

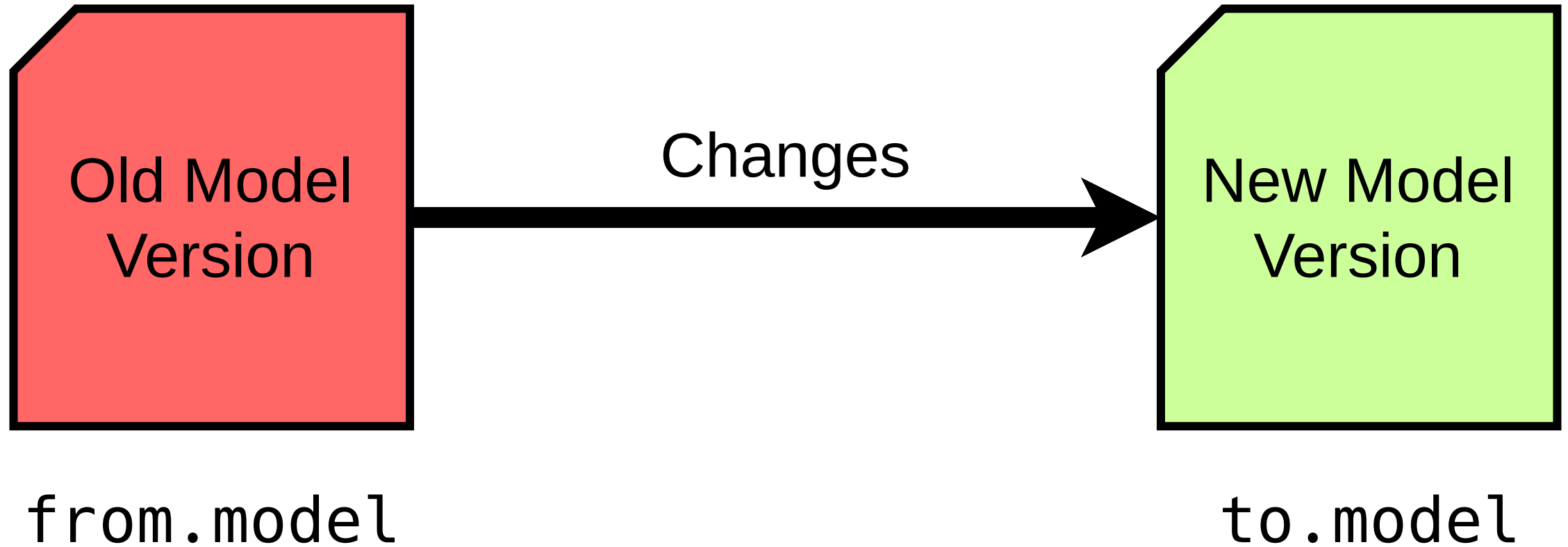
Towards an Interoperable and Customisable Textual Format for Model Differences Reporting

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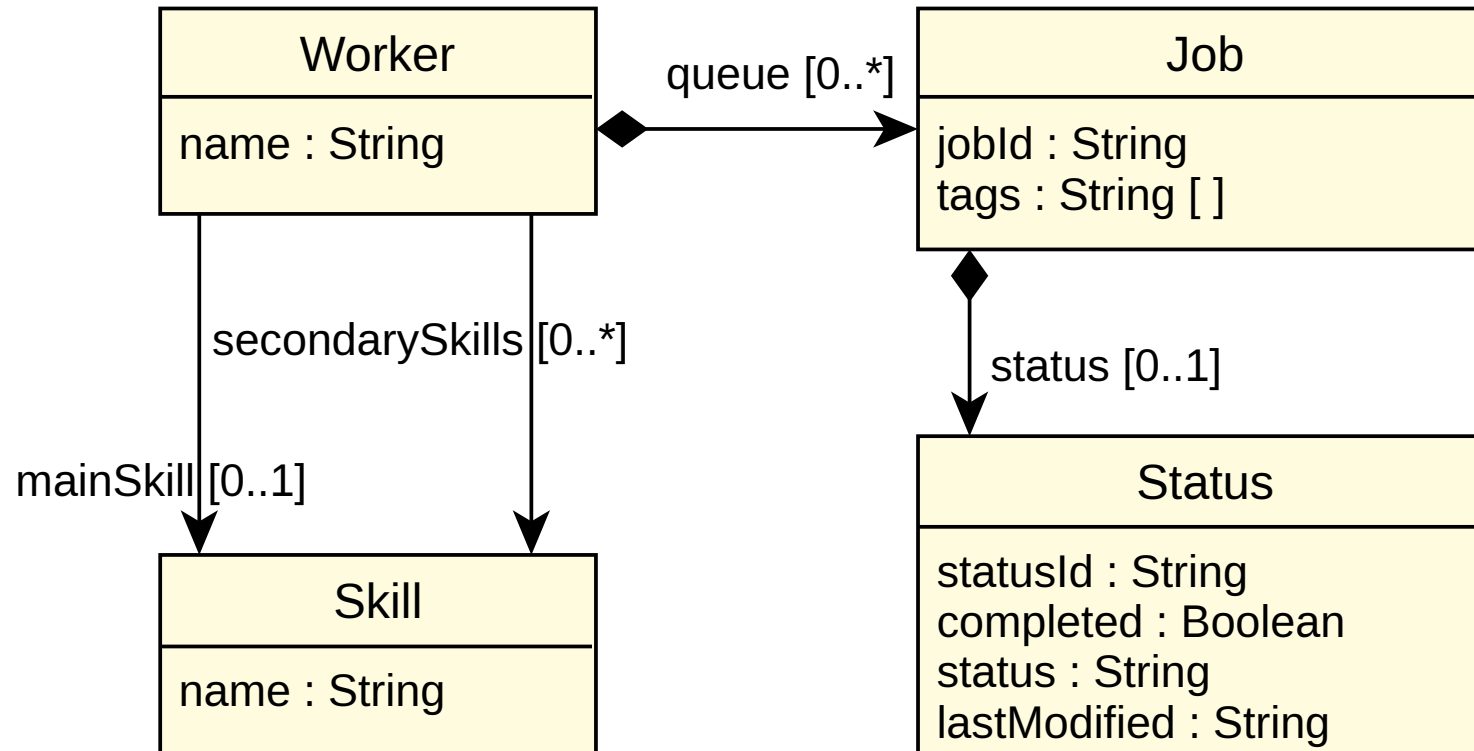
Two-Way Model Comparison



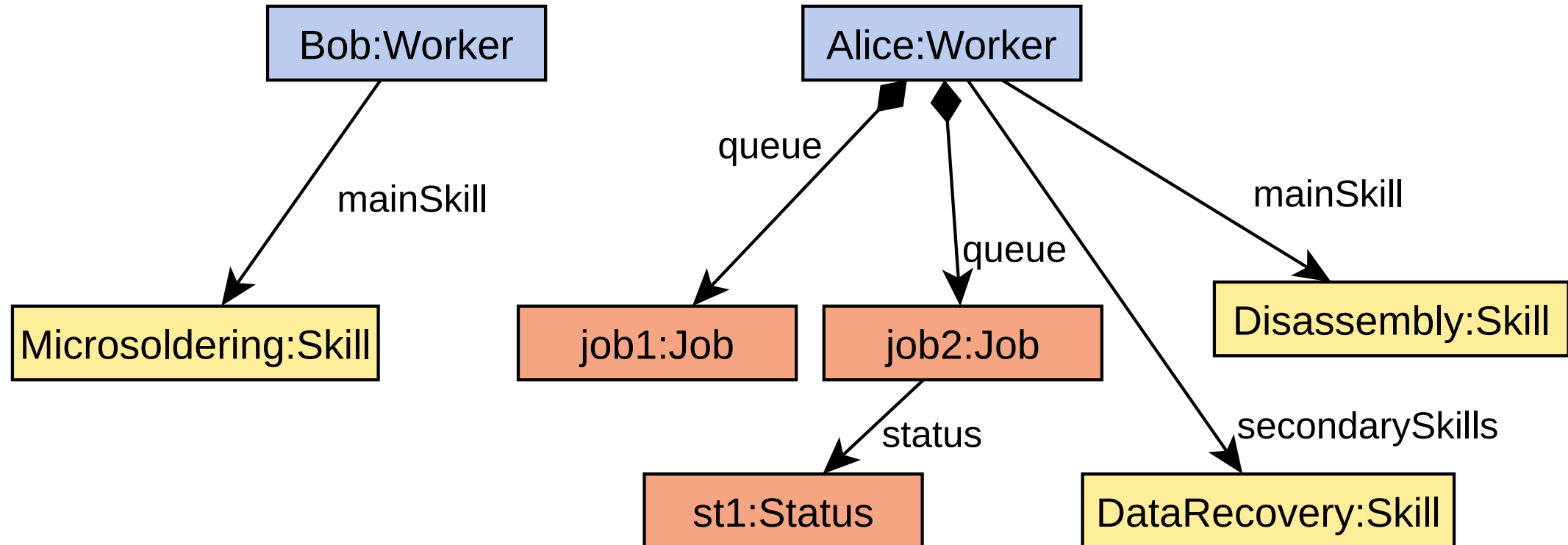
Two-Way Model Comparison: Stages [1]

1. Comparison
2. Differences Representation
3. **Differences Reporting**

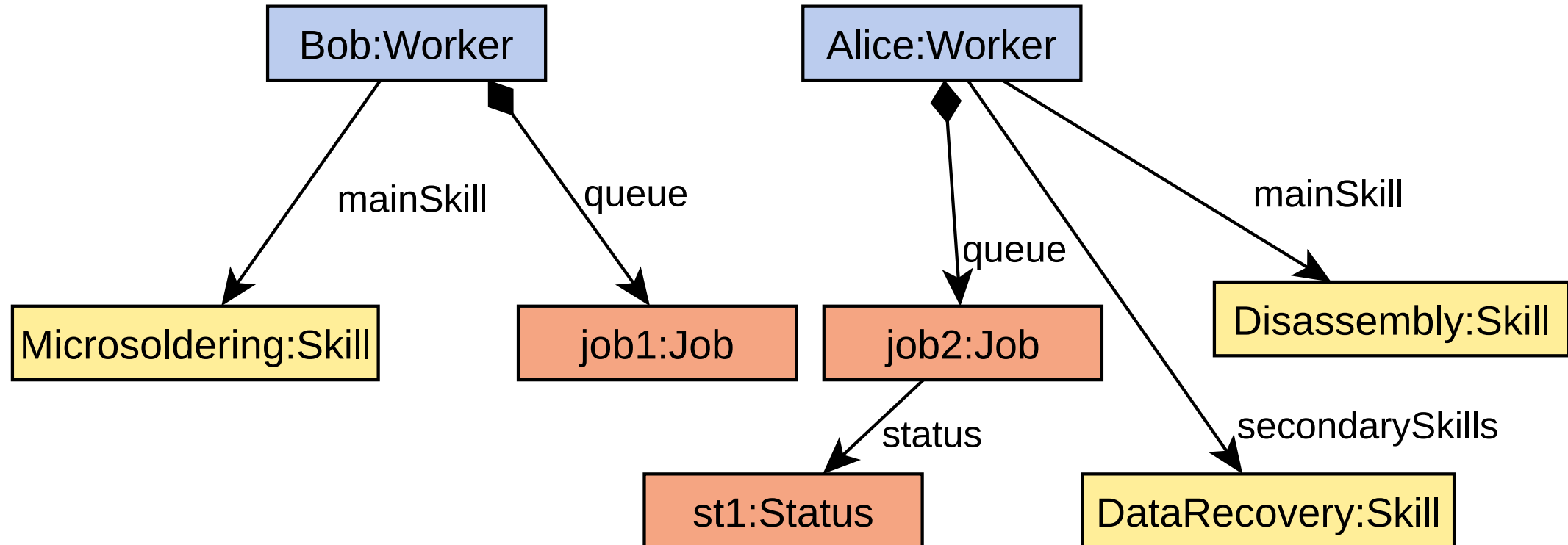
Example: Repair Shop (metamodel)



from.model

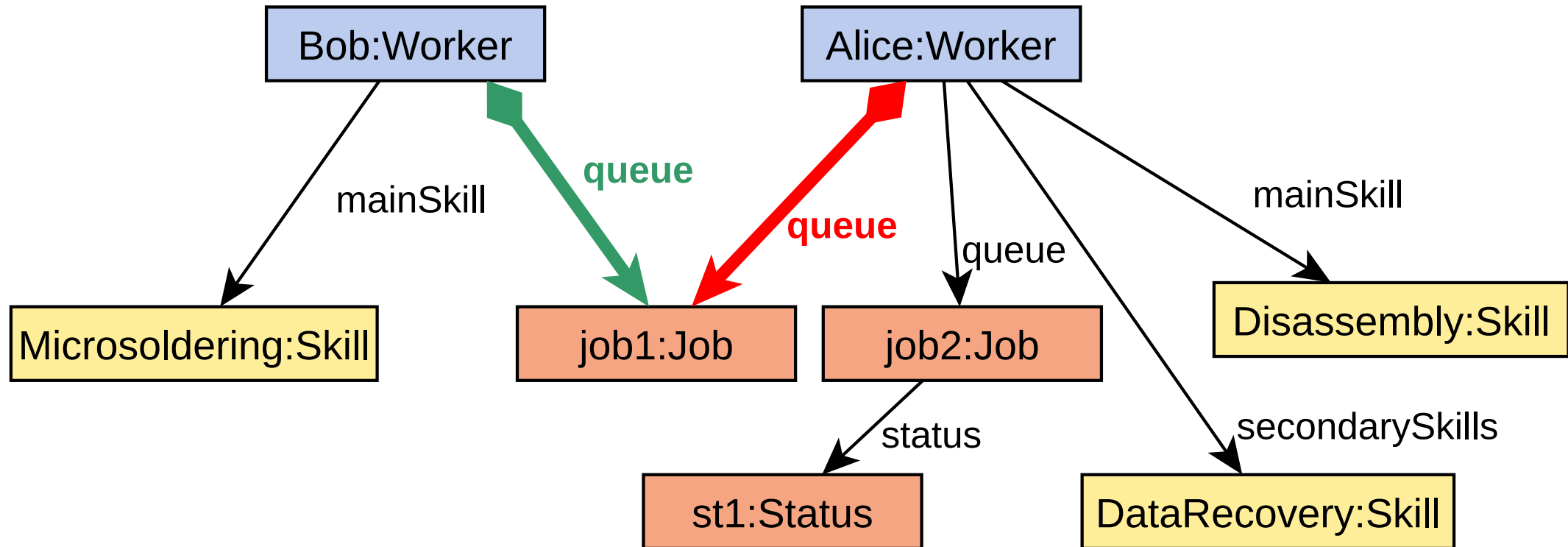


to.model (with changes)

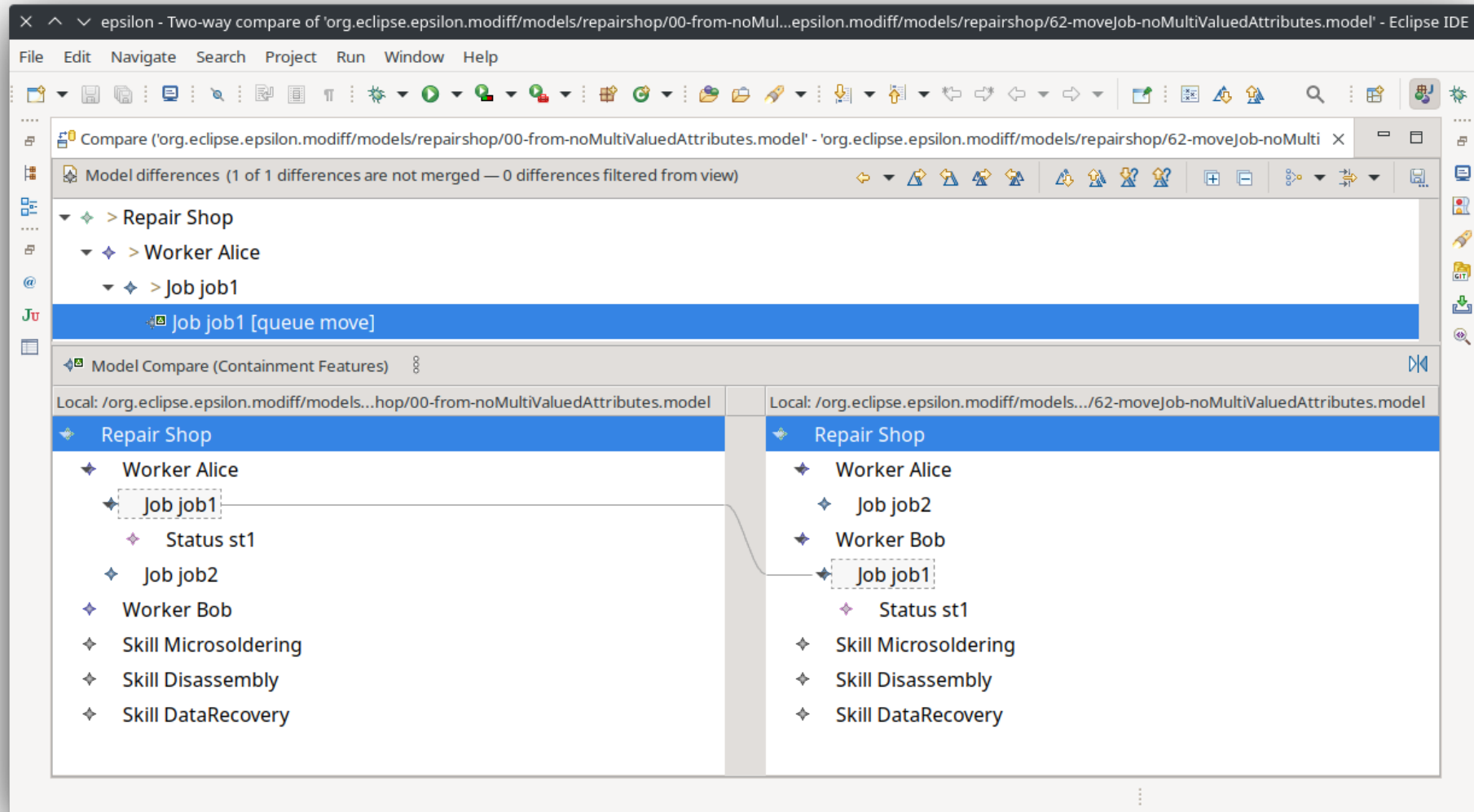


Graphical diff

The *job1* job has moved from Alice's queue to Bob's



Tree-based graphical diff: EMF Compare



What about plain textual diff?

If there is a custom concrete textual syntax (e.g. Xtext-based) -> **Probably great!**

If no concrete textual syntax -> **diff the persistence format?**

What about plain textual diff? XMI example

Remember: the only change is *job1* moving from Alice's to Bob's queue

```
$ diff -u from.model to.model
--- from.model
+++ to.model
@@ -6,6 +6,11 @@
    <workers name="Alice"
      mainSkill="Disassembly"
      secondarySkills="Microsoldering DataRecovery">
+   <queue jobId="job2"
+     description="broken phone screen"/>
+ </workers>
+ <workers name="Bob"
+   mainSkill="Microsoldering">
    <queue jobId="job1"
      description="laptop does not charge">
      <tags>battery</tags>
@@ -14,11 +19,7 @@
      statusId="st1"
      status="pending"/>
    </queue>
-   <queue jobId="job2"
-     description="broken phone screen"/>
- </workers>
- <workers name="Bob"
-   mainSkill="Microsoldering"/>
    <skills name="Microsoldering"/>
    <skills name="Disassembly"/>
    <skills name="DataRecovery"/>
```

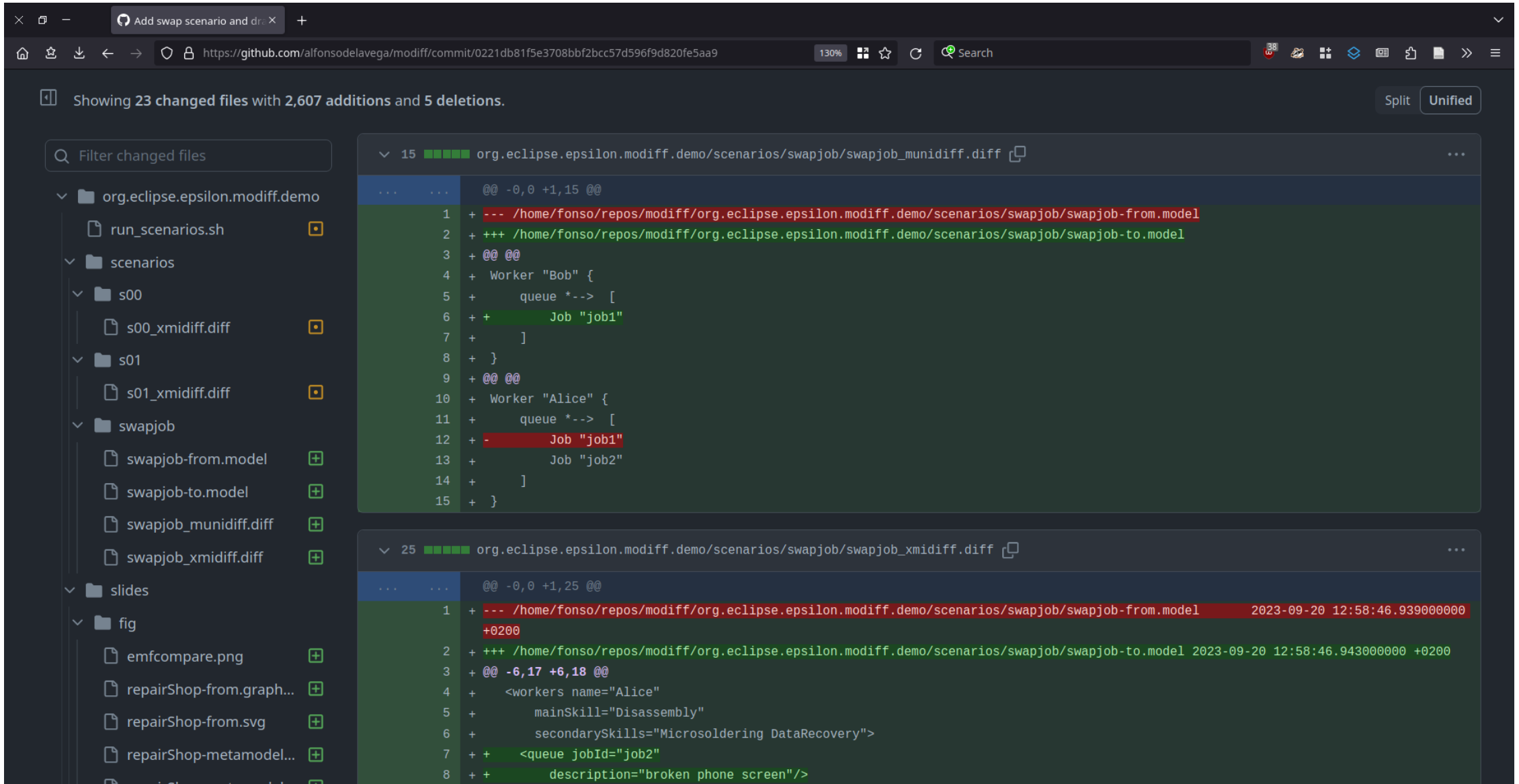
Can we do better than XMI diffs? Munidiff format

```
--- from.model
+++ to.model
@@ @@
  Worker "Bob" {
    queue *--> [
+   Job "job1"
    ]
  }
@@ @@
  Worker "Alice" {
    queue *--> [
-   Job "job1"
    Job "job2"
    ]
  }
```

Why bother? Existing support for the Unified Format

- Markdown code blocks (these slides)
- Editors (e.g. Eclipse, JetBrains, Visual Studio Code)
- Version Control Systems: GitHub, GitLab, Bitbucket
 - Commits, pull requests, issues, user comments

Support Example: GitHub



The screenshot shows a GitHub commit page for the repository `alfonsodelavega/modiff` at commit `0221db81f5e3708bbf2bcc57d596f9d820fe5aa9`. The page indicates 23 changed files with 2,607 additions and 5 deletions. The left sidebar shows a file tree for the `org.eclipse.epsilon.modiff.demo` directory, including `run_scenarios.sh`, `scenarios` (with subdirectories `s00` and `s01`), `swapjob`, `slides`, and `fig`. The `swapjob` directory contains `swapjob-from.model`, `swapjob-to.model`, `swapjob_munidiff.diff`, and `swapjob_xmidiff.diff`. The right pane displays the diff for `swapjob_munidiff.diff` (lines 15-15) and `swapjob_xmidiff.diff` (lines 25-25). The diff for `swapjob_munidiff.diff` shows changes to a JSON-like structure, including the addition of a `Job "job1"` and the removal of a `Job "job1"`. The diff for `swapjob_xmidiff.diff` shows changes to a XML-like structure, including the addition of a `<queue jobId="job2">` tag and the removal of a `<queue jobId="job1">` tag.

Showing 23 changed files with 2,607 additions and 5 deletions. Split Unified

Filter changed files

org.eclipse.epsilon.modiff.demo

- run_scenarios.sh
- scenarios
 - s00
 - s00_xmidiff.diff
 - s01
 - s01_xmidiff.diff
 - swapjob
 - swapjob-from.model
 - swapjob-to.model
 - swapjob_munidiff.diff
 - swapjob_xmidiff.diff
 - slides
 - fig
 - emfcompare.png
 - repairShop-from.graph...
 - repairShop-from.svg
 - repairShop-metamodel...
 - repairShop-metamodel...

15 org.eclipse.epsilon.modiff.demo/scenarios/swapjob/swapjob_munidiff.diff

```
@@ -0,0 +1,15 @@
1 + --- /home/fonso/repos/modiff/org.eclipse.epsilon.modiff.demo/scenarios/swapjob/swapjob-from.model
2 + +++ /home/fonso/repos/modiff/org.eclipse.epsilon.modiff.demo/scenarios/swapjob/swapjob-to.model
3 + @@ @@
4 + Worker "Bob" {
5 +   queue *--> [
6 +     Job "job1"
7 +   ]
8 + }
9 + @@ @@
10 + Worker "Alice" {
11 +   queue *--> [
12 +     Job "job1"
13 +     Job "job2"
14 +   ]
15 + }
```

25 org.eclipse.epsilon.modiff.demo/scenarios/swapjob/swapjob_xmidiff.diff

```
@@ -0,0 +1,25 @@
1 + --- /home/fonso/repos/modiff/org.eclipse.epsilon.modiff.demo/scenarios/swapjob/swapjob-from.model 2023-09-20 12:58:46.939000000
2 + +++ /home/fonso/repos/modiff/org.eclipse.epsilon.modiff.demo/scenarios/swapjob/swapjob-to.model 2023-09-20 12:58:46.943000000 +0200
3 + @@ -6,17 +6,18 @@
4 + <workers name="Alice"
5 +   mainSkill="Disassembly"
6 +   secondarySkills="Microsoldering DataRecovery">
7 + <queue jobId="job2"
8 +   description="broken phone screen"/>
```

Munidiff: Textual Reporting of Model Differences

- Follows the Unified Format [1]
- Can be integrated with any two-way EMF comparison tool
- Currently:
 - EMF Compare (used for the article)
 - *Modiff* (used in this demo, work in progress)

Munidiff Syntax

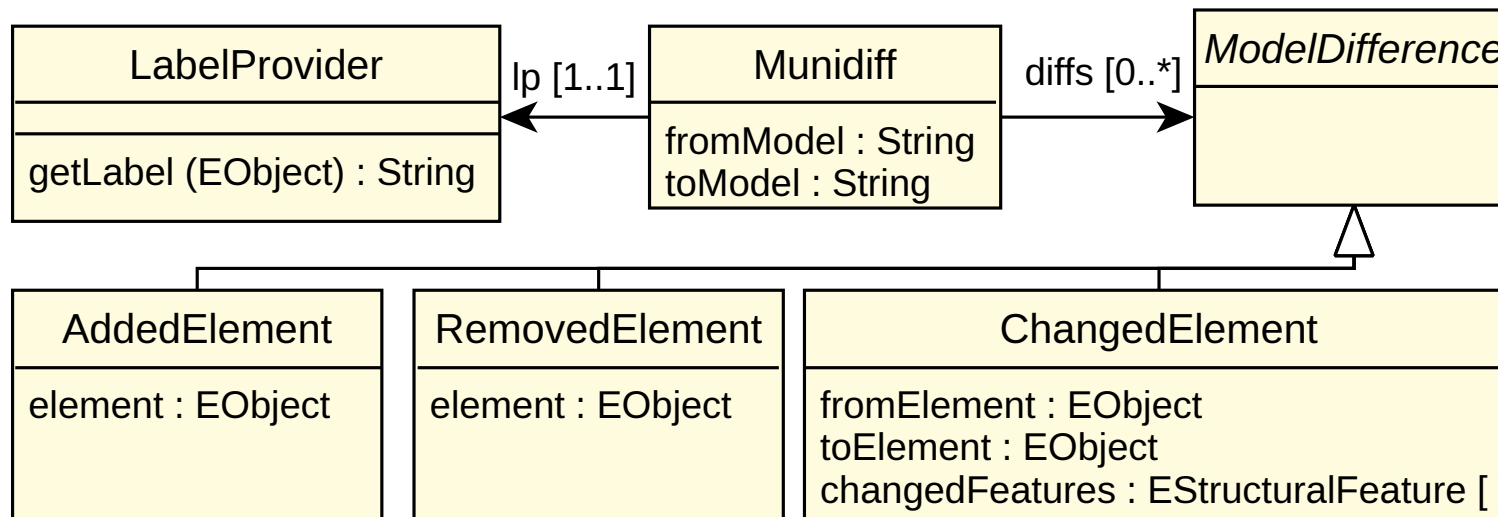
```
--- from.model
+++ to.model
@@ @@
  Worker "Bob" {
    queue *--> [
+   Job "job1"
    ]
  }
@@ @@
  Worker "Alice" {
    queue *--> [
-   Job "job1"
    Job "job2"
    ]
  }
```

- Element-level chunk granularity
- Elements identified by their type and a custom label
- Features occupy their own lines
 - Facilitates/Respects diff format

How to Use Munidiff: From Model Differences to Text Report

For EMF Compare:

1. Perform the two-way comparison
2. Translate the differences from EMF Compare representation to Munidiff's:



3. Generate a text report from the Munidiff representation

Demo: Find the Differences!

Future Work

- Test different Munidiff flavours
- Exploit more parts of the Unified Format (hunk headers? @@ @@)
 - Summary of the changes in natural language?
- Automatic generation of graphical diffs
 - E.g. Munidiff -> PlantUML's Object Diagram diff
 - Previous experience: Picto [1]

[1] <https://eclipse.dev/epsilon/doc/picto/>

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Tools, demo and slides:

