

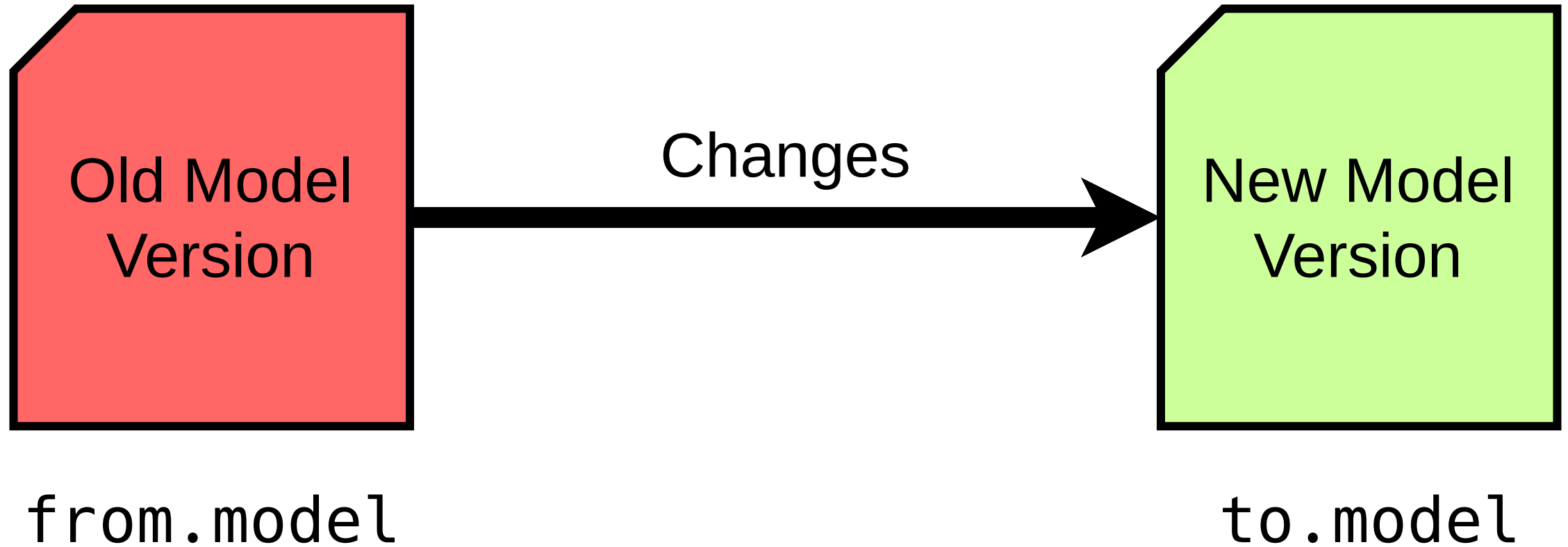
# Towards an Interoperable and Customisable Textual Format for Model Differences Reporting

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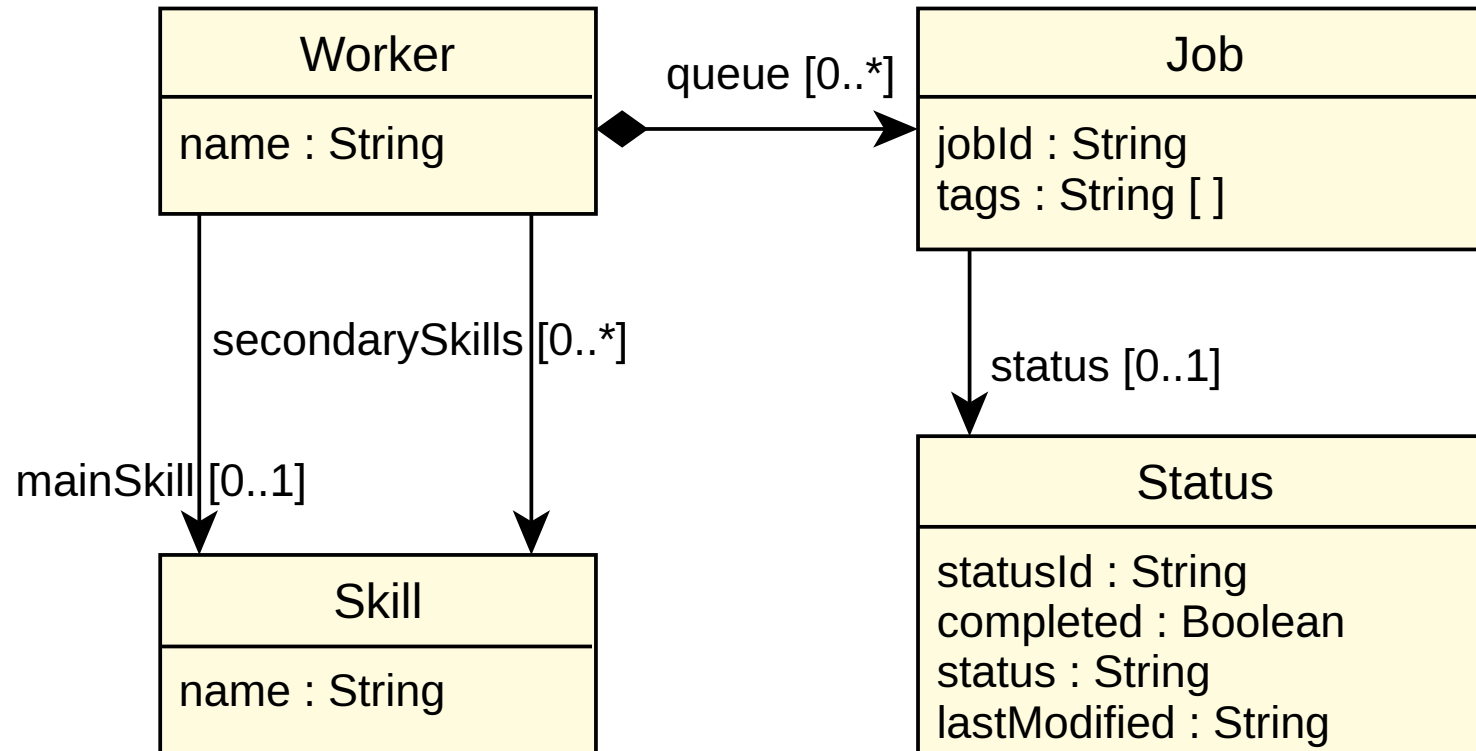
# Two-Way Model Comparison



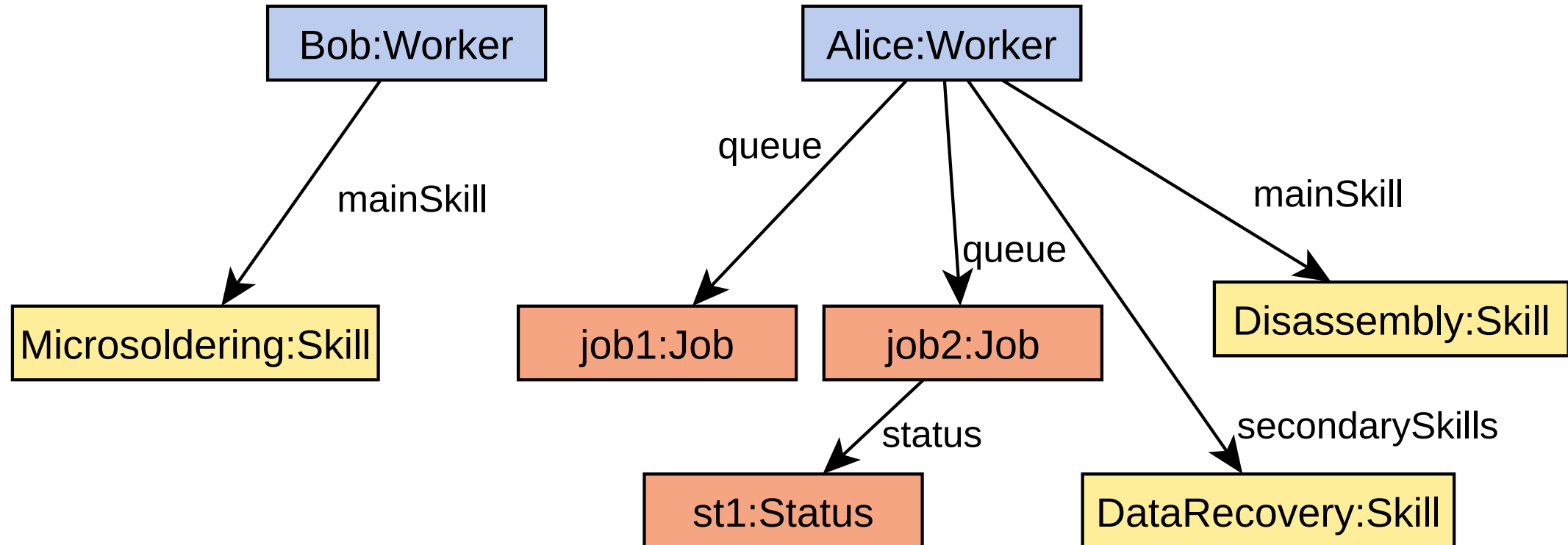
# Two-Way Model Comparison: Stages

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

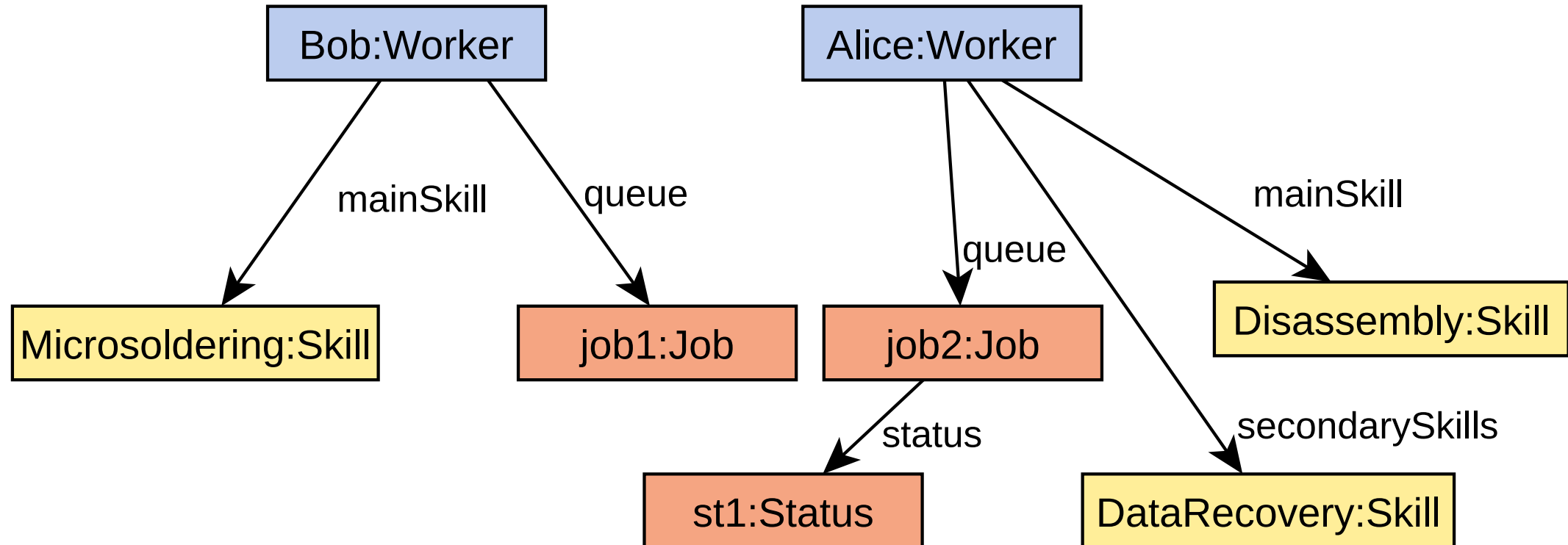
# Example: Repair Shop (metamodel)



from.model

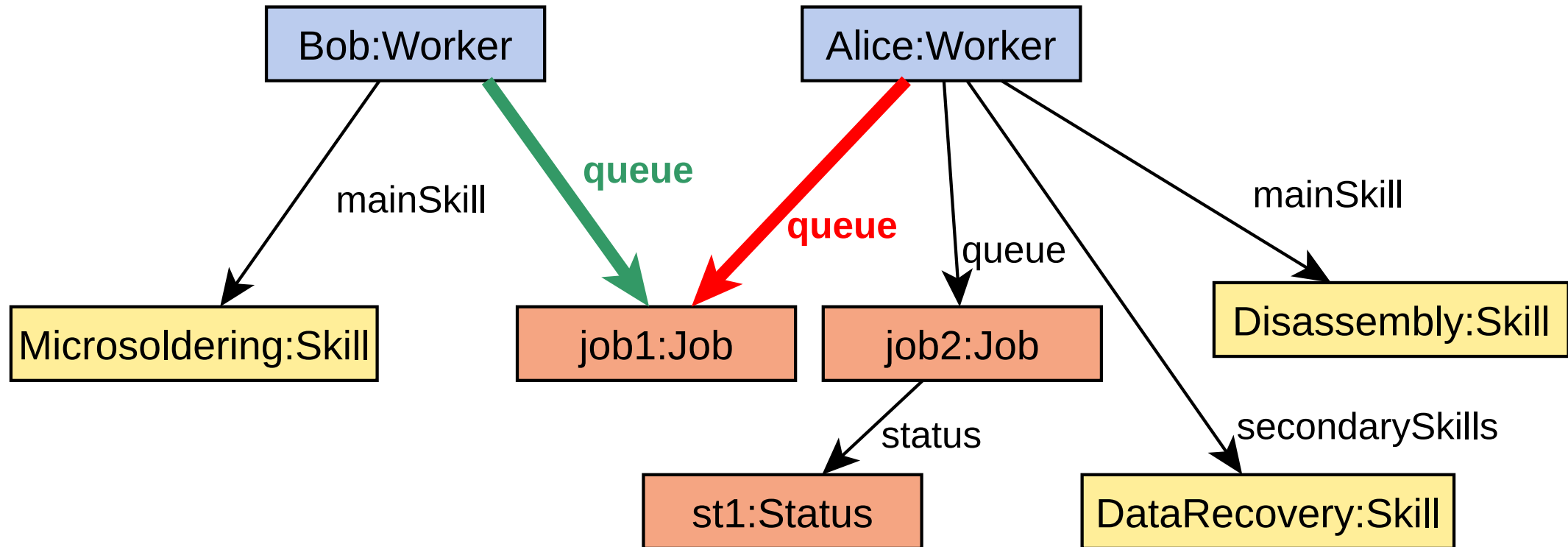


## to.model (with changes)

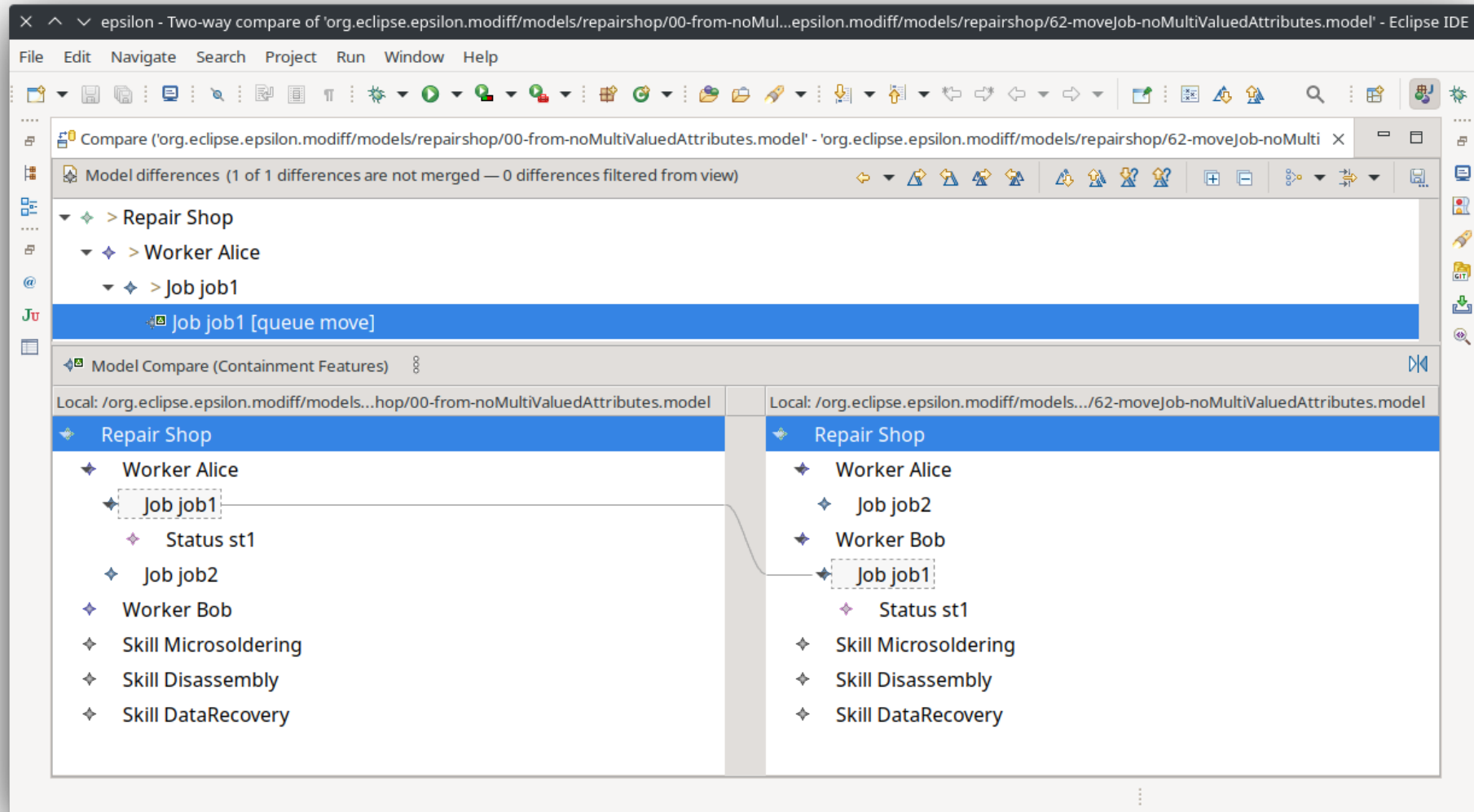


# Graphical diff

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"/>
```

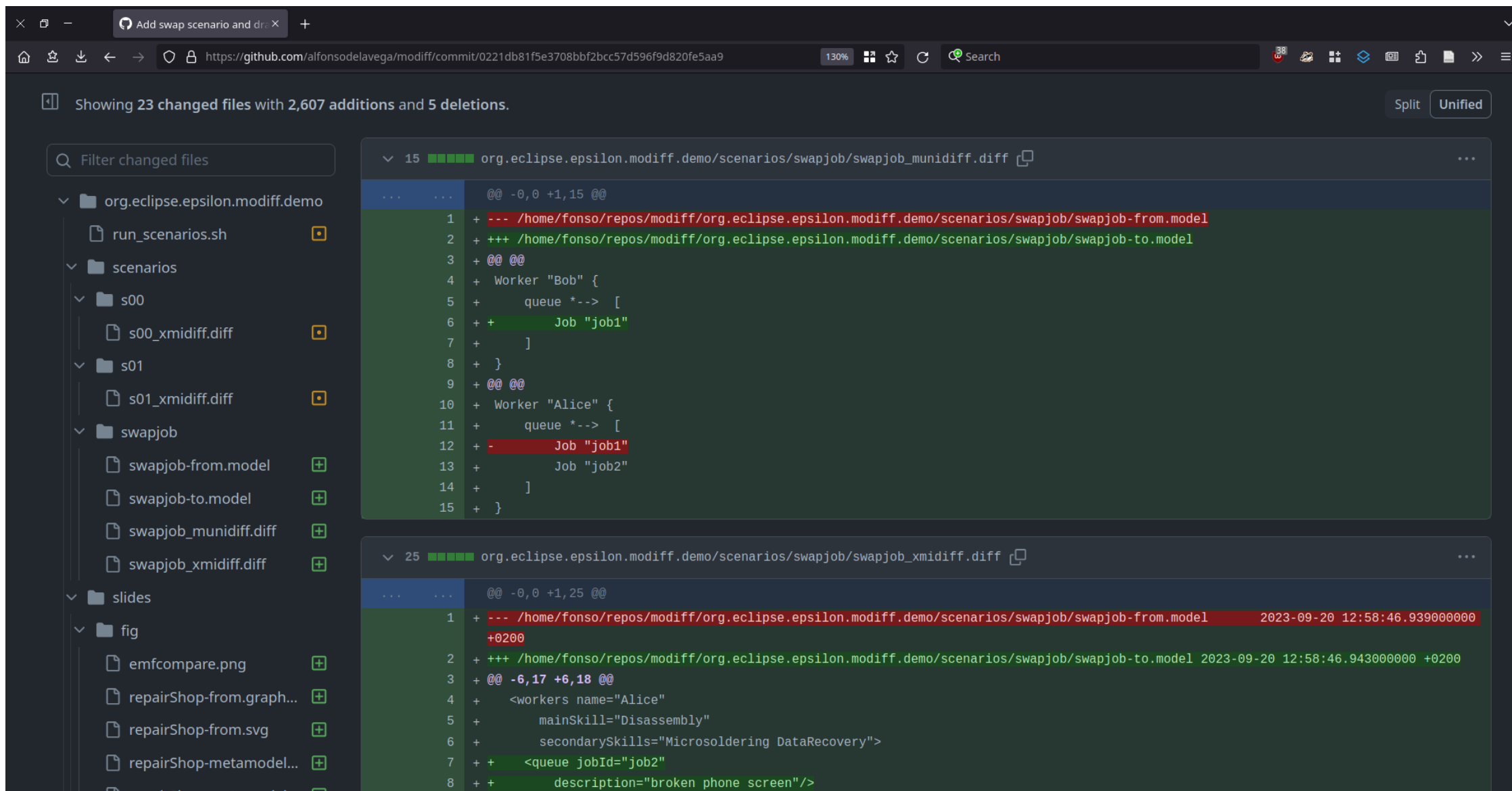
# Can we do better than XMI diffs? Munidiff format

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

# Why bother? Existing support for the Unified Format

- Editors (e.g. Eclipse, JetBrains, Visual Studio Code)
- Command-Line Interfaces
- Markdown code blocks (these slides)
- 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 displays 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 main area shows two diff views. The top view is for `swapjob/swapjob_munidiff.diff`, showing changes to `swapjob-from.model` and `swapjob-to.model`. The bottom view is for `swapjob/swapjob_xmidiff.diff`, showing changes to `swapjob-from.model` and `swapjob-to.model` with timestamps.

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"/>
```

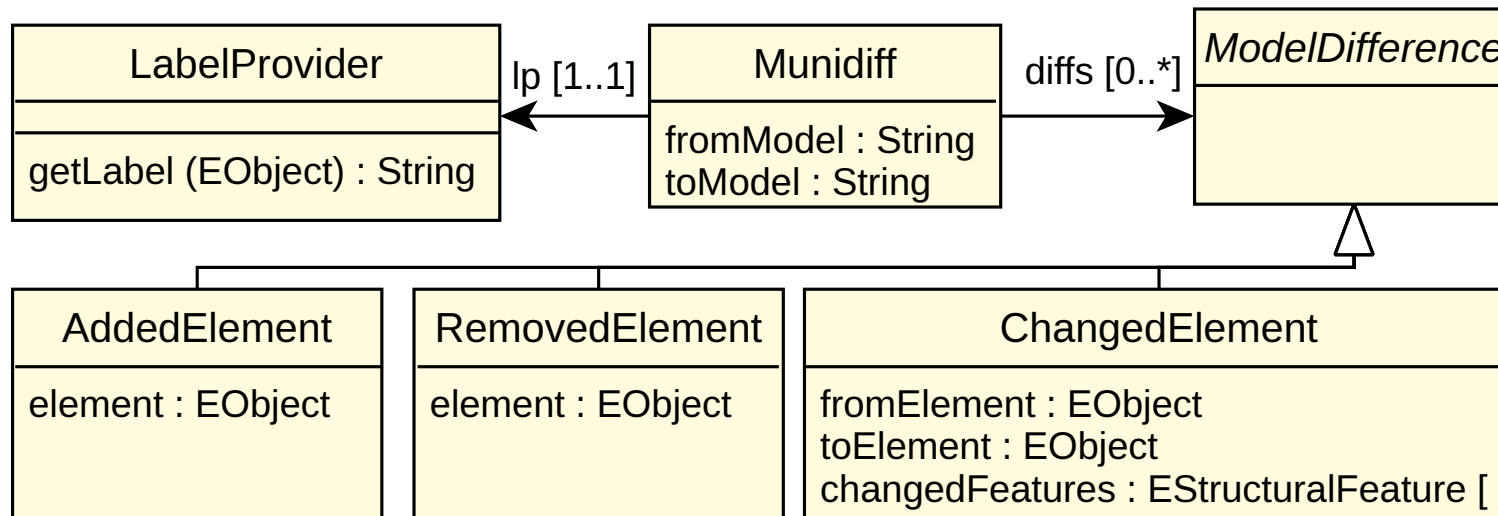
# Munidiff: Unified Diff Format for Models

- Follows the Unified Format
- 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)

# 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 the Unified Format (hunk headers? @@ @@ )
- Graphical diff visualisations
  - Previous experience: Picto [1]