

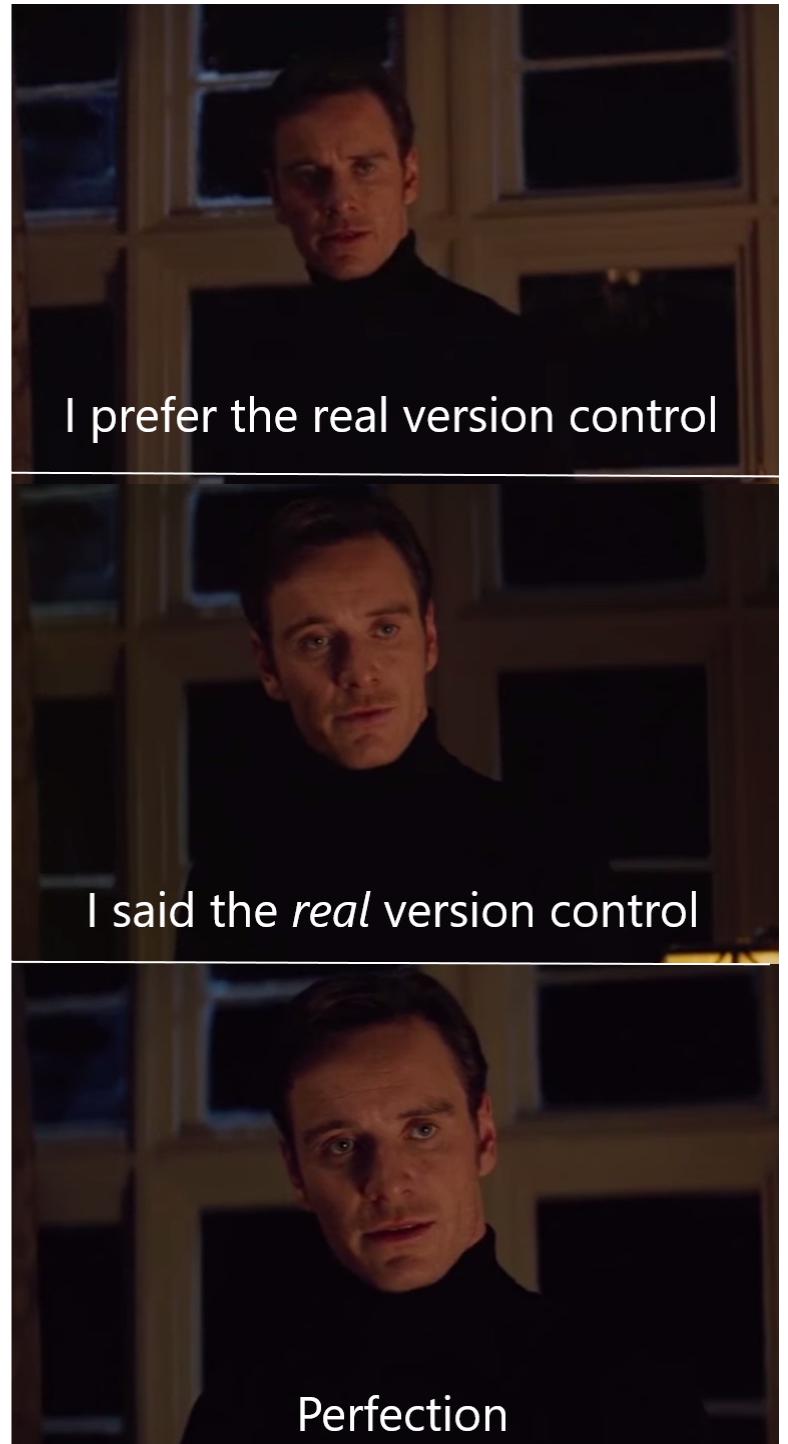
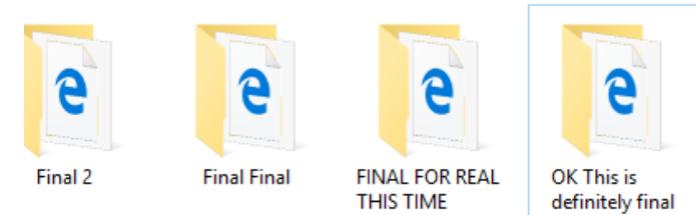
Introduction to Git and the MonPlan Development Workflow

Eric Jiang (@lorderikir)

So, I love coding  and I love working in teams 

But what if there was a way that I good remember how the code look liked throughout its stage, for example if something went wrong and I want to go back to a previous version?

First of all, what is Git?

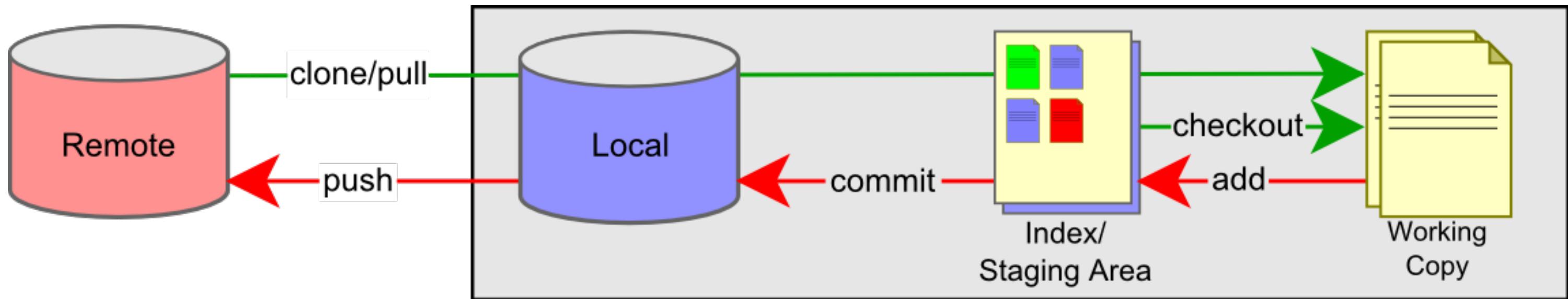


Git

Git is a version control system for tracking changes in computer files and coordinating work on those files among multiple people

– Git-SCM Website

How Git Works



Some Terminology

Repository

The Git repository is stored in the same directory as the project itself, in a subdirectory called .git. Note differences from central-repository systems like CVS or Subversion:

- There is only one .git directory, in the root directory of the project.
- The repository is stored in files alongside the project. There is no central server repository.

Some Terminology

Commit

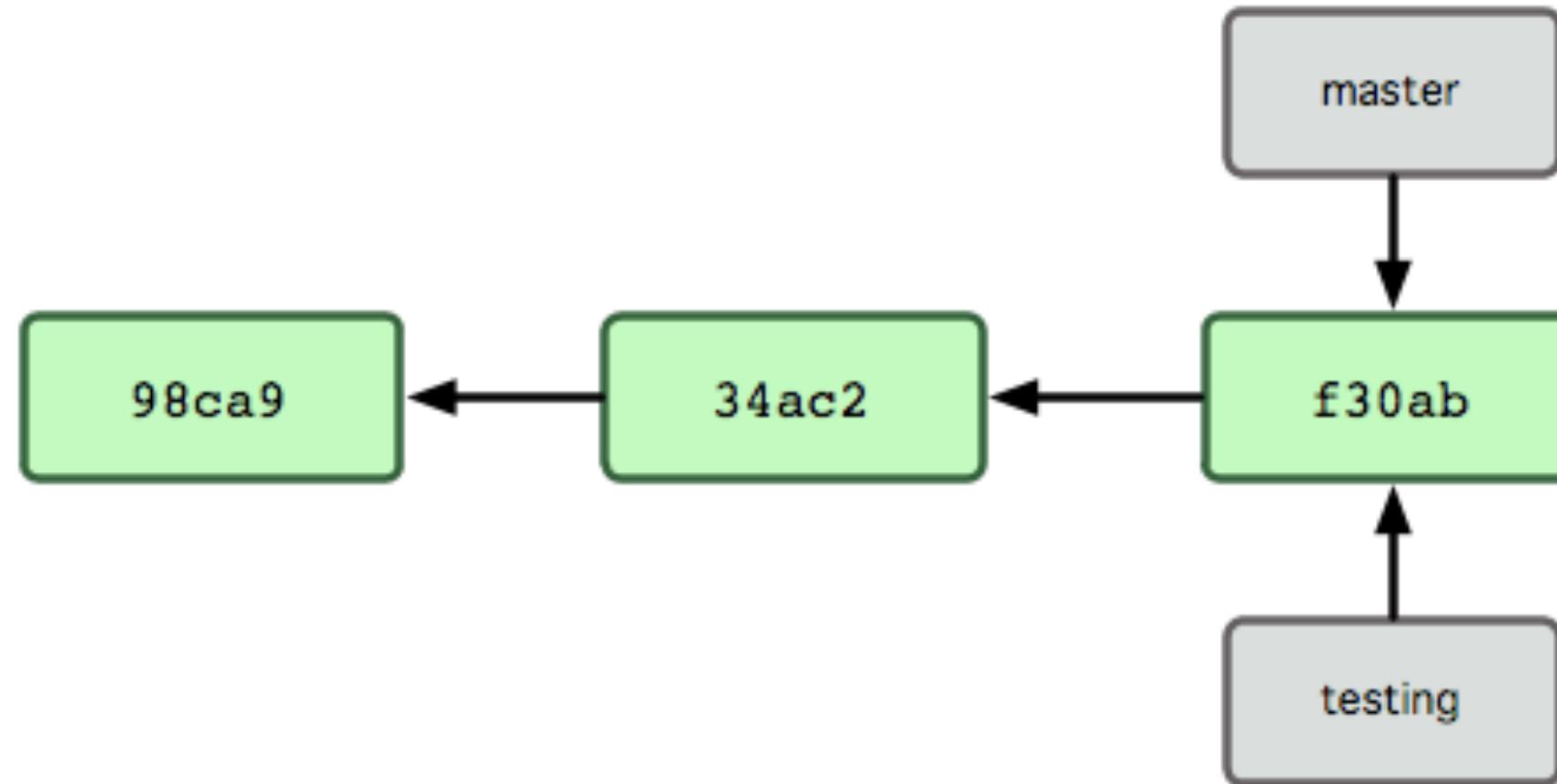
The git commit command captures a snapshot of the project's currently staged changes

- A reference to some changes to a file (removals or deletions in files, creation/moving/deletion of files)

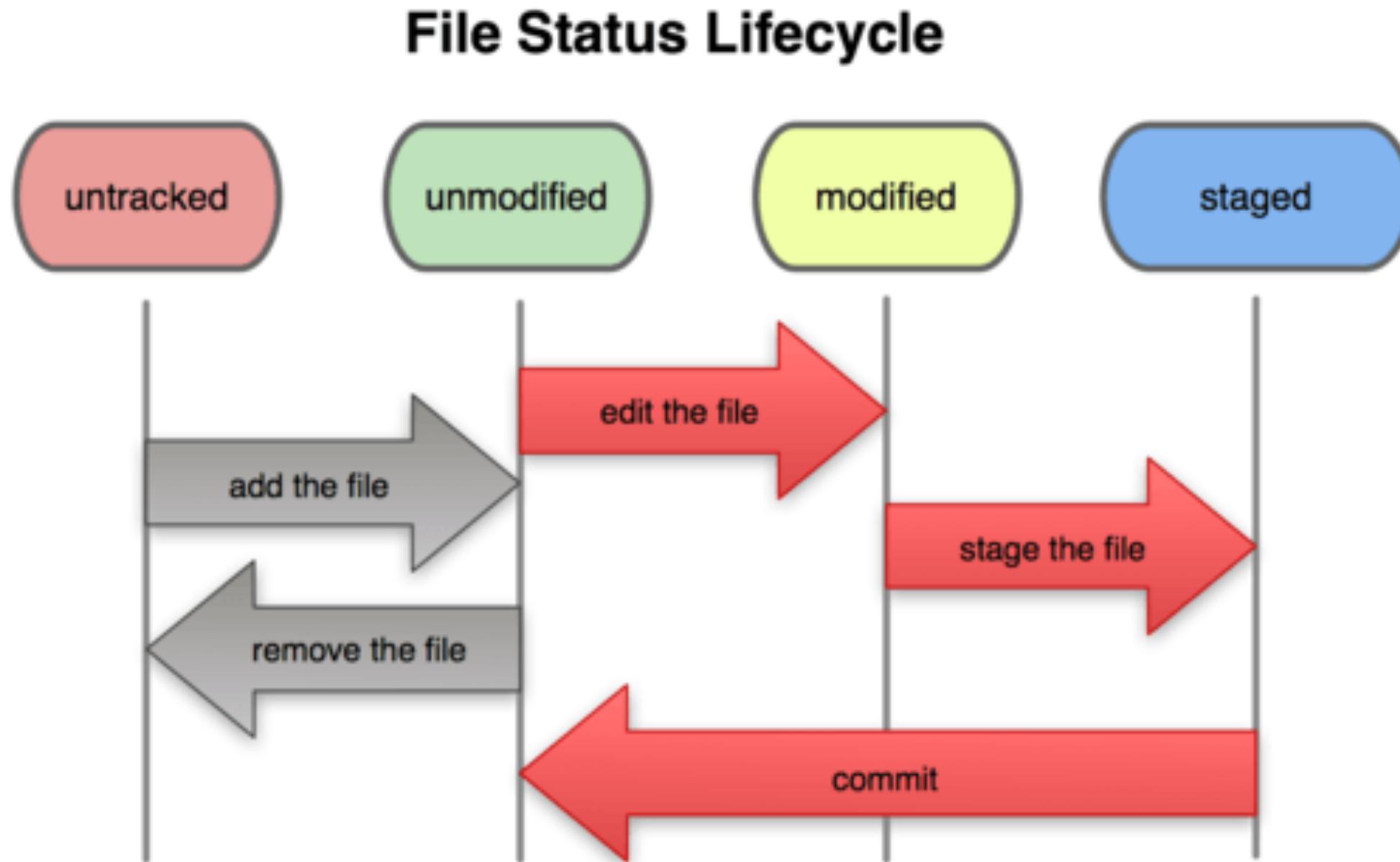
Some Terminology

Branches

A branch in Git is simply a lightweight movable pointer to one of these commits. The default branch name in Git is master



Git File Lifecycle



Some Basic Commands

Command	Description
git clone	Clones a repository locally
git add	Stages changes to file(s) for a commit
git commit	Creates a commit (set of changes)
git push	Push changes to the hosted repo

Using Git within teams

Well, working with teams  may be hard. There are generally two ways you can work off a repository.

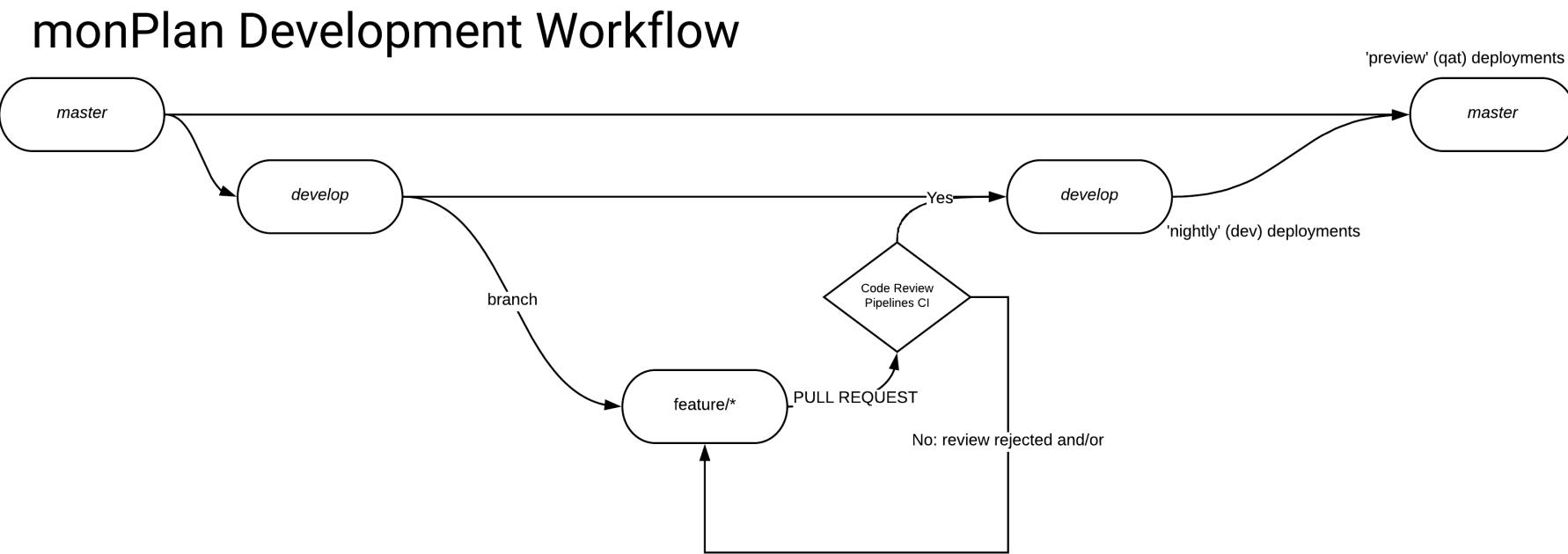
- Using Branches
- Using Forks
- Open Source projects tend to use Forks, while:
- a lot of places also uses what is known as GitFlow which uses branches!

Use Branches for Versioning Control (GitFlow)

1. Make a branch with the feature, bug, hotfix you are working on.
2. Every time you commit and push up
3. Make a Pull Request
4. Merge the pull request

One of the best workflows is known as *GitFlow*

GitFlow



- **master**: branch is the key branch, everytime for release
- **develop**: *unstable*, most of the PRs should go here
- **'feature/*'**, **'fix/*'**, etc.: are 'for purpose' branches, these branches are for development

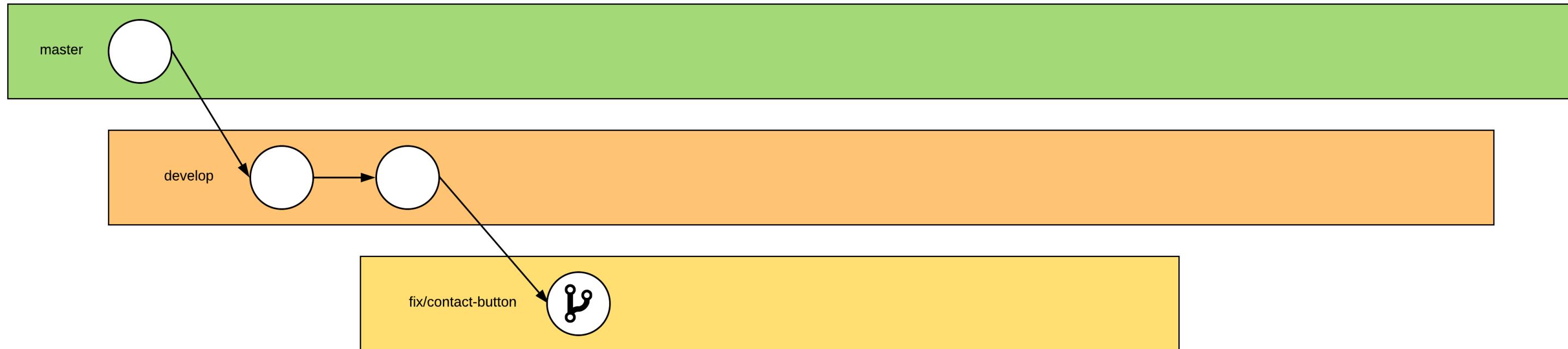
This slide has been adapted from my CI-CD talk

So we know that
development is done
incrementally

Imagine we using Git within our practices

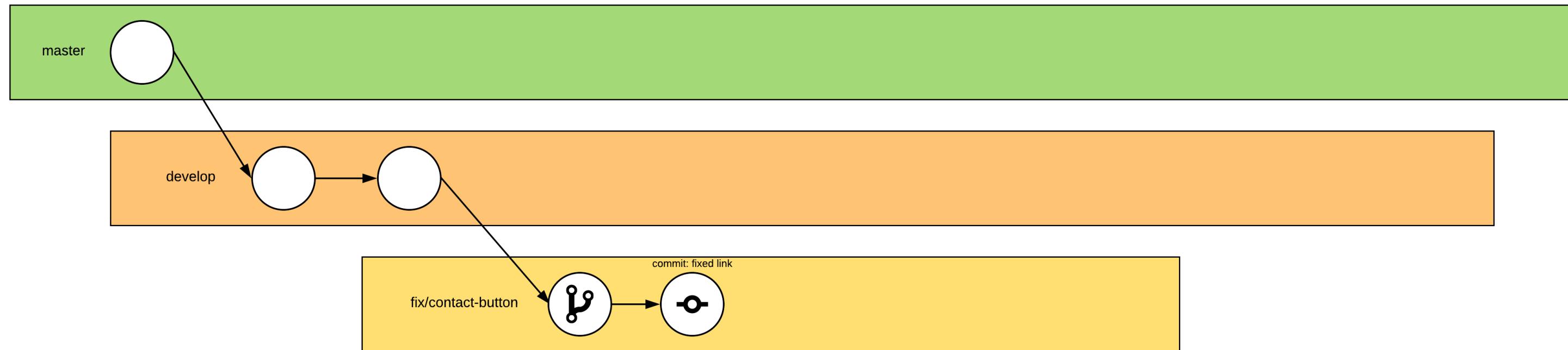
And one of my team mates, Nicholas has found a bug within one of our buttons.

So, he creates a new branch to fix the bug



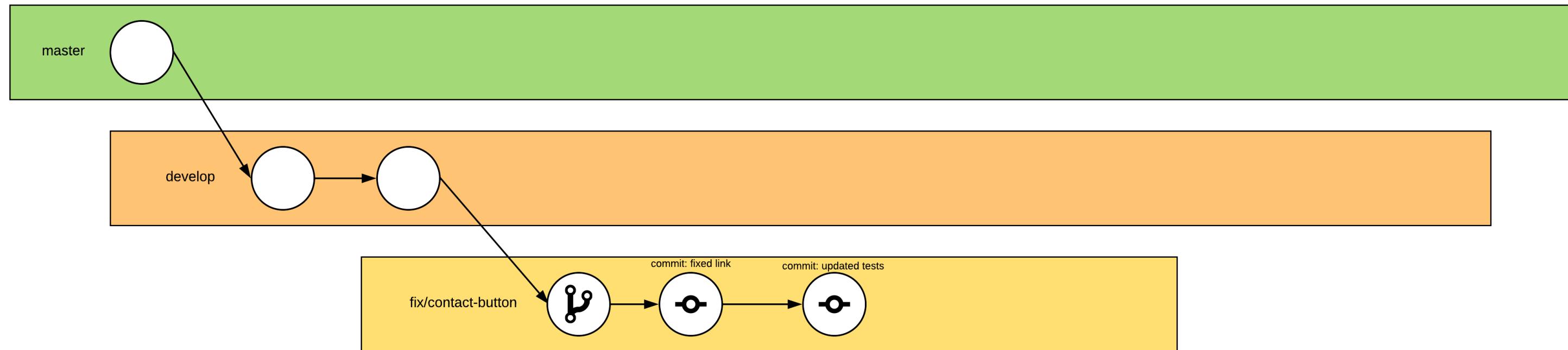
```
# update our develop branch  
git checkout develop  
git pull  
# we create a new branch  
git branch fix/contact-button  
# we make the new branch the new working branch  
git checkout fix/contact-button
```

He fixes the code and stages the change in commits



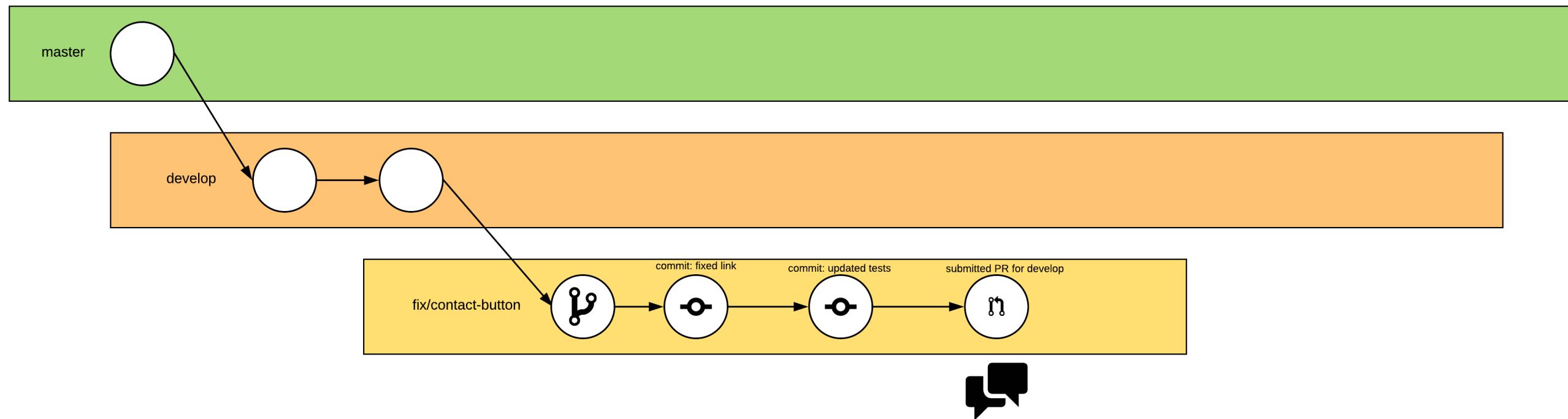
```
git add .  
git commit -m "new commit"  
git push
```

He fixes the code and stages the change in commits



```
git add .  
git commit -m "new commit"  
git push
```

He then makes a PR into my develop or master branch



Where we discuss his proposed changes

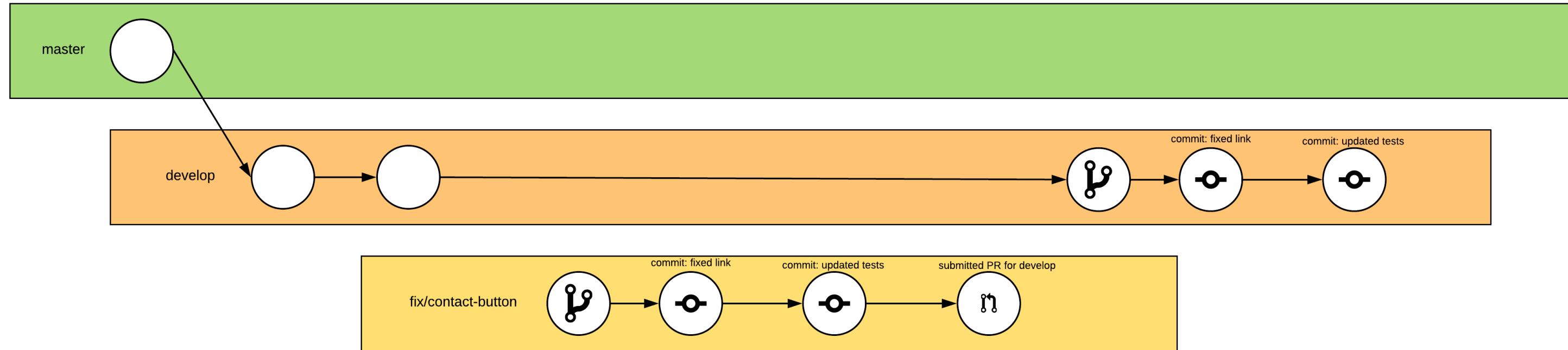
The screenshot shows a Bitbucket pull request page for a repository named 'monplan'. The pull request is titled 'Feature/notification announcements' and has been merged. It was created by Eric Jiang and has one review from Saurabh Joshi. The description of the pull request includes a list of changes:

- I F**KING FIXED IT
- feat: frontend rendering Announcements
- chore: eslint cleanup
- feat: initial admin component
- added material-ui time picker
- feat: admin page for adding announcements
- claenup

Comments on the pull request include a suggestion from Saurabh Joshi to add cookies and create a table for announcement viewing history. There are 18 files changed in the pull request.

File	Type	Changes
backend/src/main/java/edu/monash/monplan/controllers/NotificationsController.java	M	+25 -2
backend/src/main/java/edu/monash/monplan/models/request/NotificationRequest.java	M	+5 -0
backend/src/main/java/edu/monash/monplan/service/NotificationService.java	M	+5 -0
frontend/package.json	M	+2 -0
frontend/src/components/Base/Announcement/Announcement.js	A	+61 -0
frontend/src/components/Base/Announcement/styles.js	A	+30 -0
frontend/src/components/Base/Main.js	M	+68 -1
frontend/src/constants/limits.js	M	+1 -0
frontend/src/containers/AdminDashboard/NotificationCreationContainer/NotificationCreationContainer.js	A	+154 -0
frontend/src/containers/AdminDashboard/NotificationCreationContainer/index.js	A	+2 -0
frontend/src/containers/AdminDashboard/NotificationCreationContainer/strings.js	A	+6 -0
frontend/src/index.js	M	+8 -1

We then merge the Changes



This would also work for...

- Upgrades to the codebase
- Refactoring our legacy code
- Upgrading frameworks to newer versions

Unfortunately we won't go into fixing merge conflicts in this talk

Why is using GitFlow important?

- We separate production code and our 'work-in-progress' (WIP) code.
- We have a clearer understanding of what each developer is working on
- We can branch off WIP branches and merge changes in
- Relatively easier (not always) to fix merge conflicts
- Some CI/CD tools only run off branches (not PRs)
- We can set our CI/CD to deployment so that it can deploy off branches (i.e. develop to *dev*, master to *staging* or *qa* and deploy to *prod*)

Key notes



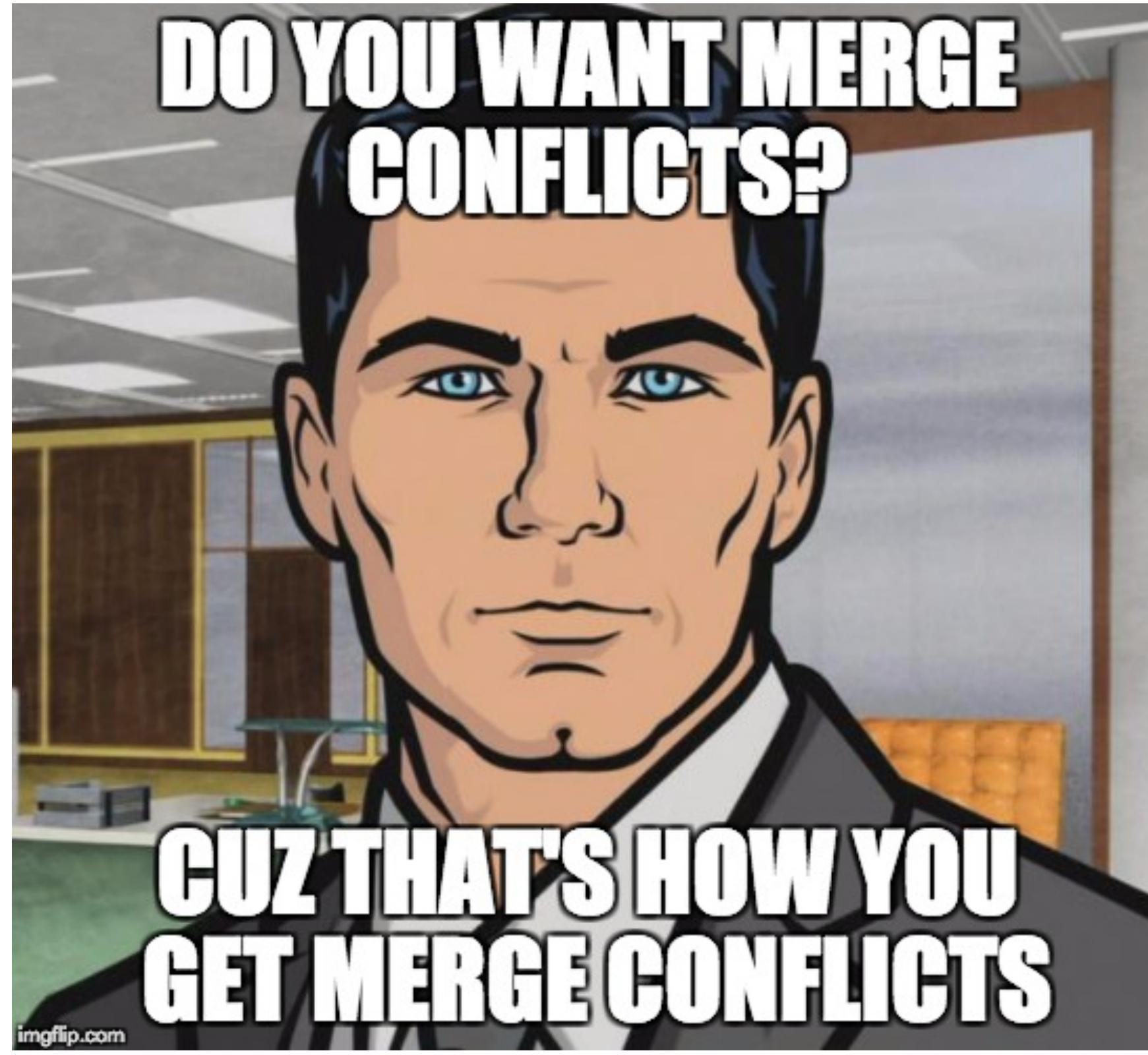
- Version Control over Development is really important as it helps keep 'backups' and you can see the changes
- You can always see who pushed out the broken code with git blame 😈
- Git is always useful as you can always revert broken code or changes
- Branching and forking is basically the same,
 - when working we typically use branches over forks as we can solve merge conflicts more easily (and locally)

Please DO NOT ever git push --force



Key things to look out for.

- Merge conflicts are always the hardest part
- Be careful of git merge and git rebase commands. Always merge don't rebase
 - This is because rebase always applies your changes last (assumes you are always correct)
 - When merging between branches and fixing conflicts always work with a team-mate



imgflip.com

Here's one of the best and easiest ways to resolve a conflict

1. We go to the target branch and pull down the latest changes
2. We then 'checkout' our current working branch and create a new branch off the working branch
3. We then attempt to merge our target branch into our new branch
4. Resolve Conflicts (by choosing the right pieces of code you want), VSCode makes this really easier
5. Merge the new branch into our current branch
6. Merge the current branch into the target branch

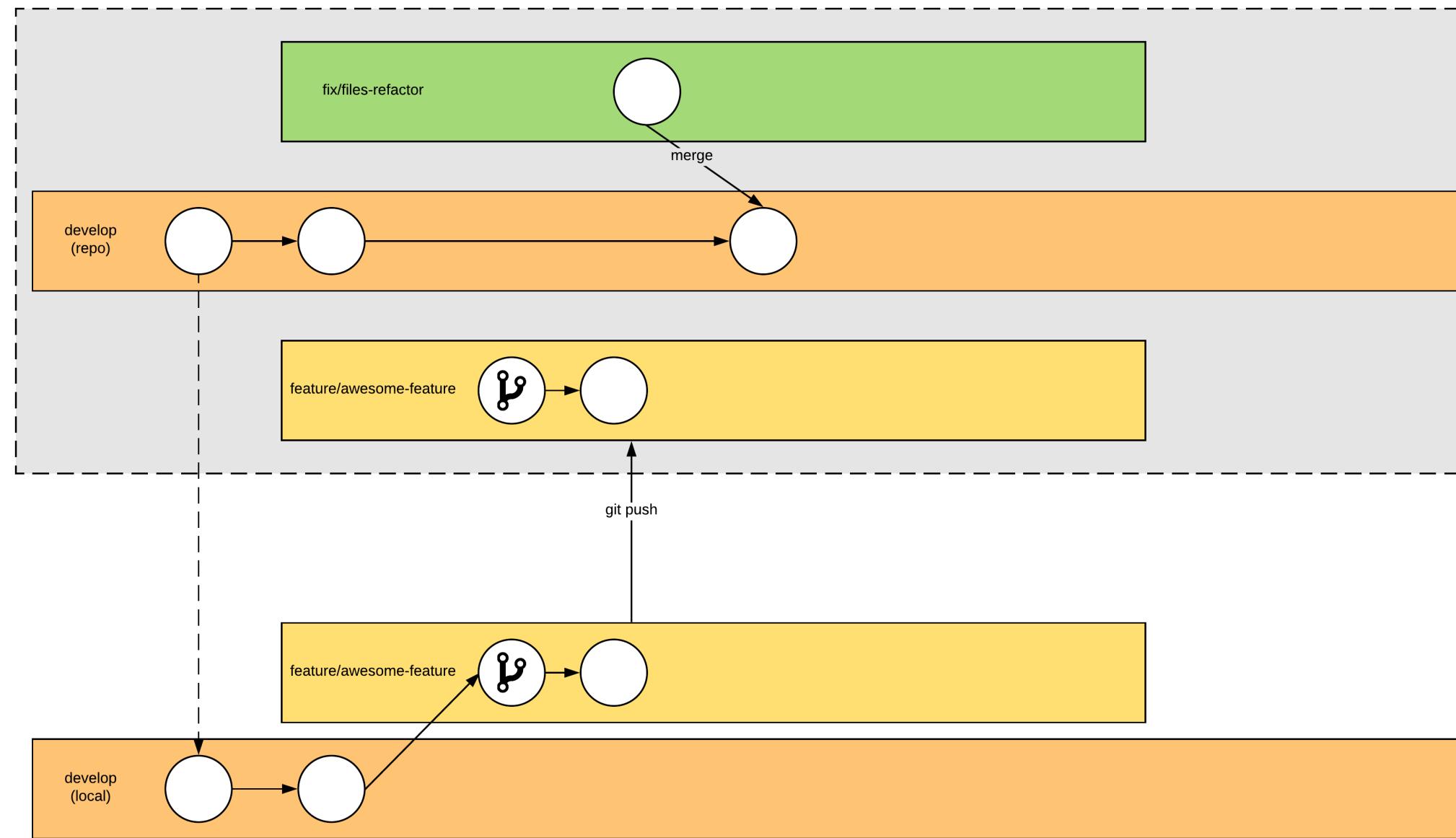
Got it? 🙋

It's probably easier if I show you commands

Try and Fork and some branches instead

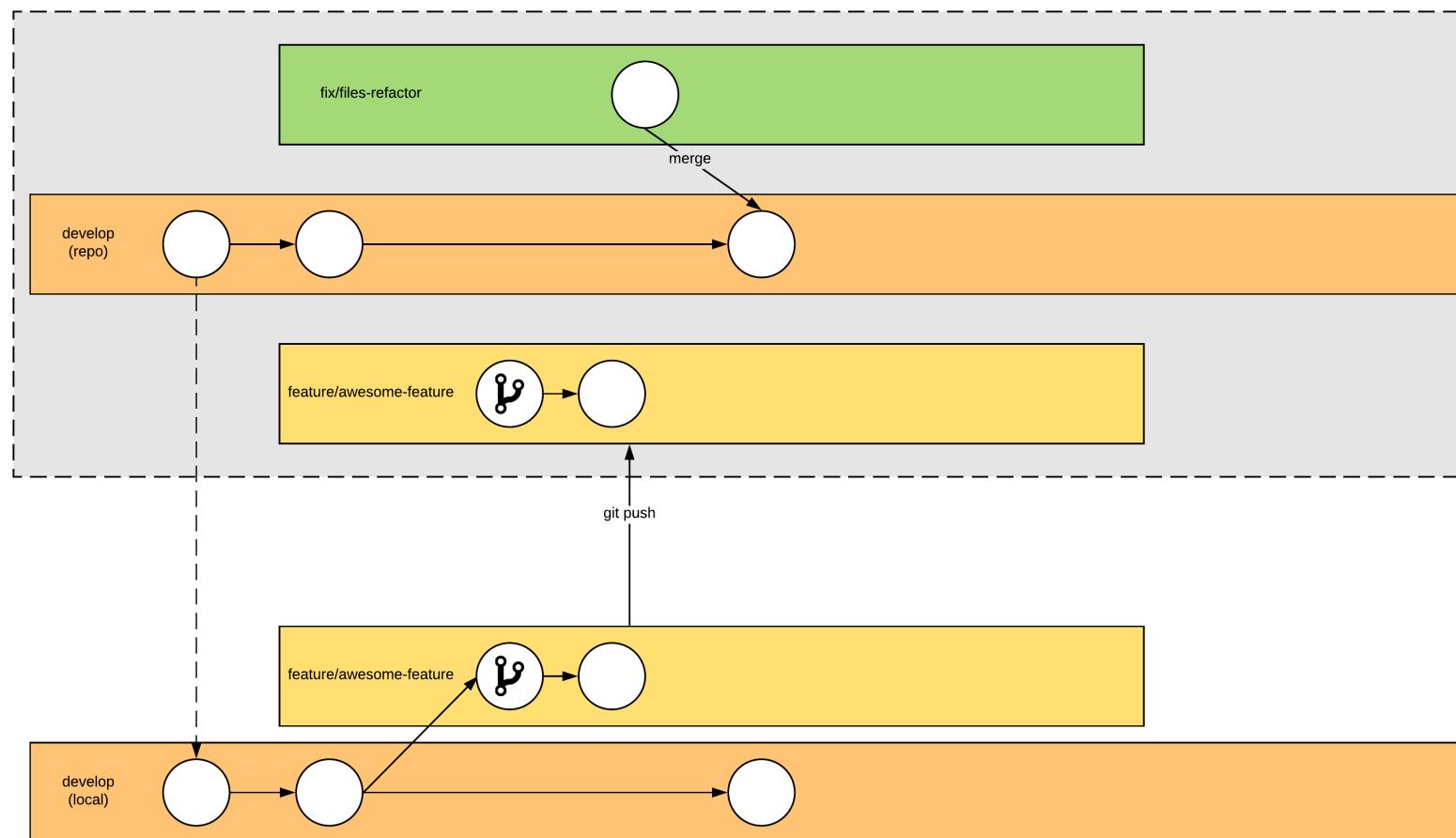
Go to <https://github.com/lorderikir/git-example> for some playing around

This is the current state of the branches



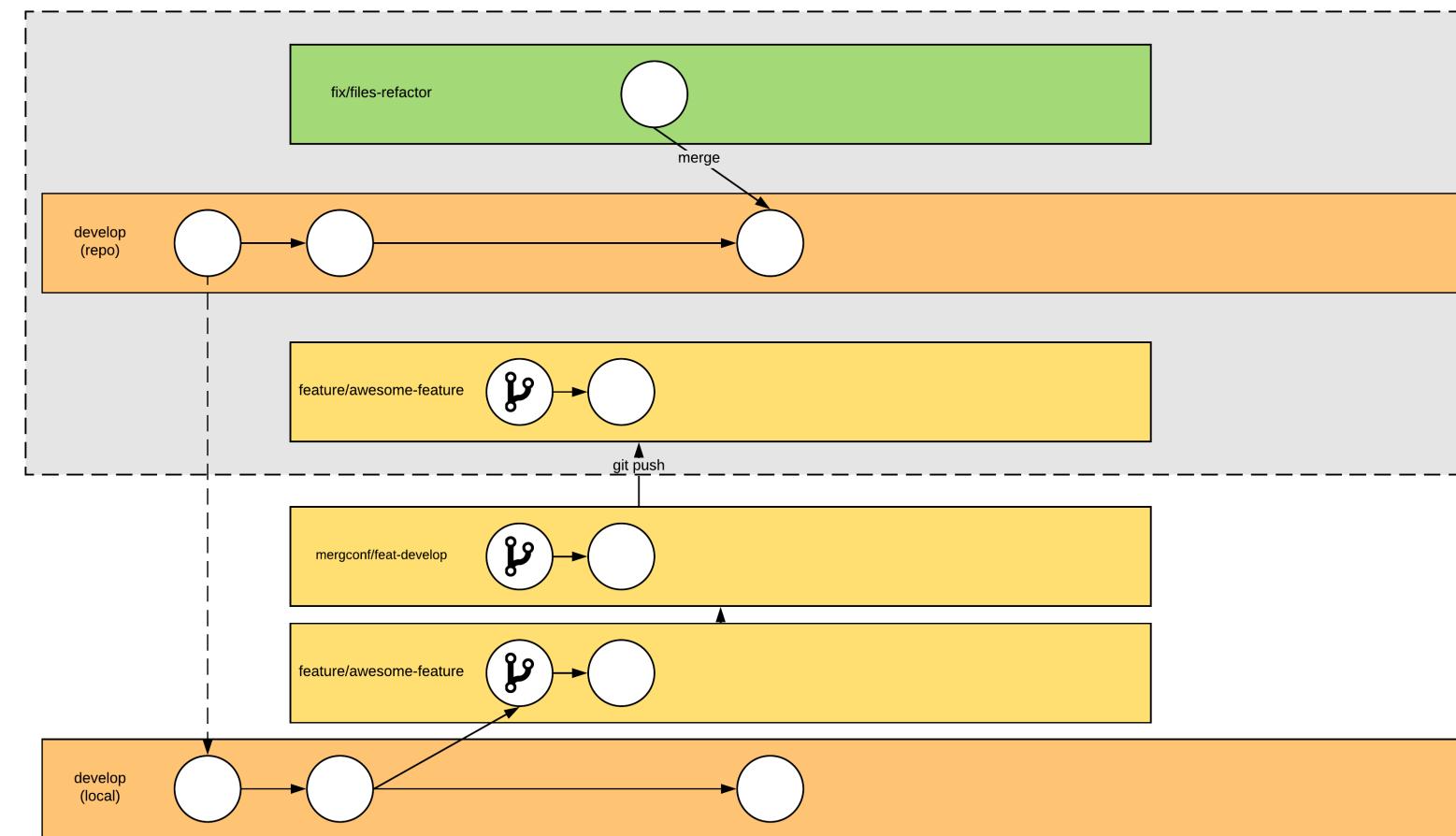
We go to the target branch and pull down the latest changes

```
git checkout develop  
git pull  
git checkout feature/awesome-feature  
git checkout mergconf/feat-develop  
# ...
```



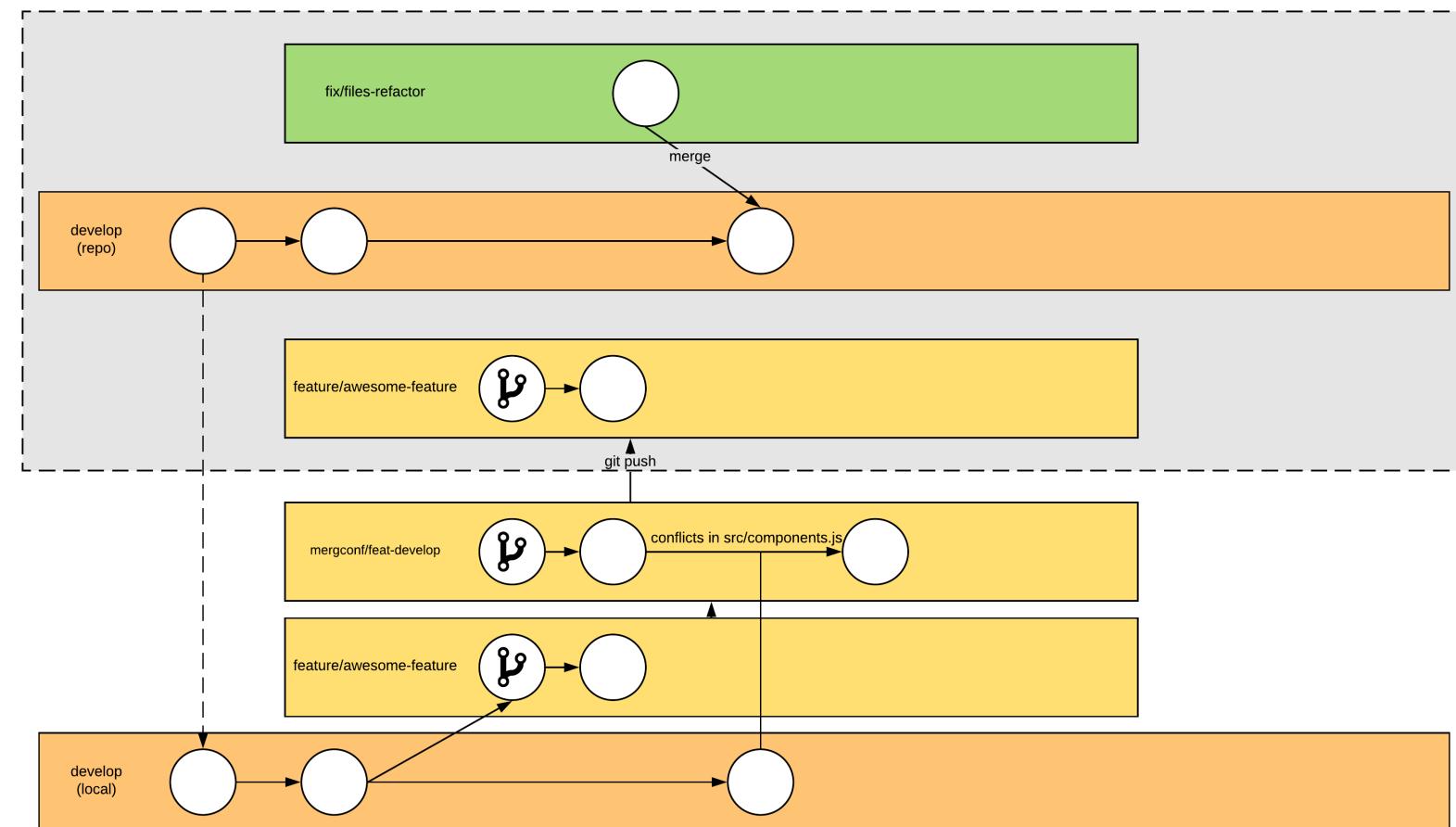
We then 'checkout' our current working branch and create a new branch off the working branch

```
git pull  
git checkout feature/awesome-feature  
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git merge develop  
# ...
```

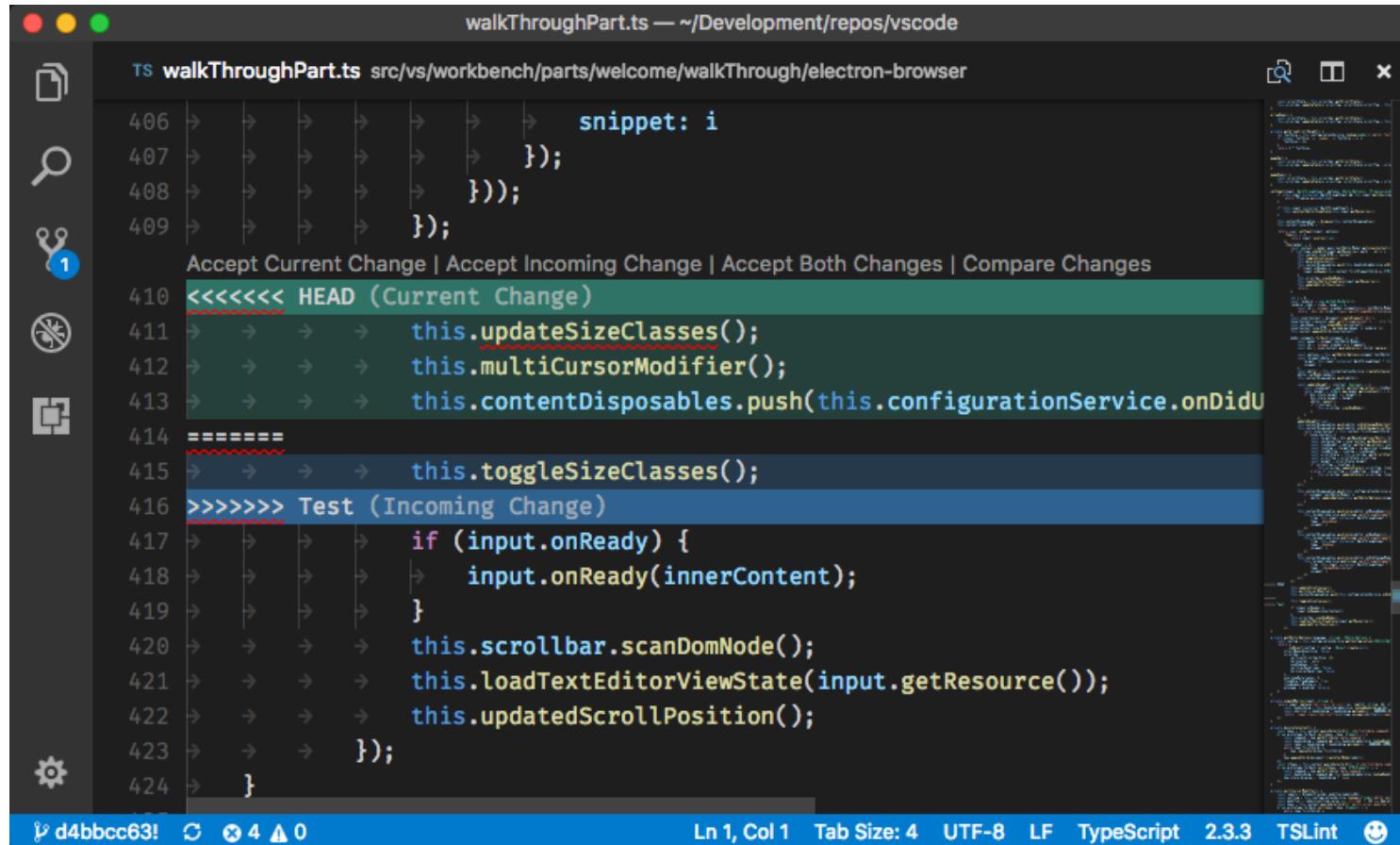


We then attempt to merge our target branch into our new branch

```
git pull  
git checkout feature/awesome-feature  
git checkout mergconf/feat-develop  
git merge develop  
# ...
```



Resolve Conflicts (by choosing the right pieces of code you want), VSCode makes this really easier

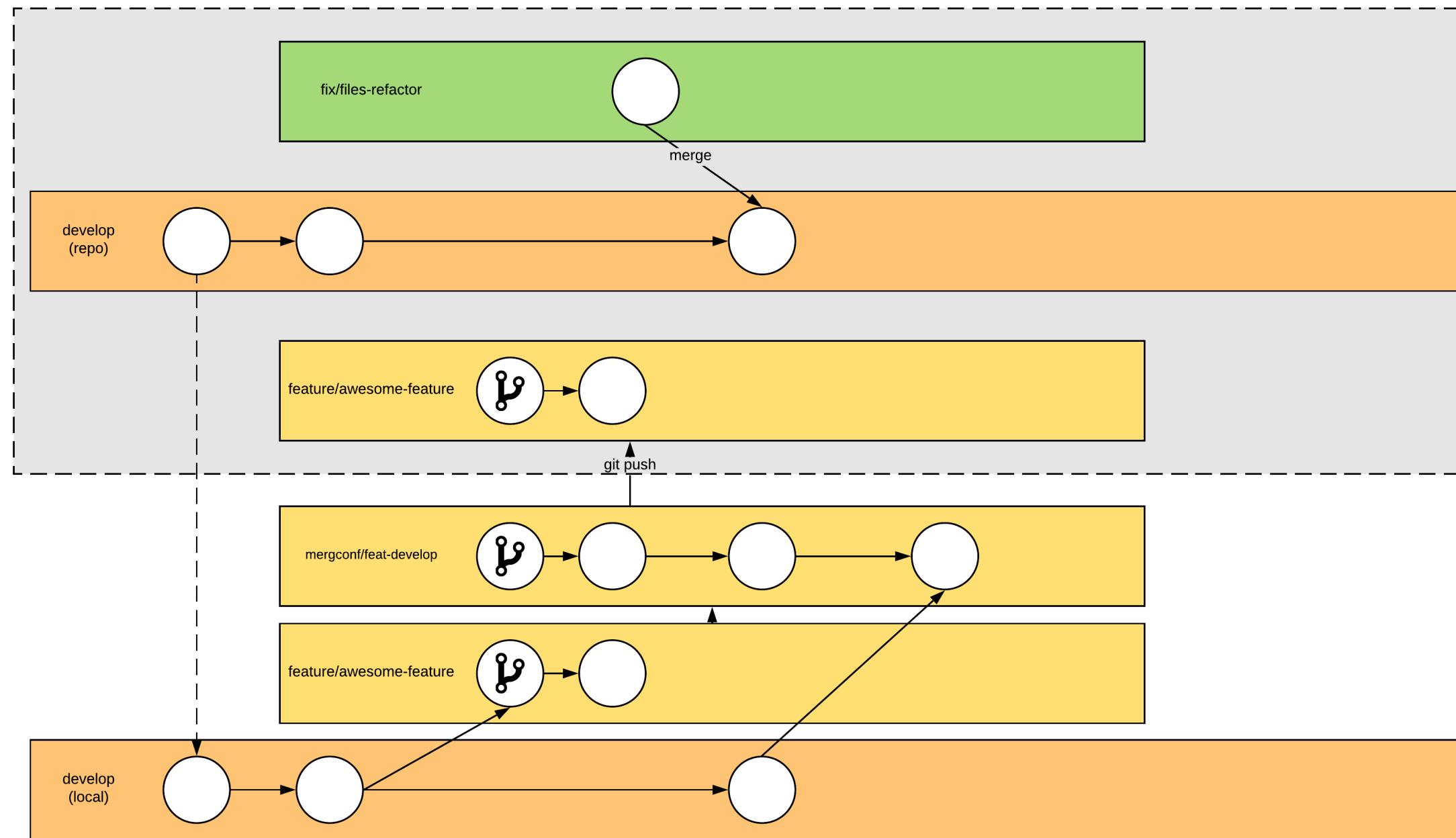


The screenshot shows a code editor in VSCode with a dark theme. The file being edited is `walkThroughPart.ts`. A conflict is visible between two branches. The top section, labeled `<<<< HEAD (Current Change)`, contains code from the local branch. The bottom section, labeled `>>>> Test (Incoming Change)`, contains code from a pull request or incoming changes. The code editor highlights the differences with red and green arrows indicating additions and deletions. A status bar at the bottom shows the commit hash `d4bbcc63!` and other details like tab size and file type.

Stage and commit changes

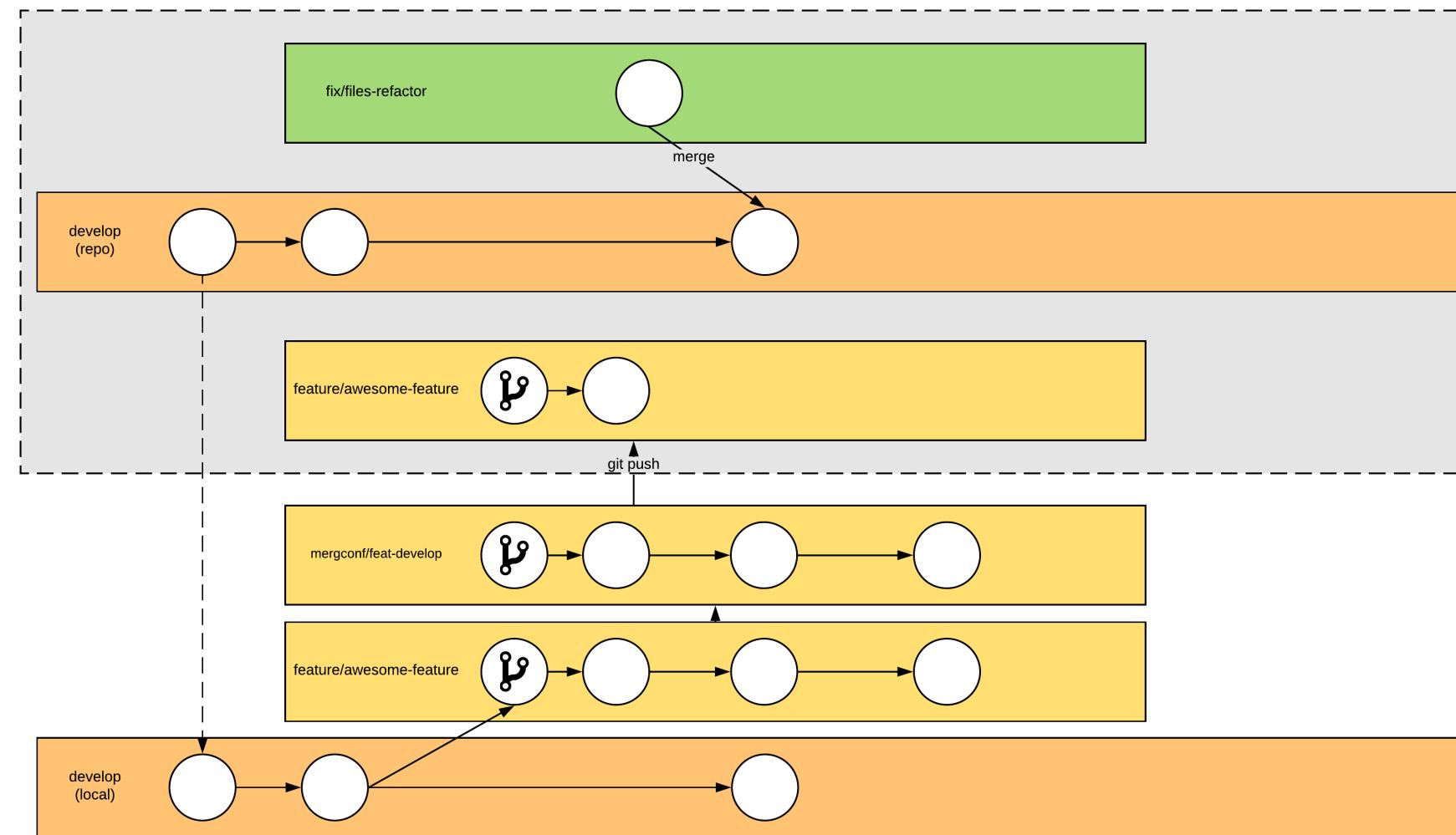
```
git add .
git commit -m "resolved merge issues"
```

Here's how the state of the branches are:



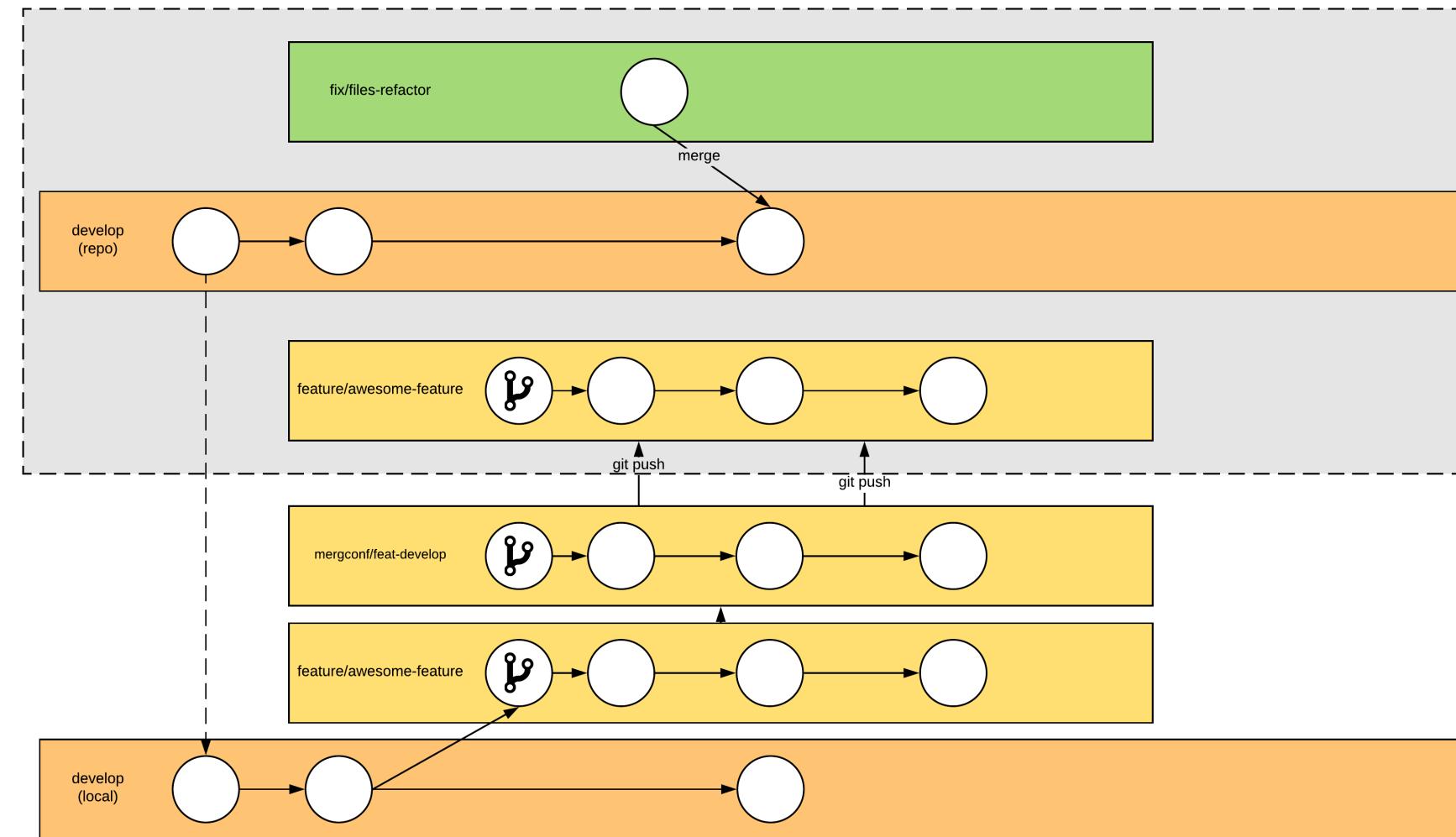
Merge the new branch into our current branch

```
git checkout feature/awesome-feature #get to current working branch  
git merge mergconf/feat-develop  
git push # push to repo
```



Push changes to repository

```
git checkout feature/awesome-feature #get to current working branch  
git merge mergconf/feat-develop  
git push # push to repo
```



Our Conflicts would have
been solved now!



Questions?

