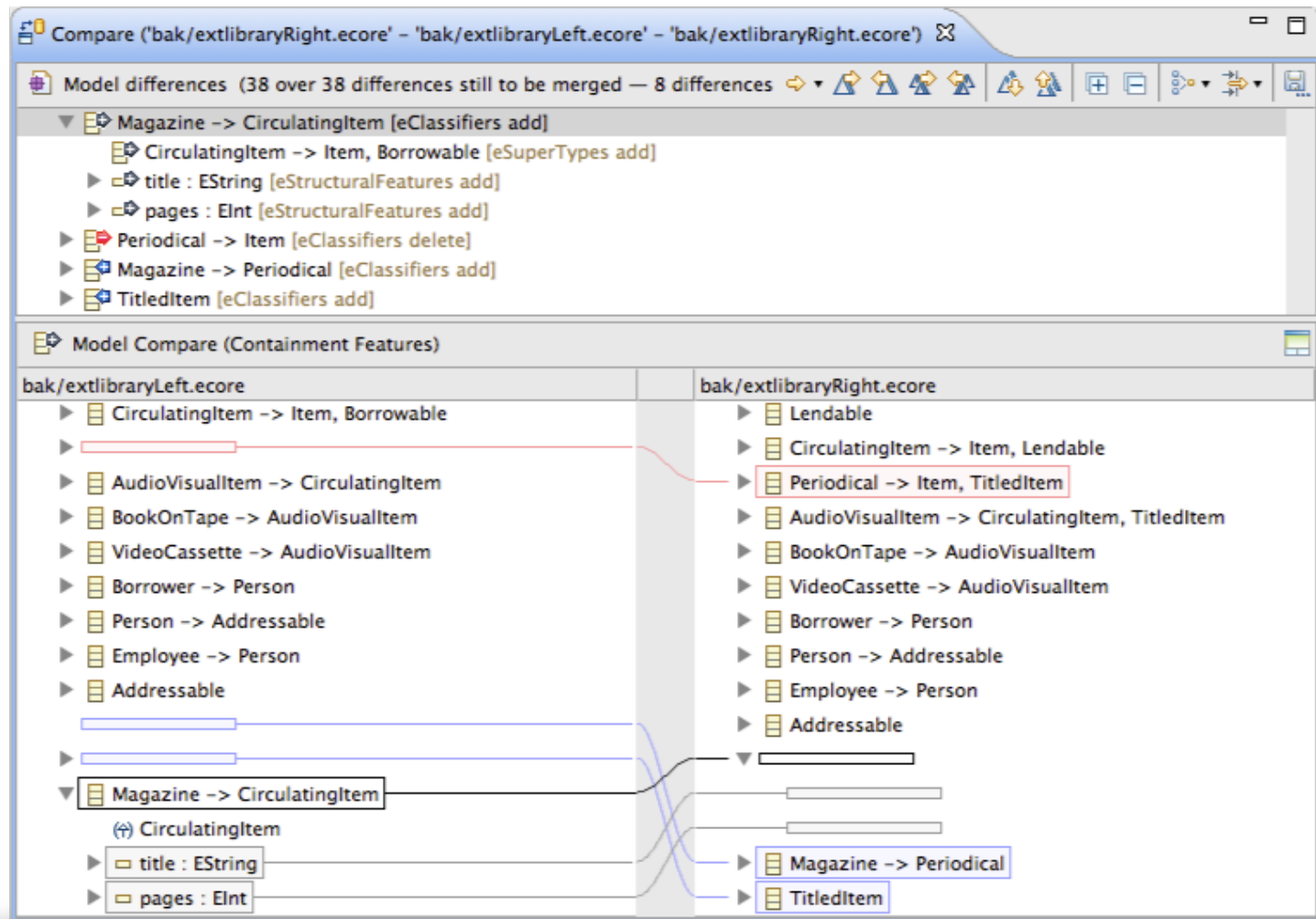
compare.ecore 48ec9e4... (cbrun)
186 ..... <eStructuralFeatures xsi:type="ecore:EReferen
187 ..... eType="#//Diff" eOpposite="#//Diff/require
188 ..... <eAnnotations source="http://www.eclipse.or
189 ..... <details key="documentation" value="This
190 ..... </eAnnotations>¶
191 ..... </eStructuralFeatures>¶
192 ..... <eStructuralFeatures xsi:type="ecore:EReferen
193 ..... eType="#//Diff" eOpposite="#//Diff/refine
194 ..... <eAnnotations source="http://www.eclipse.or
195 ..... <details key="documentation" value="This
196 ..... </eAnnotations>¶
197 ..... </eStructuralFeatures>¶
198 ..... <eStructuralFeatures xsi:type="ecore:EReferen
199 ..... eType="#//Diff" eOpposite="#//Diff/refine
200 ..... <eAnnotations source="http://www.eclipse.or
201 ..... <details key="documentation" value="This
202 ..... </eAnnotations>¶
203 ..... </eStructuralFeatures>¶
204 ..... <eStructuralFeatures xsi:type="ecore:EAttribu
205 ..... <eAnnotations source="http://www.eclipse.or
206 ..... <details key="documentation" value="Descr
207 ..... </eAnnotations>¶
208 ..... </eStructuralFeatures>¶
209 ..... <eStructuralFeatures xsi:type="ecore:EAttribu
210 ..... eType="#//DifferenceSource"/>¶
211 ..... <eAnnotations source="http://www.eclipse.or
212 ..... <details key="documentation" value="Retur
213 ..... </eAnnotations>¶
```



EMF Compare

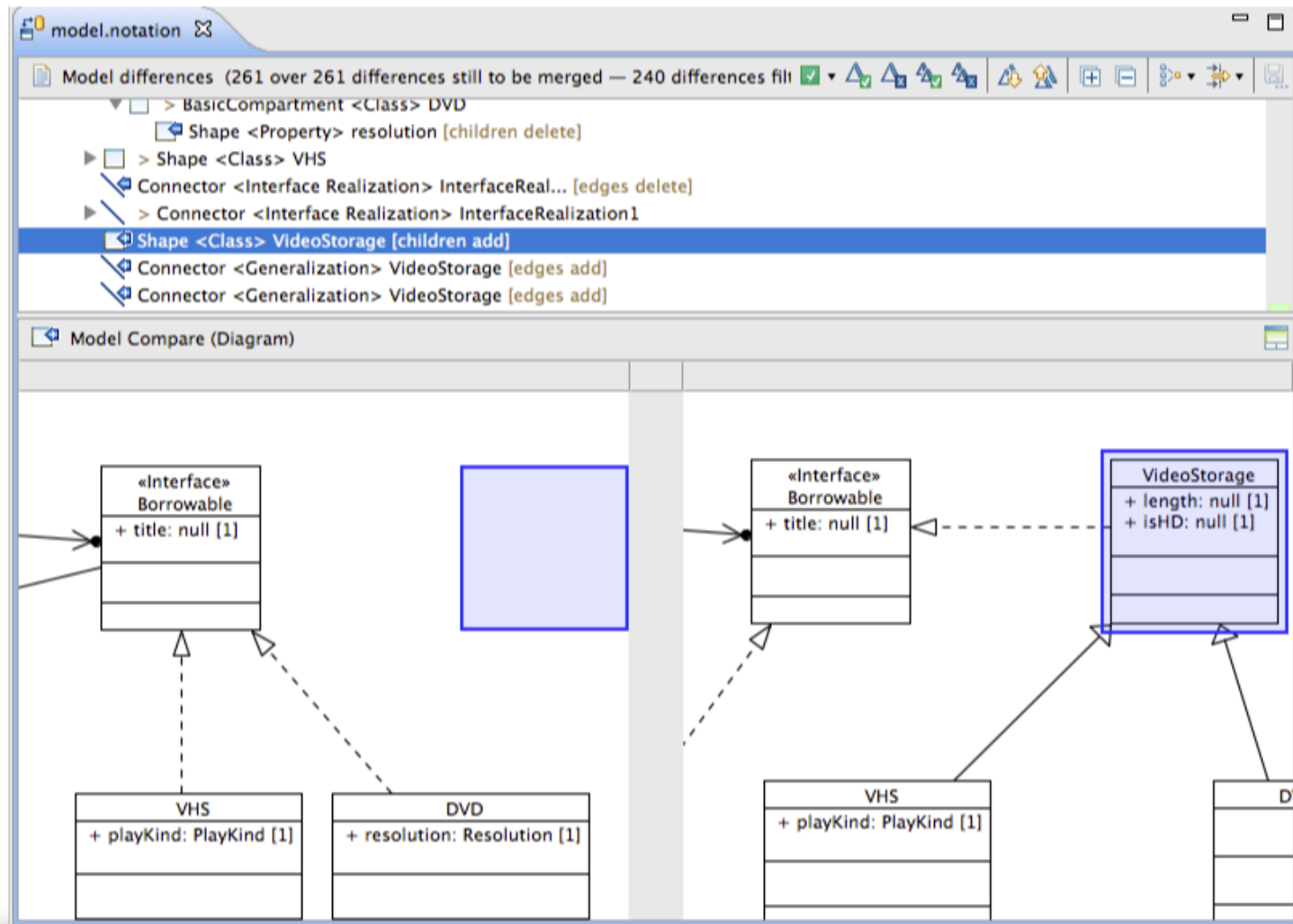
Now

EMF Compare



Now

EMF Compare



EMF Compare

Demo

- Preview of merge consequences
- Filters and Groups
- Diagrams comparison

Team Modeling Challenges

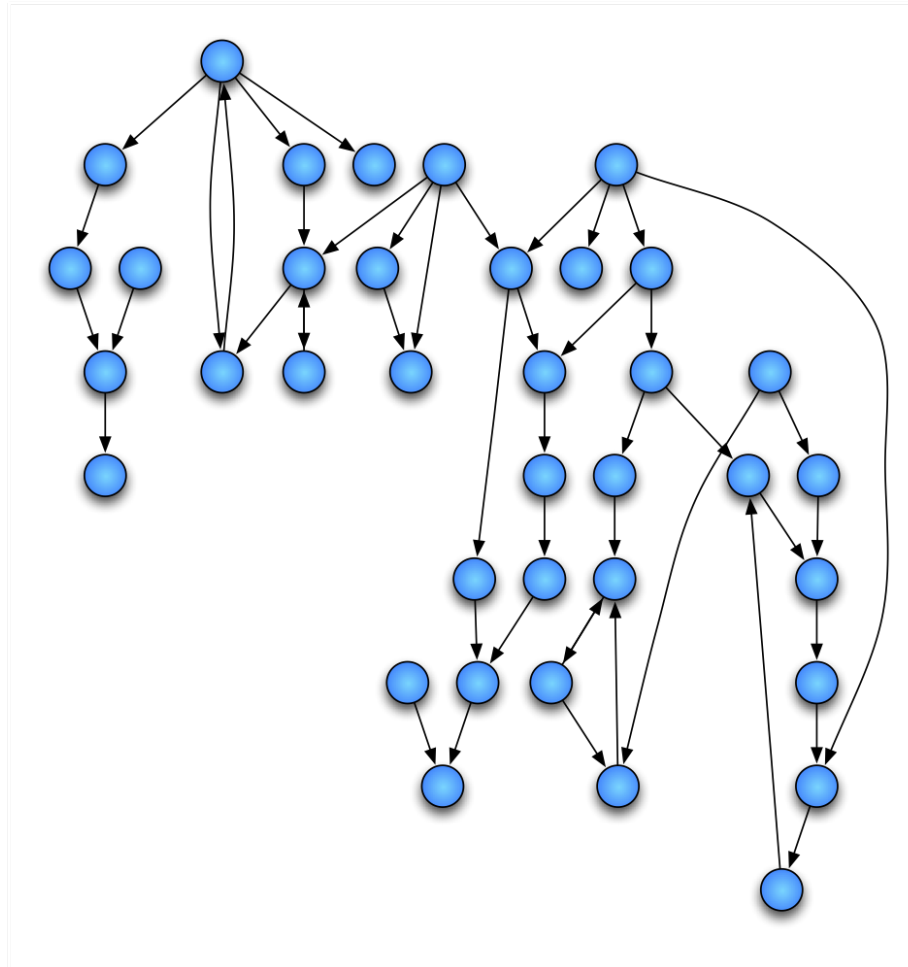


What about the
Consistency?



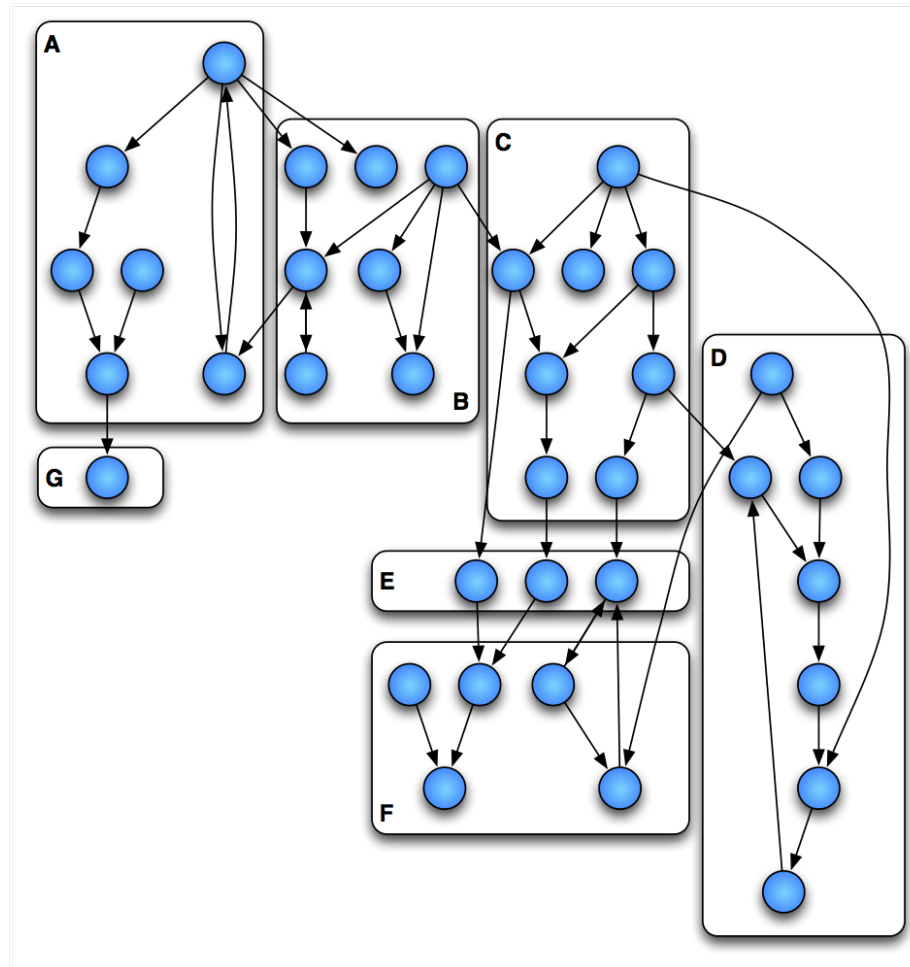
EMF Models are

Large Objects Graph



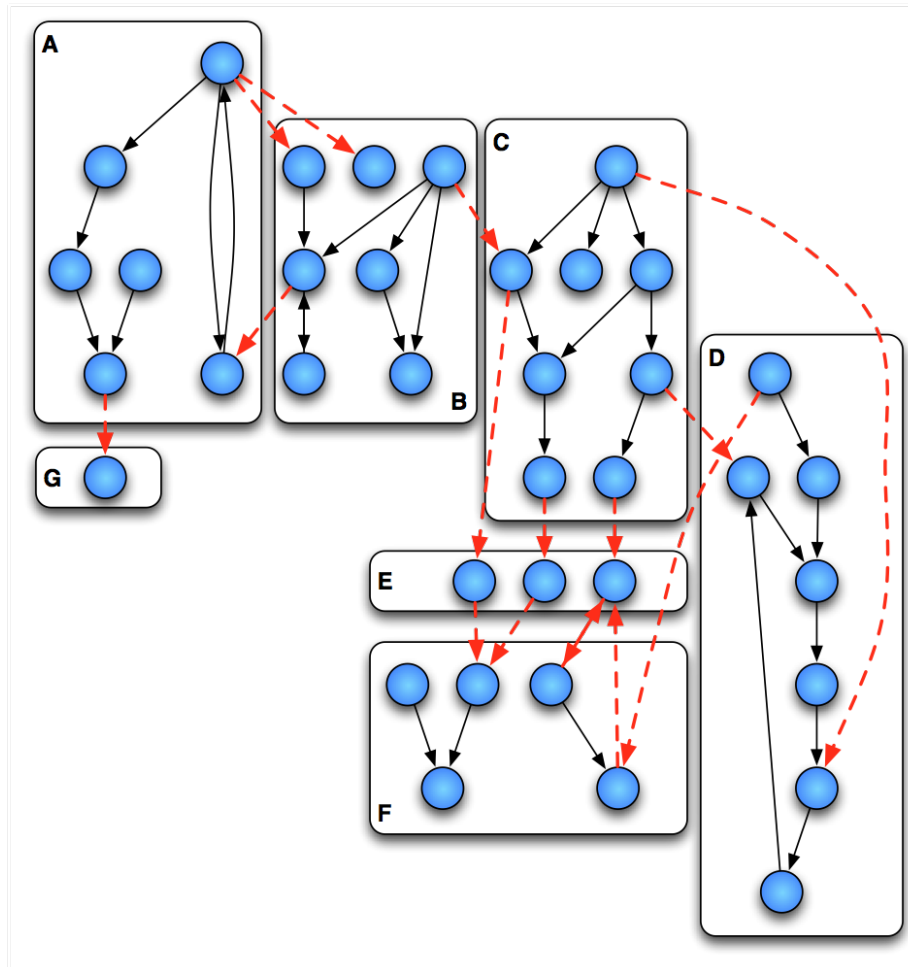
EMF Models are

Large Objects Graph












EMF Models are

Large Objects Graph

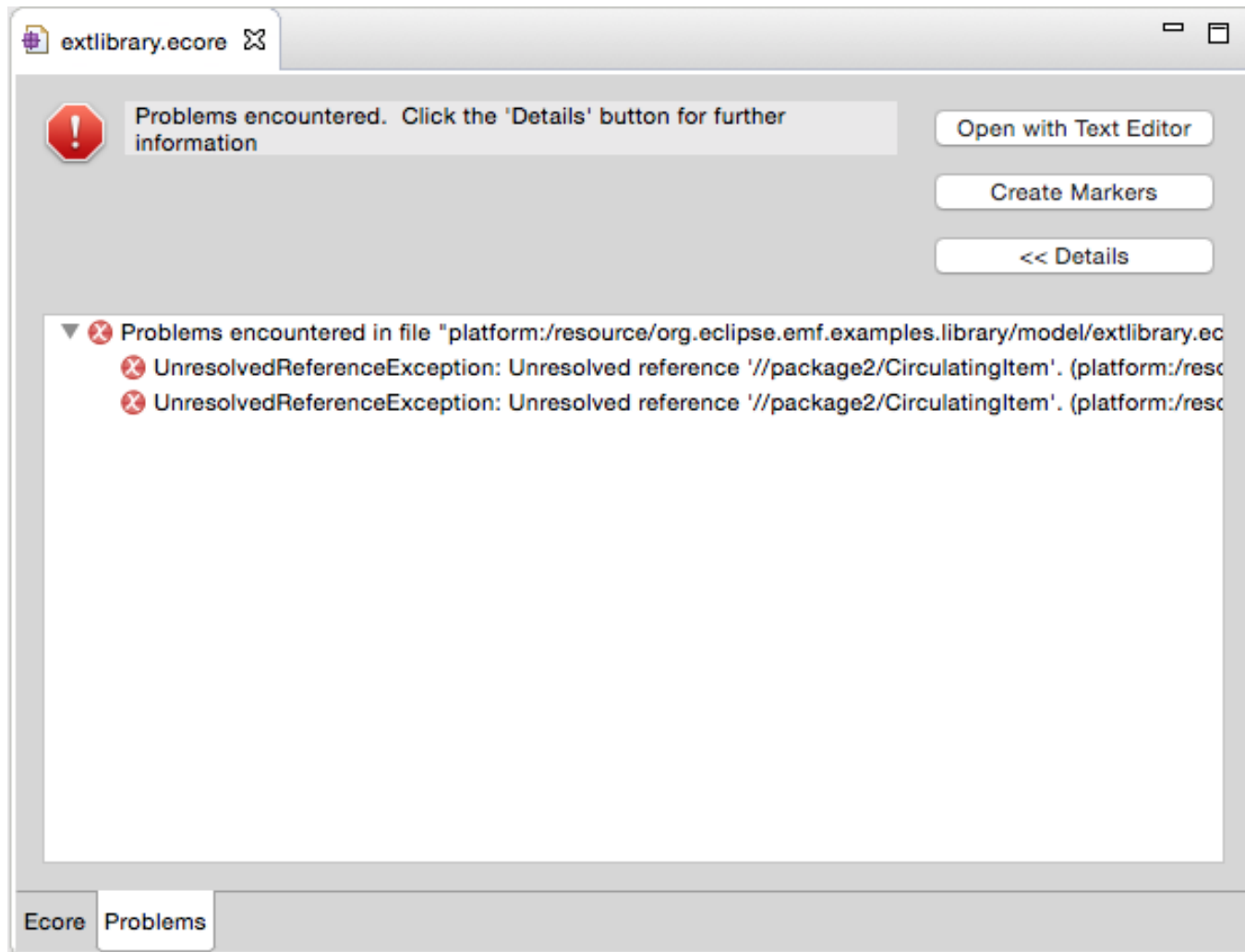


EMF handles cross resources references as Proxies

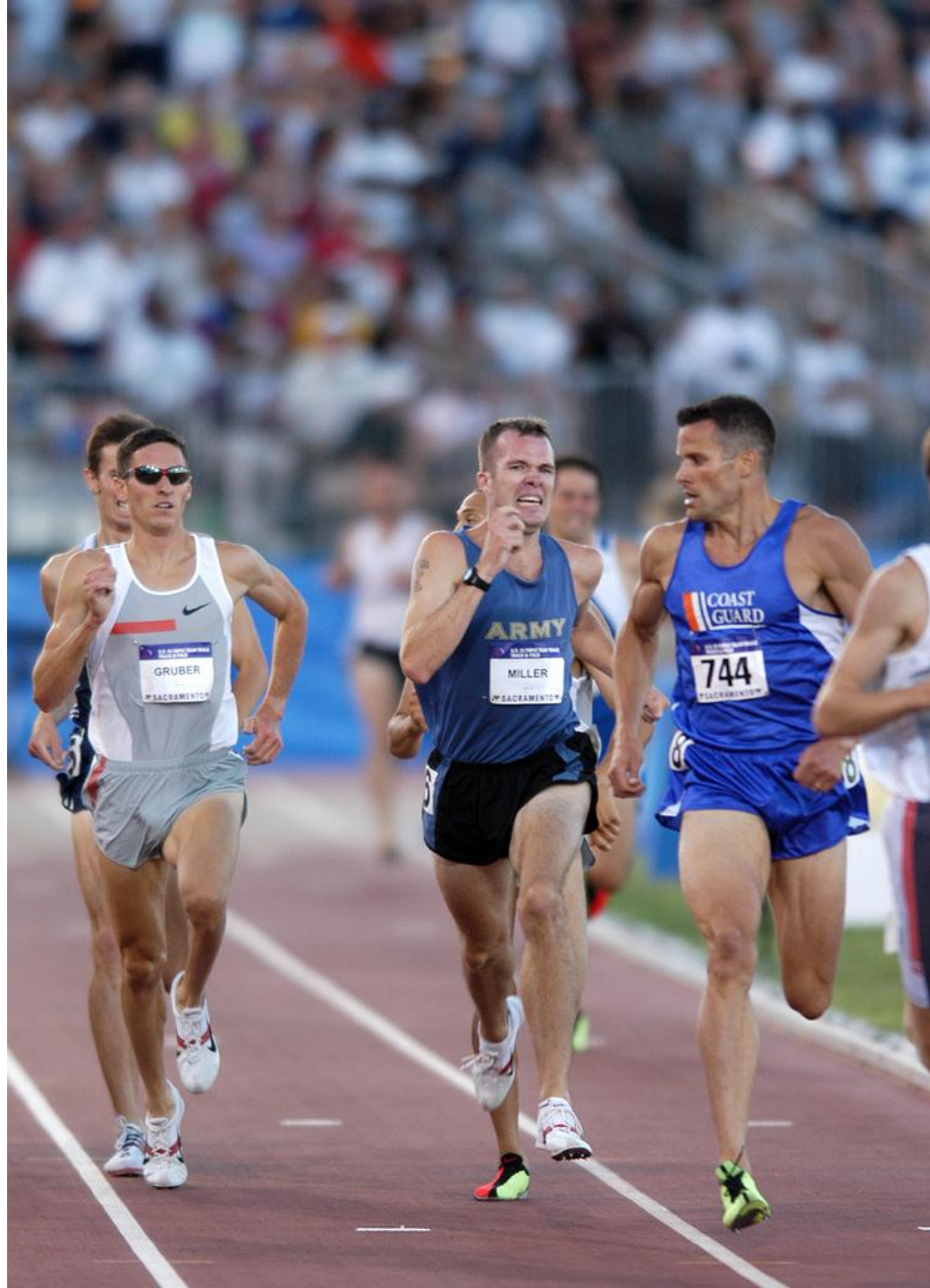
- ▶  BOOKOnTape -> AudiovisualItem
- ▶  VideoCassette -> AudioVisualItem
- ▶  Borrower -> Person
- ▶  Person -> Addressable
- ▶  Employee -> Person
- ▶  Addressable
- ▼  package2
 - ▼  CirculatingItem -> Item, Lendable
 - (↔) Item
 - (↔) Lendable

 platform:/resource/org.eclipse.emf.examples.library/model/extlibrary_file2.ecore

Very few EMF based tools gracefully support Resolution Failure

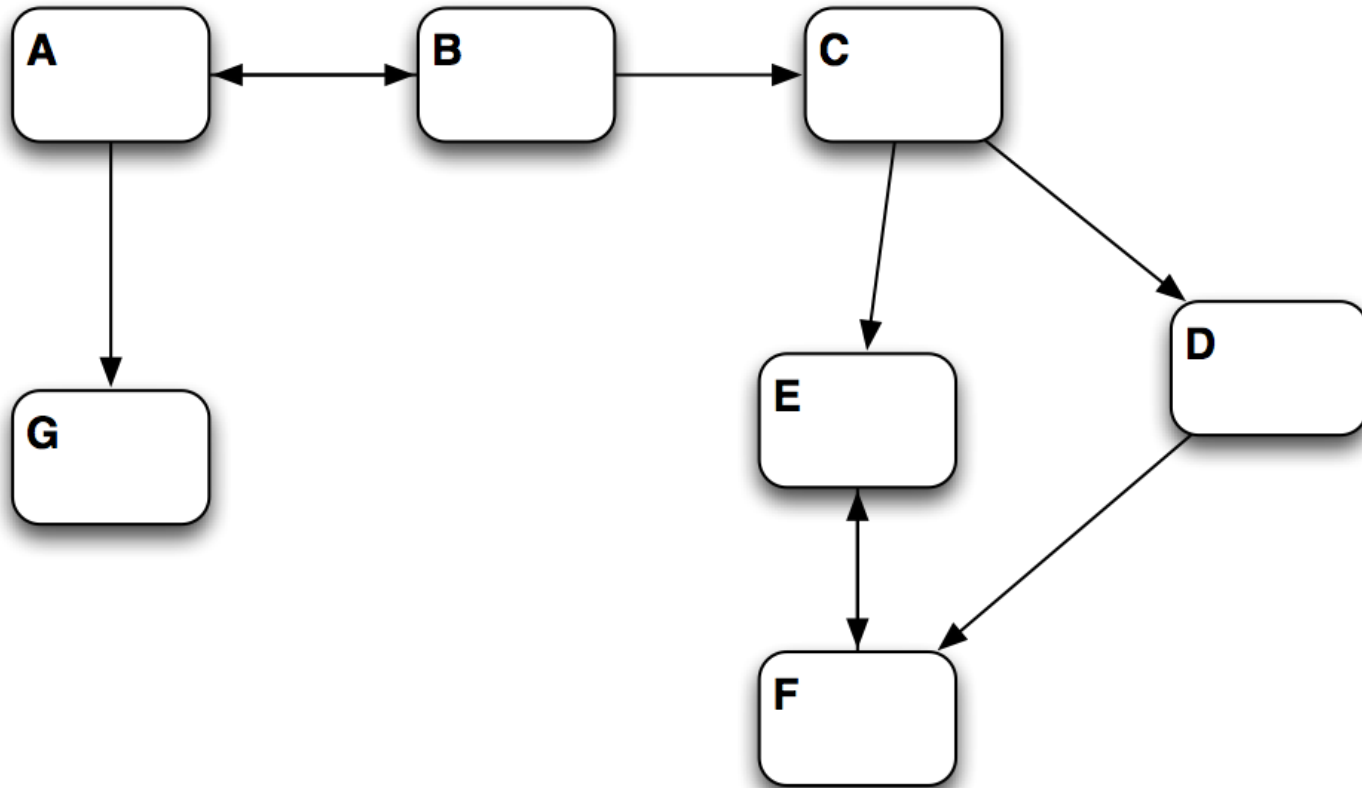


What about the
Performance?

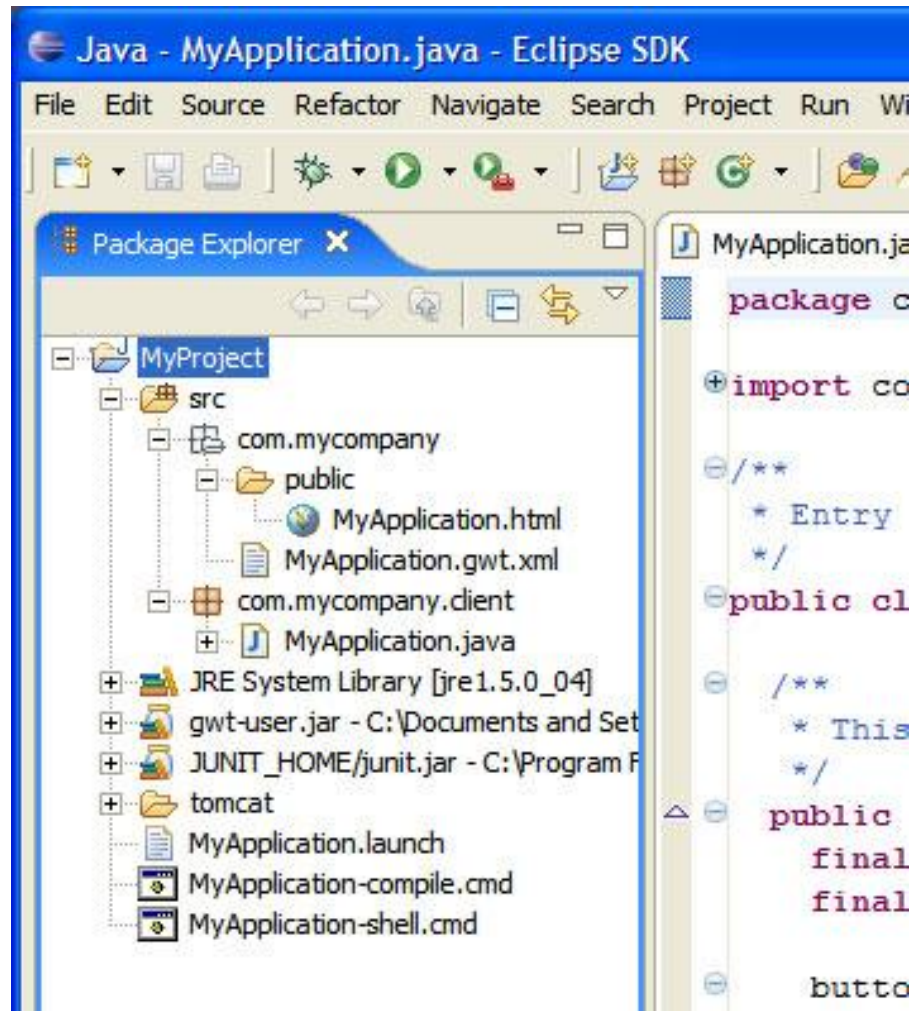


How to create the

Graph of Resources?

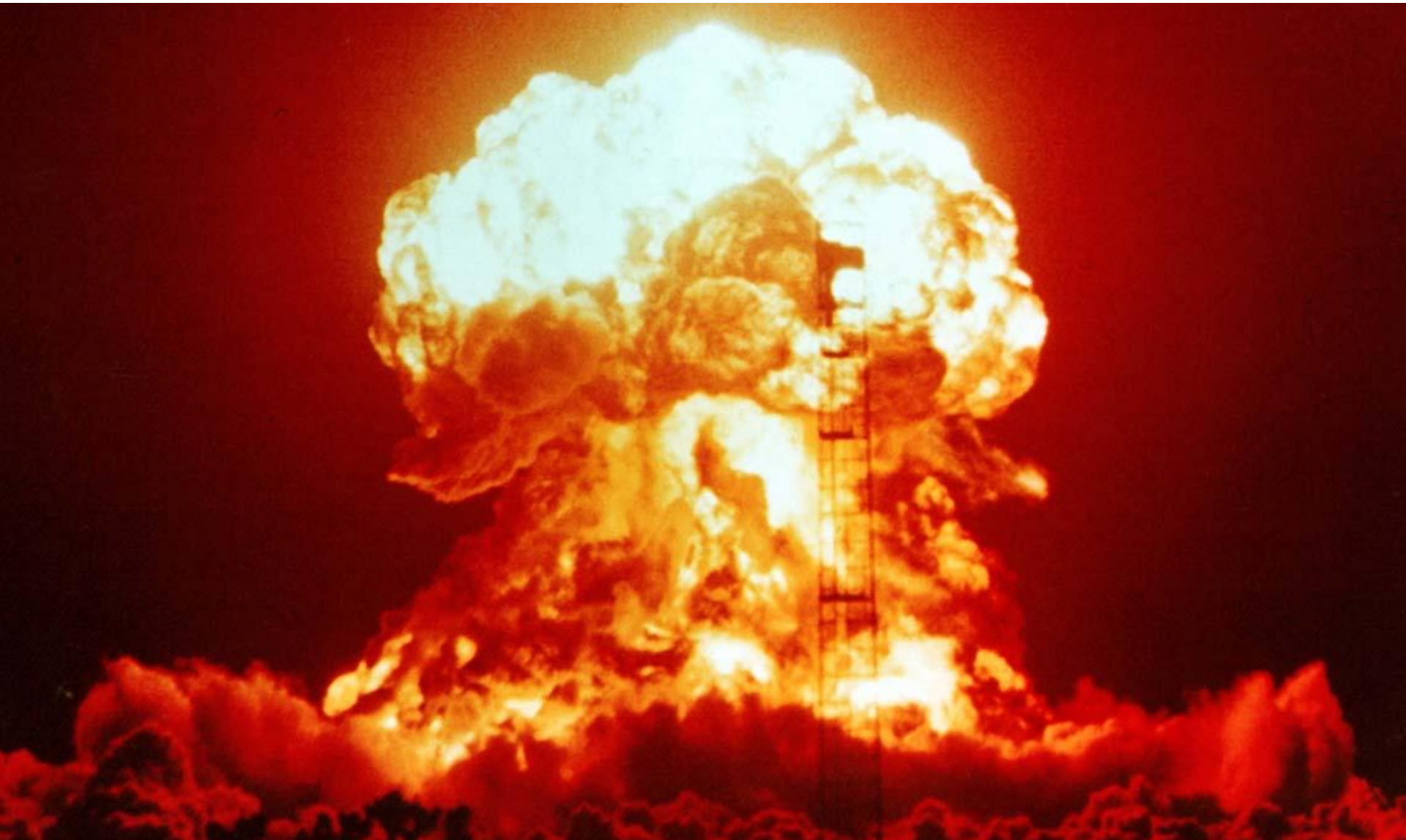


Search for model files in the Workspace



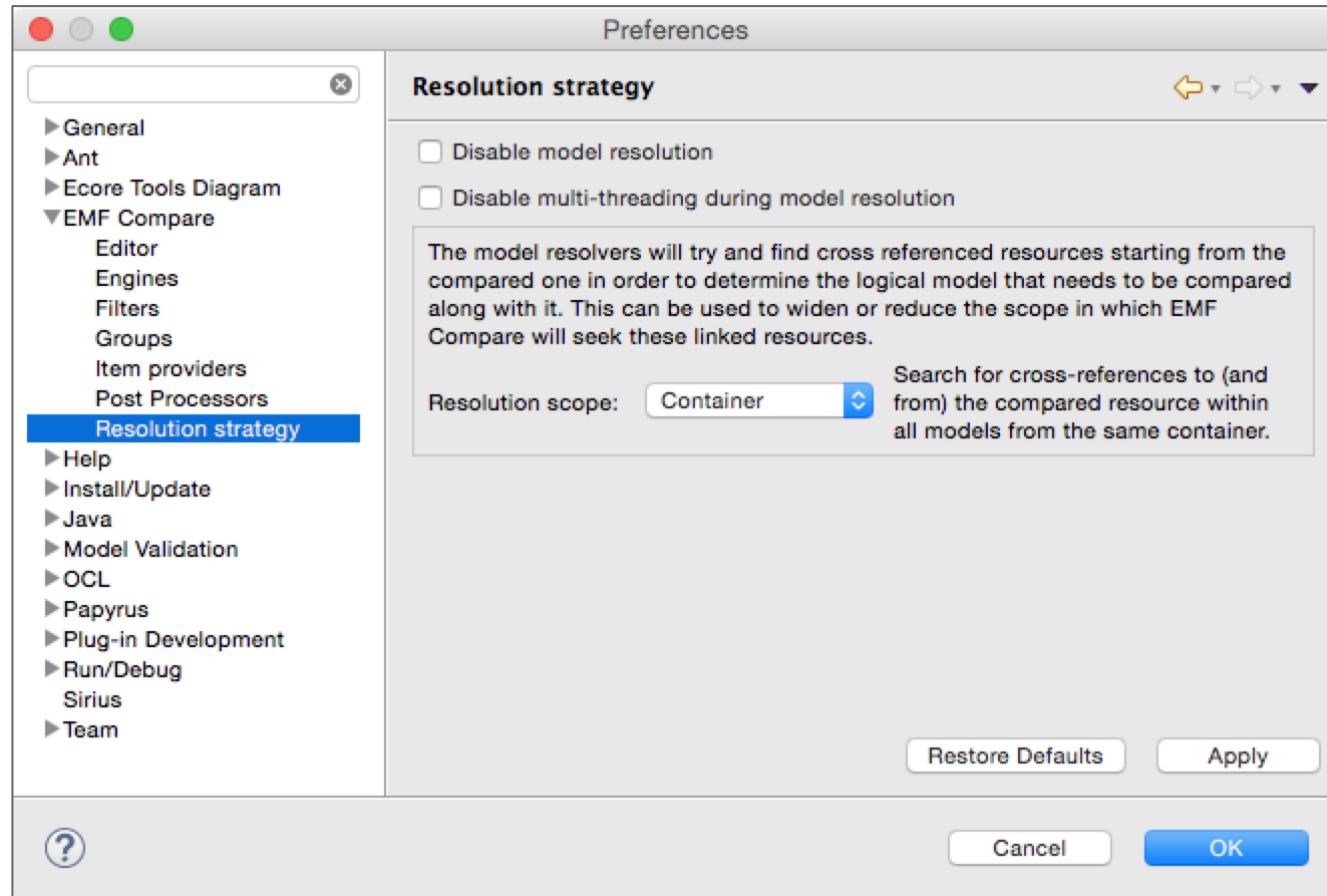
and...

Resolve All



Strategies to Optimize the

Resolution of the Graph of Resources

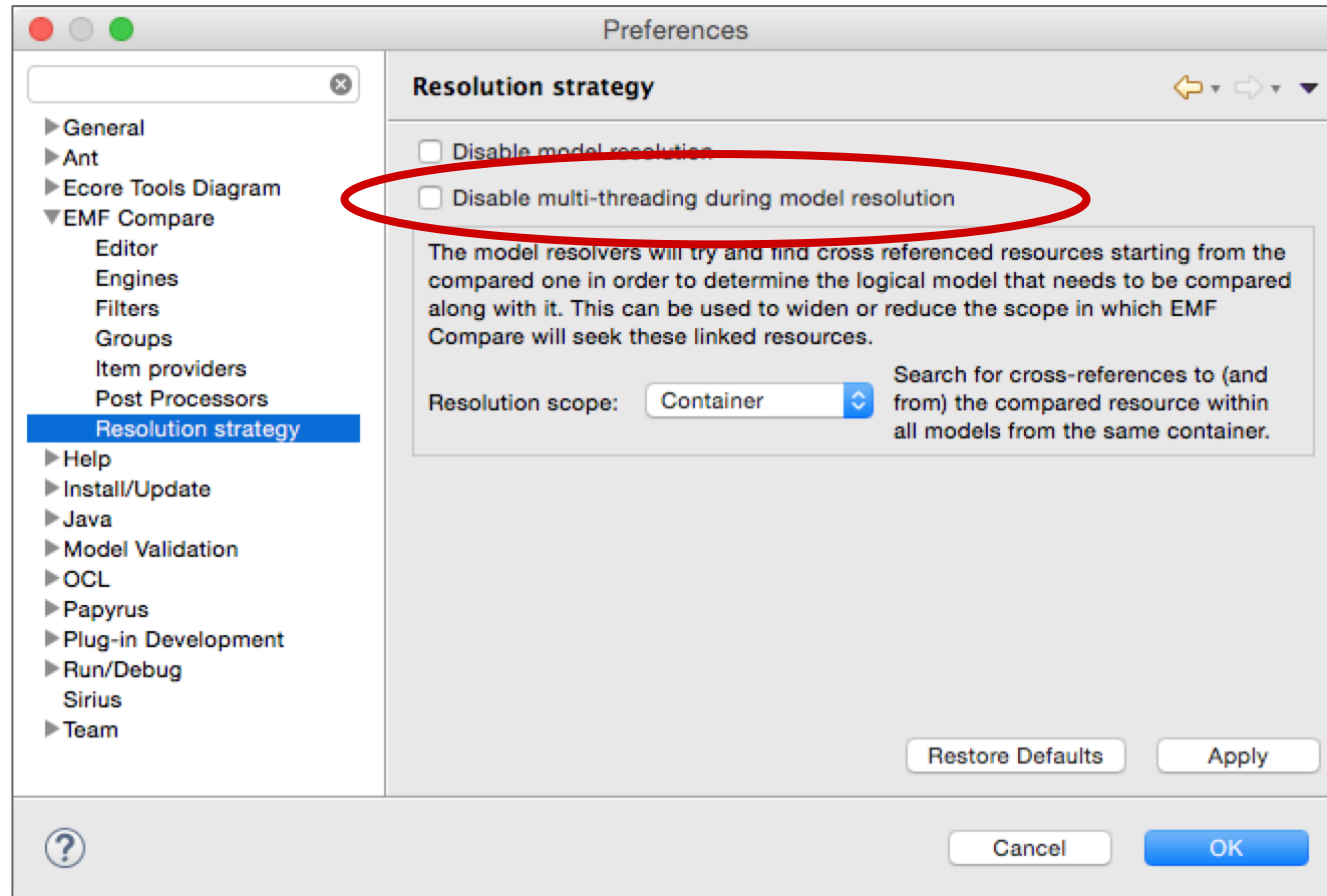


Limit the Scope of Lookup

- **Workspace**
 - Load every files in the **workspace**
- **Project**
 - Load every files in the containing **project** of the file from which the resolution is started
- **Container**
 - Load every files in the containing **folder** of the file from which the resolution is started
- **Outgoing**
 - Load all **reachable** (via cross-references & containment references) files starting with the file from which the resolution started

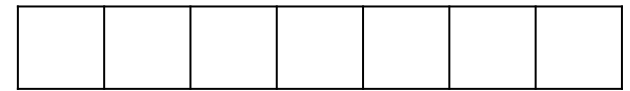
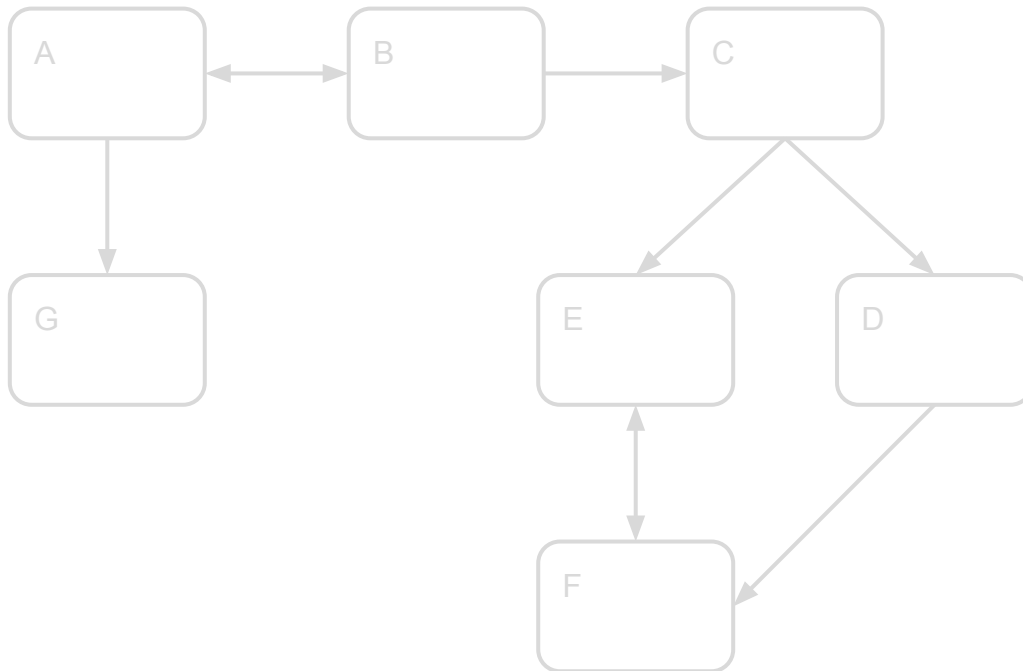
Second Solution

Multithreaded Resolution

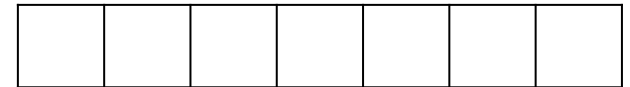


Second Solution

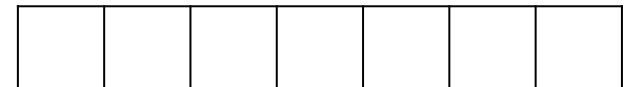
Multithreaded Resolution



To be Loaded



To be Unloaded



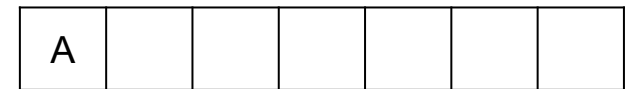
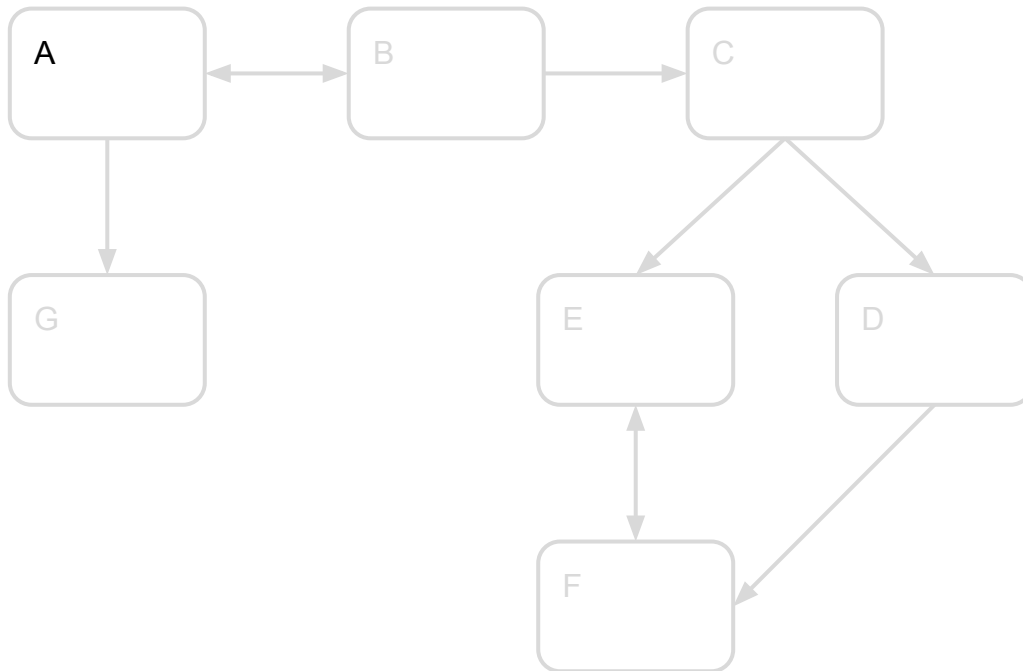
Already Browsed

 Loading Thread

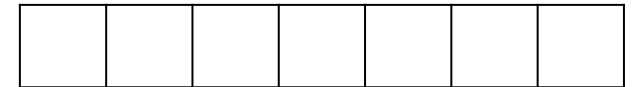
 Unloading Thread

Second Solution

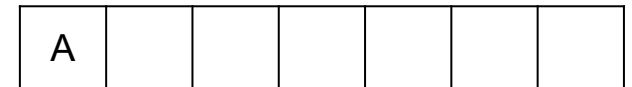
Multithreaded Resolution



To be Loaded



To be Unloaded



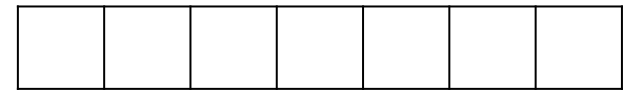
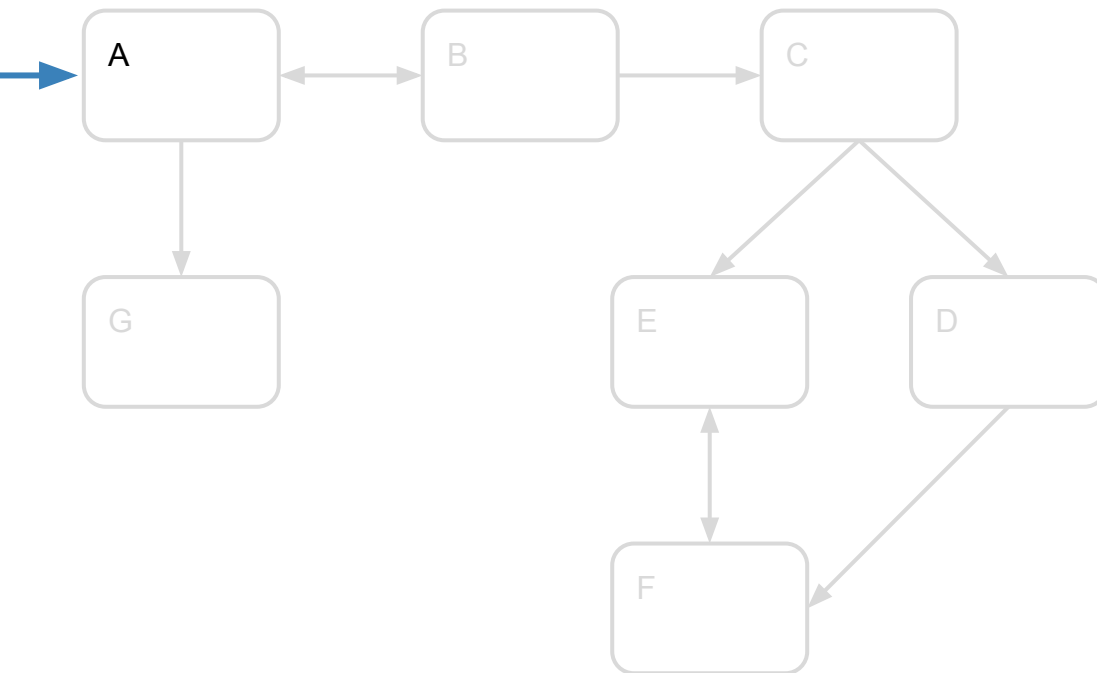
Already Browsed

 Loading Thread

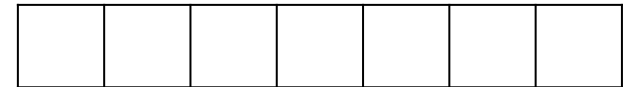
 Unloading Thread

Second Solution

Multithreaded Resolution



To be Loaded



To be Unloaded



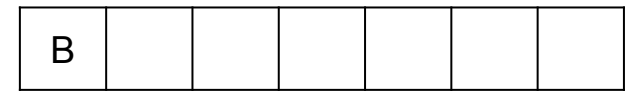
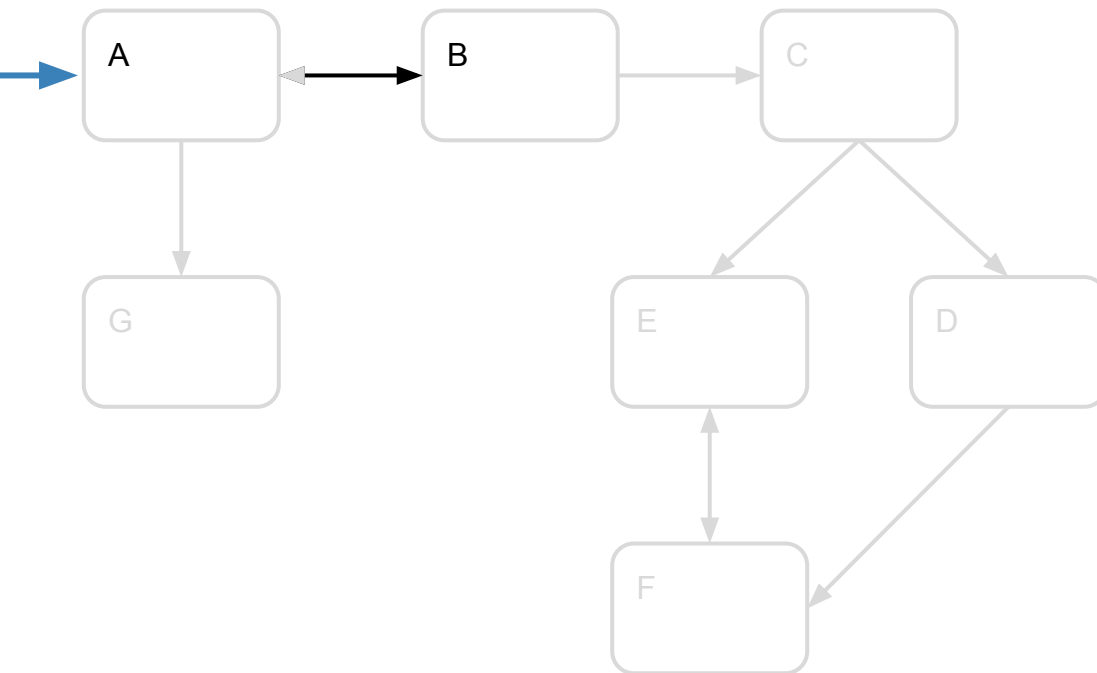
Already Browsed

 Loading Thread

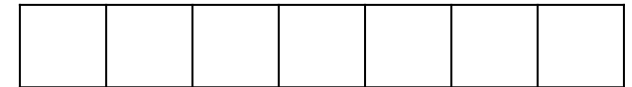
 Unloading Thread

Second Solution

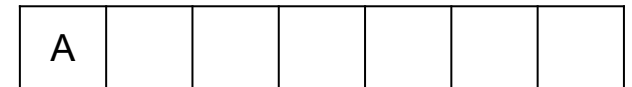
Multithreaded Resolution



To be Loaded



To be Unloaded



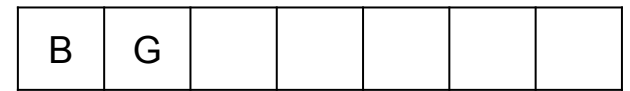
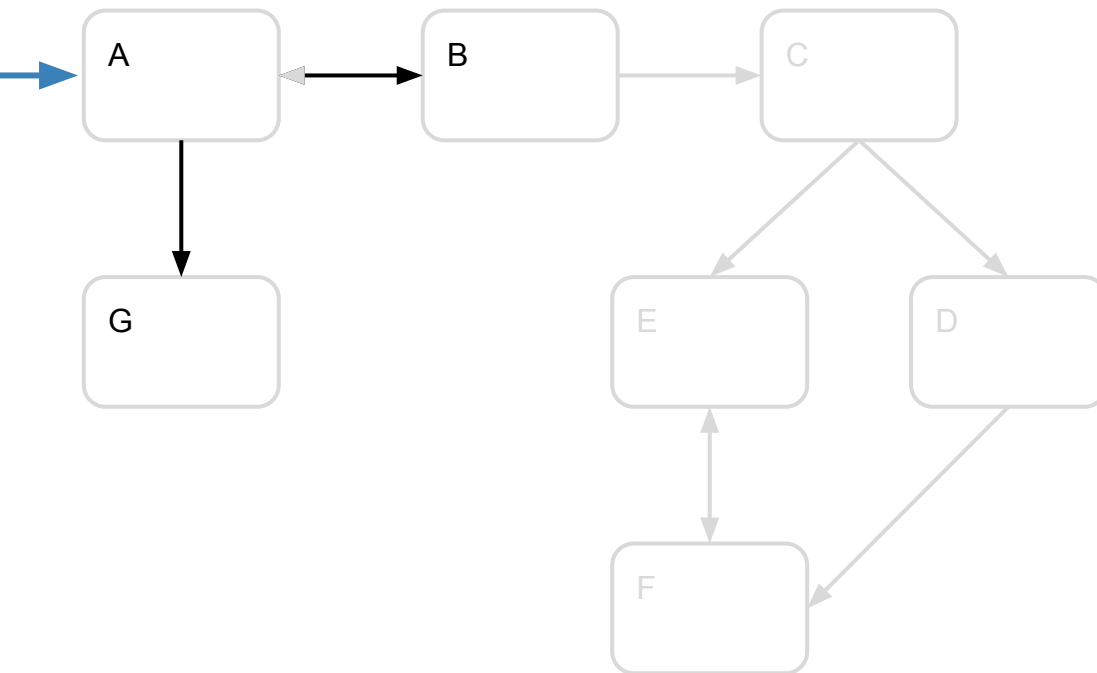
Already Browsed

 Loading Thread

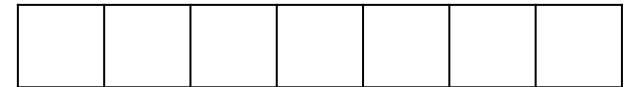
 Unloading Thread

Second Solution

Multithreaded Resolution



To be Loaded



To be Unloaded



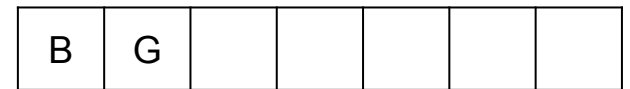
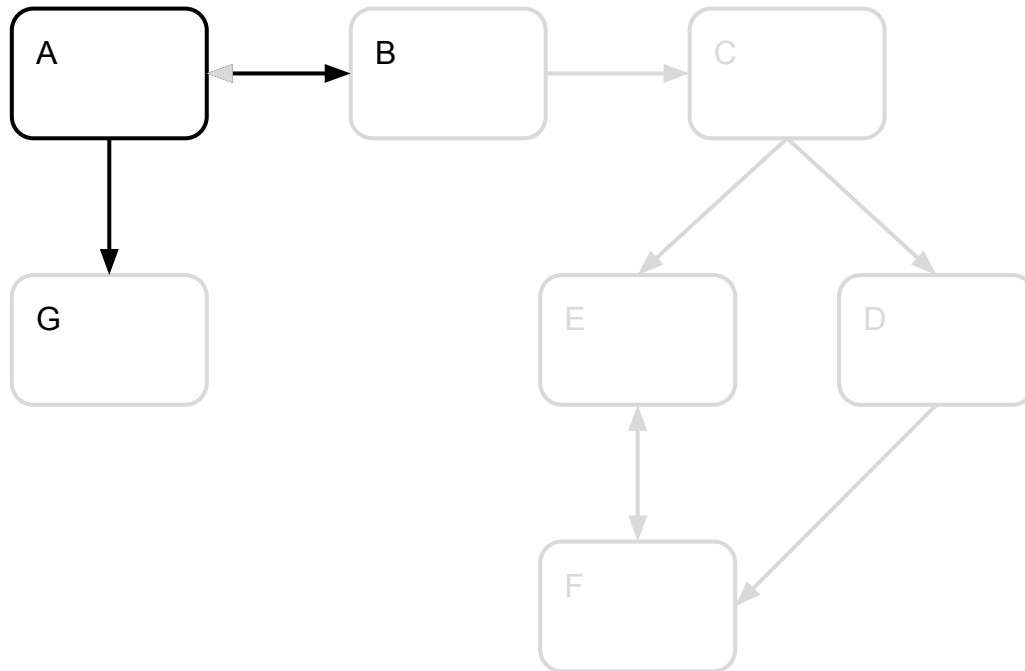
Already Browsed

 Loading Thread

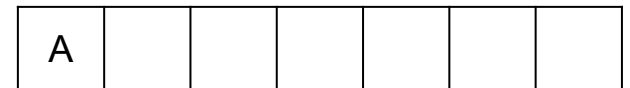
 Unloading Thread

Second Solution

Multithreaded Resolution



To be Loaded



To be Unloaded



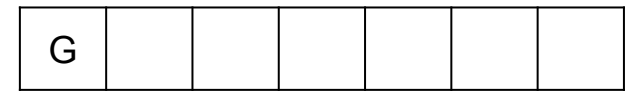
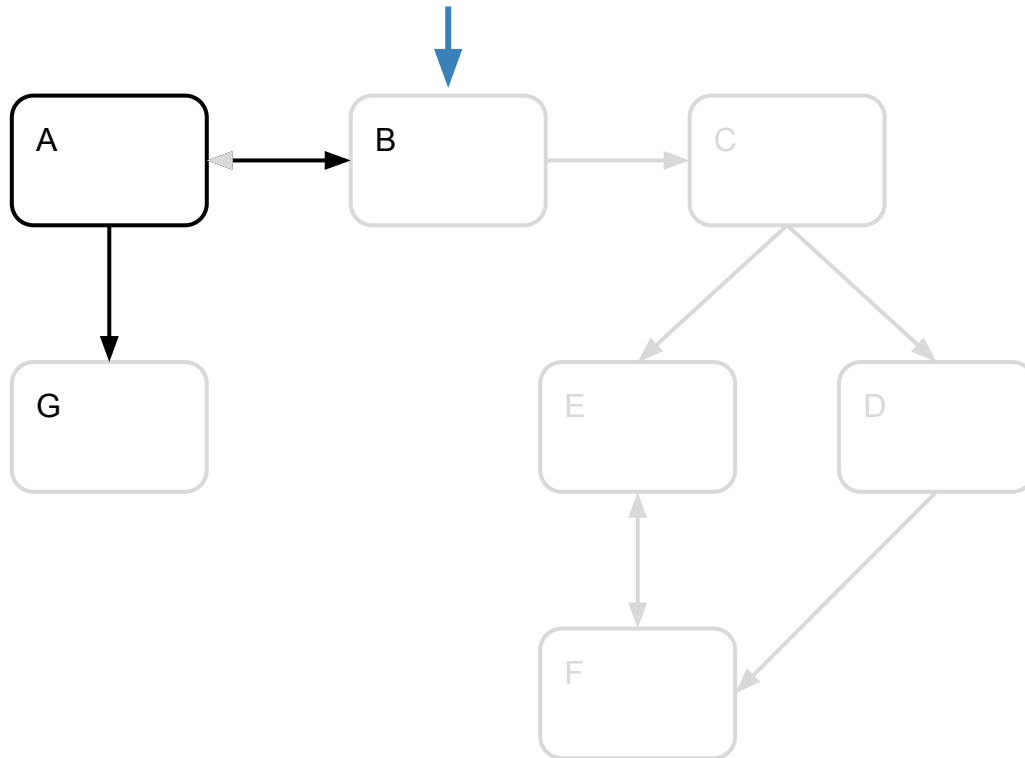
Already Browsed

 Loading Thread

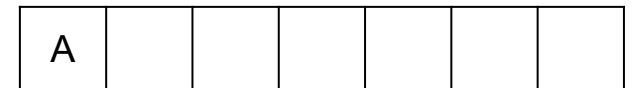
 Unloading Thread

Second Solution

Multithreaded Resolution



To be Loaded



To be Unloaded



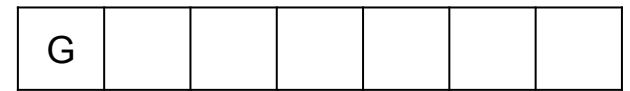
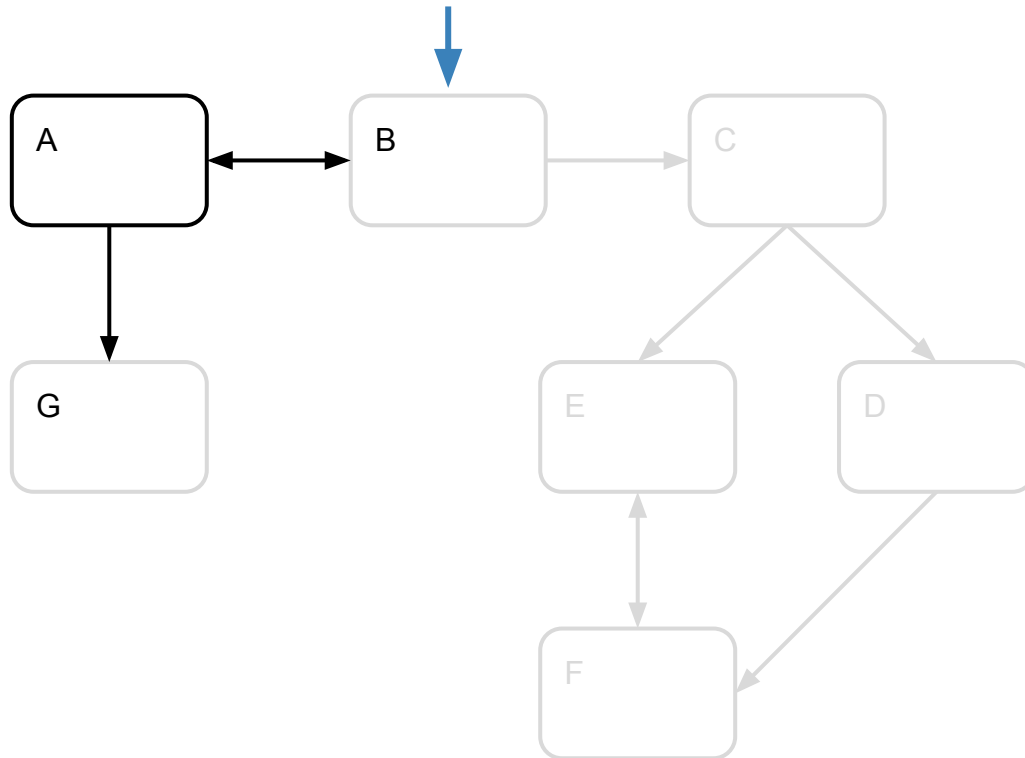
Already Browsed

 Loading Thread

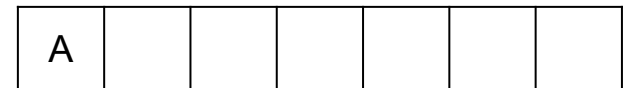
 Unloading Thread

Second Solution

Multithreaded Resolution



To be Loaded



To be Unloaded



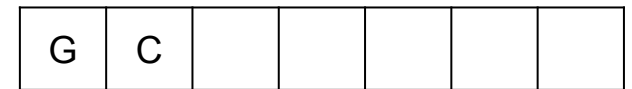
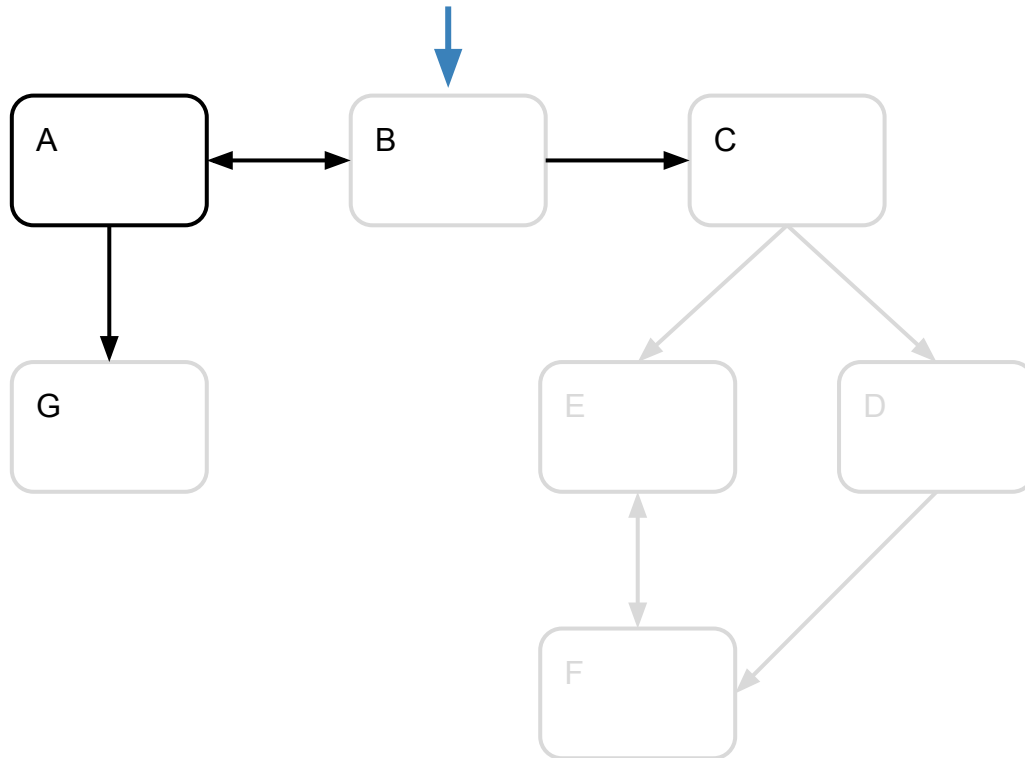
Already Browsed

 Loading Thread

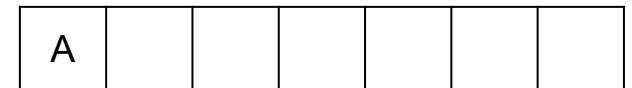
 Unloading Thread

Second Solution

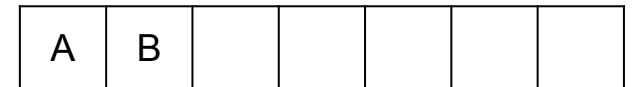
Multithreaded Resolution



To be Loaded



To be Unloaded



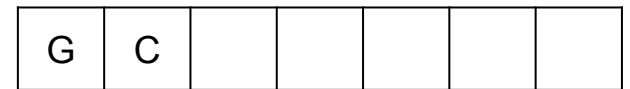
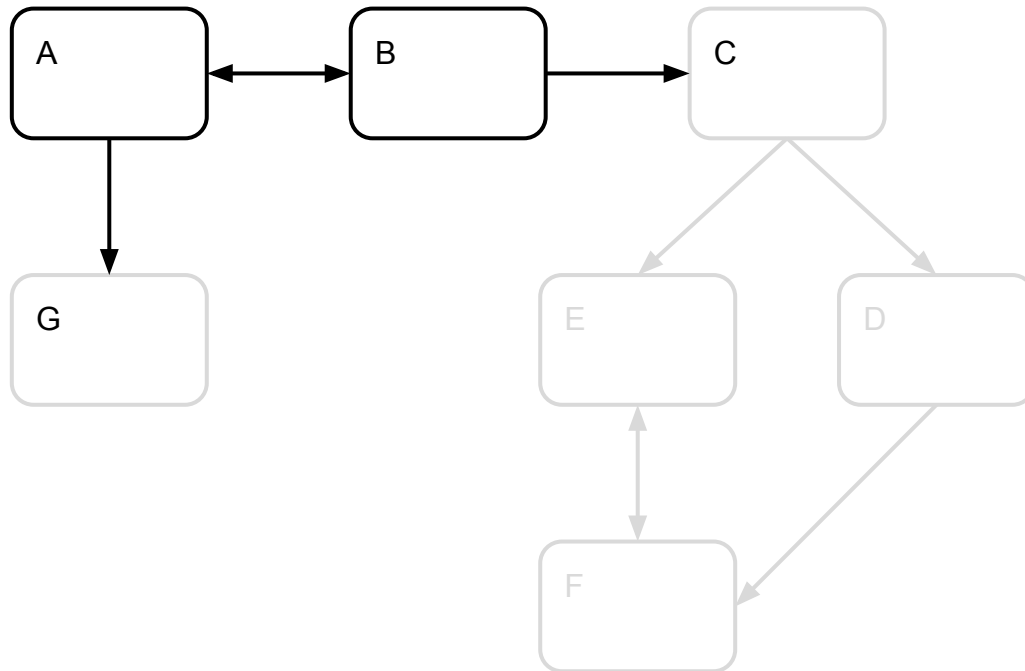
Already Browsed

 Loading Thread

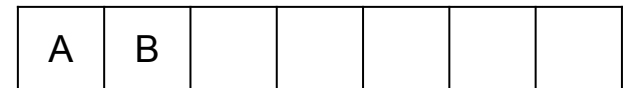
 Unloading Thread

Second Solution

Multithreaded Resolution



To be Loaded



To be Unloaded



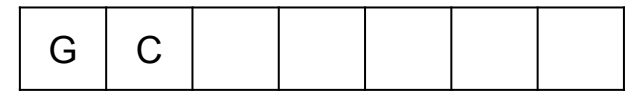
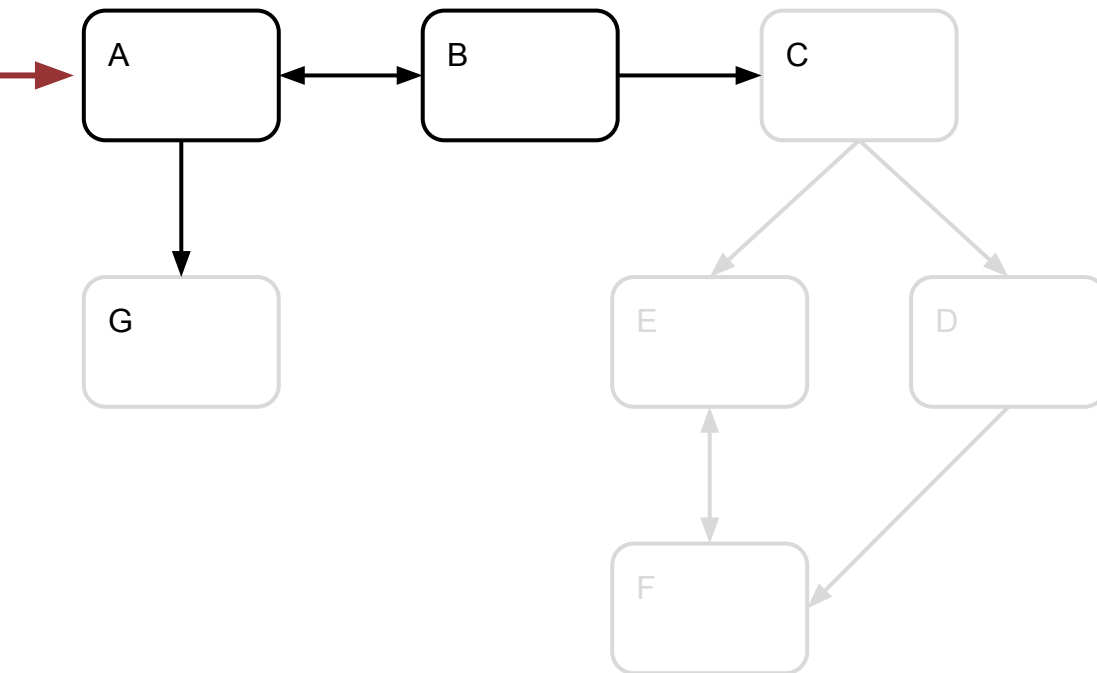
Already Browsed

 Loading Thread

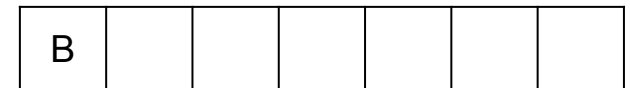
 Unloading Thread

Second Solution

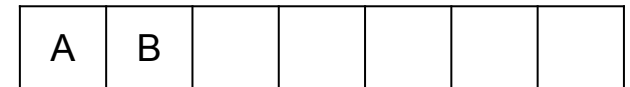
Multithreaded Resolution



To be Loaded



To be Unloaded



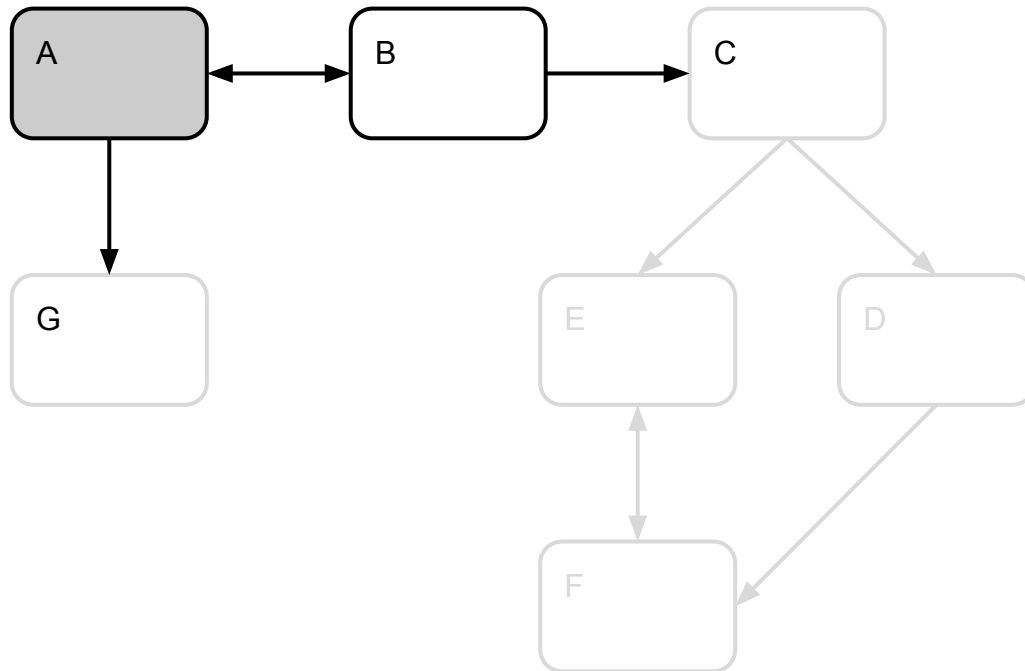
Already Browsed

 Loading Thread

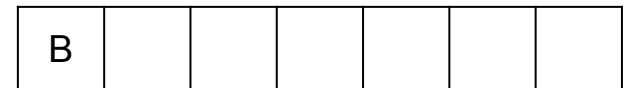
 Unloading Thread

Second Solution

Multithreaded Resolution



To be Loaded



To be Unloaded



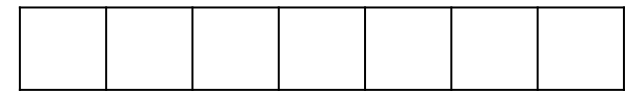
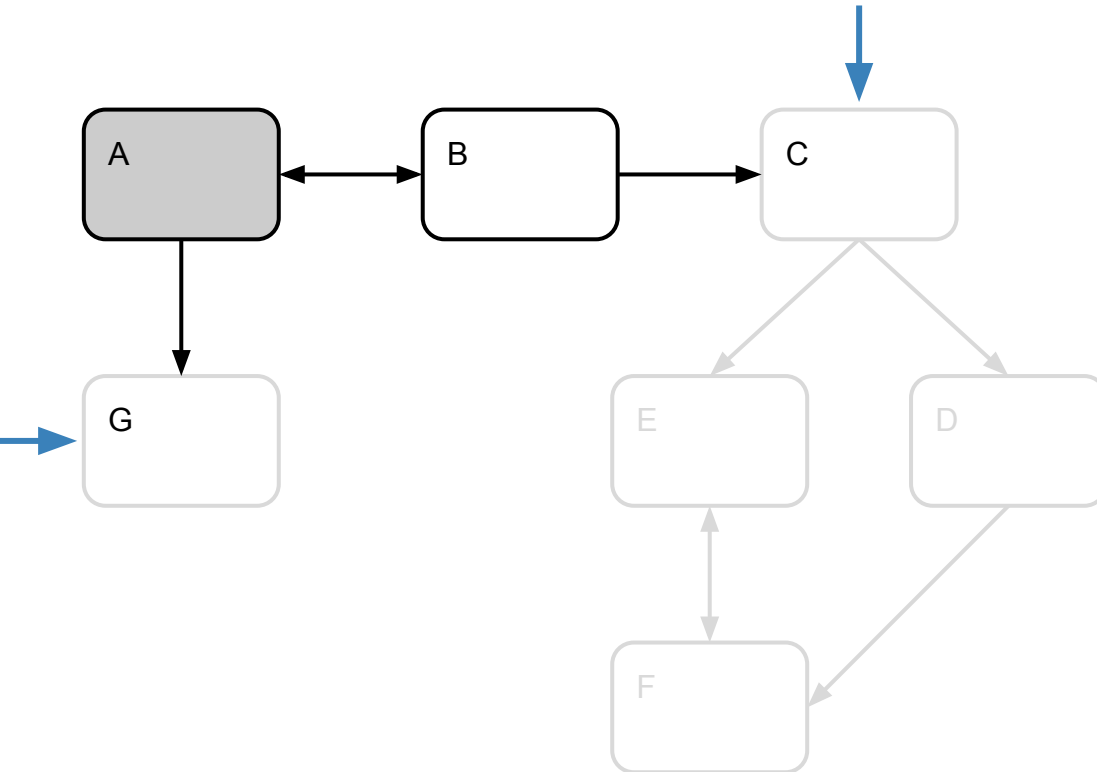
Already Browsed

 Loading Thread

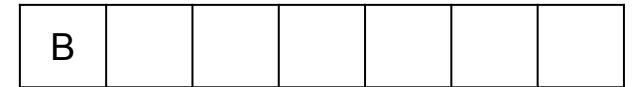
 Unloading Thread

Second Solution

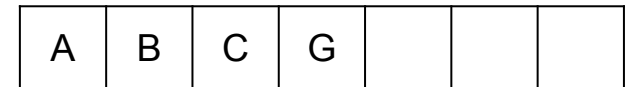
Multithreaded Resolution



To be Loaded



To be Unloaded



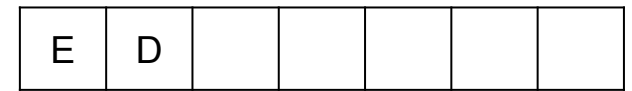
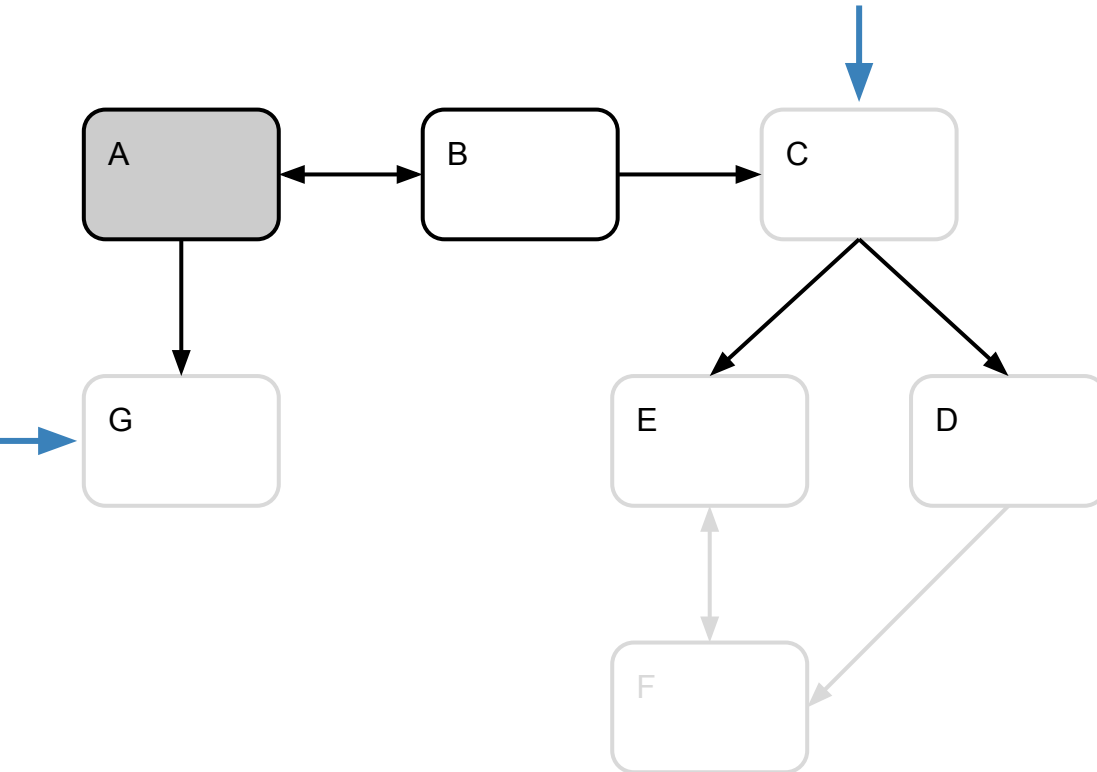
Already Browsed

 Loading Thread

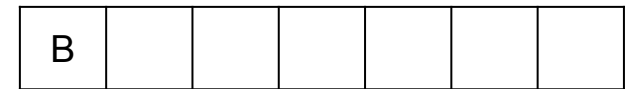
 Unloading Thread

Second Solution

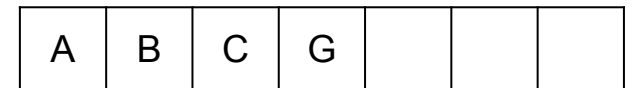
Multithreaded Resolution



To be Loaded



To be Unloaded



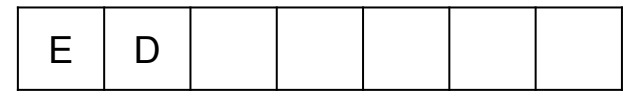
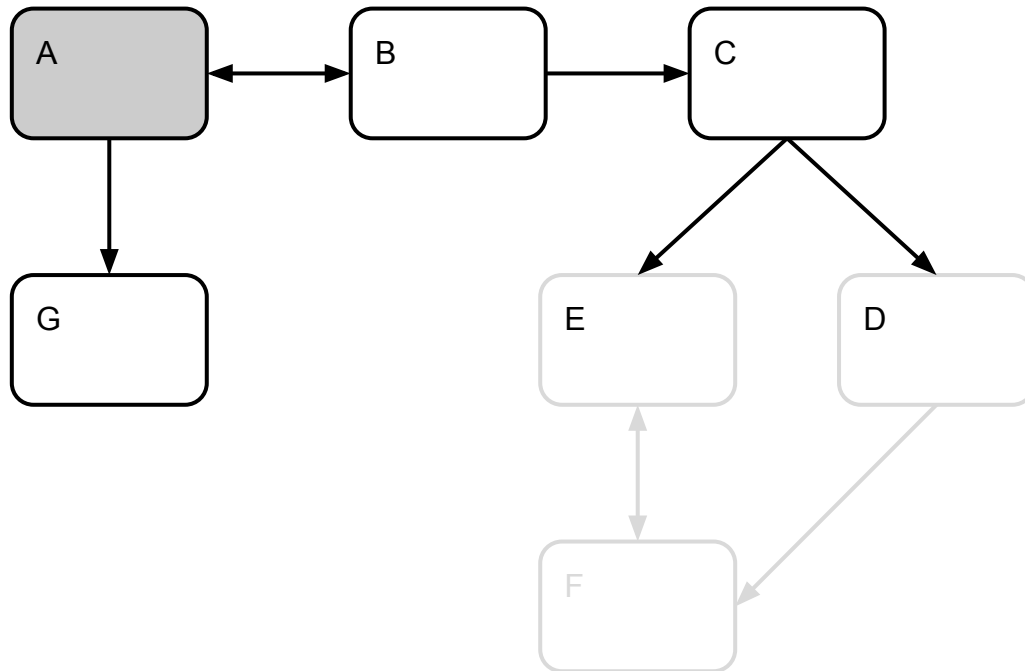
Already Browsed

 Loading Thread

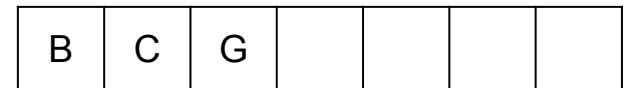
 Unloading Thread

Second Solution

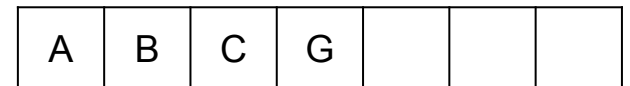
Multithreaded Resolution



To be Loaded



To be Unloaded



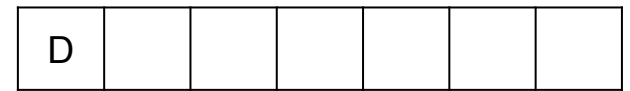
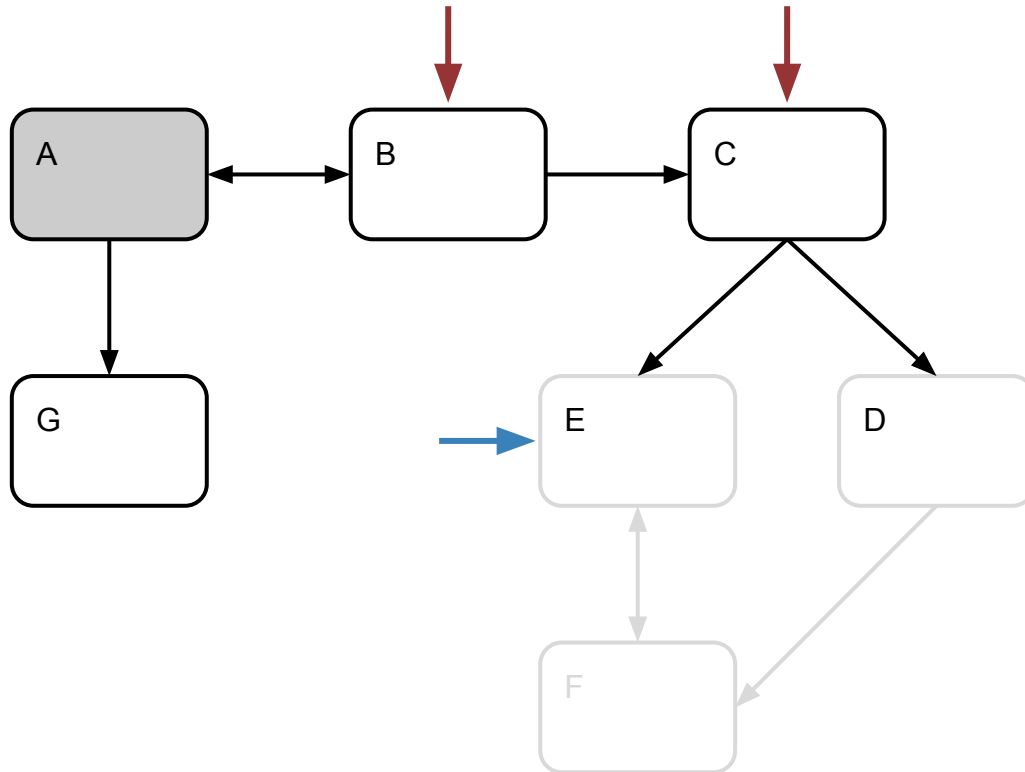
Already Browsed

 Loading Thread

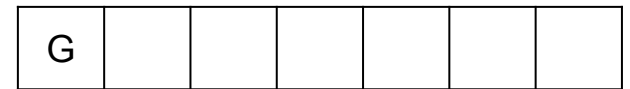
 Unloading Thread

Second Solution

Multithreaded Resolution



To be Loaded



To be Unloaded



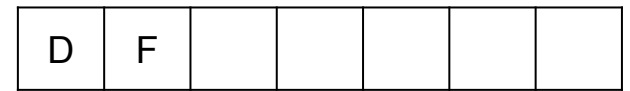
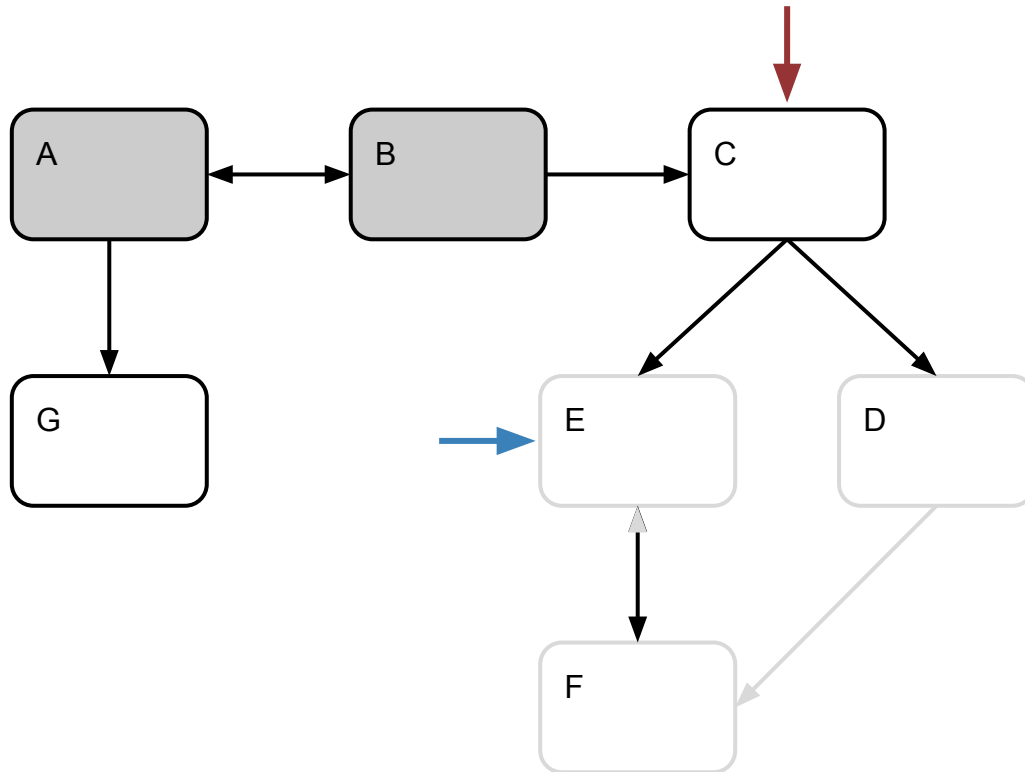
Already Browsed

 Loading Thread

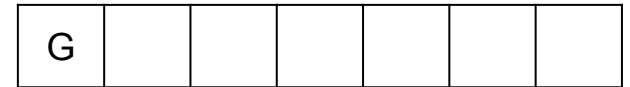
 Unloading Thread

Second Solution

Multithreaded Resolution



To be Loaded



To be Unloaded



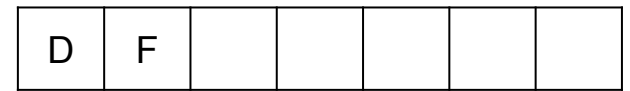
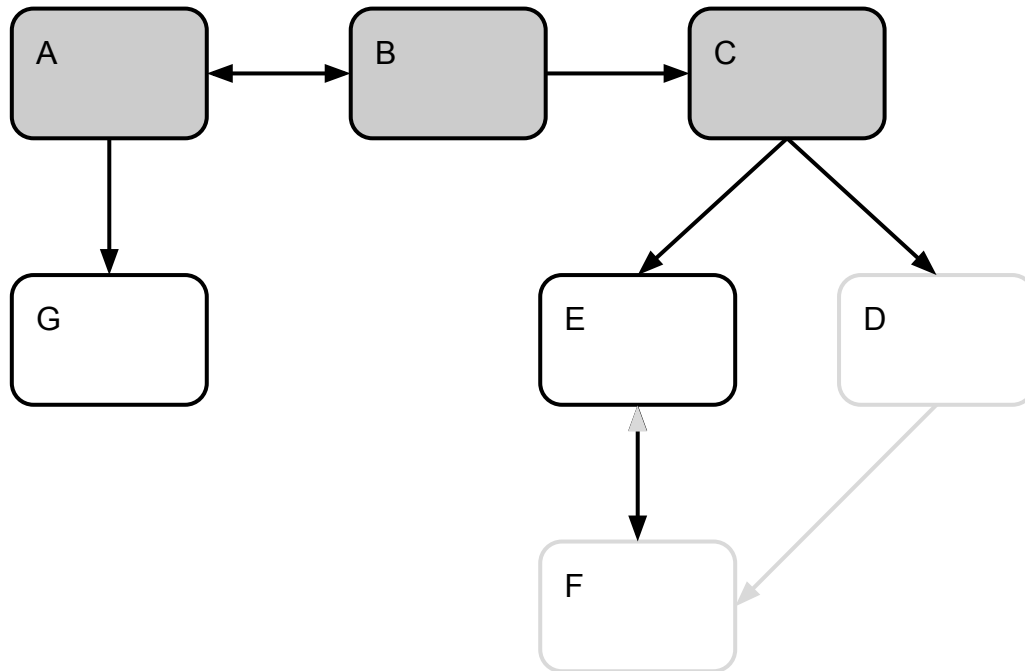
Already Browsed

 Loading Thread

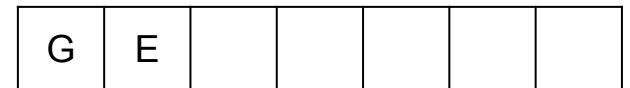
 Unloading Thread

Second Solution

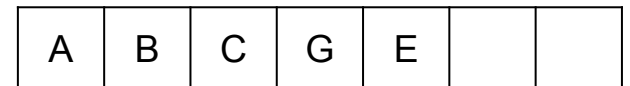
Multithreaded Resolution



To be Loaded



To be Unloaded



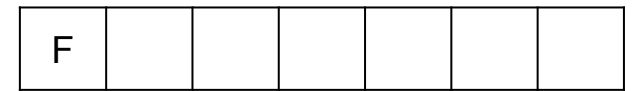
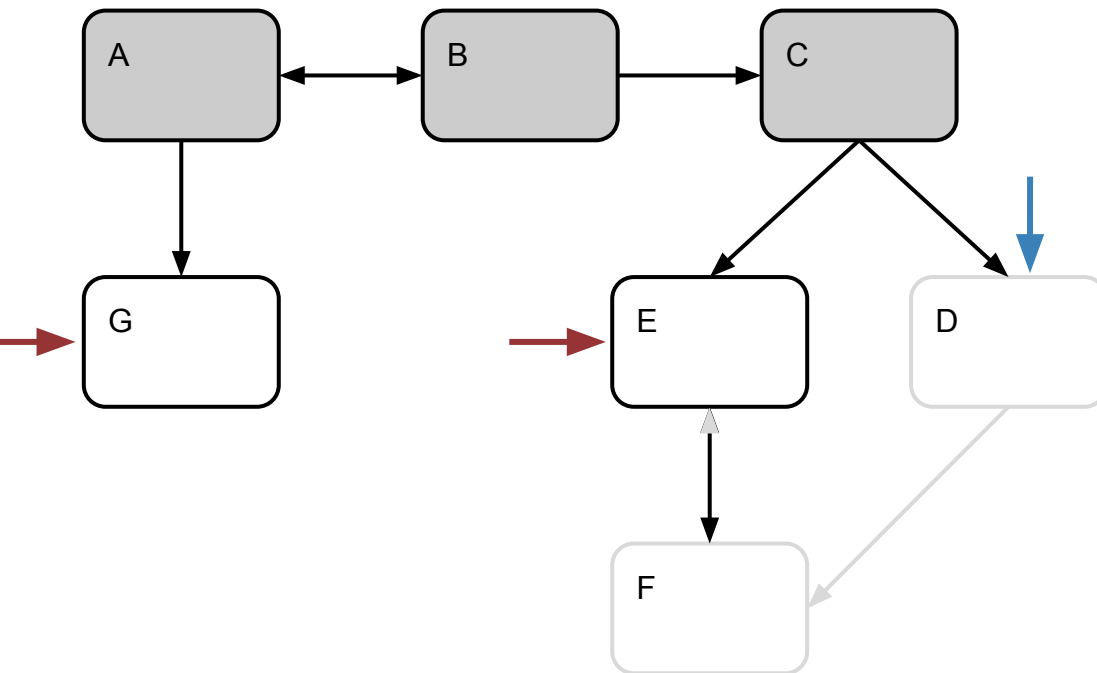
Already Browsed

 Loading Thread

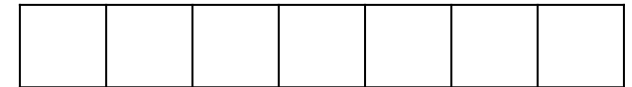
 Unloading Thread

Second Solution

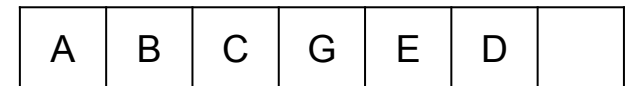
Multithreaded Resolution



To be Loaded



To be Unloaded



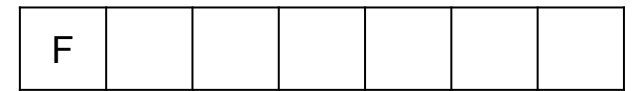
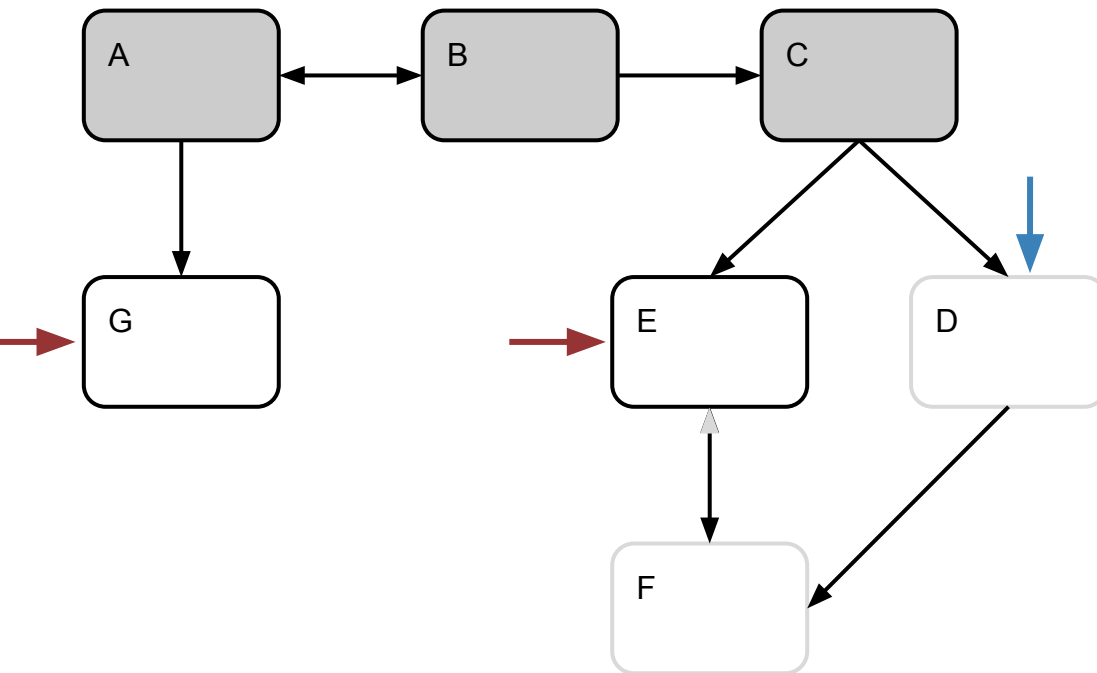
Already Browsed

 Loading Thread

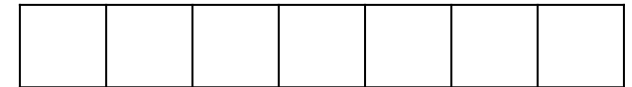
 Unloading Thread

Second Solution

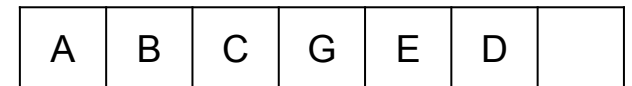
Multithreaded Resolution



To be Loaded



To be Unloaded



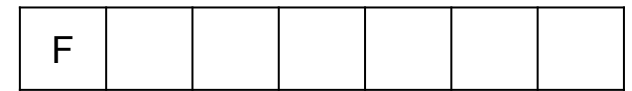
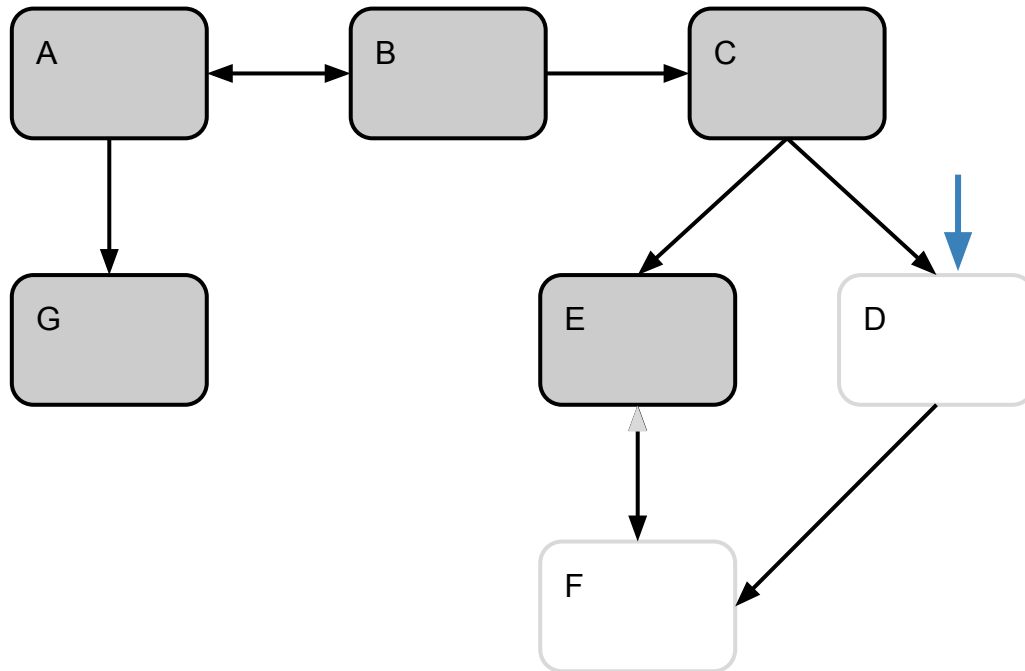
Already Browsed

 Loading Thread

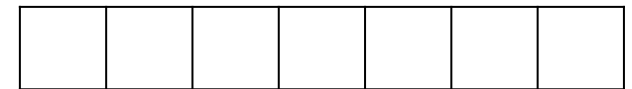
 Unloading Thread

Second Solution

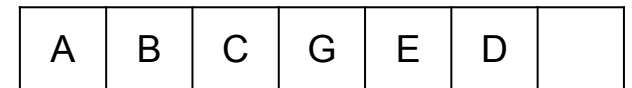
Multithreaded Resolution



To be Loaded



To be Unloaded



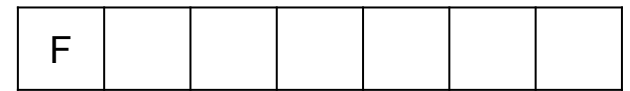
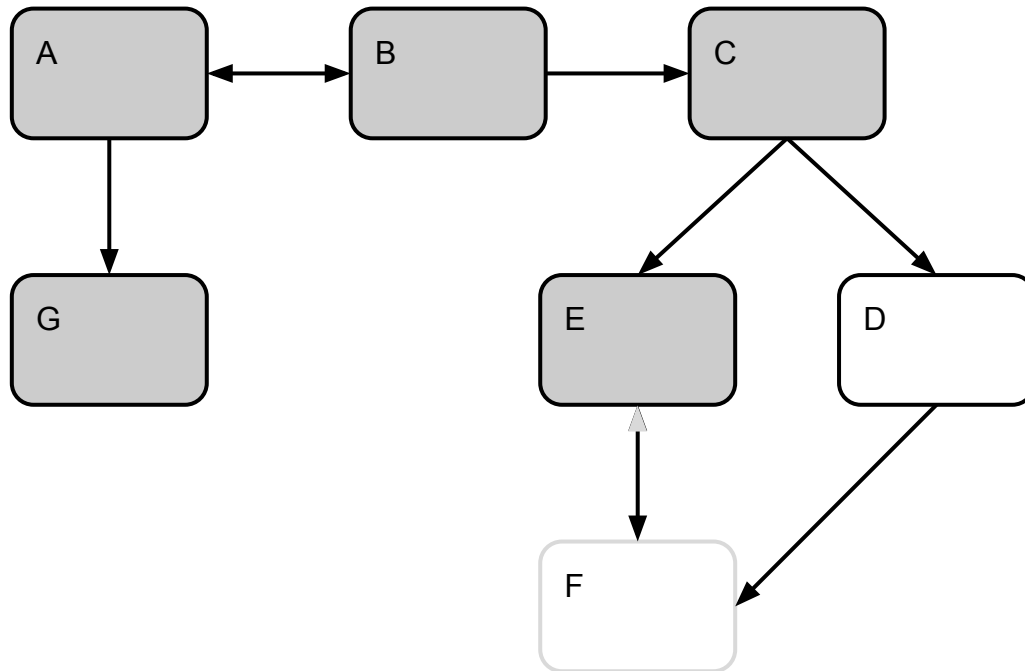
Already Browsed

 Loading Thread

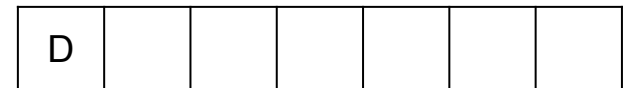
 Unloading Thread

Second Solution

Multithreaded Resolution



To be Loaded



To be Unloaded



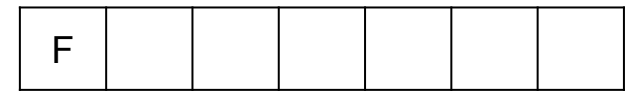
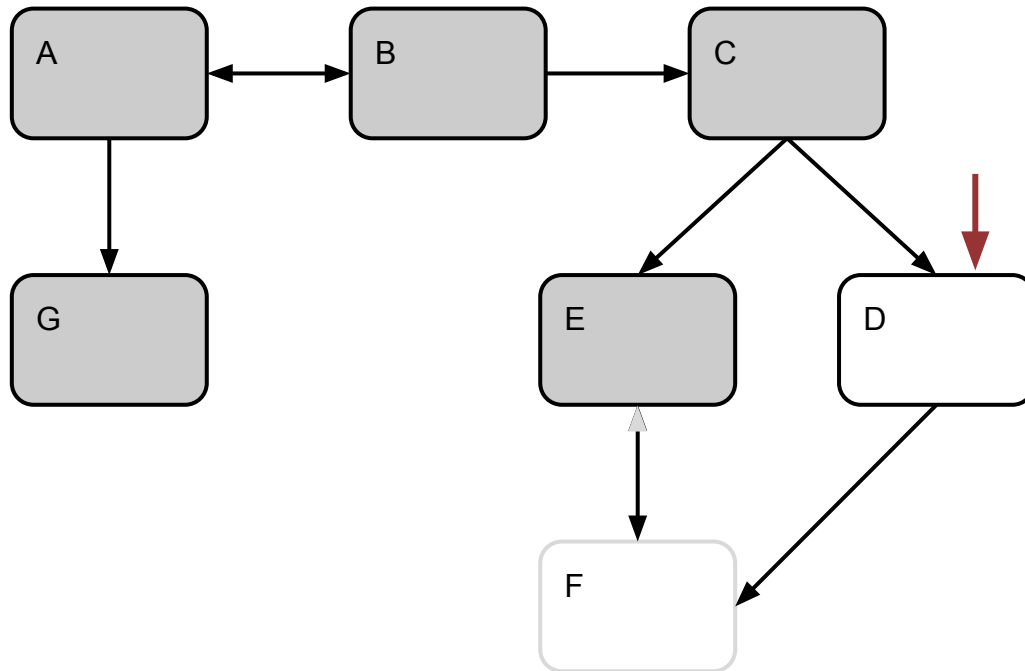
Already Browsed

 Loading Thread

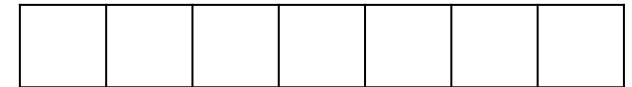
 Unloading Thread

Second Solution

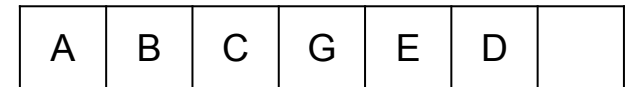
Multithreaded Resolution



To be Loaded



To be Unloaded



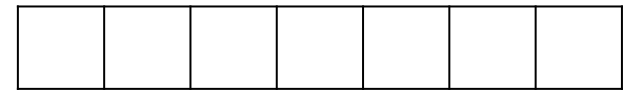
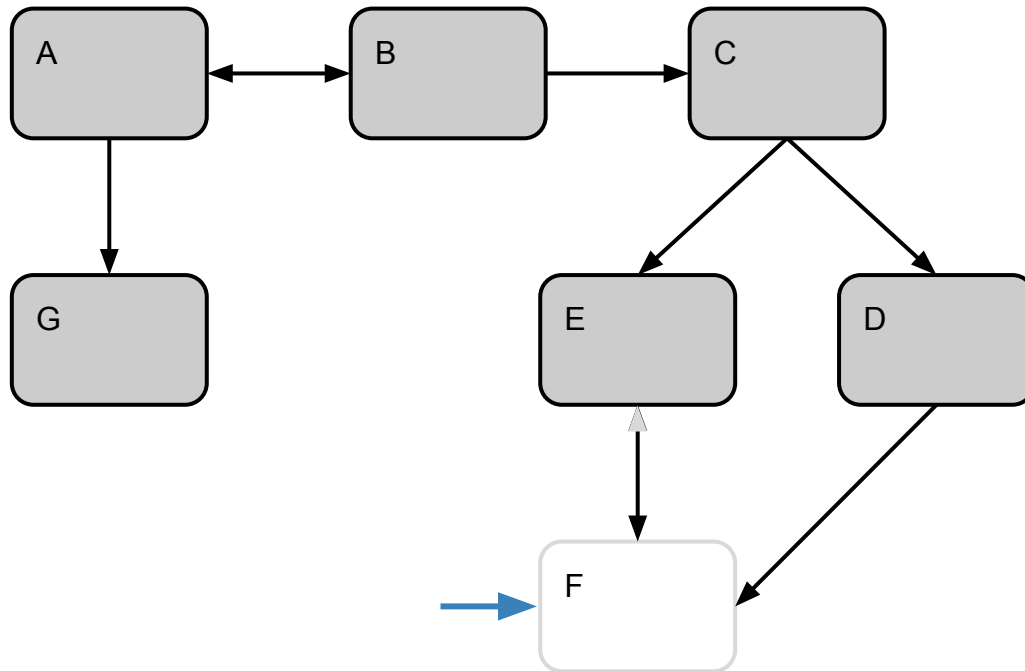
Already Browsed

 Loading Thread

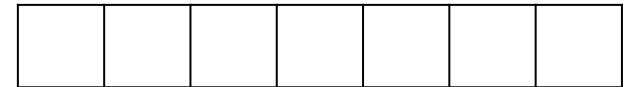
 Unloading Thread

Second Solution

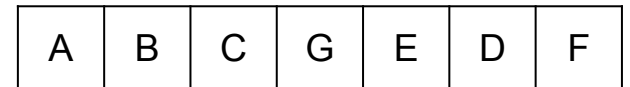
Multithreaded Resolution



To be Loaded



To be Unloaded



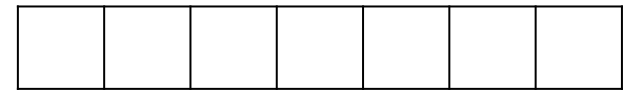
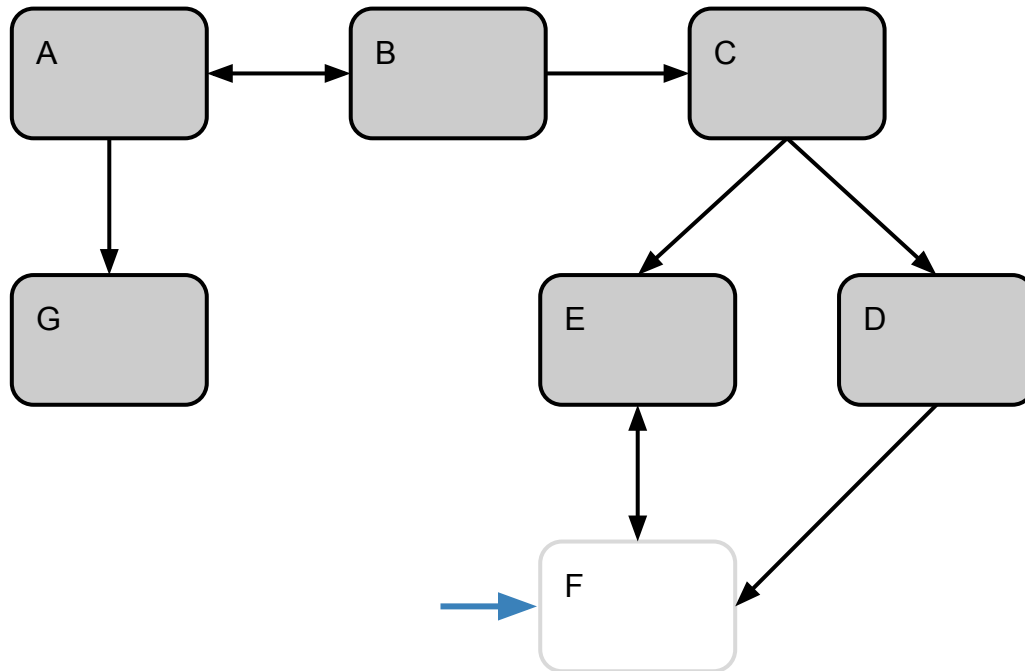
Already Browsed

 Loading Thread

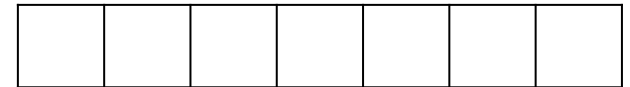
 Unloading Thread

Second Solution

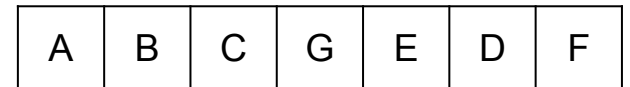
Multithreaded Resolution



To be Loaded



To be Unloaded



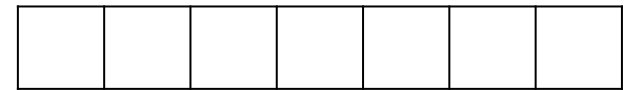
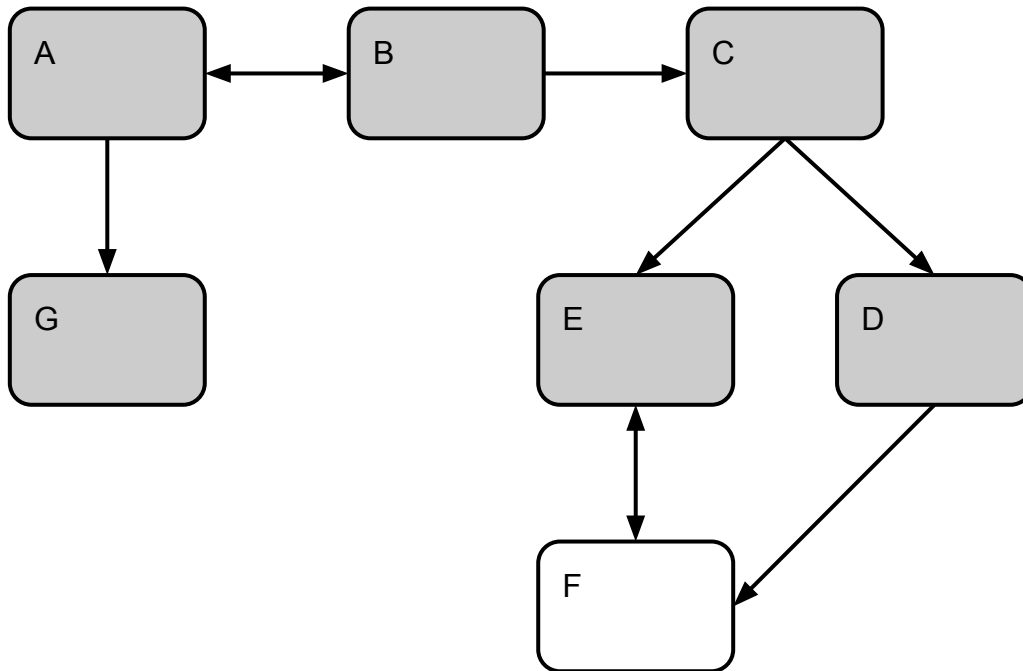
Already Browsed

 Loading Thread

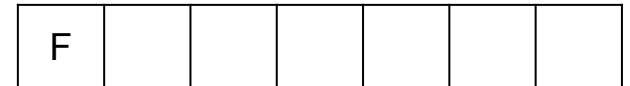
 Unloading Thread

Second Solution

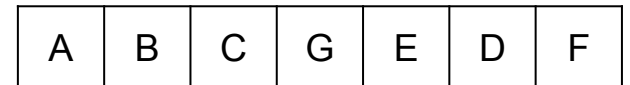
Multithreaded Resolution



To be Loaded



To be Unloaded



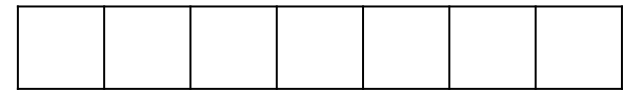
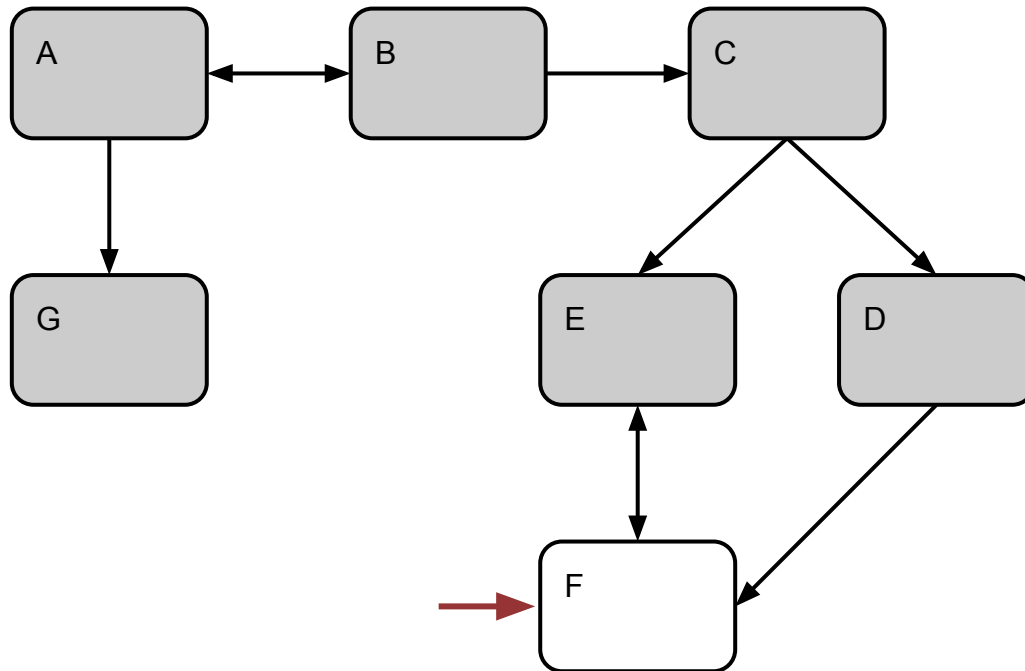
Already Browsed

 Loading Thread

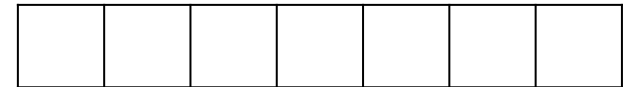
 Unloading Thread

Second Solution

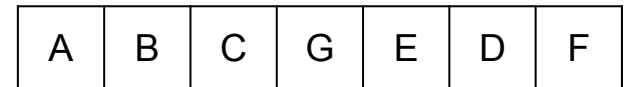
Multithreaded Resolution



To be Loaded



To be Unloaded



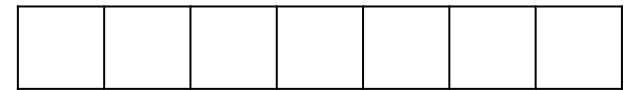
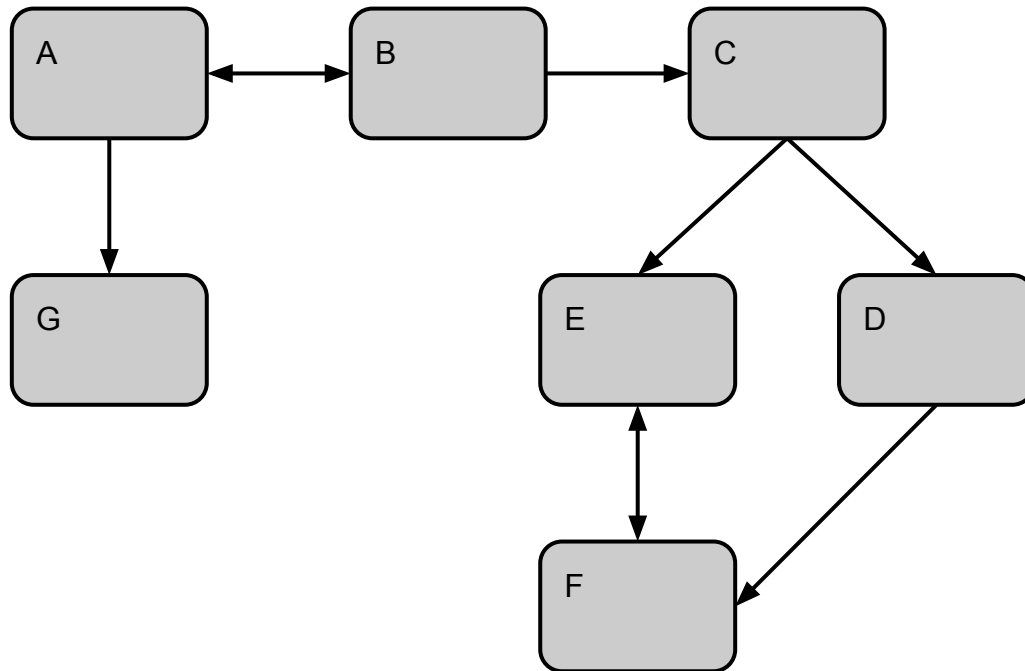
Already Browsed

 Loading Thread

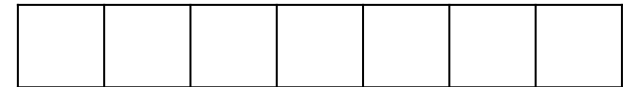
 Unloading Thread

Second Solution

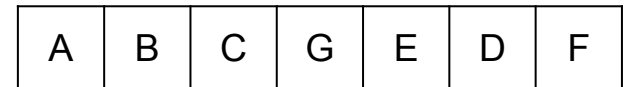
Multithreaded Resolution



To be Loaded



To be Unloaded



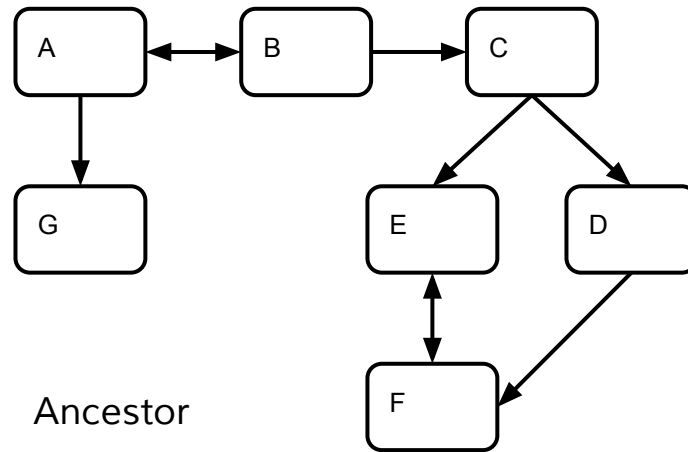
Already Browsed

 Loading Thread

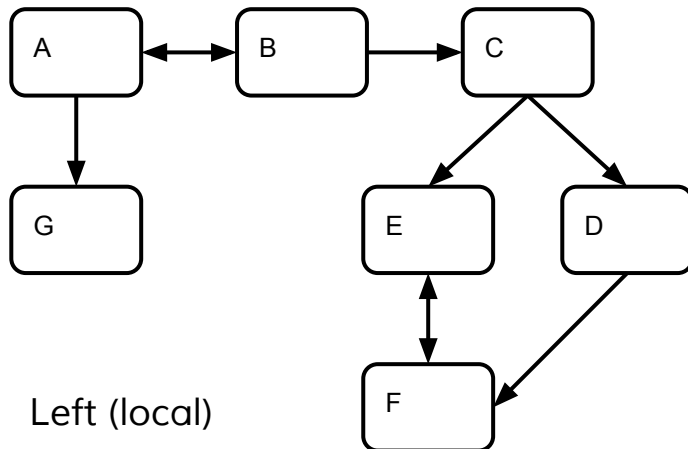
 Unloading Thread

Third Solution

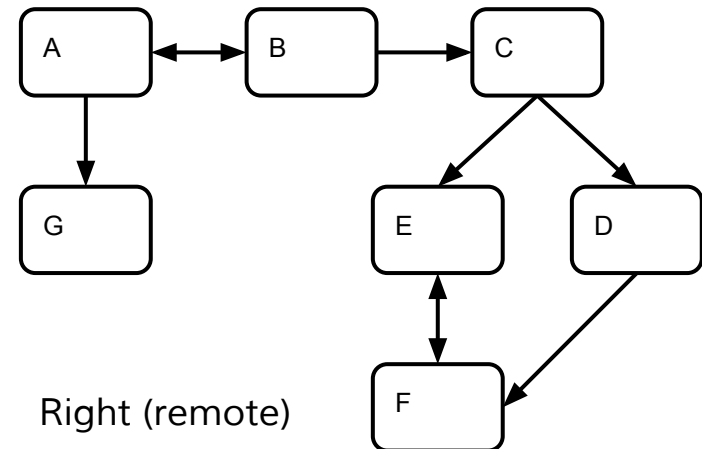
Minimize the Scope



Ancestor



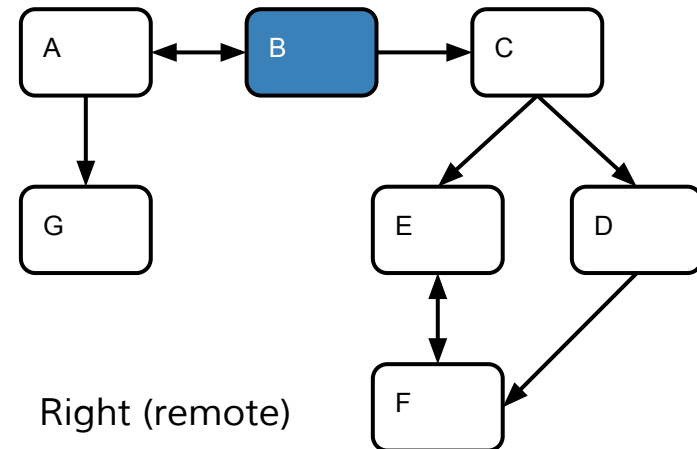
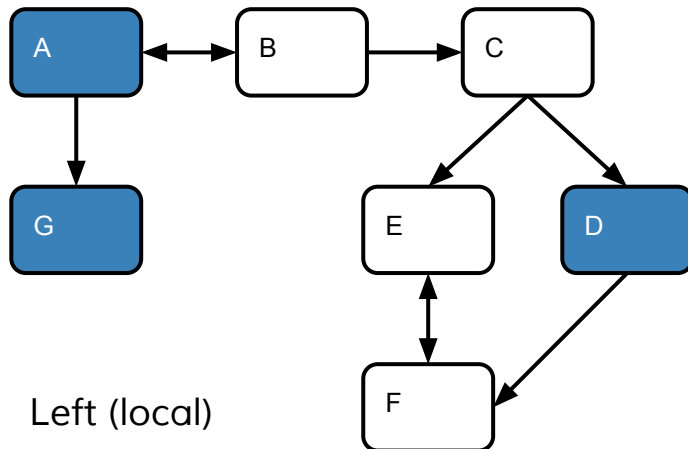
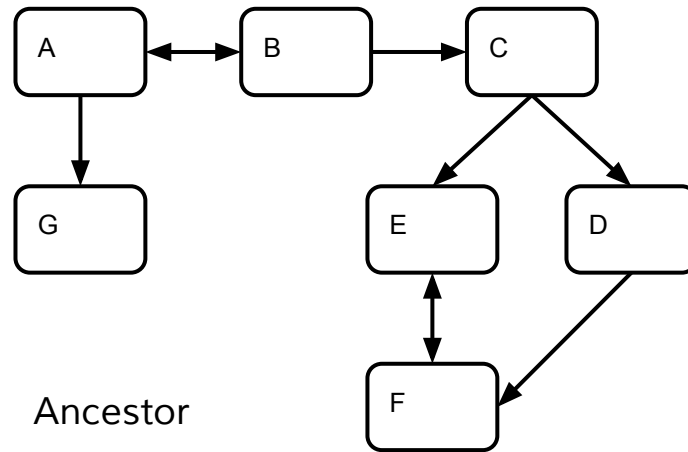
Left (local)



Right (remote)

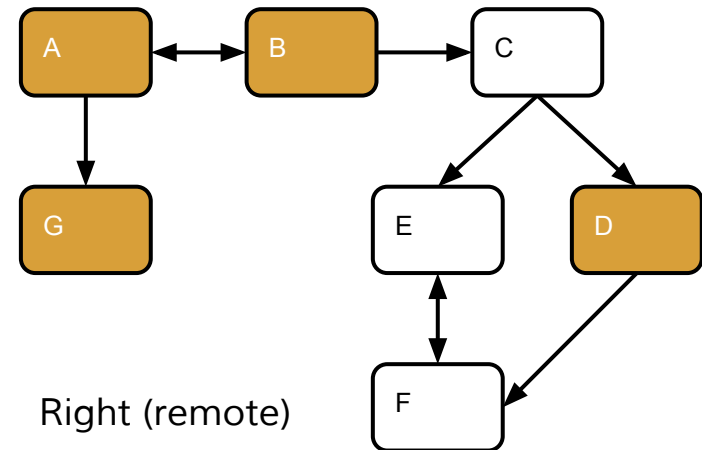
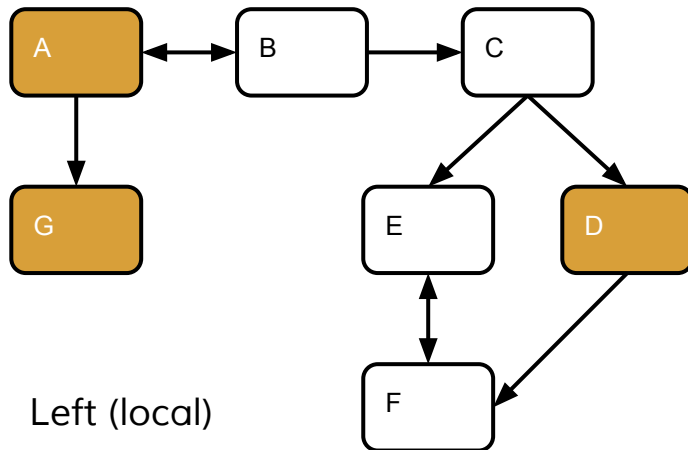
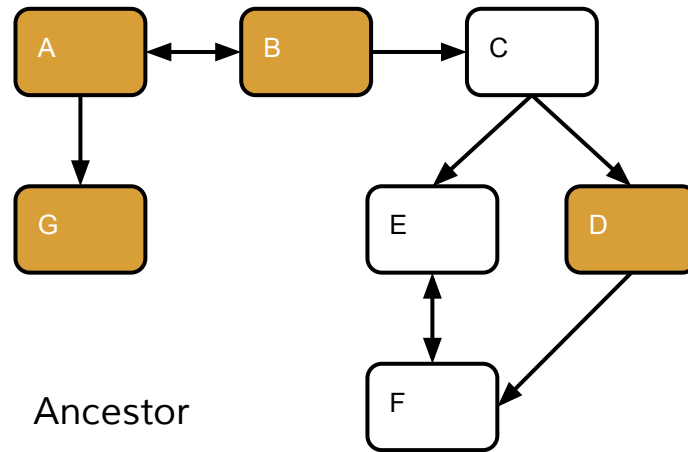
Third Solution

Minimize the Scope



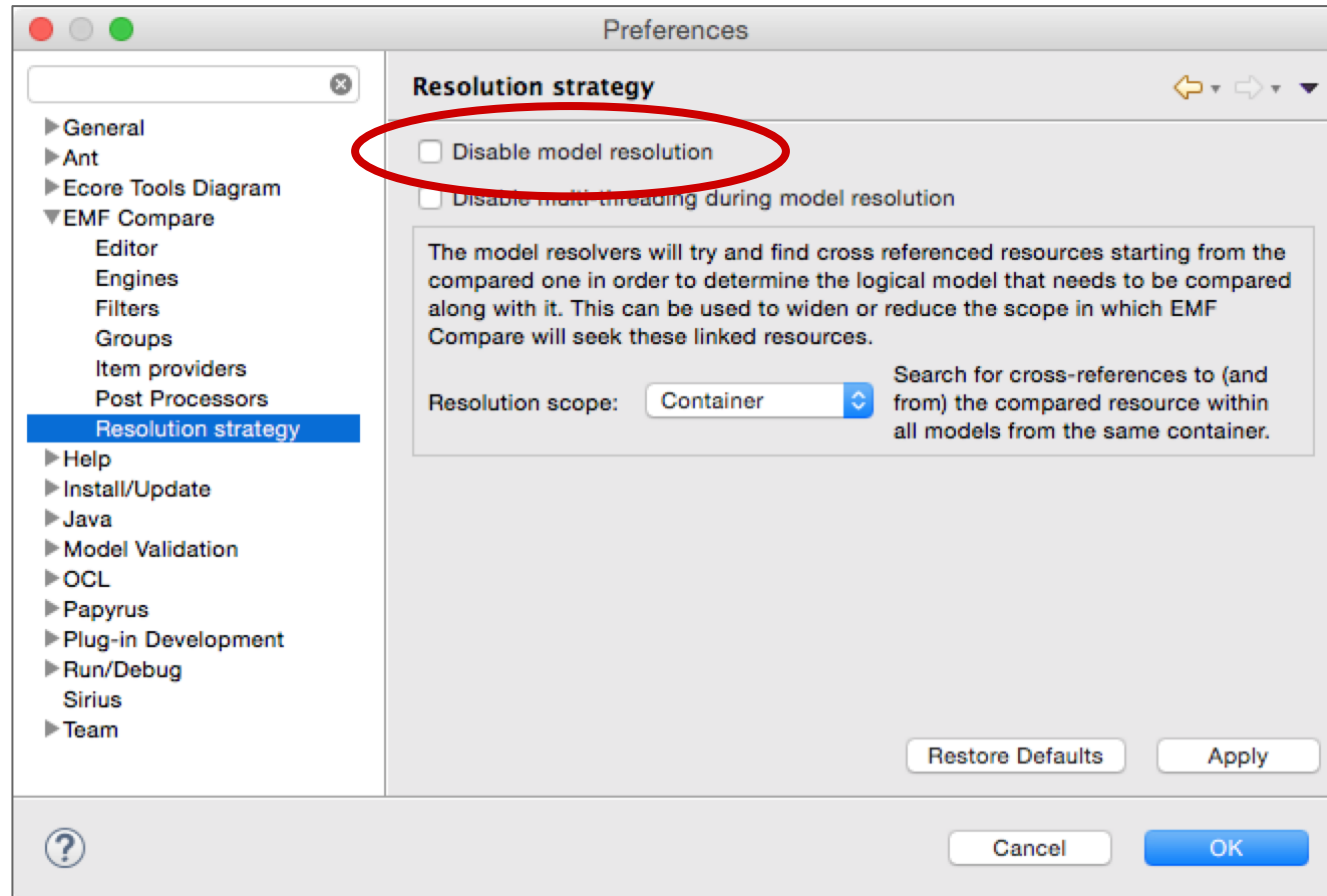
Third Solution

Minimize the Scope



Fourth Solution

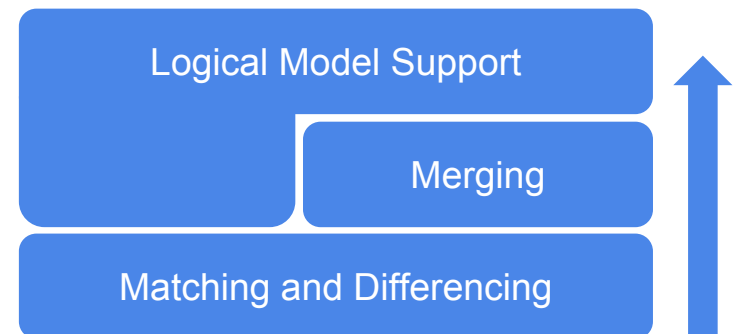
Do not do any Model Resolution



Increasing

Reliability of EMF Compare

- Increase reliability of EMF Compare
 - Increase test coverage
 - Reduce number of faults
- Challenges
 - Model matching, differencing, and merging is inherently complex
 - Increased reliability requires comprehensive testing
 - Comprehensive testing is difficult for model merging: combinatorially sized search space
- Steps
 - Bottom-up fuzz testing
 - Isolation and fixing of bugs



Increasing reliability of EMF Compare with Fuzz Testing

● Goal

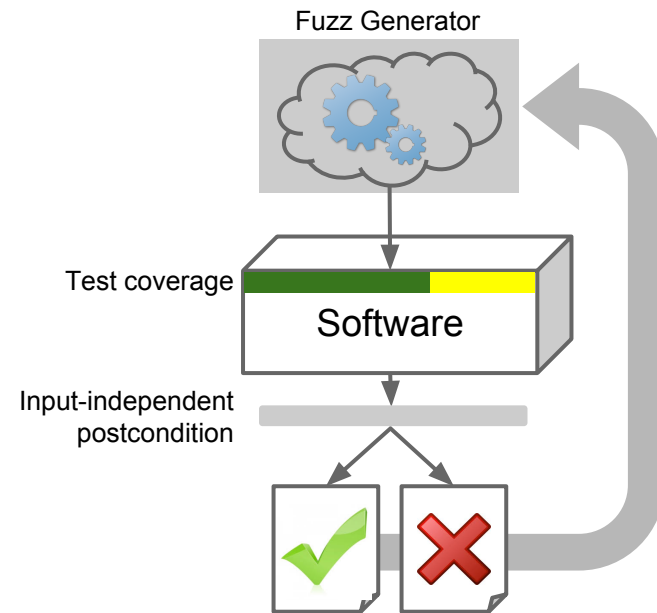
- Find inputs that cause unexpected behavior of a software
- Good cost effectiveness ratio
- Suitable for combinatorially sized and practically infinite input space
- Enable reproducibility of unexpected behavior for bug isolation

● Basic idea

- Run software under test with *pseudo random but metamodel-conform inputs*
- *Monitor* software under test during execution
- Check for *crashes and failures*

● Key ingredients

- Fuzz generator creates *pseudo random inputs*
- *Test coverage* of the fuzzed input
- *Input-independent postconditions*



Increasing reliability of EMF Compare with Fuzz Testing: Two-way Merge

- Goal

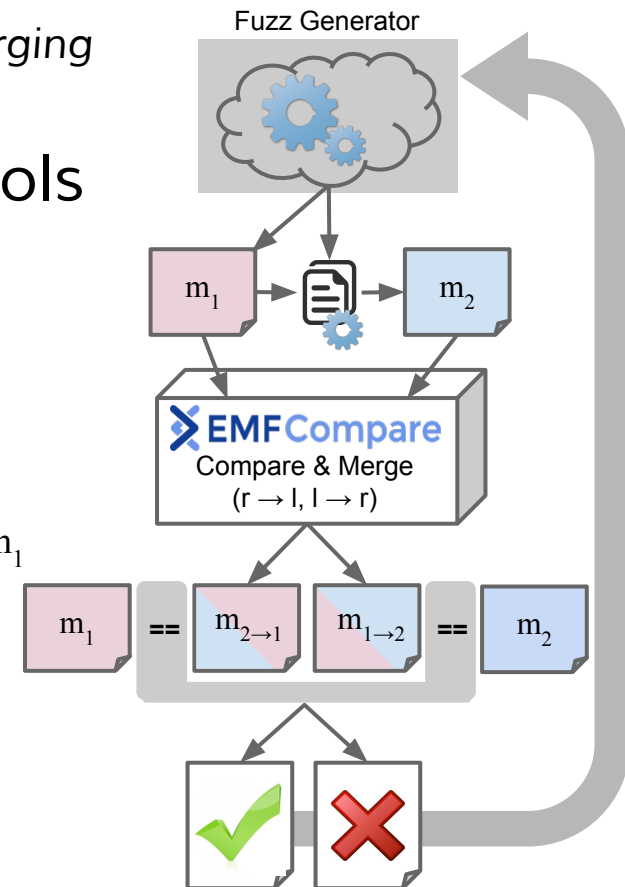
- Find combination of *model changes*
- Applied to an *EMF model*
- Causing erroneous *matching, diffing, and/or merging*

- Fuzz Testing Framework for EMF tools

- Part of EMFStore
- Repeatedly run JUnit tests with fuzzed input
- Pseudo-randomly mutate EMF models

- Basic Idea

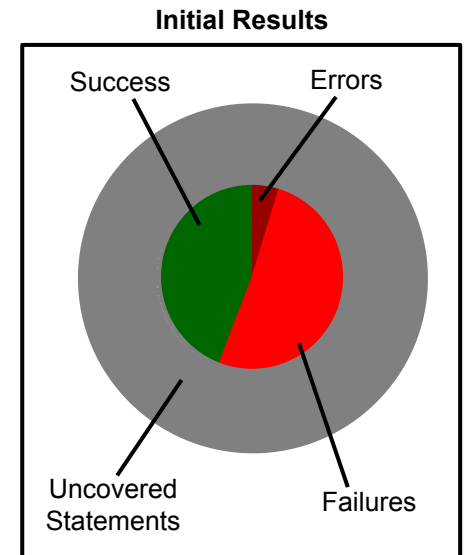
- Generate an EMF model conforming to a metamodel: m_1
- Copy and mutate this model: m_2
- Compare and merge in both directions: $m_{1 \rightarrow 2}$ and $m_{2 \rightarrow 1}$
- Compare m_1 with $m_{2 \rightarrow 1}$ and m_2 with $m_{1 \rightarrow 2}$
- Assert that there are no differences
 - Between m_1 and $m_{2 \rightarrow 1}$
 - Between m_2 and $m_{1 \rightarrow 2}$



Increasing reliability of EMF Compare

Fuzz Testing: Two-way Merge

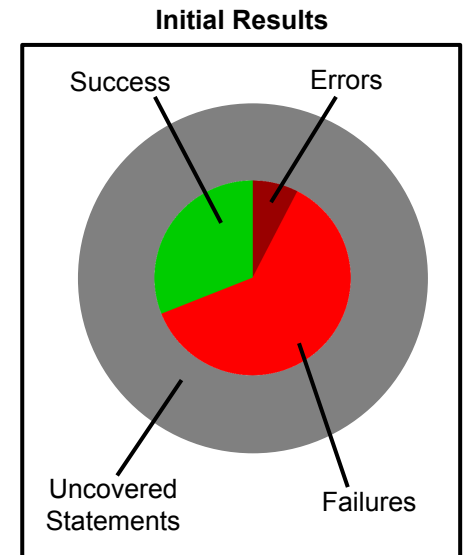
- Statement coverage of fuzz test: 40,5 %
 - 100 model elements
 - 500 seeds
 - Right-to-left and left-to-right merge: 1.000 tests
- Results of 1.000 tests
 - Initial error rate: 4,7 % (47 errors)
 - Initial failure rate: 51,1 % (511 failures)
- Does not mean that there are 511 + 47 bugs
 - x bugs that occurred (511 + 47)/x times



Increasing reliability of EMF Compare

Fuzz Testing: Two- & Three-way Merge

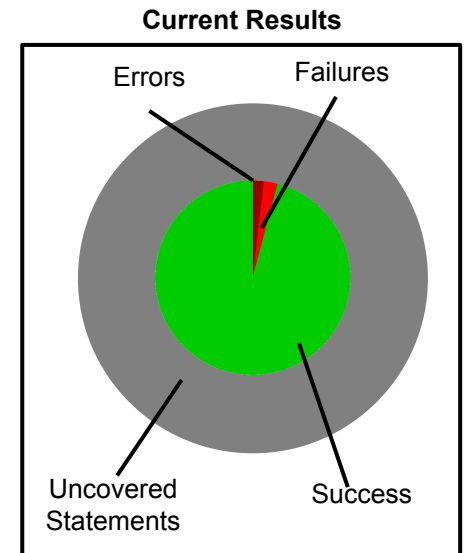
- Overall statement coverage: **53%**
 - 100 model elements
 - 500 seeds
 - 2.000 two-way merge tests
 - 1.000 three-way merge tests
- Overall results of 3.000 tests
 - Initial error rate: 7,56 % (227 errors)
 - Initial failure rate: 61,4 % (1842 failures)
- Isolation and fixing
 - Extract minimal unit test reproducing wrong behavior
 - Find, report, and fix underlying bug



Increasing reliability of EMF Compare

Fuzz Testing: Two- & Three-way Merge

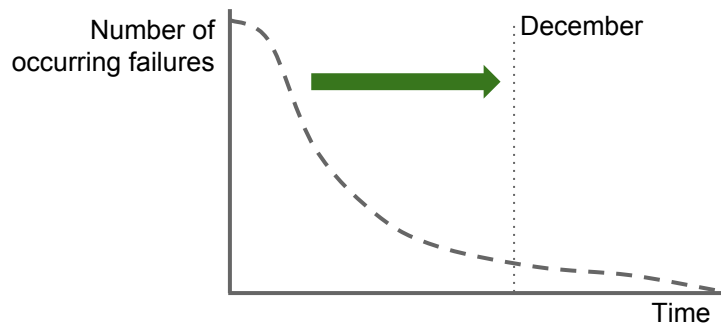
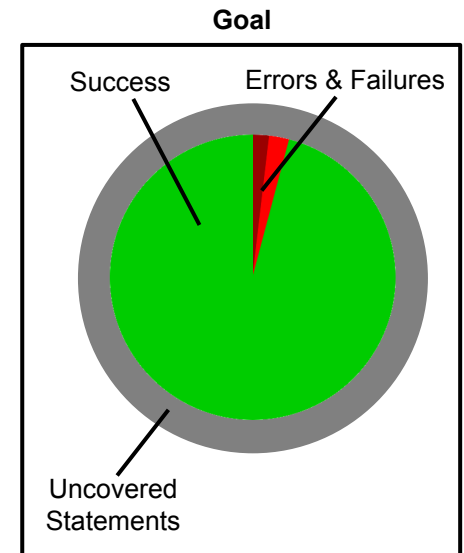
- Overall statement coverage: 53%
 - 100 model elements
 - 500 seeds
 - 2.000 two-way merge tests
 - 1.000 three-way merge tests
- Overall results of 3.000 tests
 - Initial error rate: 7,56 % (227 errors)
 - Initial failure rate: 61,4 % (1842 failures)
- Isolation and fixing (10 bugs)
 - Current error rate: **1,86 % (56 errors)**
 - Current failure rate: **2,26 % (68 failures)**
 - Increased number of tests by **12 test cases**



Increasing reliability of EMF Compare

Fuzz Testing: Two- & Three-way Merge

- Goal statement coverage: **80+ %**
 - 100 model elements
 - 50.000 seeds
 - 100.000 two-way merge tests
 - 50.000 three-way merge tests
- Goal for 150.000 tests
 - Error rate: → 0 %
 - Failure rate: → 0 %



Versioning Models with Git



Git

Created by

Linus Torvalds





As a replacement for
BitKeeper

Git is

Distributed



Primary SCM of the
Eclipse Foundation
(since 2011)



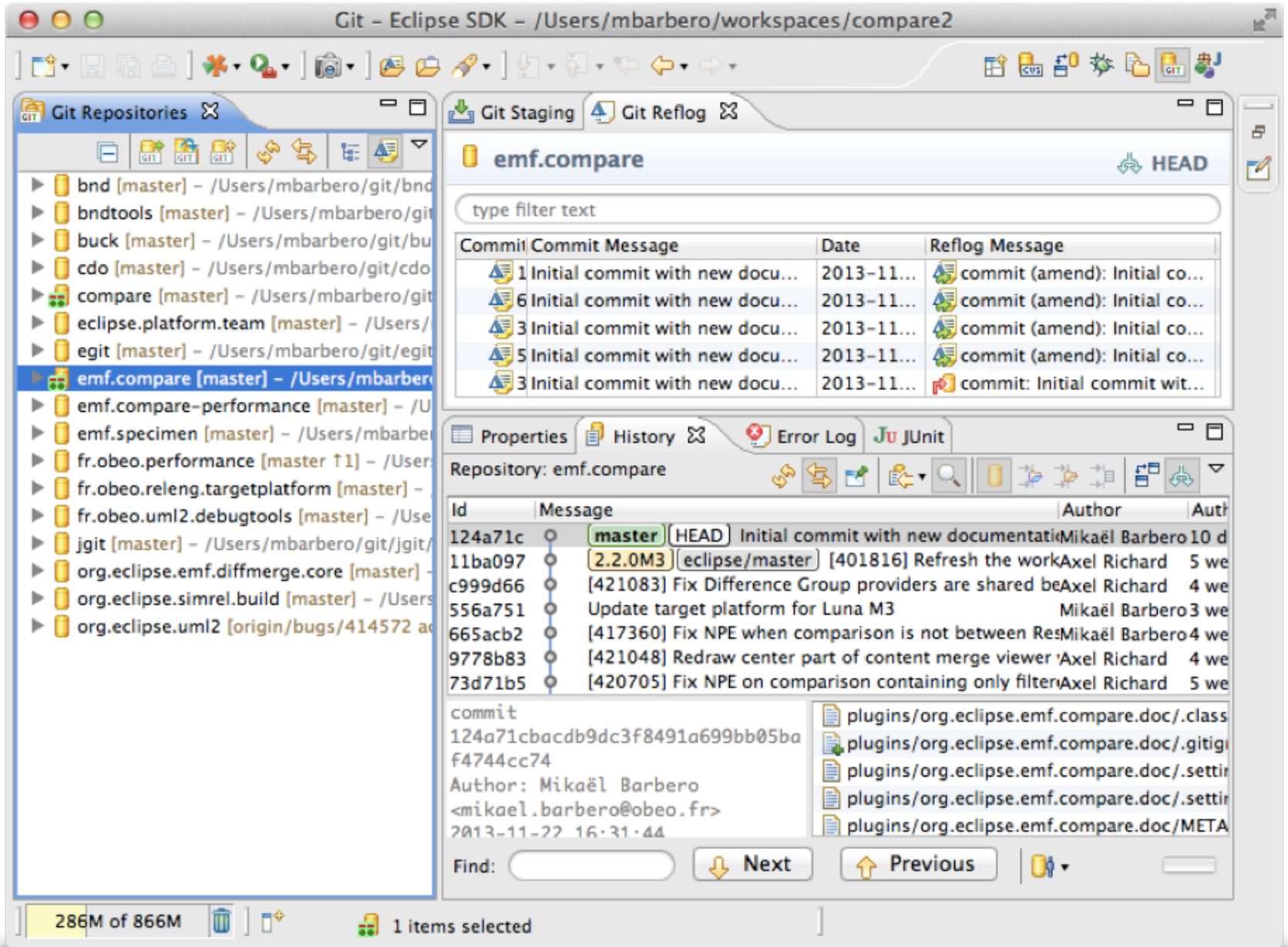
Popularized by

Famous Hosting Service





EGit



Git Repositories

- bnd [master] - /Users/mbarbero/git/bnd
- bndtools [master] - /Users/mbarbero/git/bndtools
- buck [master] - /Users/mbarbero/git/buck
- cdo [master] - /Users/mbarbero/git/cdo
- compare [master] - /Users/mbarbero/git/compare
- eclipse.platform.team [master] - /Users/mbarbero/git/eclipse.platform.team
- egit [master] - /Users/mbarbero/git/egit
- emf.compare [master] - /Users/mbarbero/git/emf.compare**
- emf.compare-performance [master] - /Users/mbarbero/git/emf.compare-performance
- emf.specimen [master] - /Users/mbarbero/git/emf.specimen
- fr.obeo.performance [master ↑1] - /Users/mbarbero/git/fr.obeo.performance
- fr.obeo.releng.targetplatform [master] - /Users/mbarbero/git/fr.obeo.releng.targetplatform
- fr.obeo.uml2.debugtools [master] - /Users/mbarbero/git/fr.obeo.uml2.debugtools
- jgit [master] - /Users/mbarbero/git/jgit
- org.eclipse.emf.diffmerge.core [master] - /Users/mbarbero/git/org.eclipse.emf.diffmerge.core
- org.eclipse.simrel.build [master] - /Users/mbarbero/git/org.eclipse.simrel.build
- org.eclipse.uml2 [origin/bugs/414572] - /Users/mbarbero/git/org.eclipse.uml2

Git Staging | Git Reflog

emf.compare HEAD

type filter text

Commit	Commit Message	Date	Reflog Message
1	Initial commit with new docu...	2013-11...	commit (amend): Initial co...
6	Initial commit with new docu...	2013-11...	commit (amend): Initial co...
3	Initial commit with new docu...	2013-11...	commit (amend): Initial co...
5	Initial commit with new docu...	2013-11...	commit (amend): Initial co...
3	Initial commit with new docu...	2013-11...	commit: Initial commit wit...

Properties | History | Error Log | JUnit

Repository: emf.compare

Id	Message	Author	Aut
124a71c	master HEAD Initial commit with new documentati	Mikaël Barbero	10 d
11ba097	2.2.0M3 [eclipse/master] [401816] Refresh the work	Axel Richard	5 we
c999d66	[421083] Fix Difference Group providers are shared be	Axel Richard	4 we
556a751	Update target platform for Luna M3	Mikaël Barbero	3 we
665acb2	[417360] Fix NPE when comparison is not between Res	Mikaël Barbero	4 we
9778b83	[421048] Redraw center part of content merge viewer	Axel Richard	4 we
73d71b5	[420705] Fix NPE on comparison containing only filter	Axel Richard	5 we

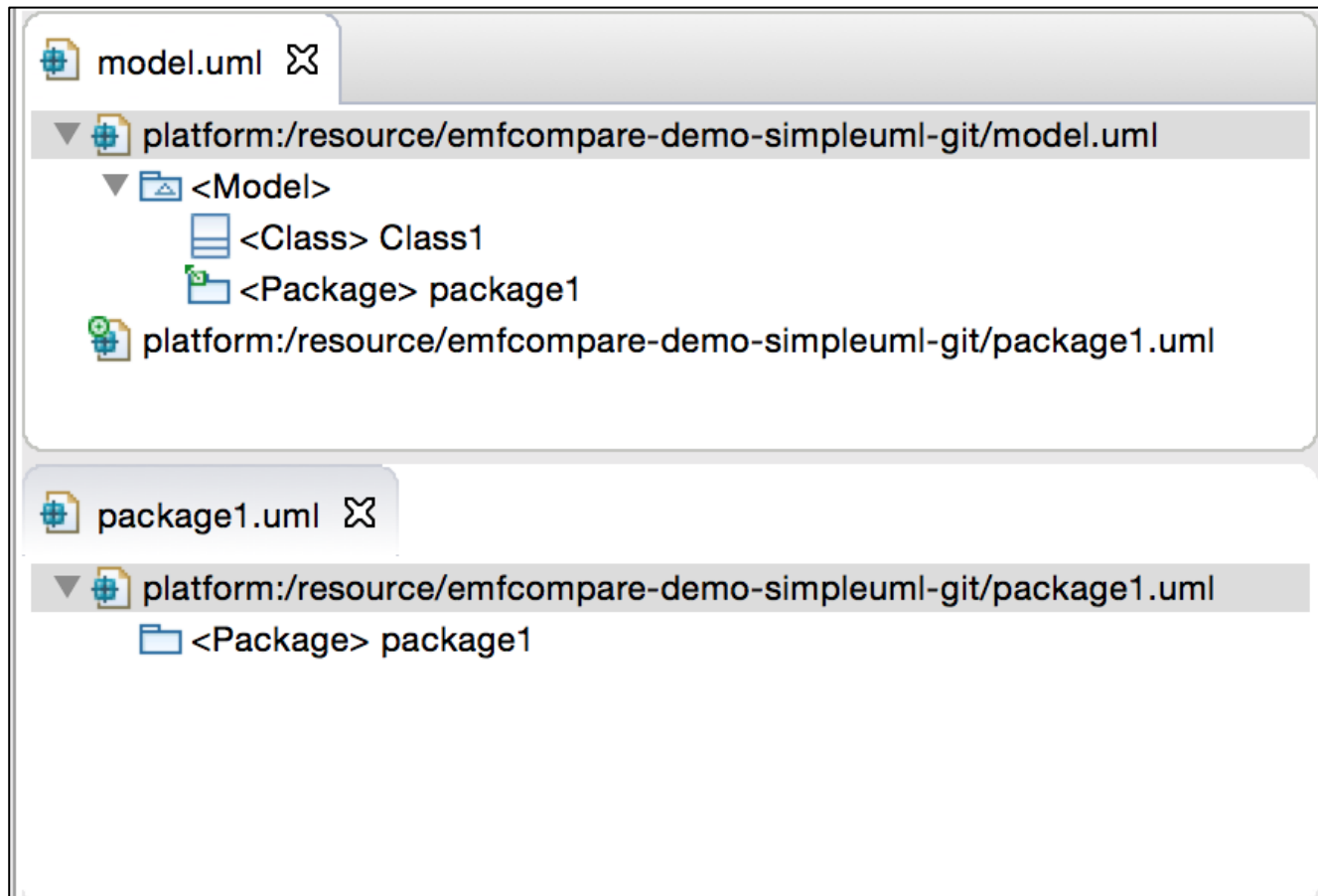
commit
124a71cbacdb9dc3f8491a699bb05ba
f4744cc74
Author: Mikaël Barbero
<mikael.barbero@obeo.fr>
2013-11-22 16:31:44

- plugins/org.eclipse.emf.compare.doc/.class
- plugins/org.eclipse.emf.compare.doc/.gitigi
- plugins/org.eclipse.emf.compare.doc/.settit
- plugins/org.eclipse.emf.compare.doc/.settit
- plugins/org.eclipse.emf.compare.doc/META

Find:

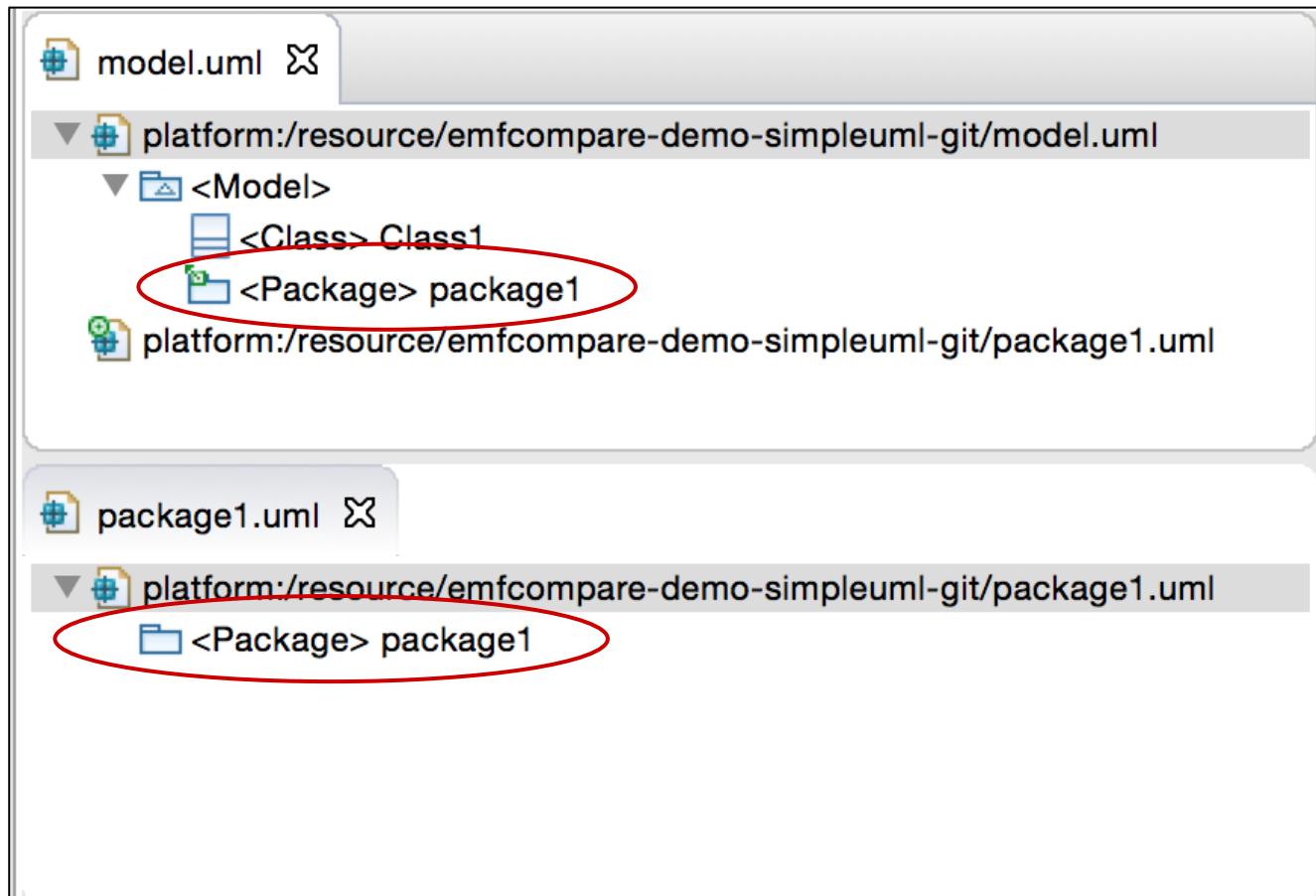
What if EGit could prevent you from...

Creating dangling edges?



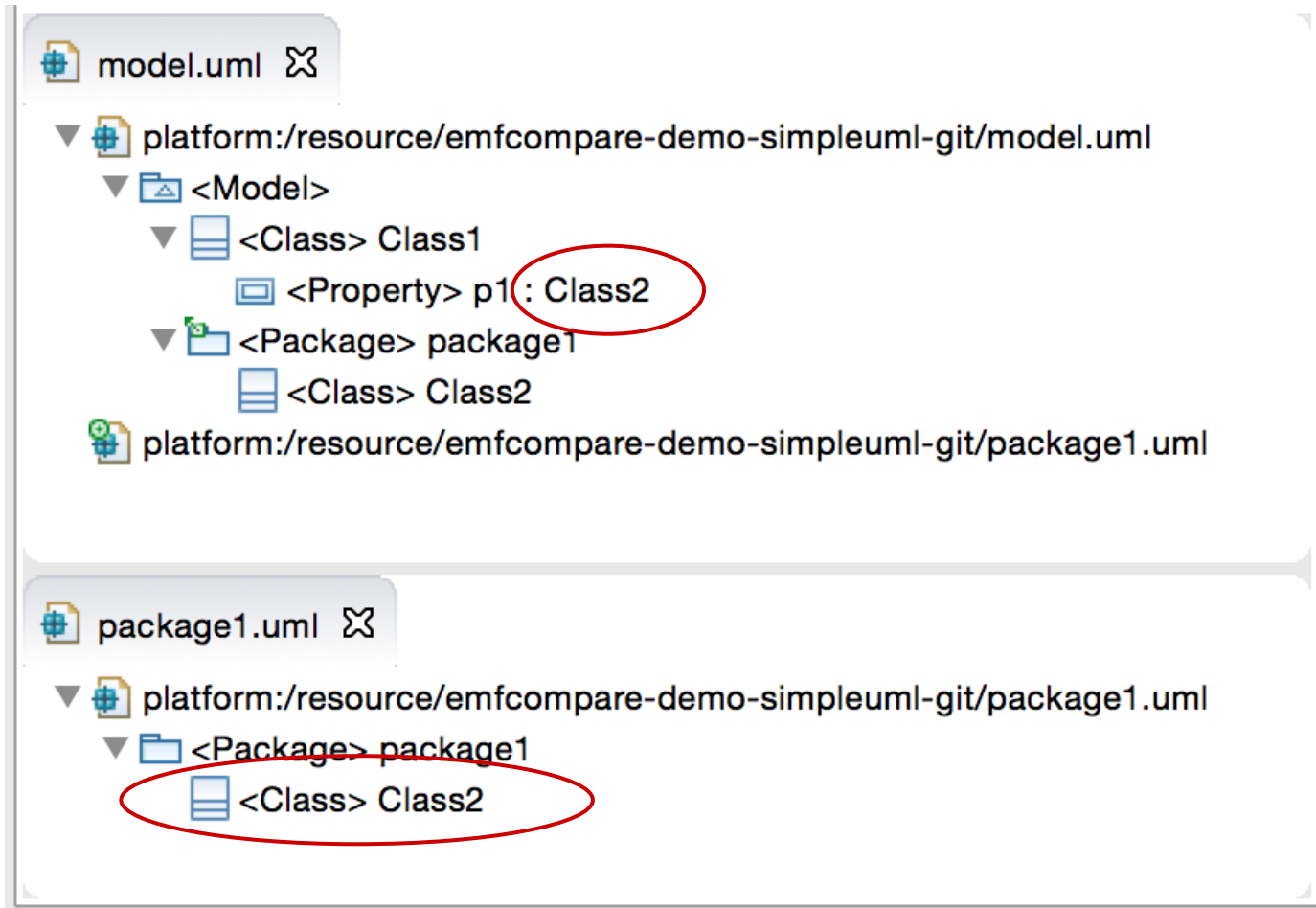
What if EGit could prevent you from...

Creating dangling edges?



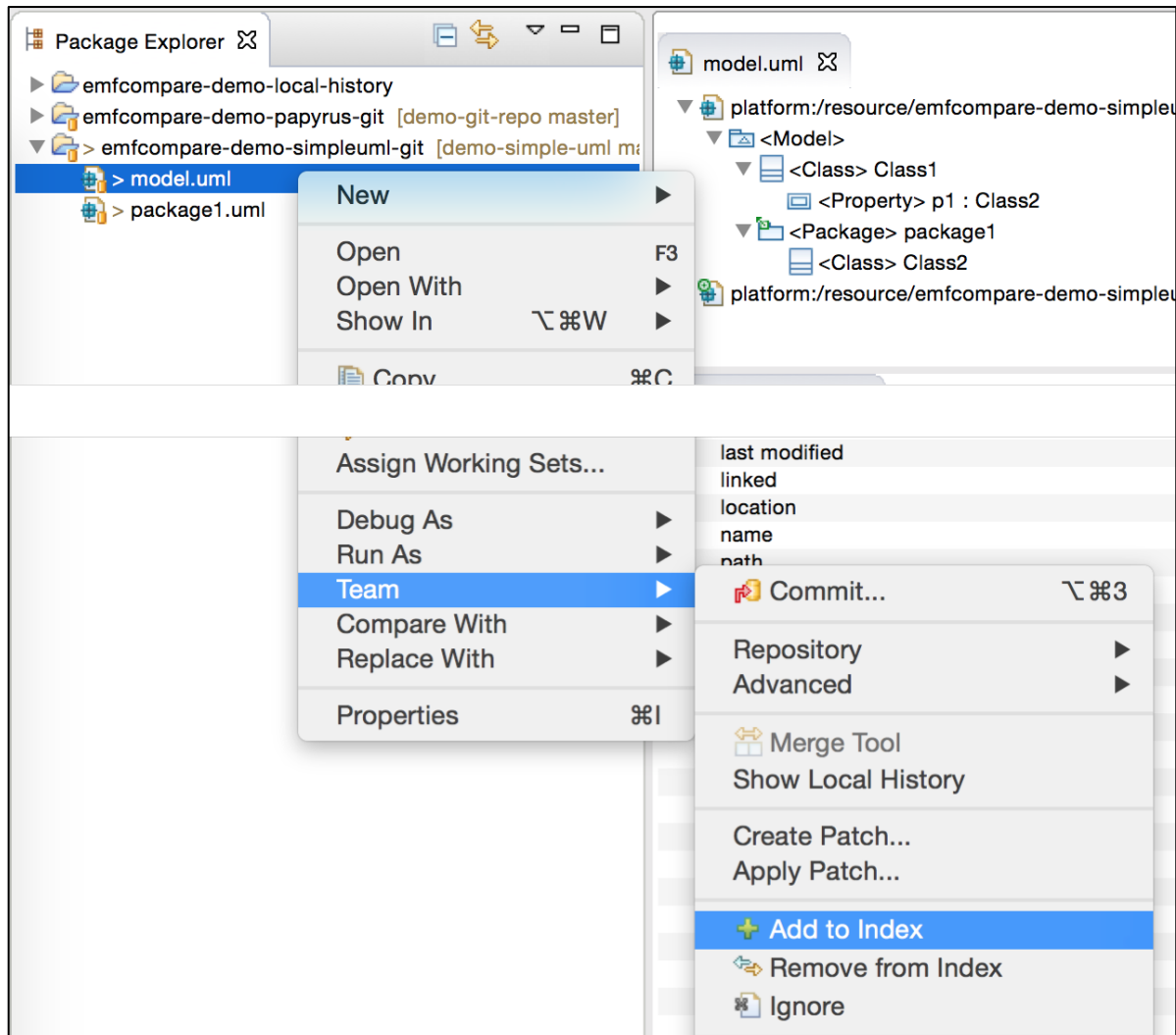
What if EGit could prevent you from...

Creating dangling edges?



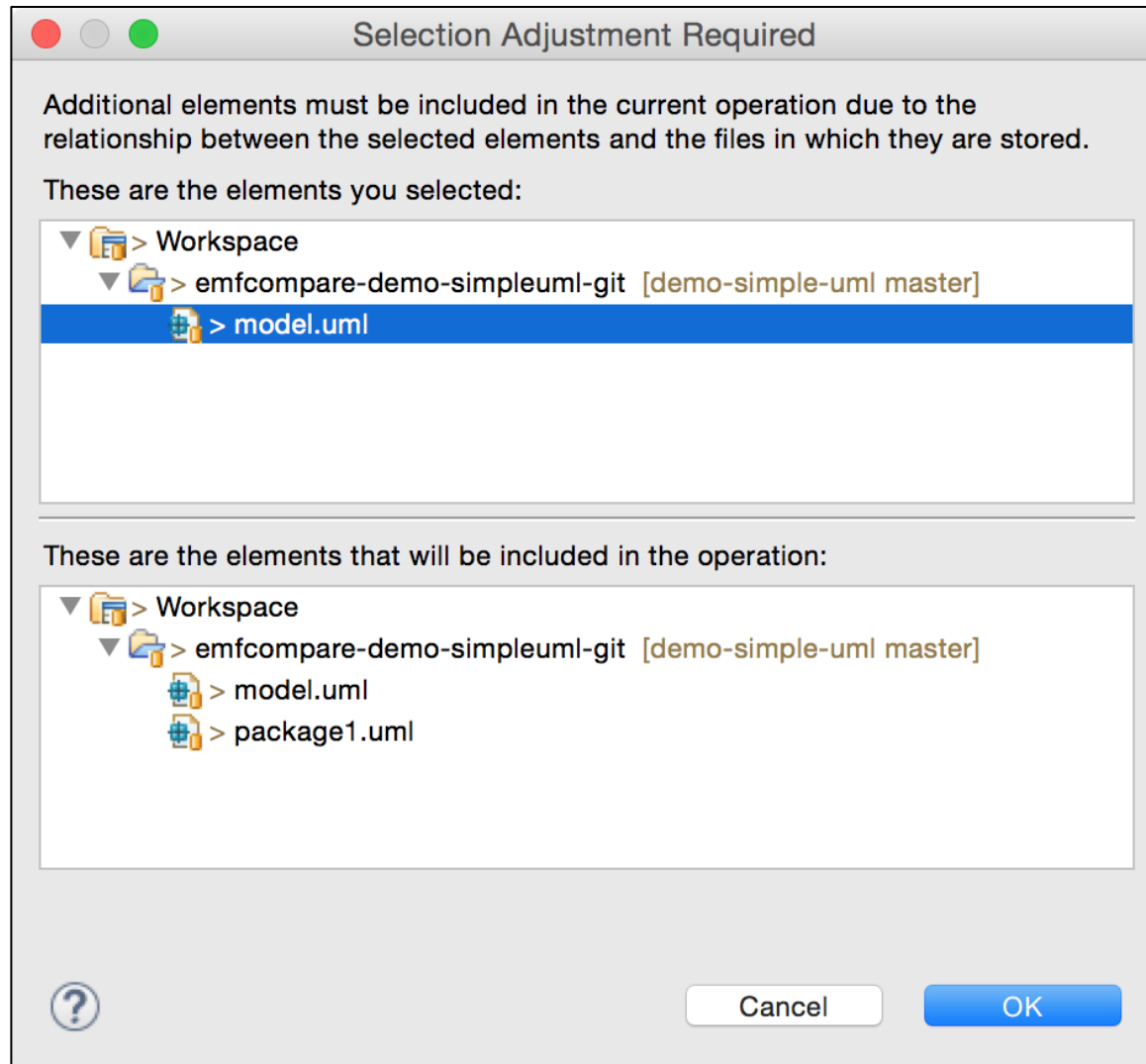
What if EGit could prevent you from...

Creating dangling edges?



What if EGit could prevent you from...

Creating dangling edges?



What if EGit could detect...

Semantic conflicts?

The screenshot displays the Eclipse IDE interface. At the top, a window titled 'model.di' shows a UML Class Diagram. It features three classes: Class1, Class2, and Class3. Class1 is a simple class with three compartments. Class2 has an association with Class3, labeled '+ class2' on the Class2 side and '+ class3' on the Class3 side. The multiplicity is '[1]' at both ends. Class3 also has an association with Class2, labeled '+ class3' on the Class3 side and '+ class2' on the Class2 side. The multiplicity is '[1]' at both ends. The diagram is titled 'ClassDiagram'.

Below the diagram, the 'Properties' tab is active, showing 'Model Validation' (checked), 'Git Staging' (checked), and 'History' (checked). The 'History' tab is selected, displaying a list of commits for the file 'emfcompare-demo-papyrus-git/model.di [demo-git-repo]'. The commits are:

Id	Message
838514d	(master) add Attribute1 of type Class2
684d0c0	(tom) remove Class2
db78907	(HEAD) add association C2 -> C2
c4861ff	add Class3
f4831ba	initial commit

At the bottom, the commit details for 'db78907394060610db1c85ddad91d87e9f6b73' are shown:

```
commit db78907394060610db1c85ddad91d87e9f6b73
Author: Mikael Barbero <mikael.barbero@gmail.com> 2014-10-24
16:39:35
Committer: Mikael Barbero <mikael.barbero@gmail.com> 2014-10-26
15:52:29
```

What if EGit could detect...

Semantic conflicts?

model.di

Class3

Class2

Class1

Palette

Nodes

Edges

ClassDiagram

Properties Model Validation Git Staging History

File: emfcompare-demo-papyrus-git/model.di [demo-git-repo]

Id	Message
838514d	add Attribute1 of type Class2
684d0c0	remove Class2
db78907	add association C2 -> C2
c4861ff	add Class3
f4831ba	initial commit

commit 838514d26d5476cdeb469282fe8b7d65bc785d23
Author: Mikaël Barbero <mikael.barbero@gmail.com> 2014-10-26 15:53:23
Committer: Mikaël Barbero <mikael.barbero@gmail.com> 2014-10-26 15:53:23

emfcompare-demo-papyrus-git/m
emfcompare-demo-papyrus-git/m

What if EGit could detect...

Semantic conflicts?

The screenshot shows a modeling tool interface with a class diagram and a commit history panel. The class diagram displays two classes, Class3 and Class1, each with three empty attribute slots. The commit history panel shows a list of commits with the following details:

Id	Message
838514d	(master) add Attribute1 of type Class2
684d0c0	(tom) (HEAD) remove Class2
db78907	add association C2 -> C2
c4861ff	add Class3
f4831ba	initial commit

Below the commit history, the commit details for 684d0c0 are shown:

```
commit 684d0c04cbf47896153113dbff48eee3a0d7021e
Author: Mikael Barbero <mikael.barbero@gmail.com> 2014-10-26
15:52:52
Committer: Mikael Barbero <mikael.barbero@gmail.com> 2014-10-26
15:52:52
```

What if EGit could detect...

Semantic conflicts?

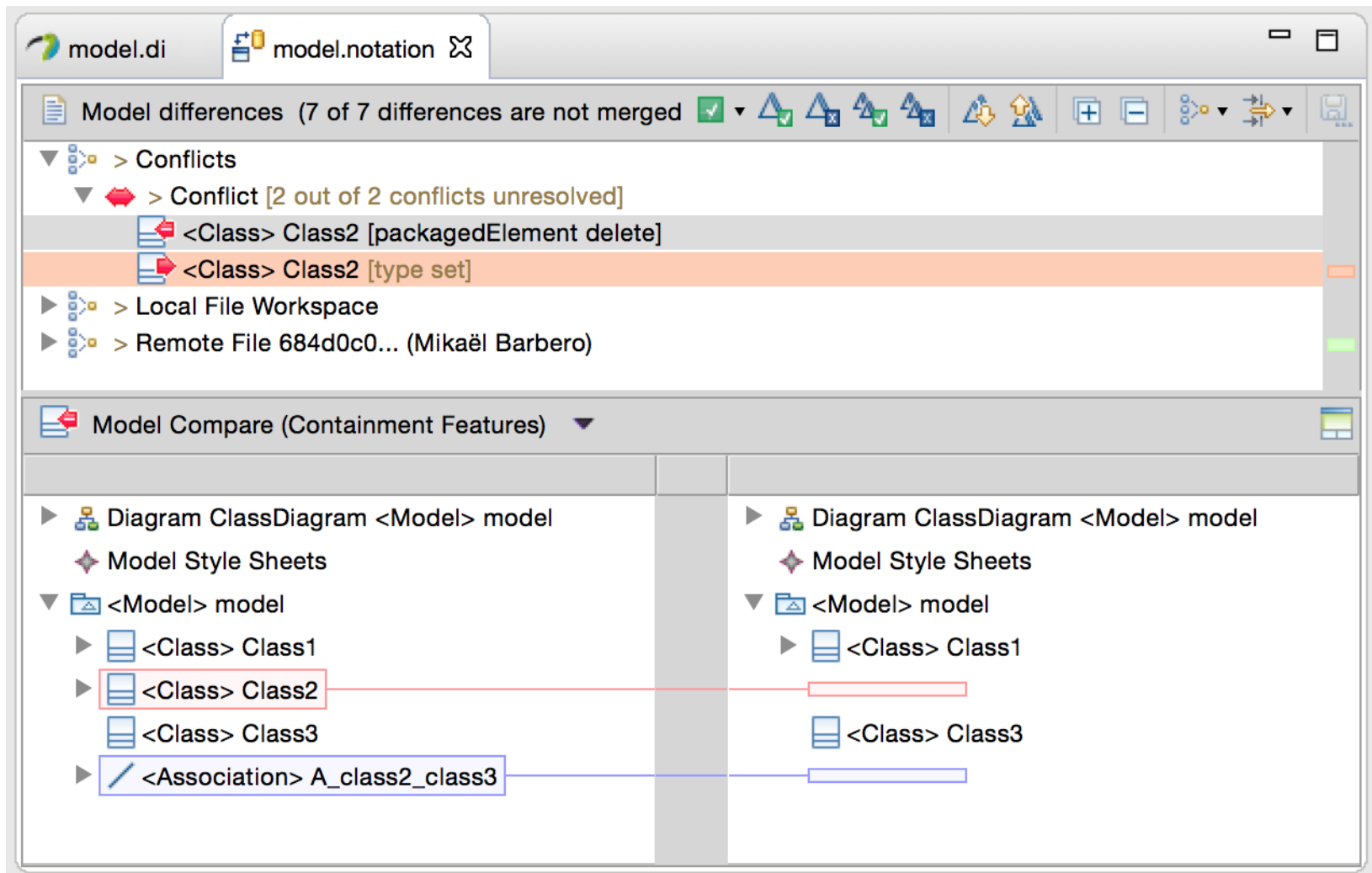
The screenshot shows the EGit interface. On the left, a commit list is displayed with columns for 'Id' and 'Message'. The commit with ID '684d0c0' is selected, and its message is 'remove C'. The 'tom' branch is highlighted in green. Below the list, the commit details are shown: 'commit 684d0c04cbf4789615', 'Author: Mikaël Barbero <mikaël.barbero@univ-st-etienne.fr>', 'Committer: Mikaël Barbero <mikaël.barbero@univ-st-etienne.fr>', and 'Parent: db78907394060610c0 (C2)'. On the right, a context menu is open, listing various Git actions. The 'Merge' option is highlighted in blue. Other options include 'Open in Commit Viewer', 'Checkout', 'Push Commit...', 'Create Branch...', 'Delete Branch', 'Rename Branch...', 'Create Tag...', 'Delete Tag...', 'Create Patch...', 'Rebase on', and 'Rebase Interactive'.

Id	Message
838514d	master HEAD
684d0c0	tom remove C
db78907	add associatio
c4861ff	add Class3
f4831ba	initial commit

- Open in Commit Viewer
- Checkout
- Push Commit...
- Create Branch...
- Delete Branch
- Rename Branch...
- Create Tag...
- Delete Tag...
- Create Patch...
- Merge**
- Rebase on
- Rebase Interactive

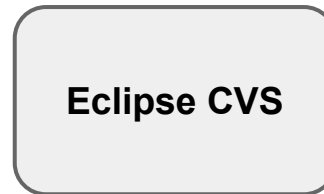
What if EGit could detect...

Semantic conflicts?

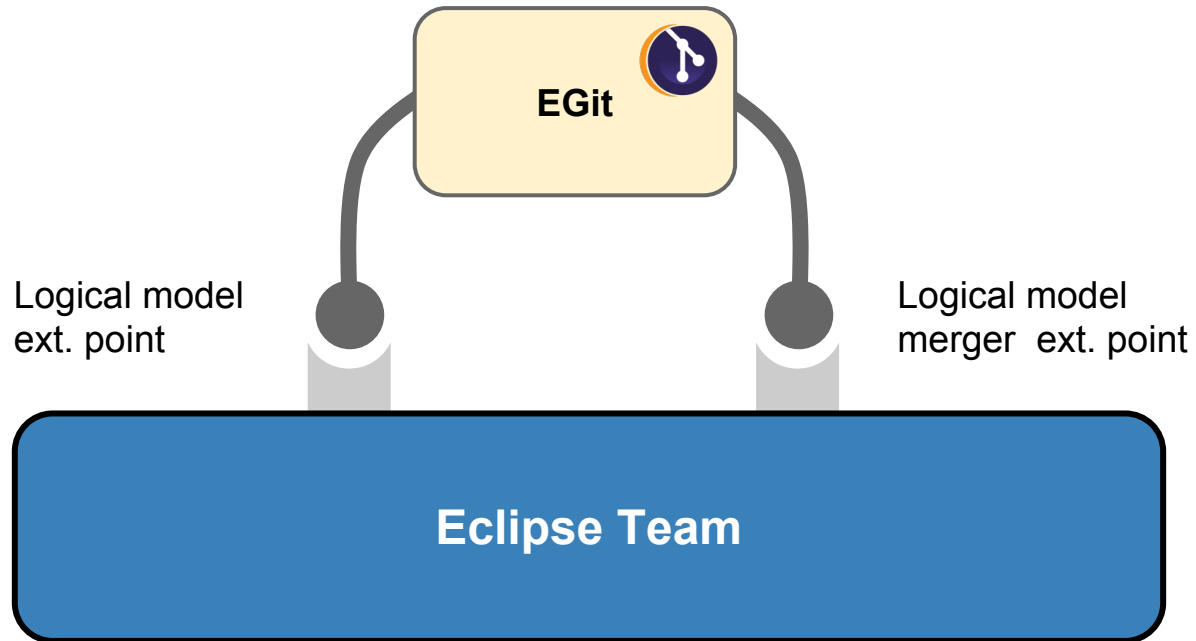


The Mediator is

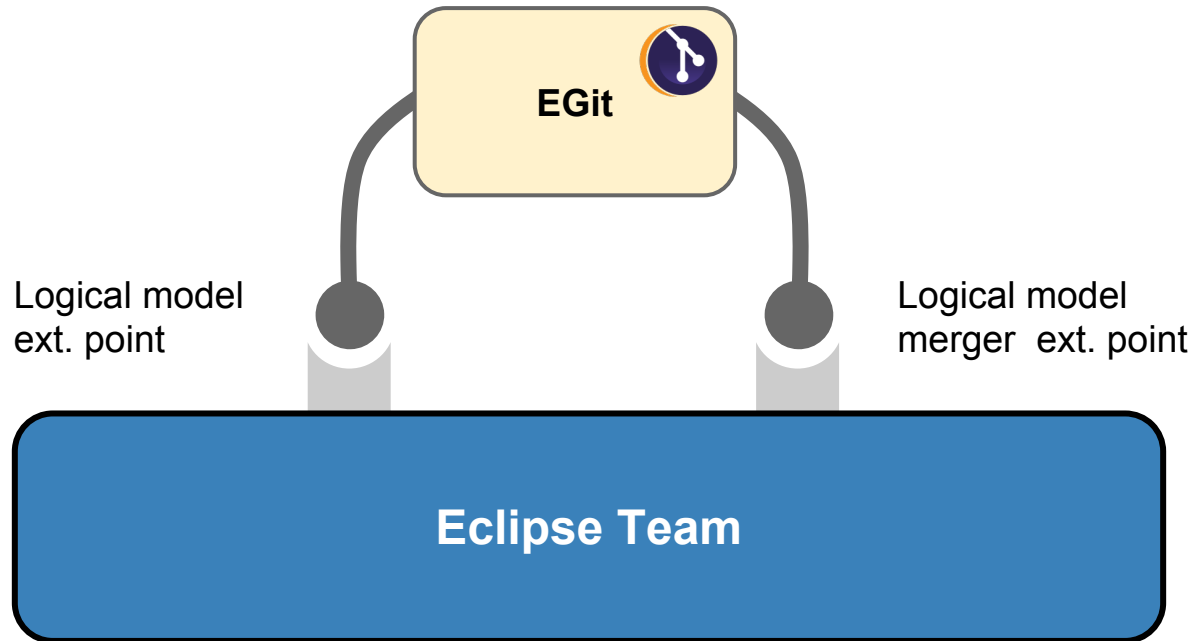
Eclipse Team



The Mediator is Eclipse Team

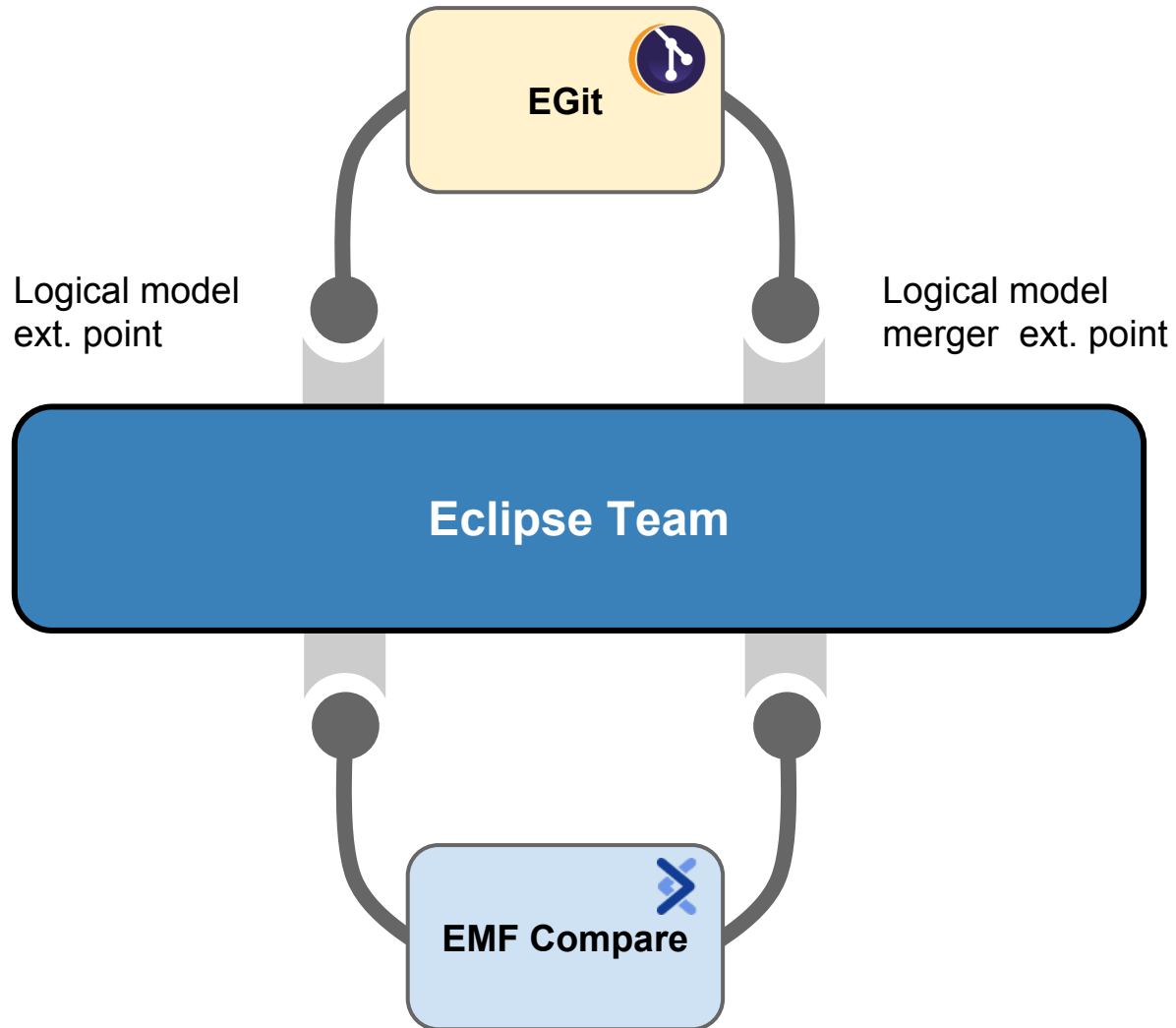


The Mediator is Eclipse Team

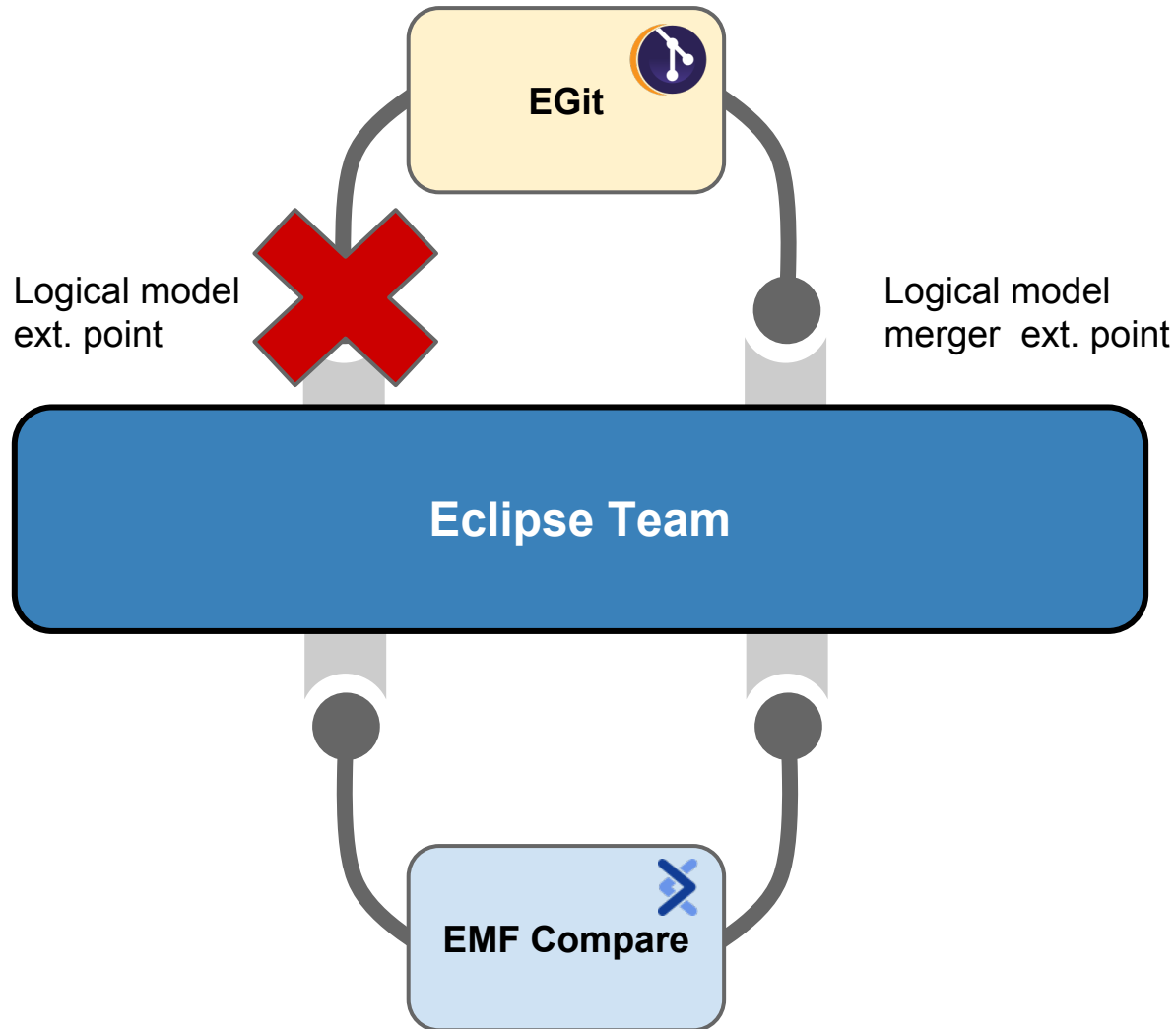


?

The Mediator is Eclipse Team

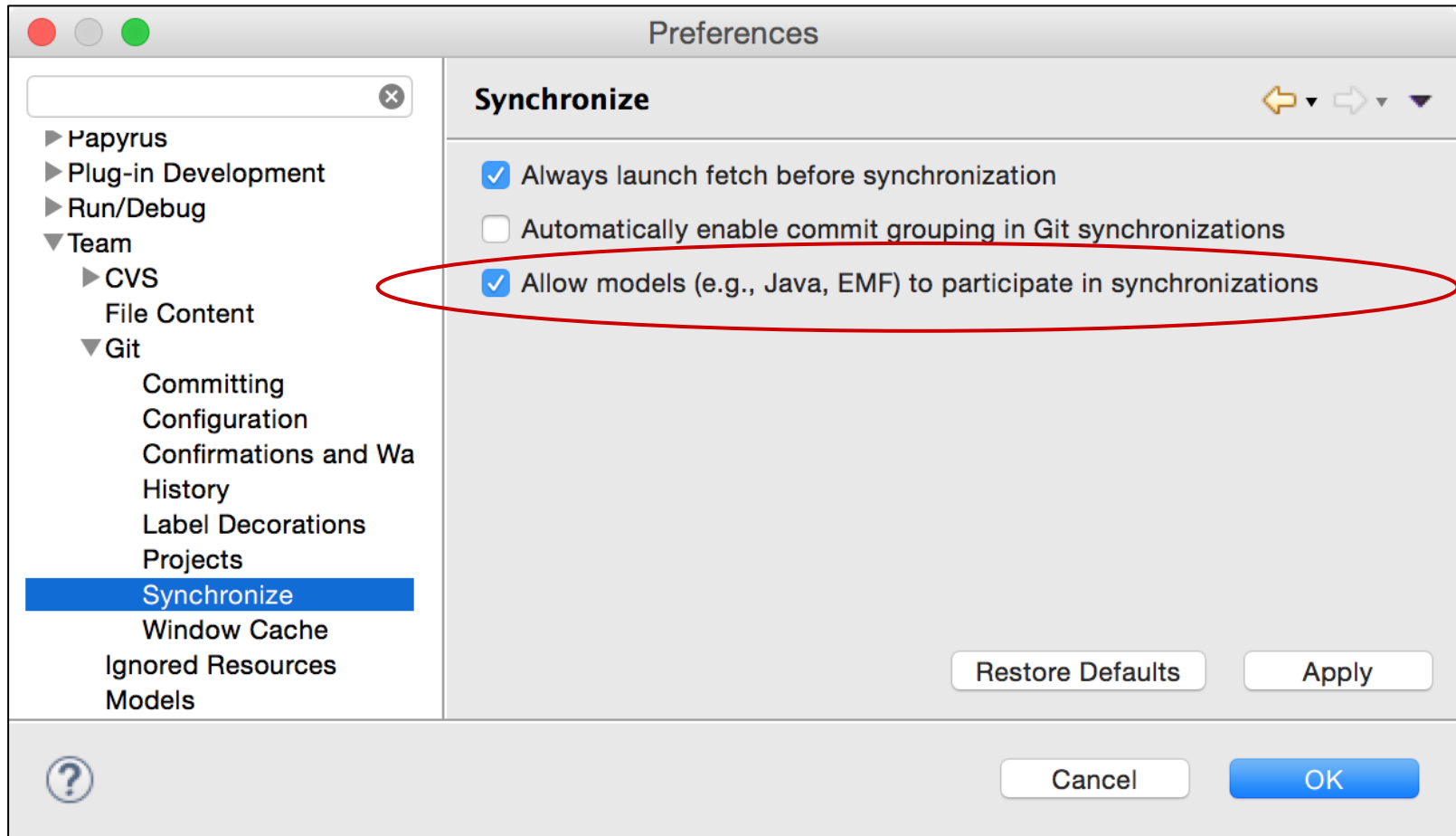


The Mediator is Eclipse Team

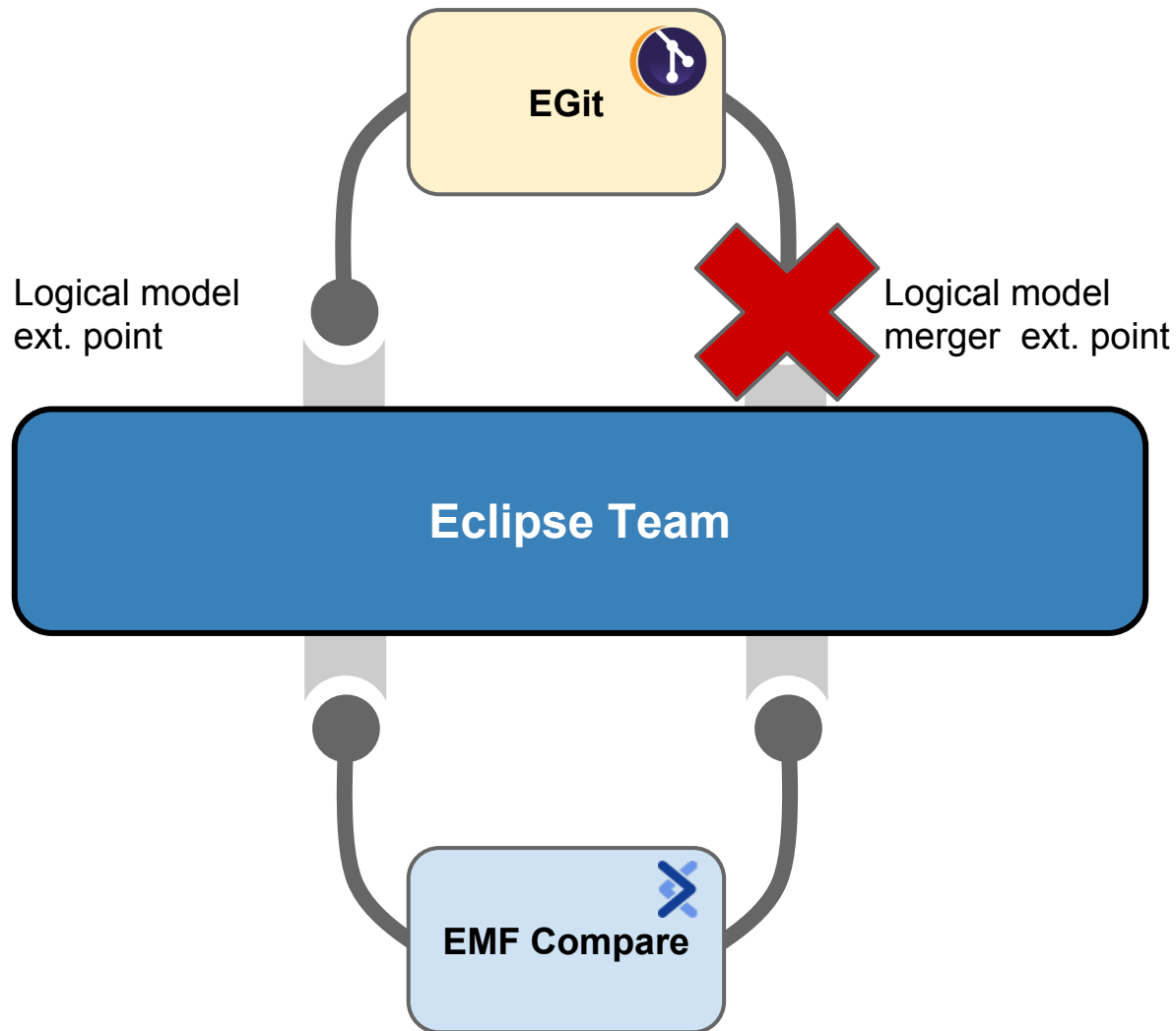


Deactivating

Logical Model Support

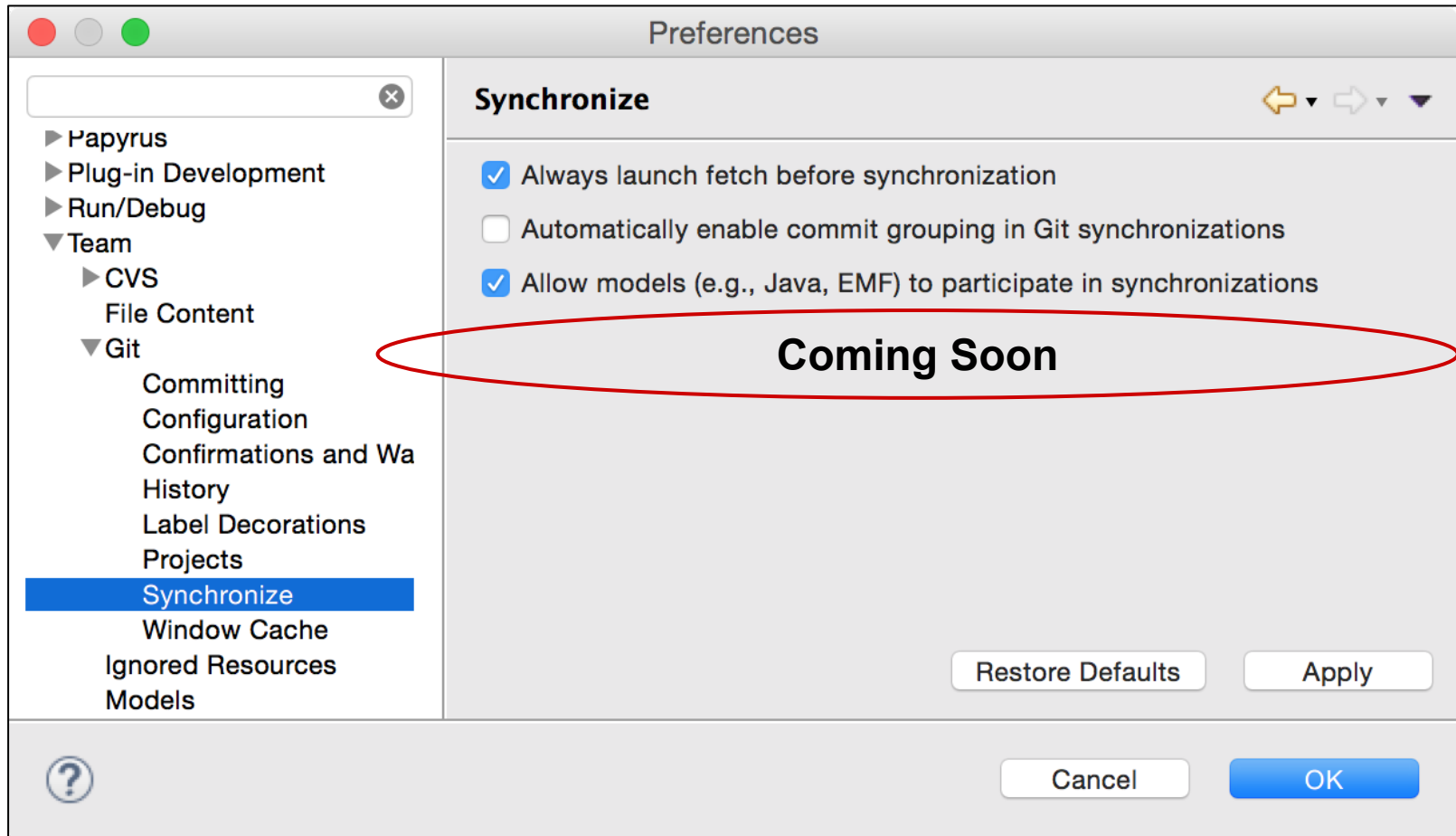


The Mediator is Eclipse Team



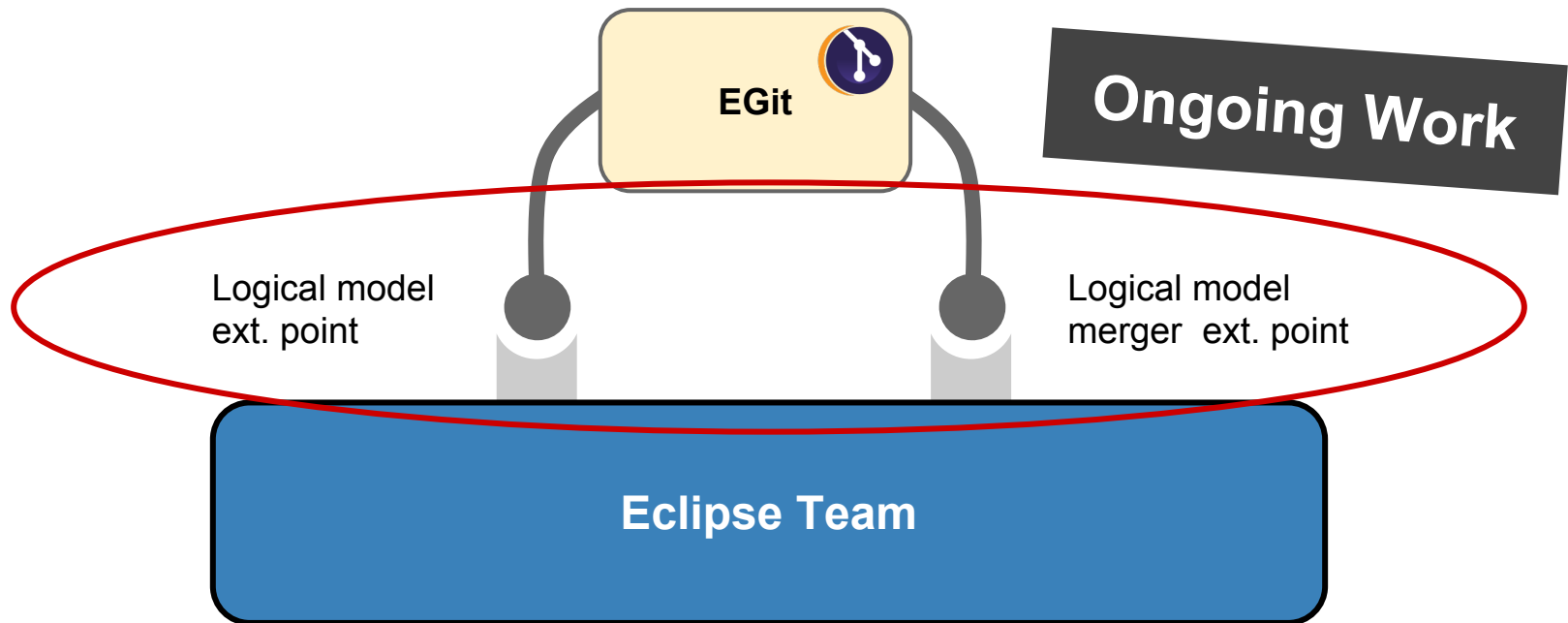
Deactivating

Logical Model Support

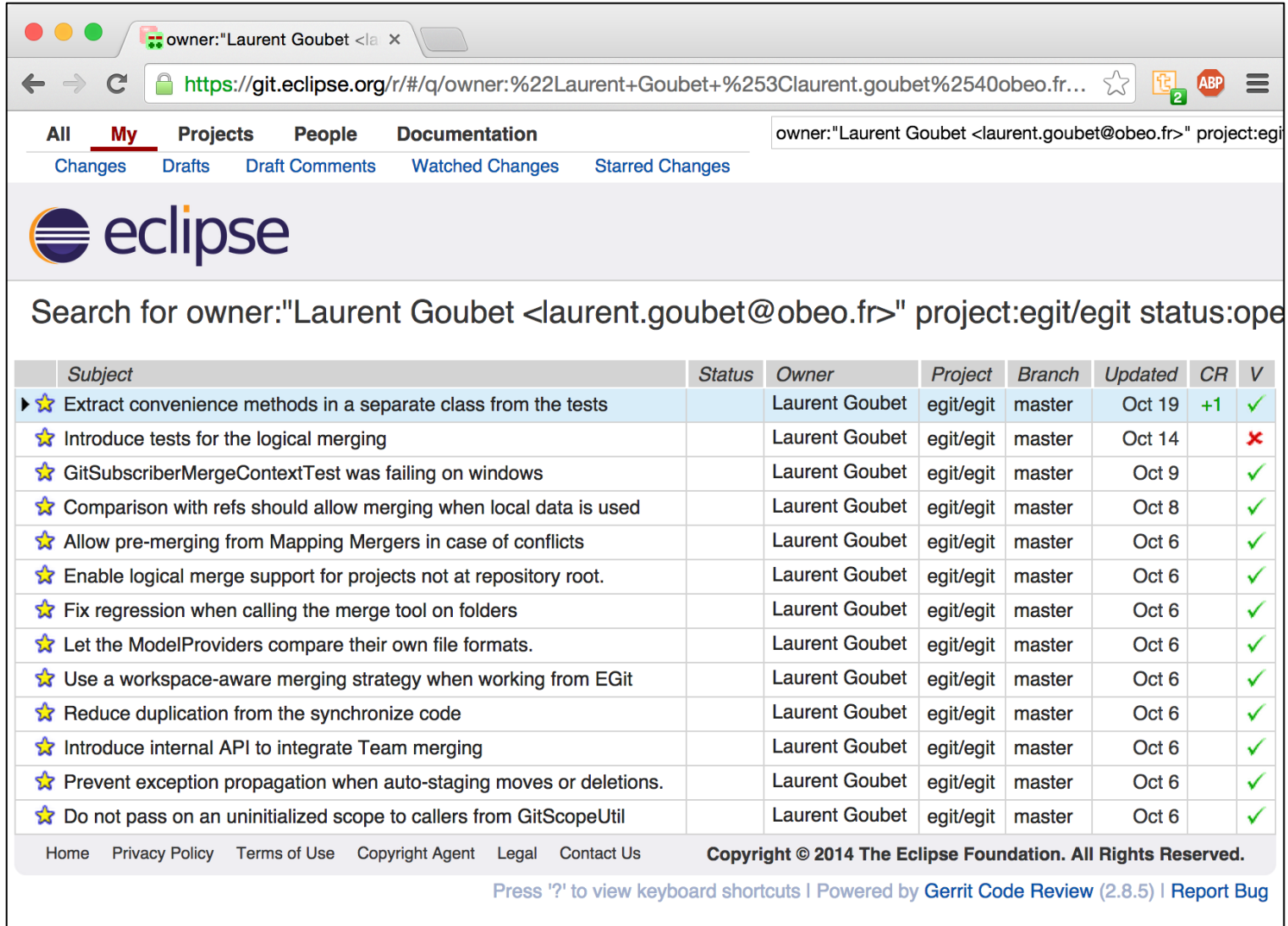


A brief note about

Current support



A brief note about Current support



The screenshot shows a web browser window displaying the Eclipse Gerrit Code Review interface. The search query is "owner:'Laurent Goubet <laurent.goubet@obeo.fr>' project:egit/egit status:open". The results table lists 13 pull requests, all owned by Laurent Goubet and targeting the master branch of the egit project. The first pull request is expanded, showing its subject: "Extract convenience methods in a separate class from the tests".

	Subject	Status	Owner	Project	Branch	Updated	CR	V
▶	★ Extract convenience methods in a separate class from the tests		Laurent Goubet	egit/egit	master	Oct 19	+1	✓
	★ Introduce tests for the logical merging		Laurent Goubet	egit/egit	master	Oct 14		✗
	★ GitSubscriberMergeContextTest was failing on windows		Laurent Goubet	egit/egit	master	Oct 9		✓
	★ Comparison with refs should allow merging when local data is used		Laurent Goubet	egit/egit	master	Oct 8		✓
	★ Allow pre-merging from Mapping Mergers in case of conflicts		Laurent Goubet	egit/egit	master	Oct 6		✓
	★ Enable logical merge support for projects not at repository root.		Laurent Goubet	egit/egit	master	Oct 6		✓
	★ Fix regression when calling the merge tool on folders		Laurent Goubet	egit/egit	master	Oct 6		✓
	★ Let the ModelProviders compare their own file formats.		Laurent Goubet	egit/egit	master	Oct 6		✓
	★ Use a workspace-aware merging strategy when working from EGit		Laurent Goubet	egit/egit	master	Oct 6		✓
	★ Reduce duplication from the synchronize code		Laurent Goubet	egit/egit	master	Oct 6		✓
	★ Introduce internal API to integrate Team merging		Laurent Goubet	egit/egit	master	Oct 6		✓
	★ Prevent exception propagation when auto-staging moves or deletions.		Laurent Goubet	egit/egit	master	Oct 6		✓
	★ Do not pass on an uninitialized scope to callers from GitScopeUtil		Laurent Goubet	egit/egit	master	Oct 6		✓

Home Privacy Policy Terms of Use Copyright Agent Legal Contact Us Copyright © 2014 The Eclipse Foundation. All Rights Reserved.
Press '?' to view keyboard shortcuts | Powered by Gerrit Code Review (2.8.5) | Report Bug

A brief note about

Current support

<http://download.eclipse.org>

[/modeling/emf/compare/updates/egit-logical/nightly/](http://download.eclipse.org/modeling/emf/compare/updates/egit-logical/nightly/)

Logical Model Support on the Command Line

<http://wiki.eclipse.org>

[/EMF_Compare/Specifications/LogicalMergeCommandLine](http://wiki.eclipse.org/EMF_Compare/Specifications/LogicalMergeCommandLine)

Commands that trigger merge operations

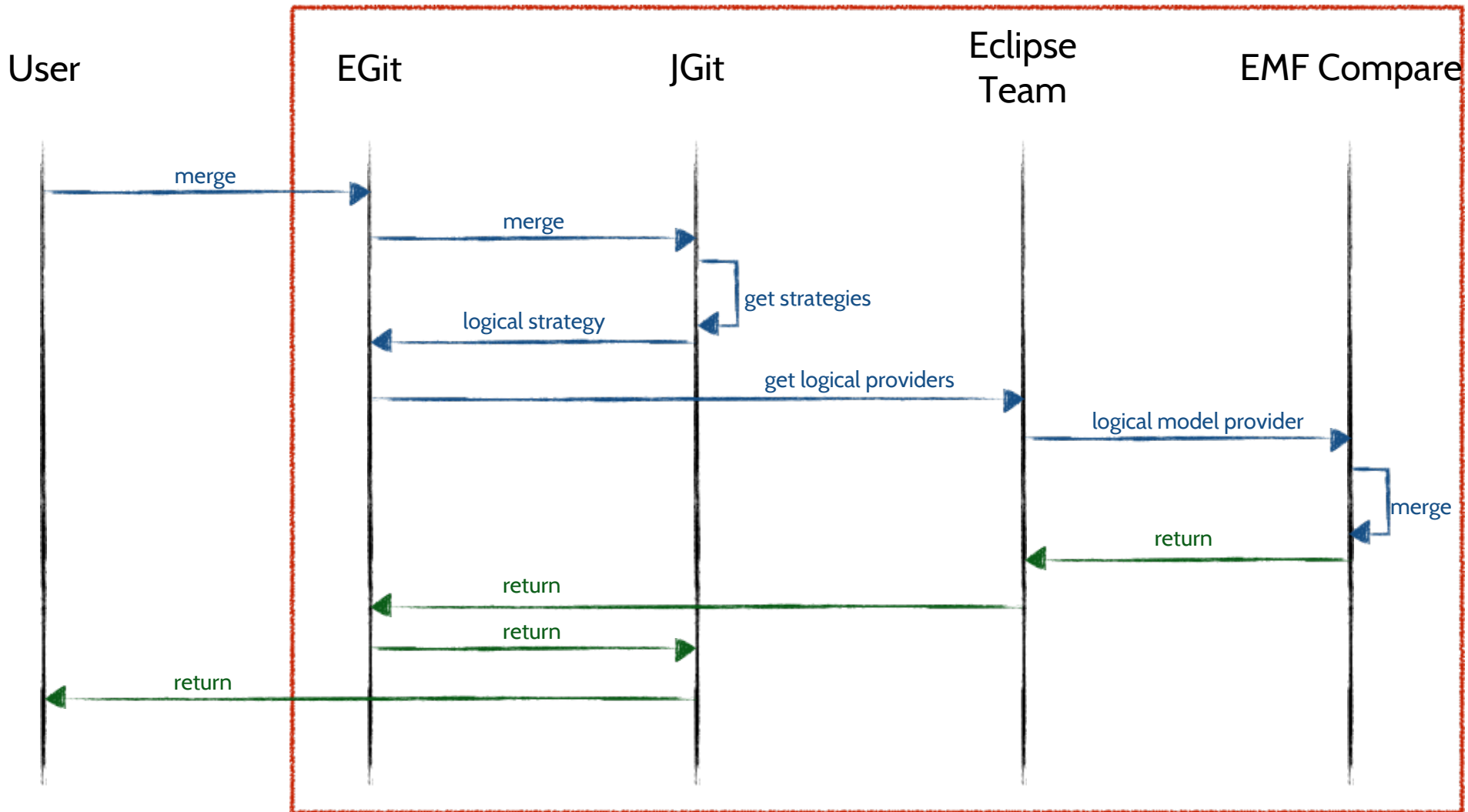
- **merge**
- cherry-pick
- pull
- rebase
- revert
- stash apply
- submodule update

EGit

JGit

Eclipse Workbench (incl.
Team)

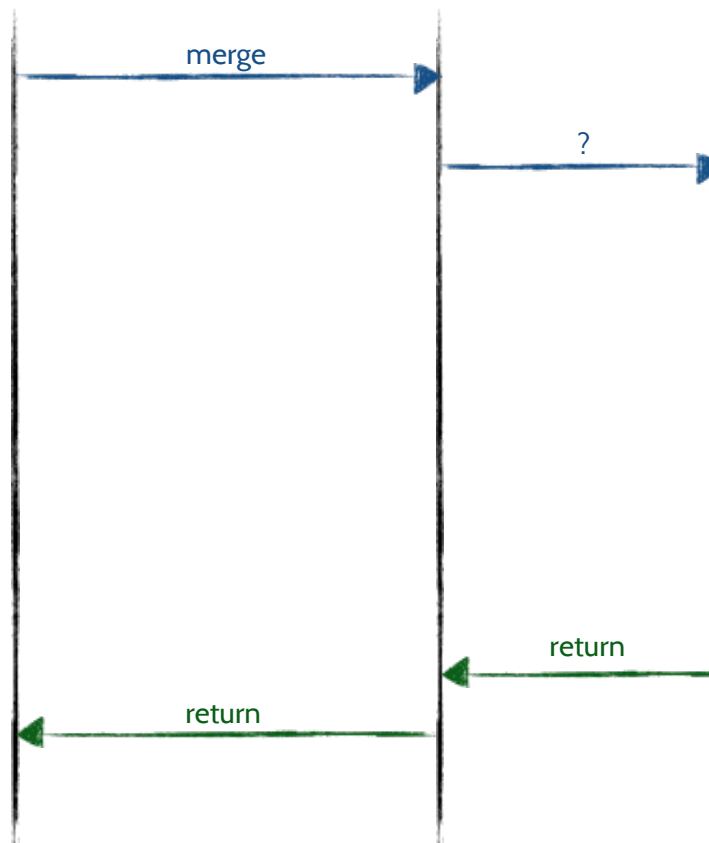
Logical Model Support on the Command Line



Logical Model Support on the Command Line

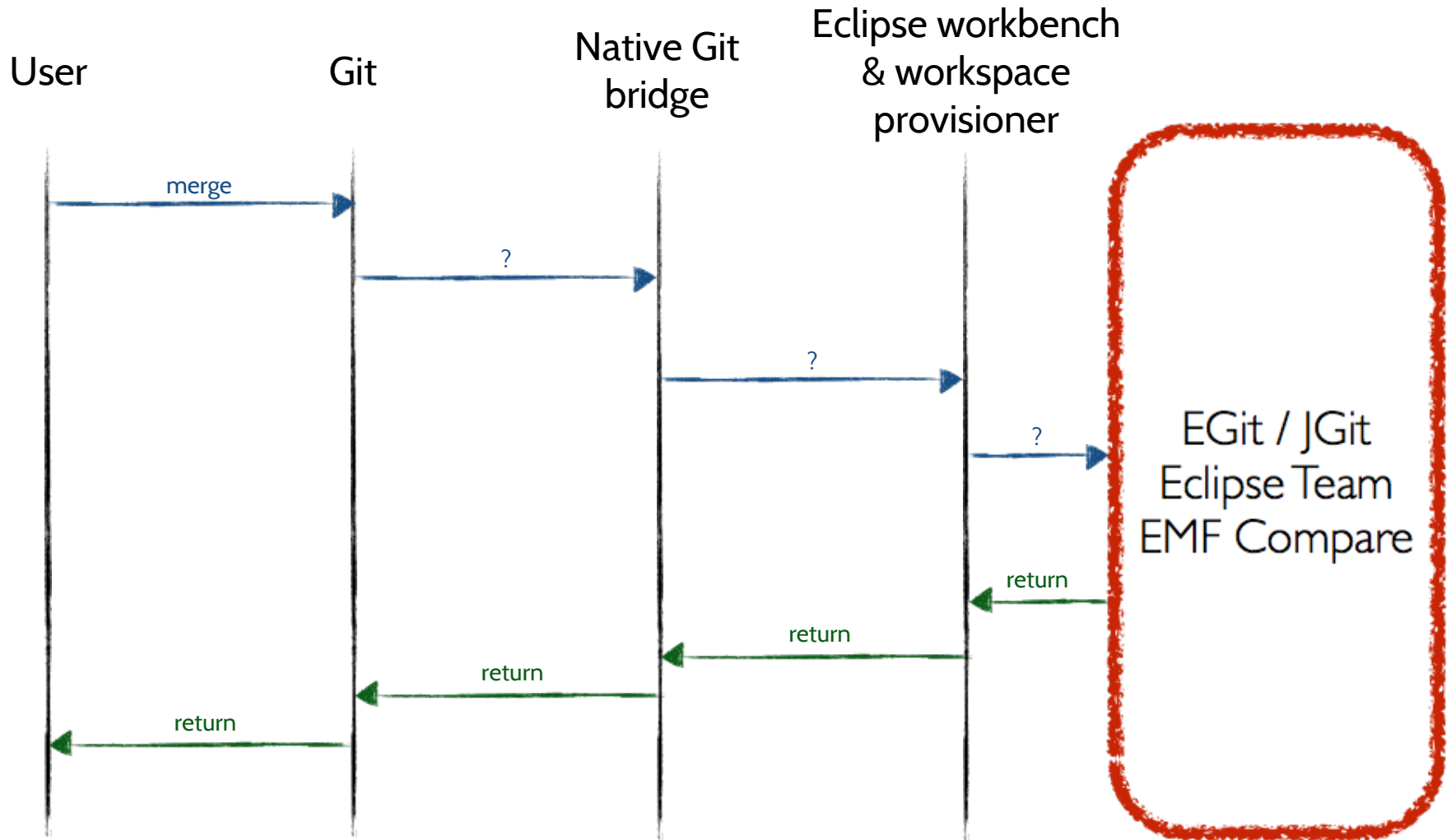
User

Git



EGit / JGit
Eclipse Team
EMF Compare

Logical Model Support on the Command Line



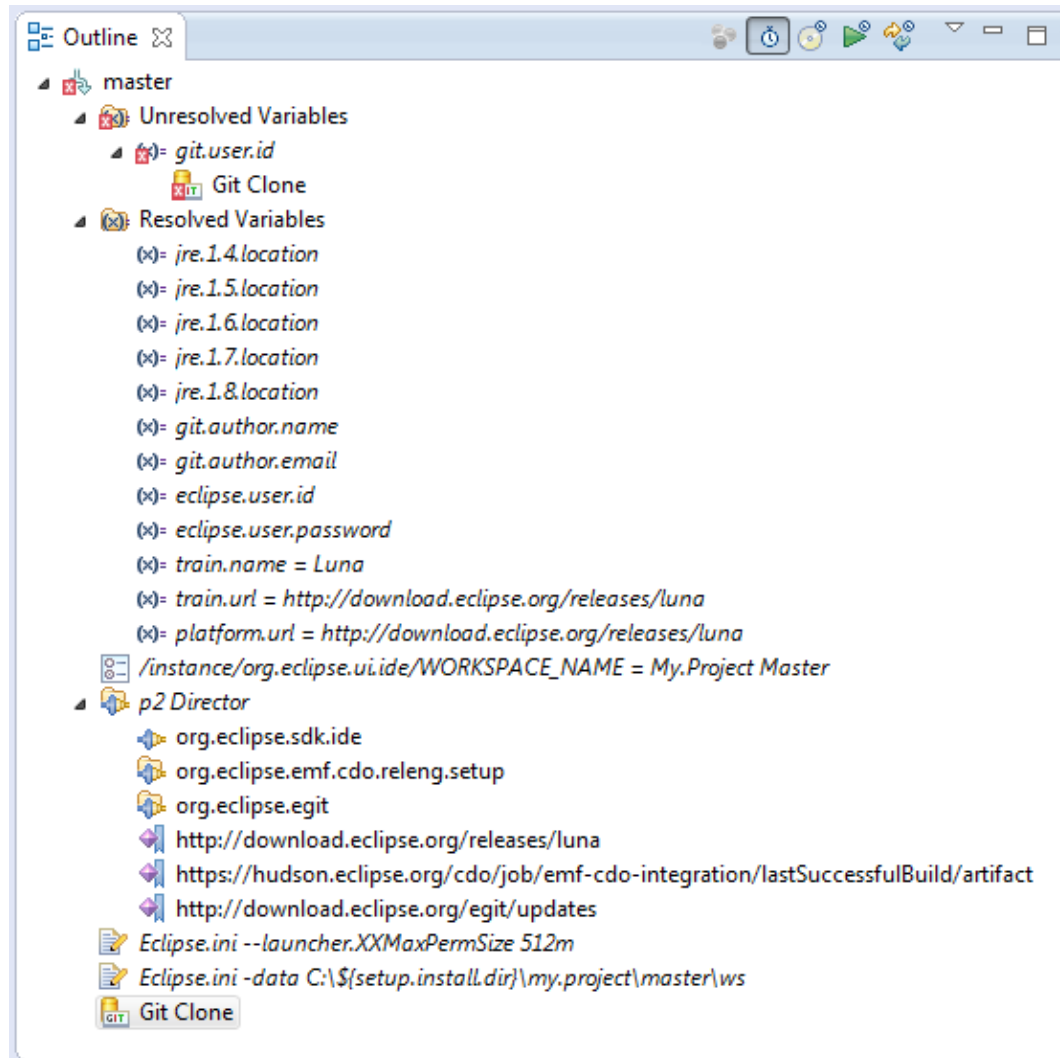
The provisionner will be

Oomph



- **Provisioning correct set of plugins in the Eclipse IDE.**
- Binding Git repos (incl. personal Gerrit push URL).
- **Checking out projects.**
- Setting workspace preferences.
- Configuring dynamic working sets.
- Keeping project preferences files in sync.
- The **configuration is model driven**, with the possibility to customize a lot for each project, each branch, each user...

The provisioner will be Oomph



Git bridge as

Additional Git Commands

```
git logicalmerge <setup> <commit> [--help (-h)] [-m message]
```

```
<setup>      : Path to the setup file. The setup file is an Oomph model  
<commit>    : Commit ID or branch name to merge  
--help (-h) : Displays this help message  
-m message  : Sets the commit message to be used for the merge commit (in case  
              one is created).
```

```
git logicalmergetool <setup> [--help (-h)]
```

```
<setup>      : Path to the setup file. The setup file is an Oomph model  
--help (-h) : Displays this help message
```

Git commands involving mc x

file:///Users/mbarbero/git/emf.compare/plugins/org.eclipse.emf.compare.doc/target/website/user/git-commands-inv...

EMF Compare — Git commands involving models

Version 3.1.0.201410261549

Table of Contents

- [Add new Git commands in you system](#)
- [Create a setup file](#)
 - [Installation](#)
 - [Basic usage](#)
- [Git diff command with models : git logicaldiff](#)
 - [Others options available](#)
- [Git merge command with models : git logicalmerge](#)
 - [Others options available](#)
- [Git mergetool command with models : git logicalmergetool](#)

When a user wants to compare or merge EMF models from the git command line interface, the operation is doing in a textual way. If he wants to compare or merge EMF models the needs in a logical way, he needs to do that in an Eclipse environment similar to the one he used to create these models. As such, the environment requires some plugins to be installed but it may also requires some preferences to be set, some perspective to be activated etc.. Among these plugins, there are the mandatory ones that will be use to do the compare/merge operation: EMF Compare and EGit.

EMF Compare provides additional git commands in order to compare and merge models on the command line. These commands will use an Eclipse as an headless application (no Graphical User Interface) including EMF Compare and Egit to compare models in a logical way. To provisioned such Eclipse environment, the new git commands will call a program using Oomph.

Oomph [Oomph](#) is a technology that provisions a set of plugins in an Eclipse IDE, clones Git repositories, binds Git repositories to this IDE, checks projects, sets workspace preferences... The configuration is model driven, with files called Oomph setup model files.

Add new Git commands in you system

The basics git commands don't allow to compare or merge EMF models in a logical way. Additional git commands must be added to your system. Each git command is a shell script describing its behaviour. So, to add a new git command, a new script has to be developed. The new scripts corresponding to the git commands are:

- `git logicalmerge`: the "models compatible" version of the `git merge` command
- `git logicaldiff`: the "models compatible" version of the `git diff` command
- `git logicalmergetool`: the "models compatible" version of the `git mergetool` command

Easily get and test the latest

Model Collaboration Setup

Oomph-based setup & ready to use packages

- Nightly build of EMF Compare
- Nightly custom build of EGit
- Latest or nightly build of Papyrus



Easily get and test the latest

Model Collaboration Setup

Ready-to-use Eclipse with collaborative modeling support

Testing

We provide a ready-to-use and easy-to-update Eclipse version that contains the latest nightly builds of Papyrus, EMF Compare, and EGit (with logical model support). Please note that this version is intended **for testing** only. These ready to use Eclipse is available by two means:

- using *Oomph*. To download and install it, please follow the [installation guide](#). Once installed on your machine, you can keep it up to date with the latest nightly builds by selecting *Help* → *Check for Updates* in your installation.
- ready to use packages. Download it, unzip it, launch it. Done.

Windows	Collaborative-Modeling-win32.zip
Windows (x86_64)	Collaborative-Modeling-win32-x86_64.zip
Linux (GTK)	Collaborative-Modeling-linux-gtk.tar.gz
Linux (GTK / x86_64)	Collaborative-Modeling-linux-gtk-x86_64.tar.gz
MacOS X (Cocoa / X86_64)	Collaborative-Modeling-macosx-cocoa-x86_64.tar.gz

If you experience any issues with the installation or if you face bugs during testing this Eclipse version or if you have any other feedback, please let us know in the [discussion forums](#).

Ready to use packages <http://goo.gl/tzPKT3>

Oomph based setup <http://goo.gl/bfl20x>

Model Review

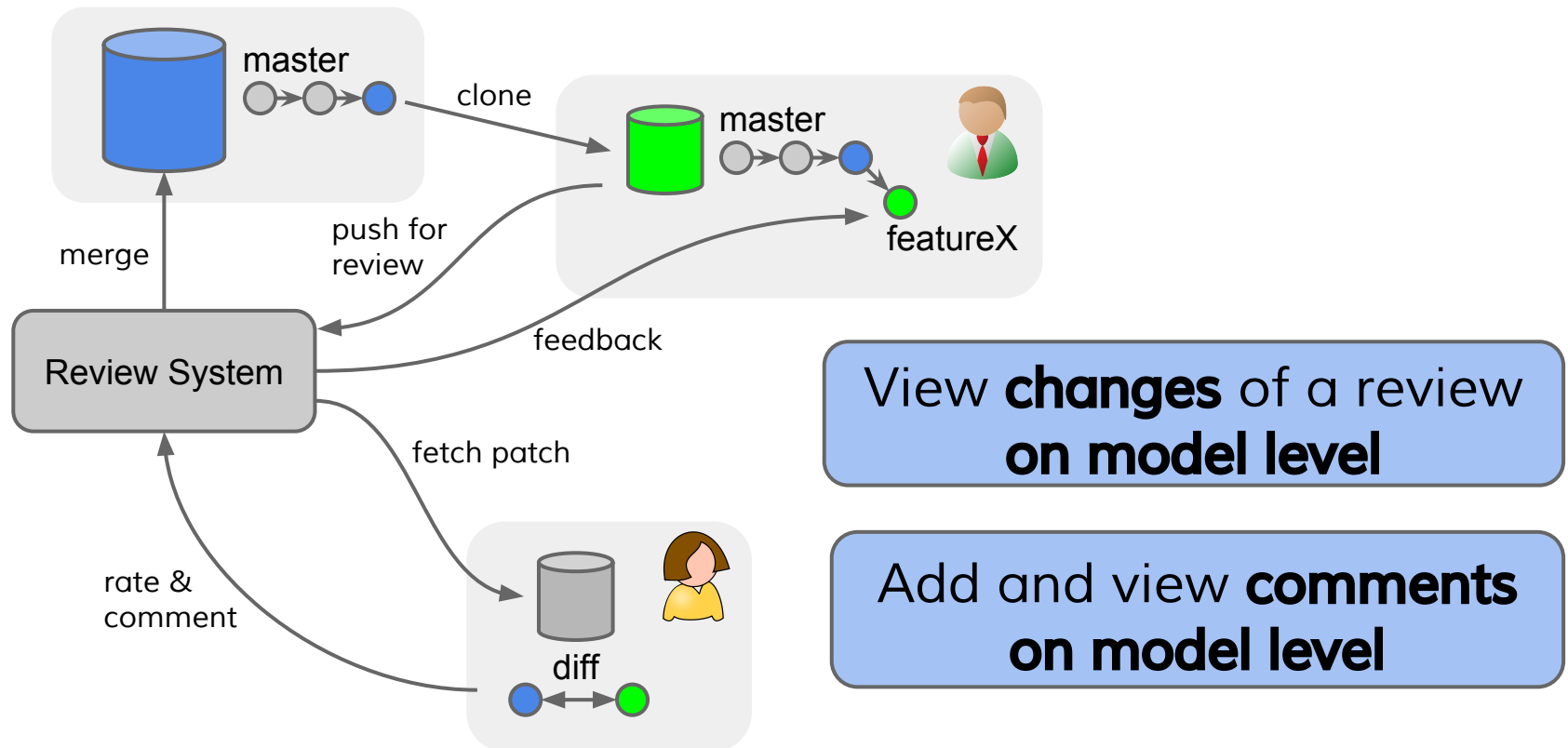
Status of developing of support for

Model Review

- Currently
 - Requirement elicitation
 - Investigating feasibility
 - Growing developer & future user community
- Beginning of 2015
 - Initial prototype for UML model review
 - For collecting feedback of users

Minimum Requirements on Model Review

- Gerrit workflow for models
Lift gerrit's line level support to model level



Technologies (planned to be) used for supporting Model Review

- Support for
 - Papyrus UML models
 - Generic support for any GMF diagrams
 - Generic support for any EMF models
- Based on
 - EMF Compare & EGit
 - Gerrit & Reviews 4 Eclipse (Gerrit connector)

Java - Changes name of class from Developer to Contributor [I78e6a81e] - Eclipse

File Edit Navigate Search Project Run Window Help

Quick Access Java

2: Changes name of class from Developer to Contributor [I78e...]

Change 2 [Not in Task List. Click to add.](#) Model Review Server

Changes name of class from Developer to Contributor

Status NEW Created 29.08.2014 Modified 29.08.2014 16:20 Last commented: 2 mins 32 secs ago

Attributes

Owner	Philip Langer	Branch	refs/heads/master
Project	test-model-review		
Change-Id	I78e6a81ebe9e5f24ac10885fc5cd195caa4fb5a2		

Private

Description

Changes name of class from Developer to Contributor

Change-Id: I78e6a81ebe9e5f24ac10885fc5cd195caa4fb5a2

Review

Reviewers

Code Review

Philip Langer

Depends On

Patch Sets

Patch Set 1 29.08.2014 16:19:27

Author Philip Langer

Committer Philip Langer

Commit 869a0645211ae41dfcd7d03f084f9d91c711c8f1

Ref refs/changes/02/2/1

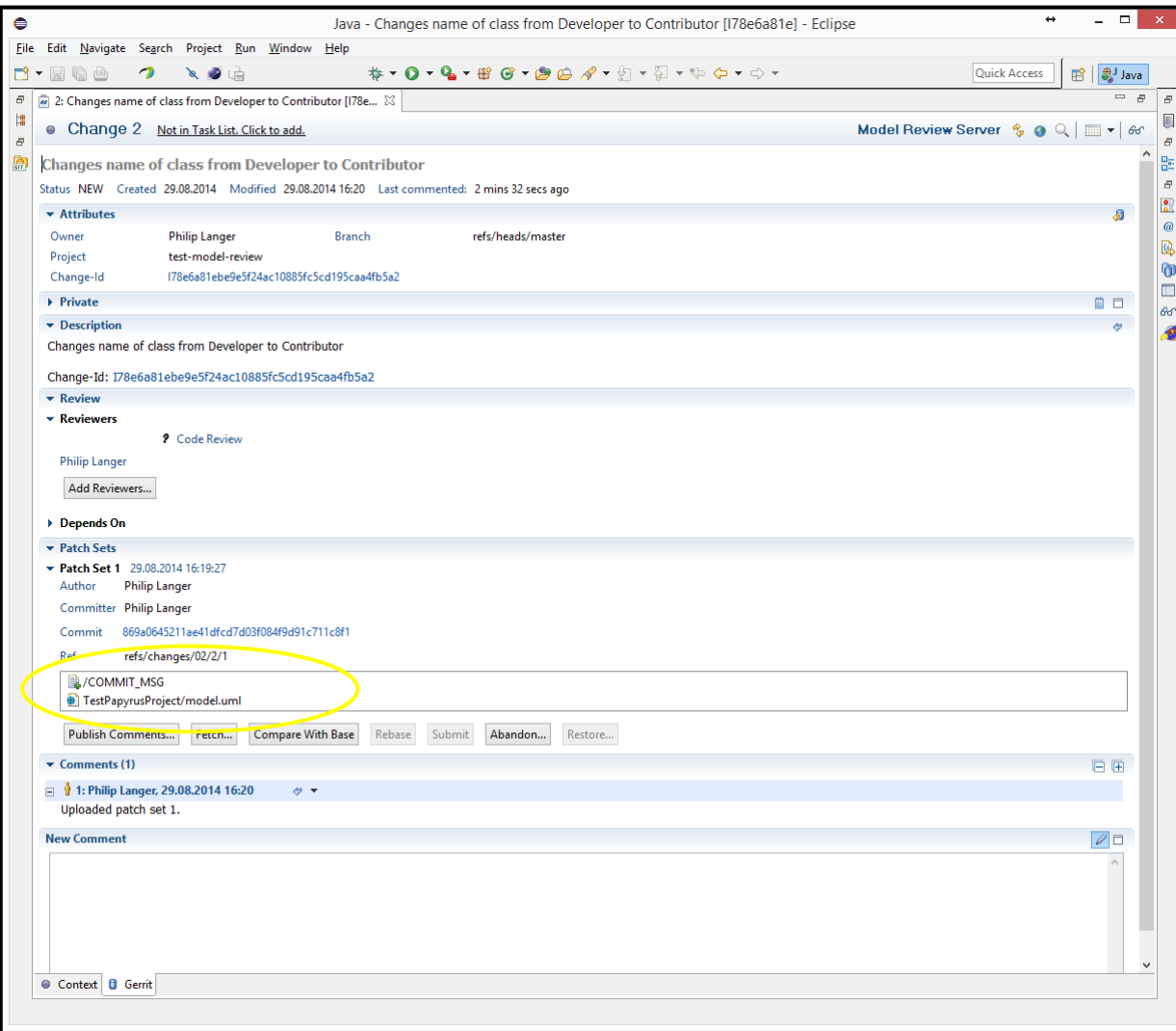
Comments (1)

1: Philip Langer, 29.08.2014 16:20

Uploaded patch set 1.

New Comment

Context Gerrit



Java - Changes name of class from Developer to Contributor [I78e6a81e] - Eclipse

File Edit Navigate Search Project Run Window Help

2: Changes name of class from Developer to Contributor [I78e...]

Change 2 [Not in Task List. Click to add.](#) Model Review Server

Changes name of class from Developer to Contributor

Status NEW Created 29.08.2014 Modified 29.08.2014 16:20 Last commented: 2 mins 32 secs ago

Attributes

Owner	Philip Langer	Branch	refs/heads/master
Project	test-model-review		
Change-Id	I78e6a81ebe9e5f24ac10885fc5cd195caa4fb5a2		

Private

Description

Changes name of class from Developer to Contributor

Change-Id: I78e6a81ebe9e5f24ac10885fc5cd195caa4fb5a2

Review

Reviewers

Code Review

Philip Langer

Depends On

Patch Sets

Patch Set 1 29.08.2014 16:19:27

Author Philip Langer

Committer Philip Langer

Commit 869a0645211ae41dfcd7d03f084f9d91c711c8f1

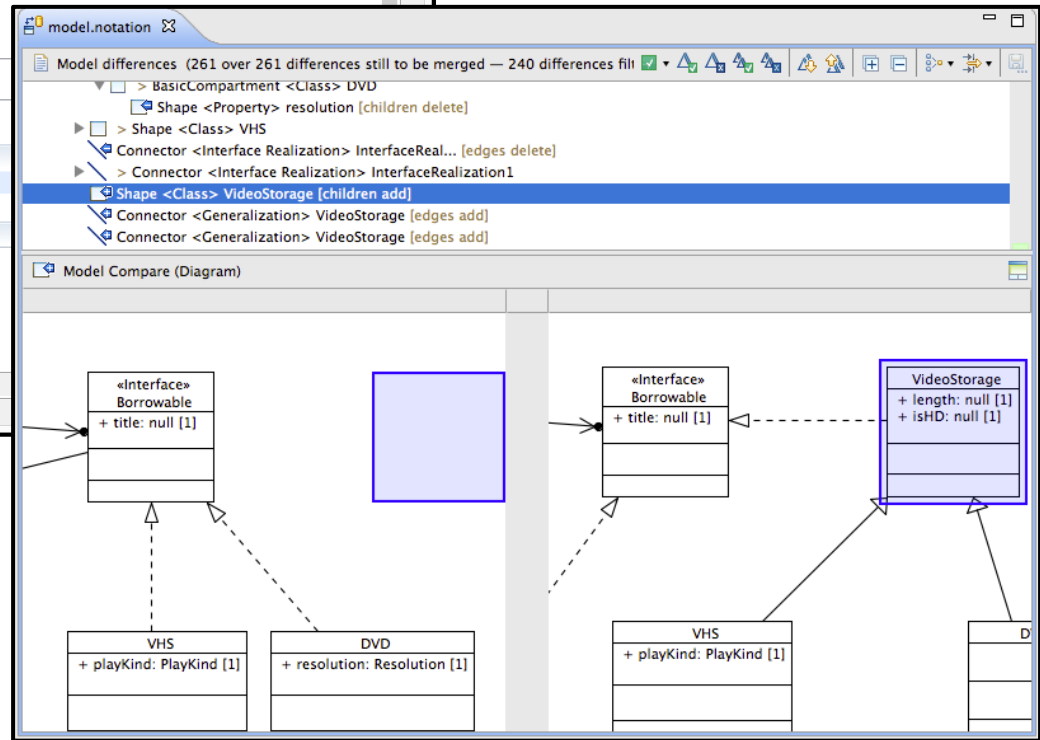
Ref refs/changes/02/2/1

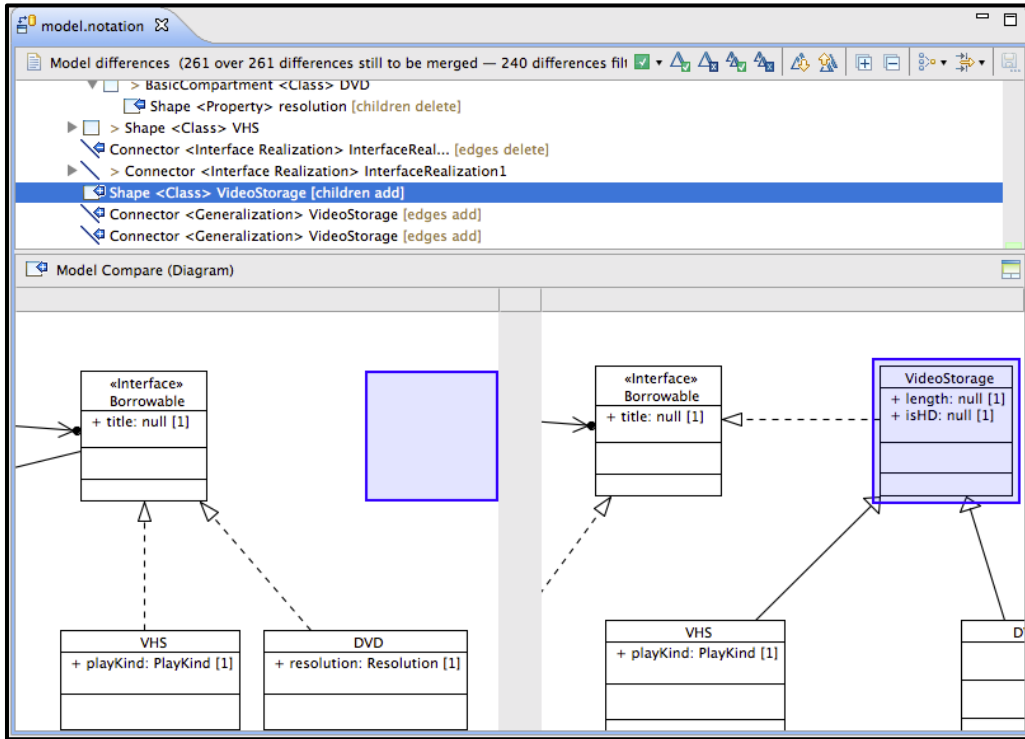
Comments (1)

1: Philip Langer, 29.08.2014 16:20
Uploaded patch set 1.

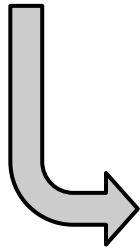
New Comment

Context Gerrit





Right-click:
Add comment

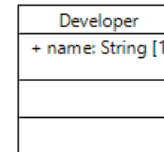


Add Comment

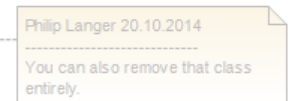
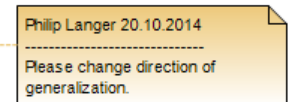
model.uml # <Generalization> Modeler

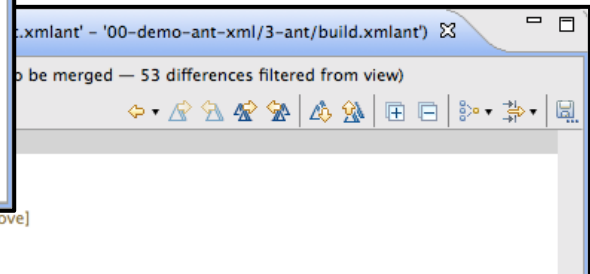
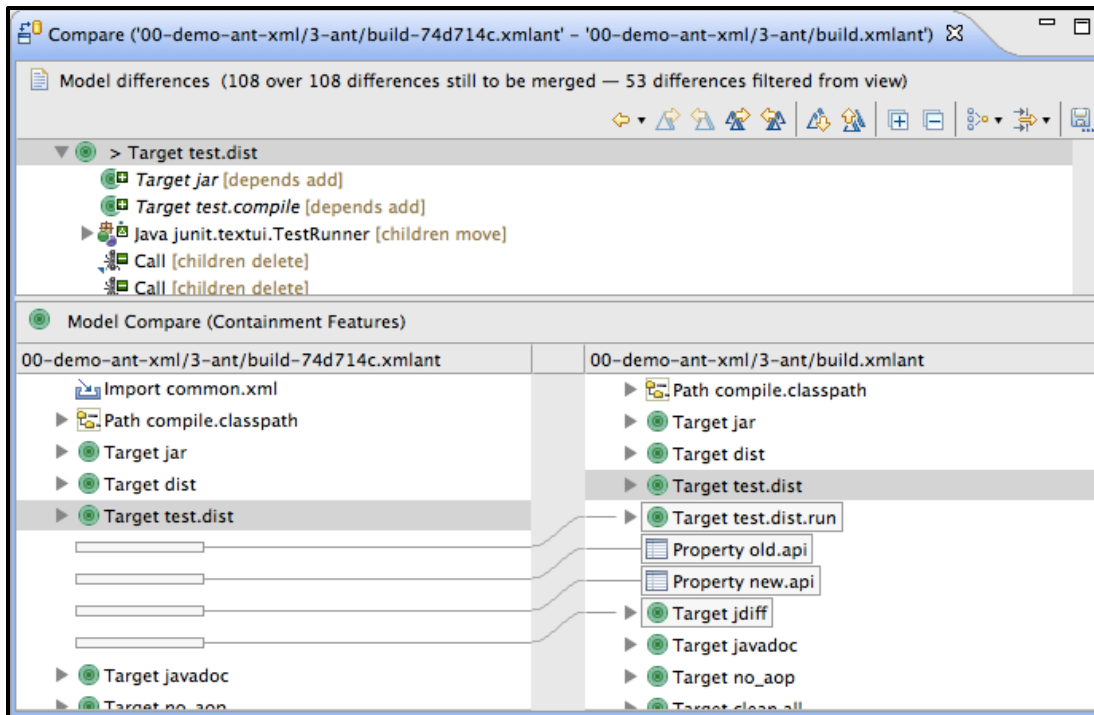
Please change direction of generalization.

OK Cancel

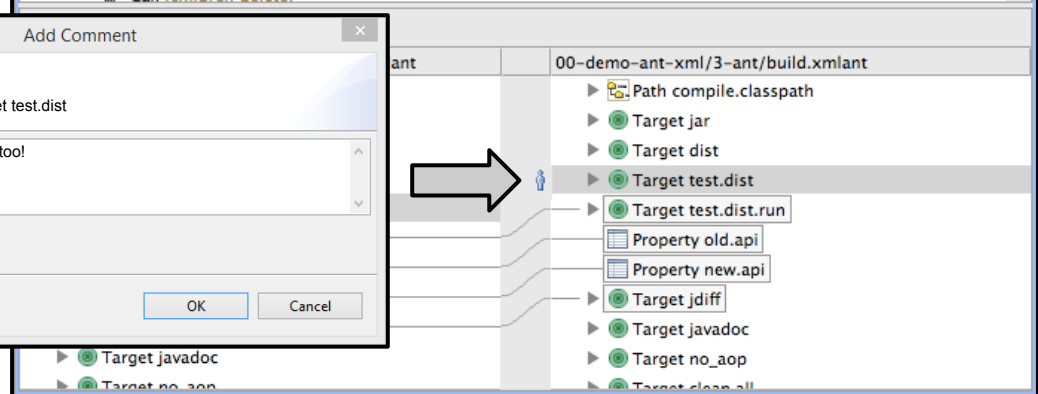
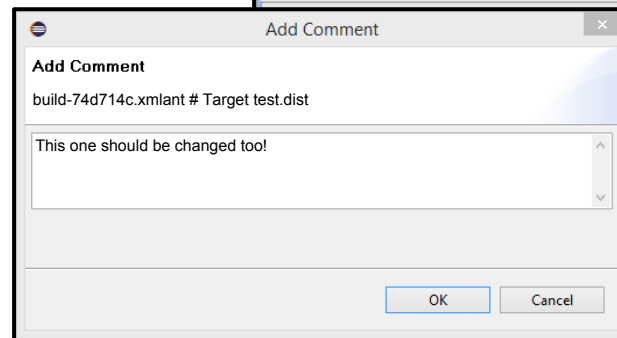
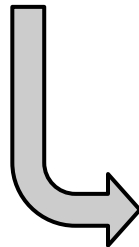


Re-use UML
comments in
Papyrus





Right-click:
Add comment

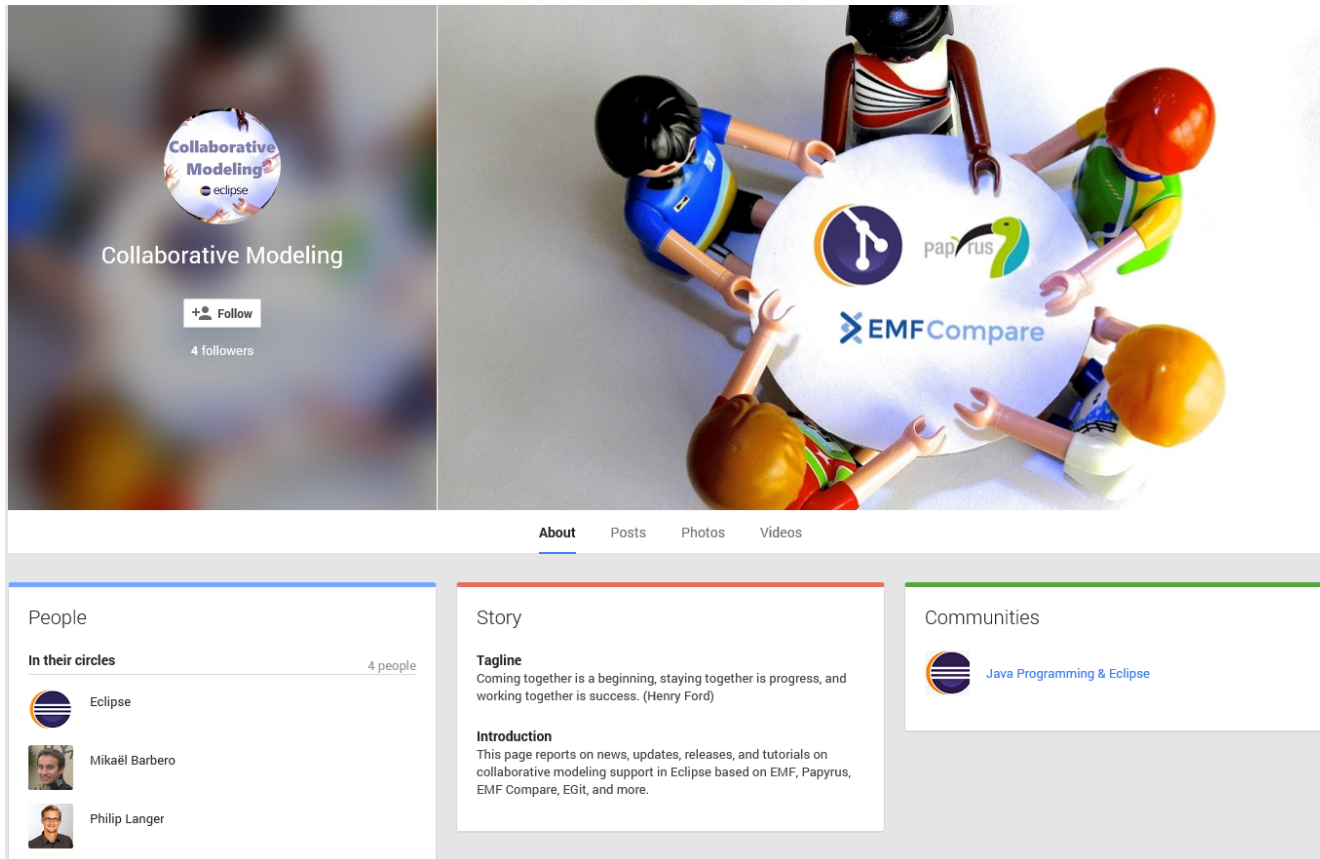


Open issues for enabling

Model Review

- View changes of a model review
 - Integration of R4E and EMF Compare
- Review comments on model level
 - Show comments on model level
 - UML comments in Papyrus in *own resource*
 - How to provide generic EMF support?
 - Store comments on model elements in Gerrit
 - Gerrit supports line-based comments only
 - Own gerrit plugin seems to be the best solution?

Follow us, discuss with us, and contribute to Collaborative Modeling Support



Collaborative Modeling
eclipse

Collaborative Modeling

+ Follow
4 followers

About Posts Photos Videos

People
In their circles 4 people

- Eclipse
- Mikaël Barbero
- Philip Langer

Story

Tagline
Coming together is a beginning, staying together is progress, and working together is success. (Henry Ford)

Introduction
This page reports on news, updates, releases, and tutorials on collaborative modeling support in Eclipse based on EMF, Papyrus, EMF Compare, EGit, and more.

Communities
Java Programming & Eclipse

Ideas? Comments?

Contact us



Maximilian Koegel
mkoegel@eclipsesource.com



Philip Langer
planger@eclipsesource.com



Mikael Barbero
mikael.barbero@obeo.fr



<http://eclipsesource.com/>



<http://www.obeo.fr>