# Sharpening Your Git Skills

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# 🔀 Basic Git workflow

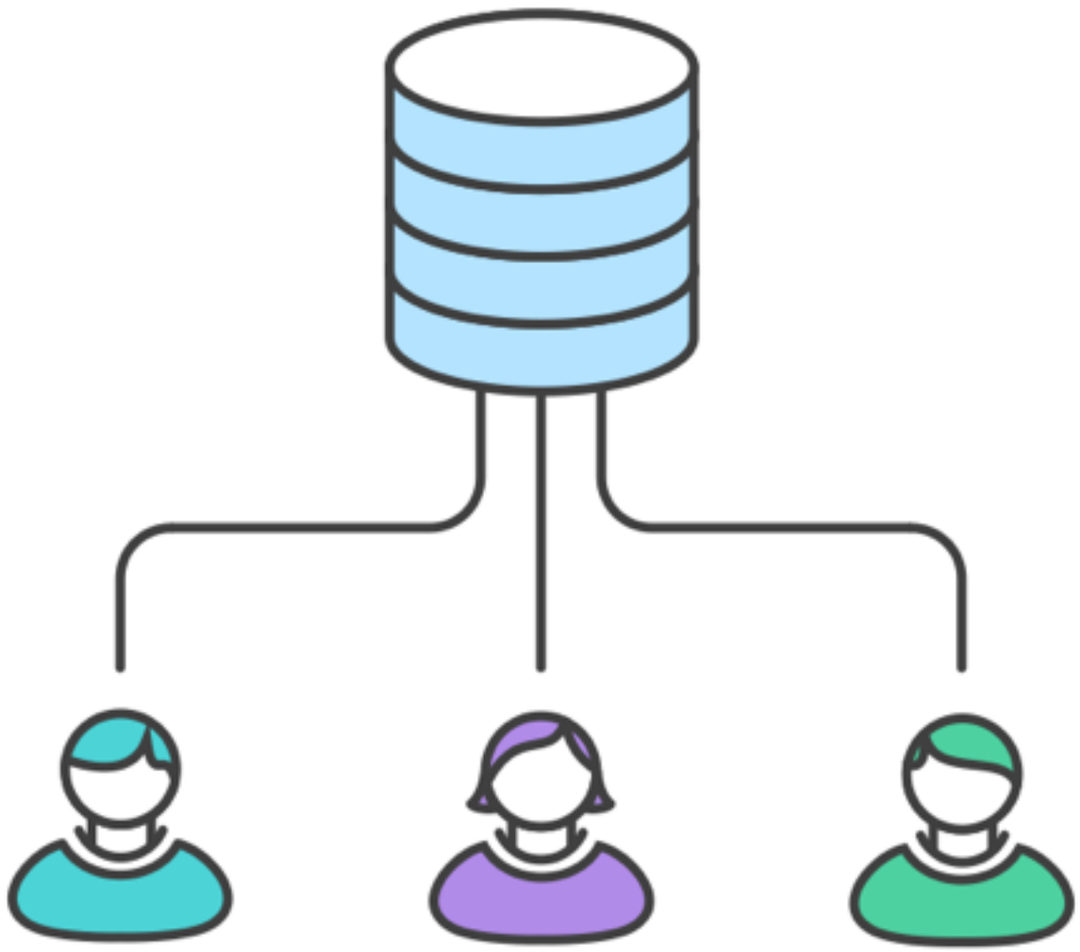
# 🔨 Additional tools

# 📜 Working with Git history

# git init

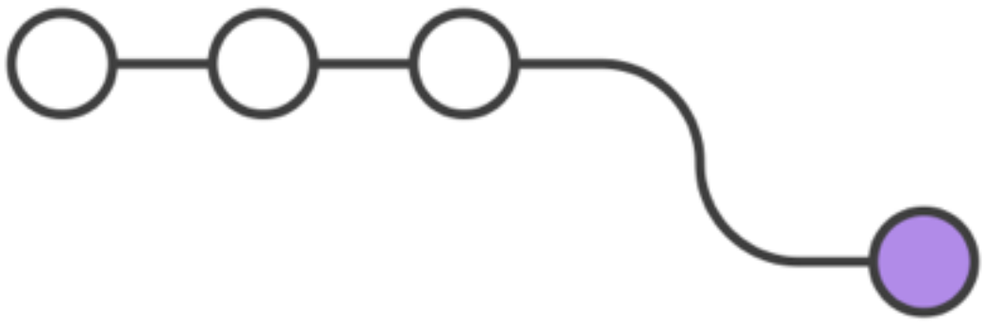
Source: atlassian.com/git/tutorials/comparing-workflows

# git clone



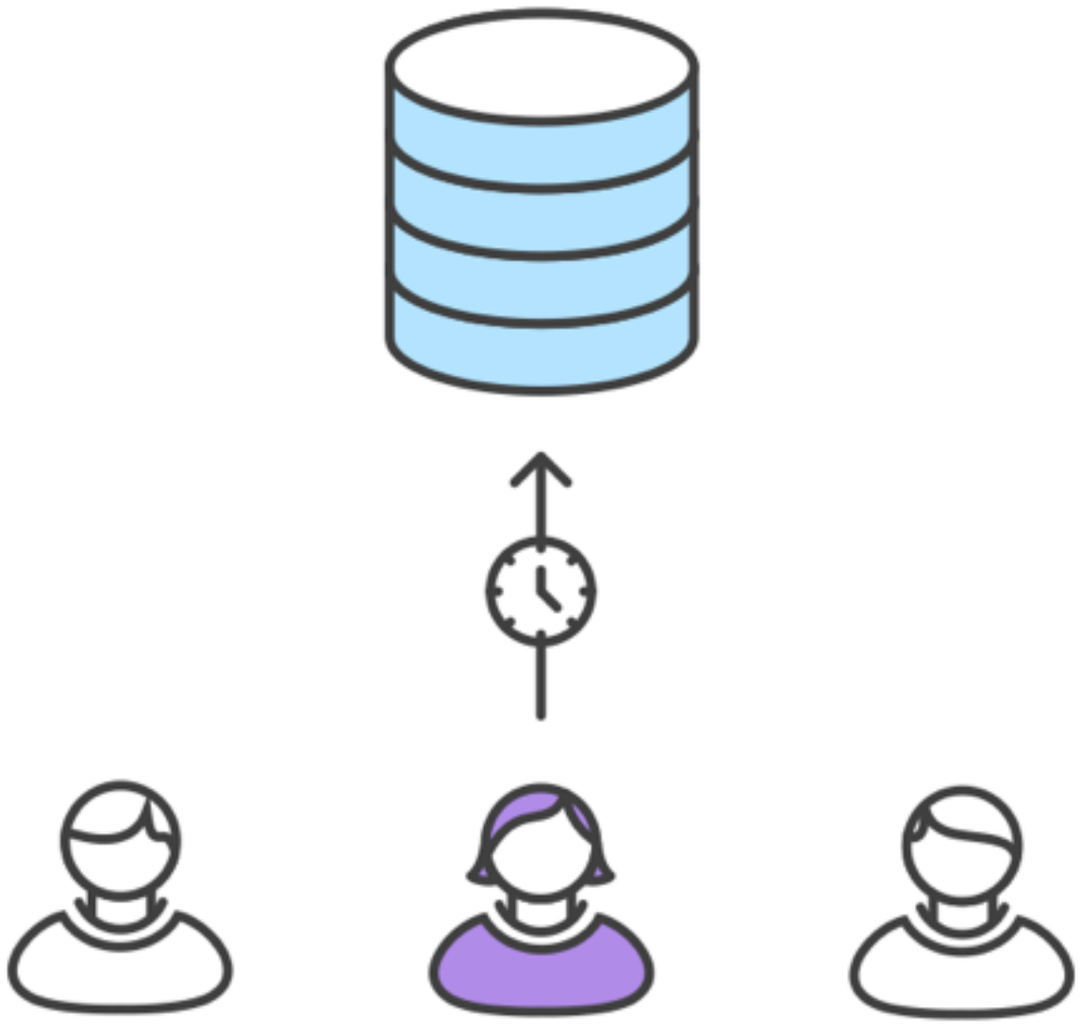
Source: atlassian.com/git/tutorials/comparing-workflows

# git checkout -b my-feature



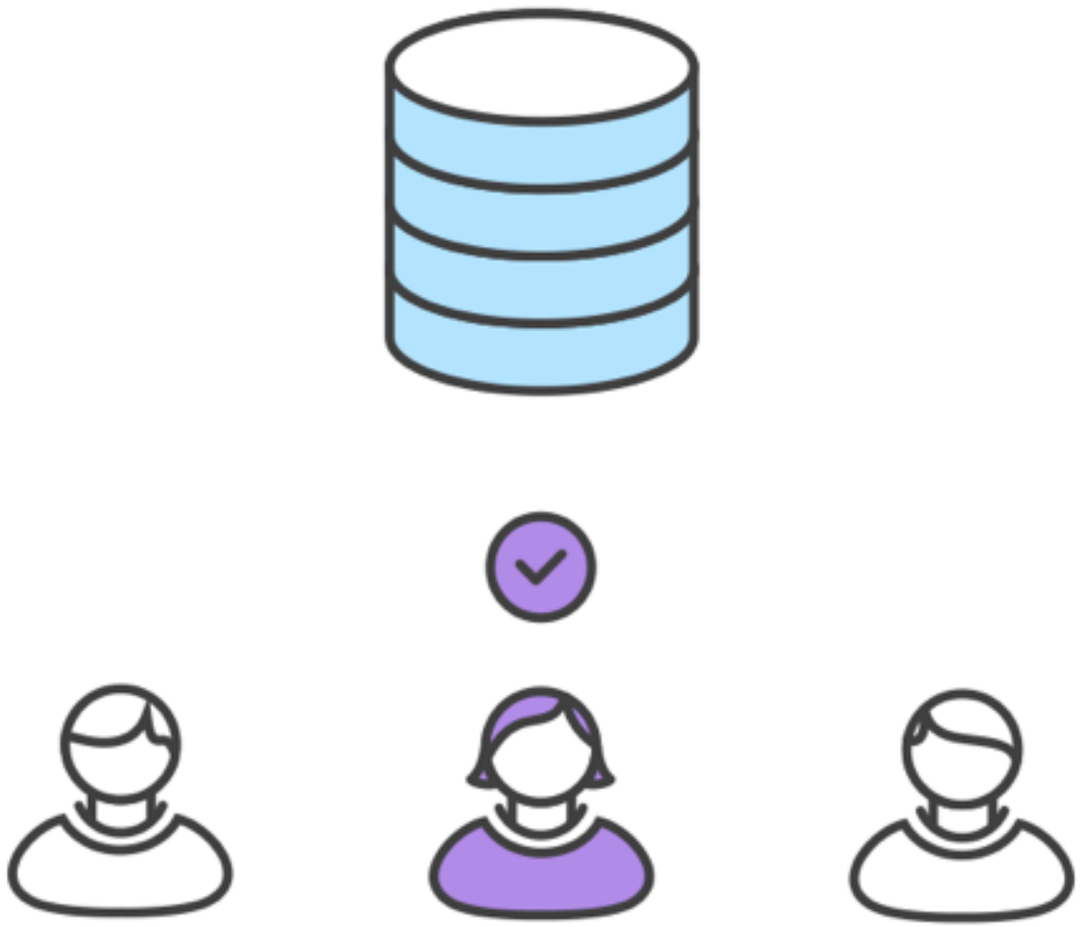
Source: atlassian.com/git/tutorials/comparing-workflows

```
git status

git add

git commit
```



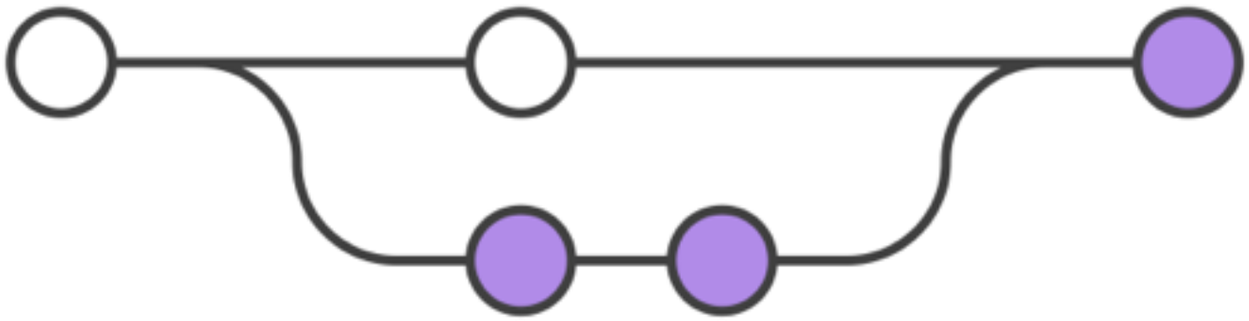
Source: atlassian.com/git/tutorials/comparing-workflows

# git push



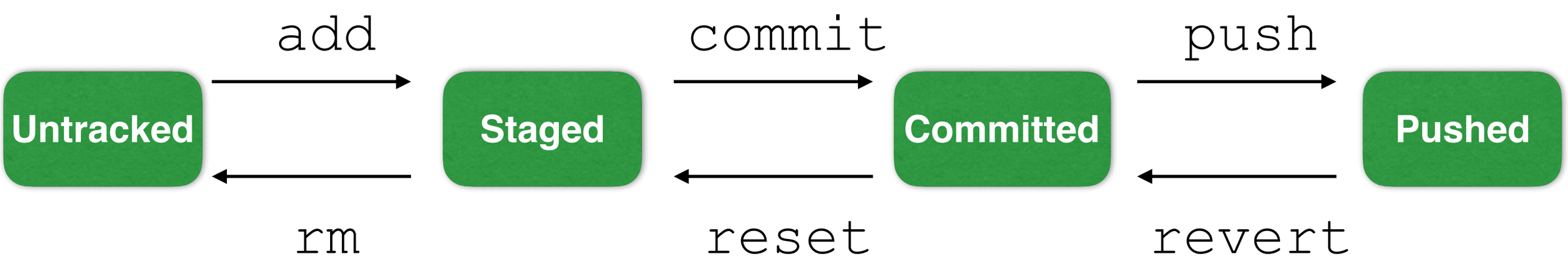
Source: atlassian.com/git/tutorials/comparing-workflows

# git merge



Source: atlassian.com/git/tutorials/comparing-workflows

# 🤖 State Machine




Adapted from code.uberinternal.com/w/teams/map_creation/cameras_and_sensors/git/

# 📷 Snapshotting

| | |
|---|---|
| `clone` | create a local copy of a repository |
| `add` | update the index with current changes |
| `status` | show difference from latest commit |
| `diff` | compare two commits (or commit & working dir) |

# 📷 Snapshotting

| | |
|---|---|
| `commit` | save the current change set in a commit |
| `reset` | go back to a specified state |
| `rm` | remove a file from the index (stop tracking) |
| `mv` | move/rename a file/directory/symlink |

#  Branching and Merging

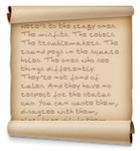
| | |
|---|---|
| `branch` | list/create/delete branches |
| `checkout` | change the current branch (or restore a file) |
| `merge` | combine 2+ histories together |
| `log` | show history of a repo (or file) |
| `stash` | record current state, go back to clean working dir |
| `tag` | create/list/delete a GPG-signed object |

#  Sharing and Updating

| | |
|---|---|
| `fetch` | download from another (remote) repository |
| `pull` | fetch and merge (or rebase) |
| `push` | update remote repository |
| `remote` | manage which repositories you're tracking |

# 🐞 Debugging

| | |
|---|---|
| `bisect` | binary search to find which commit introduced a bug |
| `blame` | which author & commit changed each line of file |
| `grep` | show lines matching a pattern |
| `cherry-pick` | apply changes from existing commits |



# Working with History

| | |
|---|---|
| `apply` | read a patch (diff output) and update files |
| `rebase` | reapply commits on top of another base |
| `revert` | undo the changes in a commit |
| `filter-branch` | rewrite a branch |

# Schools of Thought on History

# School 1

## “It’s a record of everything that happened”

*It’s a historical document, valuable in its own right, and shouldn’t be tampered with. From this angle, changing the commit history is almost blasphemous; you’re lying about what actually transpired. So what if there was a messy series of merge commits? That’s how it happened, and the repository should preserve that for posterity.*

Source: git-scm.com/book/en/v2/Git-Branching-Rebasing

# Commits from School 1

```
fix some tests
```

```
Just a test.
```

# School 2

## “It’s the story of how your project was made”

*You wouldn’t publish the first draft of a book, and the manual for how to maintain your software deserves careful editing. This is the camp that uses tools like rebase and filter-branch to tell the story in the way that’s best for future readers.*

Source: git-scm.com/book/en/v2/Git-Branching-Rebasing

# Commits from School 2

```
Convert module for
Spark pipeline.
```

```
Added utility to store
metrics in Cassandra.
```

# School 1

- Pros
  - Easy, low barrier to entry
  - Records “what really happened”
- Cons
  - Different levels of granularity
  - Lots of commits
  - More to wade through when reading history

Source: blimmer.github.io/1up-git-skills-talk

# School 2

- Pros
  - Clean, meaningful history
  - Communicates purpose and intent
- Cons
  - Takes more time to write
  - Rewriting history has risks
  - Commits may have lots of code

Source: blimmer.github.io/1up-git-skills-talk


Source: xkcd.com/1296

# Rewriting History

```
aa12ed5 Add c.txt
d478c50 Add b.txt
337d339 Add a.txt
60d706a Initial commit
```

# Rewriting History

```
pick 337d339 Add a.txt
pick d478c50 Add b.txt
pick aa12ed5 Add c.txt
```

```
pick 337d339 Add a.txt
squash d478c50 Add b.txt
squash aa12ed5 Add c.txt
```

```
git rebase -i HEAD~3
```

# Rewriting History

```
# This is a combination of 3 commits.
# The first commit's message is:
Add a.txt

# This is the 2nd commit message:

Add b.txt

# This is the 3rd commit message:

Add c.txt
```

# Rewriting History

```
af61b75 Add a.txt, b.txt, and c.txt.
60d706a Initial commit
```

# Rewriting History

```
af61b75 Add a.txt, b.txt, and c.txt.
60d706a Initial commit
```

`git commit --amend`

# Rewriting History

```
aa12ed5 Add c.txt
d478c50 Add b.txt
337d339 Add a.txt
60d706a Initial commit
```

⚖️

```
f210d94 Add text files for first three
 letters of alphabet.
60d706a Initial commit
```

# Questions for Commit Messages

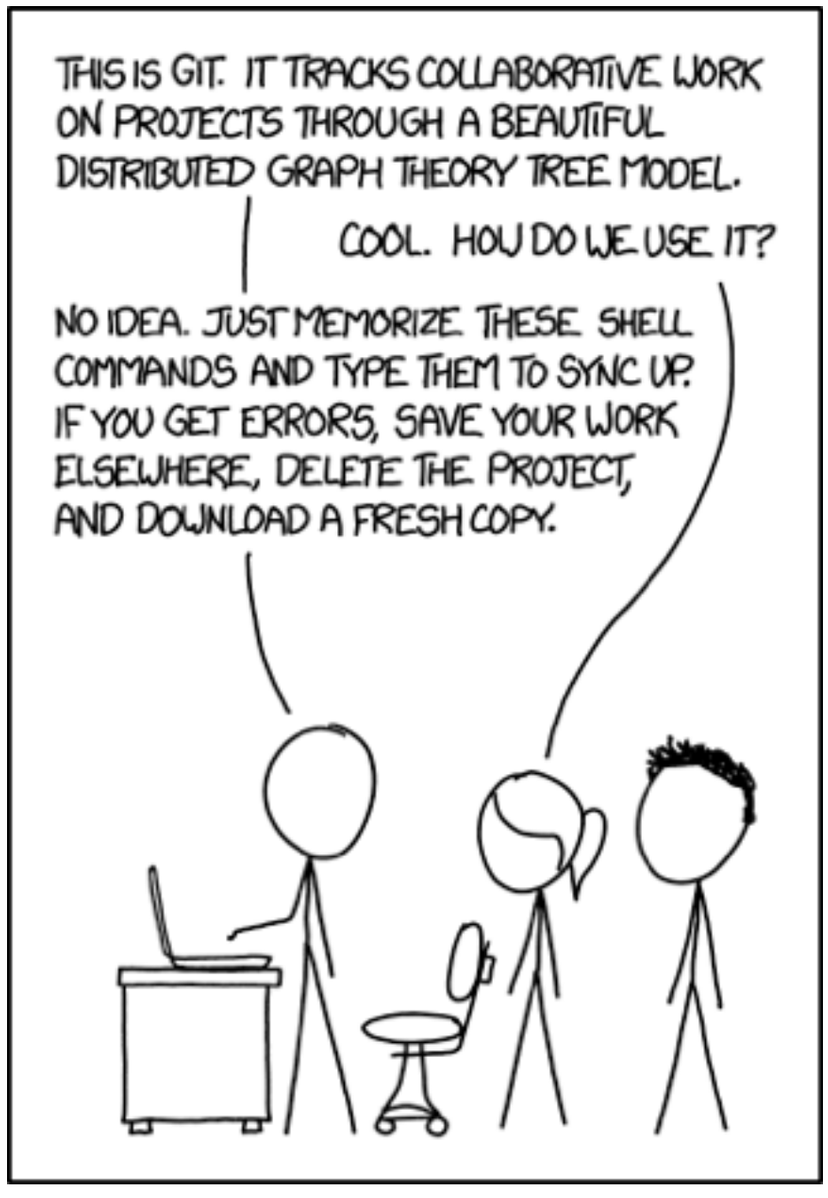
1. Why is this change necessary?
2. How does it address the issue?
3. What side effects does this change have?

Source: robots.thoughtbot.com/5-useful-tips-for-a-better-commit-message

# 📚 References

- Git book: git-scm.com/book
- Git workflows: atlassian.com/git/tutorials/comparing-workflows
- More on history: blimmer.github.io/1up-git-skills-talk

# If all else fails… 🗑️🔥




Source: xkcd.com/1597