Introduction to Git Version Control System

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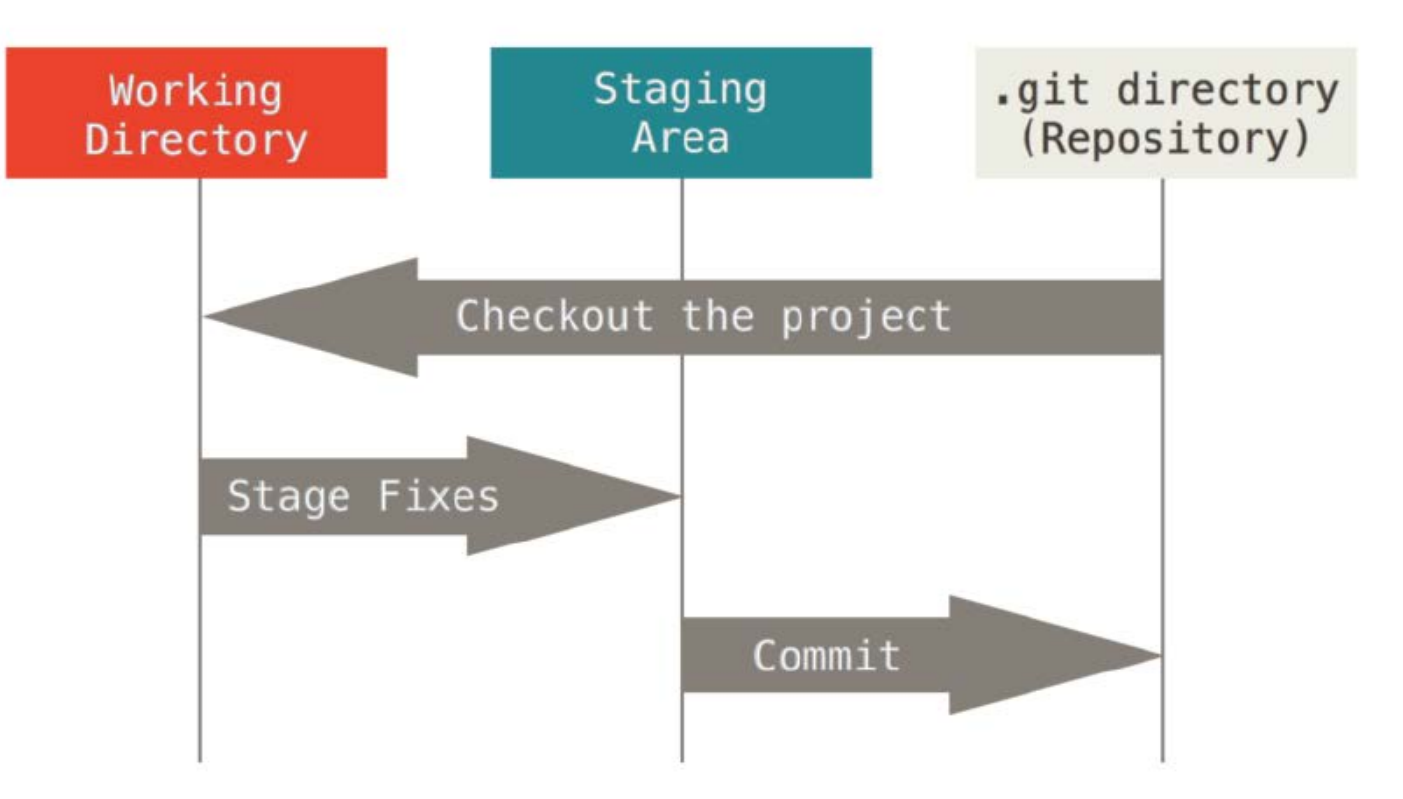
Contents

- Git Version Control System
- Local Repositories
- Remote Repositories
- Useful Tips & Resources

What is Git?

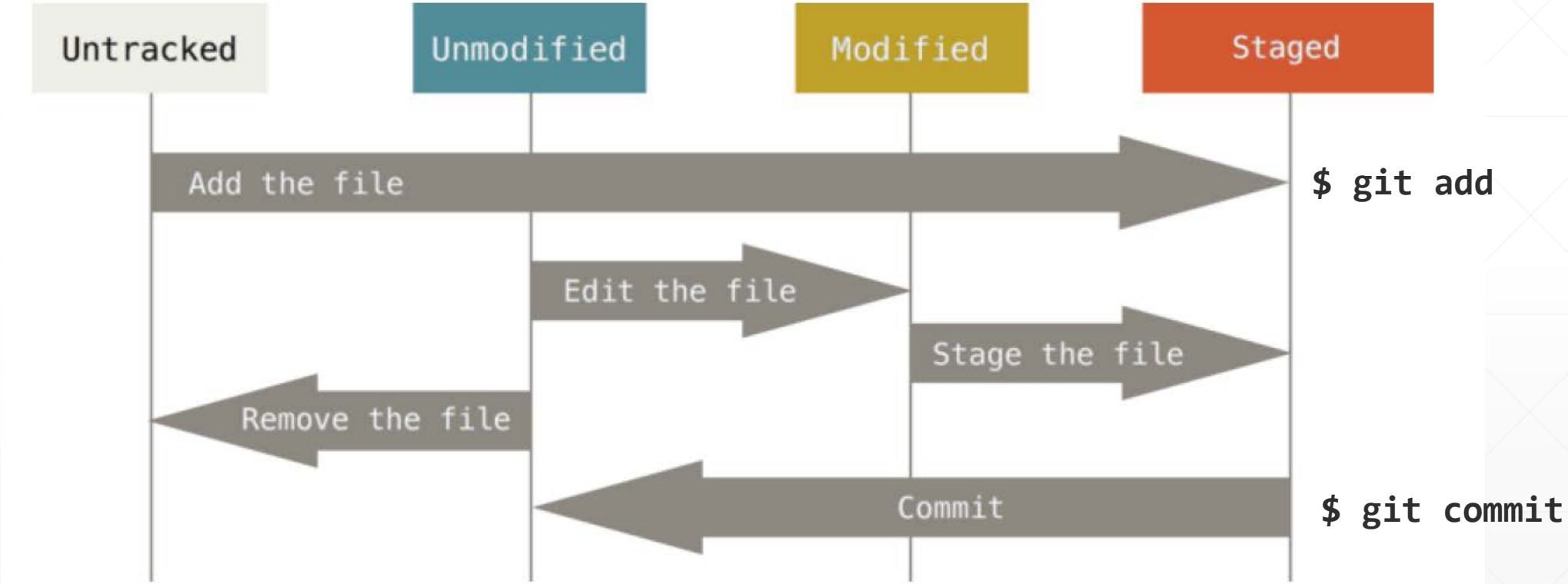
- A distributed version control system
- Developed by Linux kernel community in 2005
- Characteristics
  - Fast
  - Simple design
  - Strong support to non-linear development

Local Git Workflow



Credit: S. Chacon & B. Straub, Pro Git (2nd Edition), 2014

Status of Files

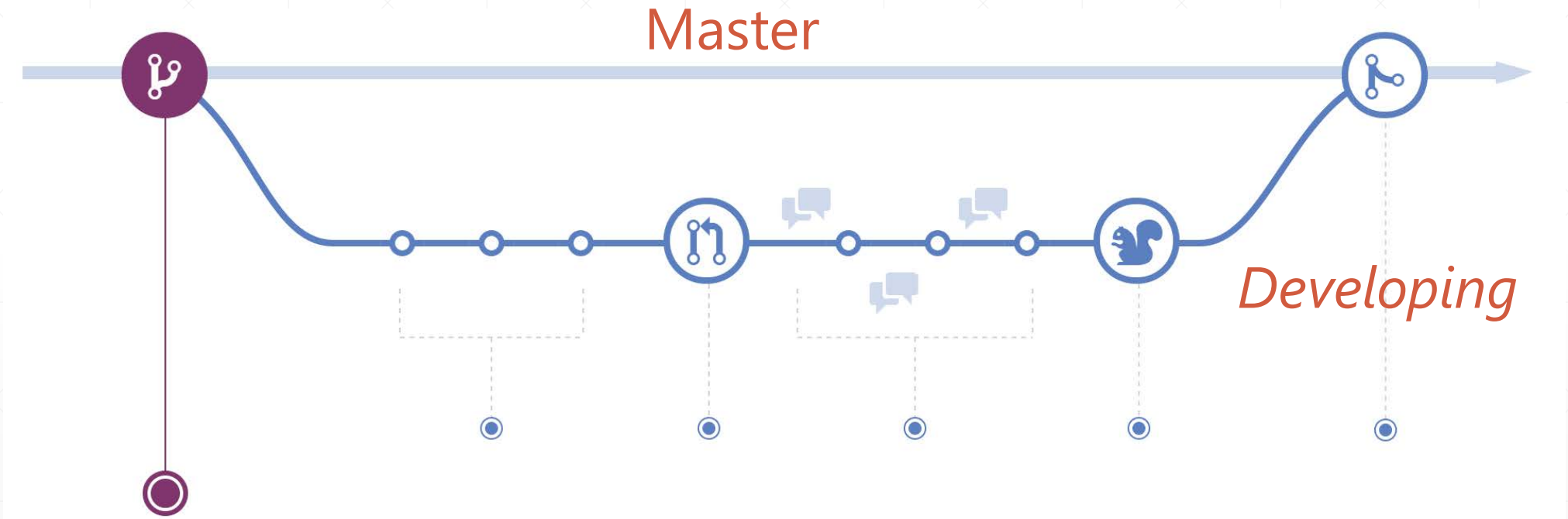


Credit: S. Chacon & B. Straub, Pro Git (2nd Edition), 2014

Basic Operations (local)

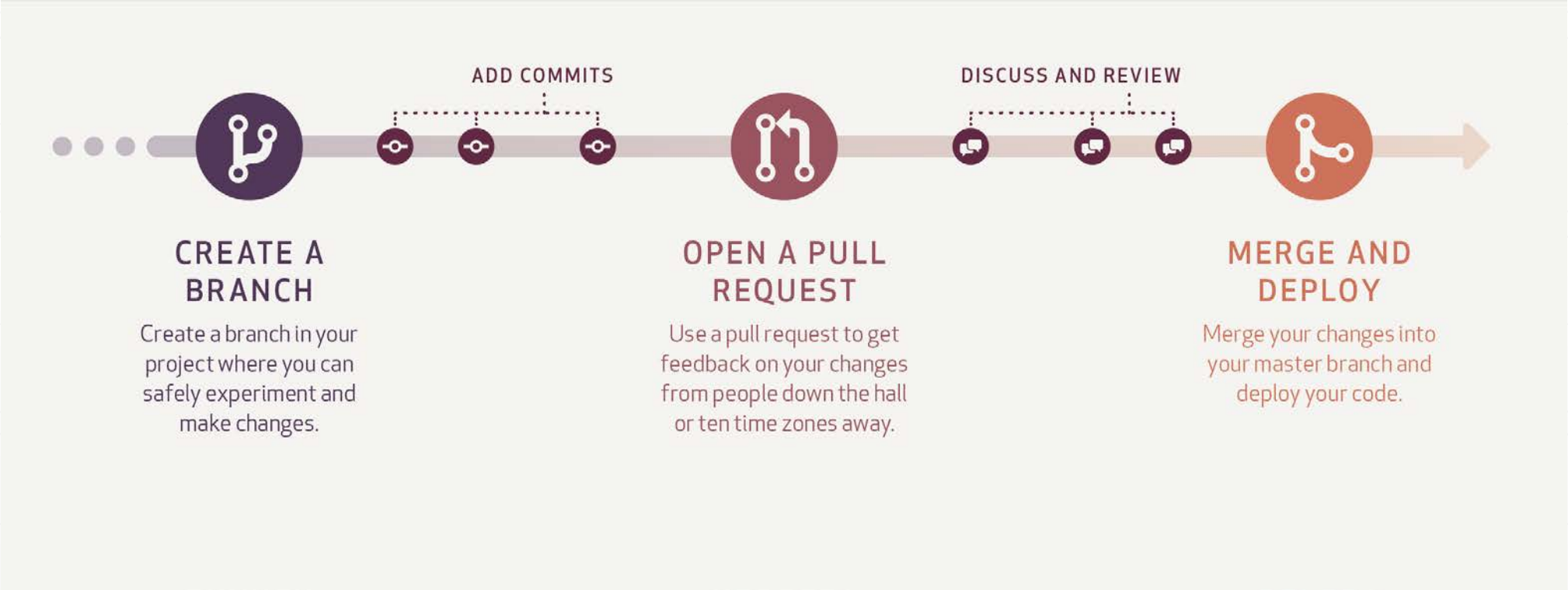
- **Initialize a repository:**
  - `$ git init`
- **Stage files**
  - `$ git add #file name, use * or . for all files`
- **Commit changes**
  - `$ git commit –m “Your message”`
- **Check status**
  - `$ git status`

Using Branches



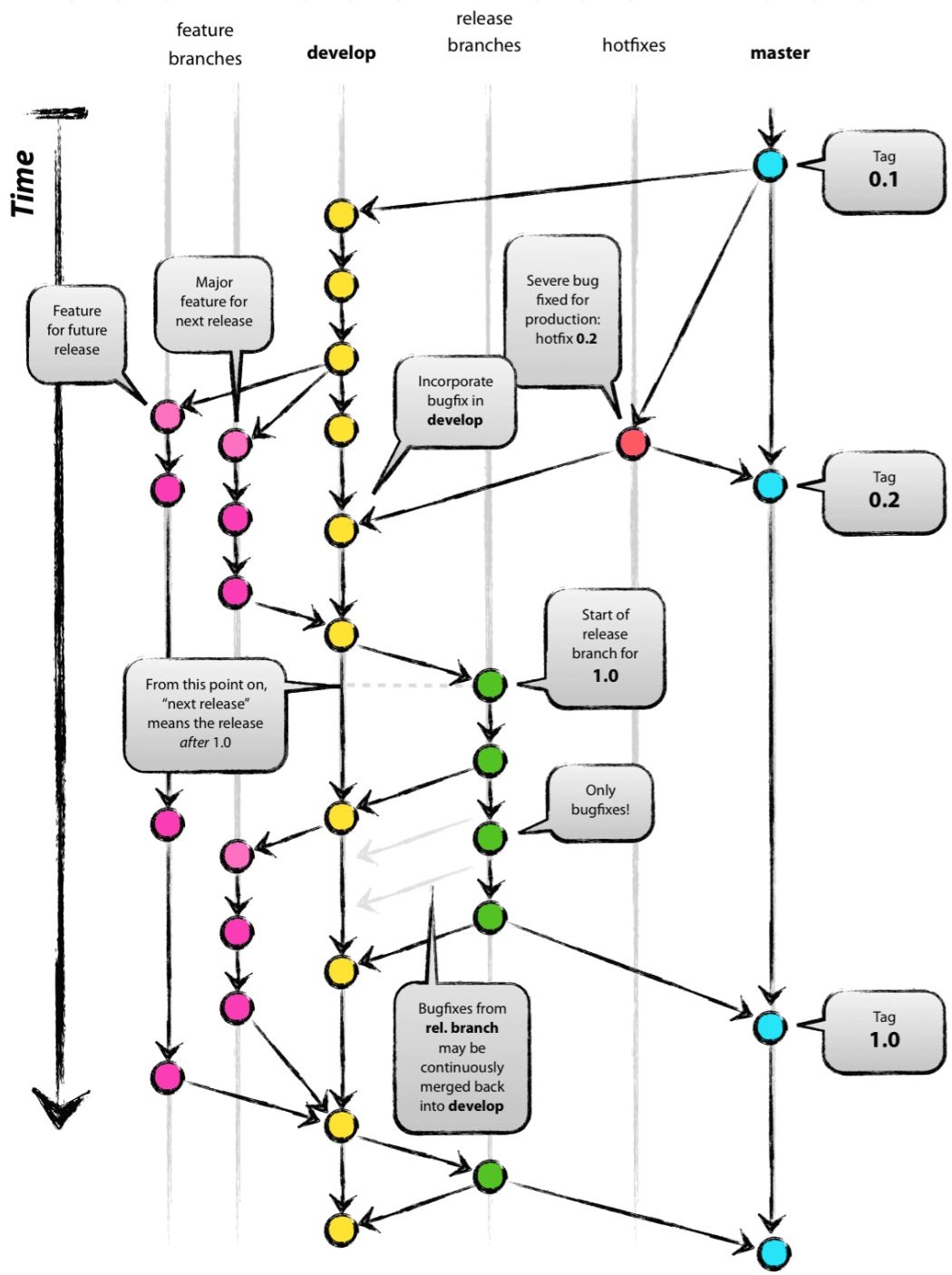
Credit: https://guides.github.com/introduction/flow/

Using Branches (Cont'd)



Credit: https://guides.github.com/introduction/flow/

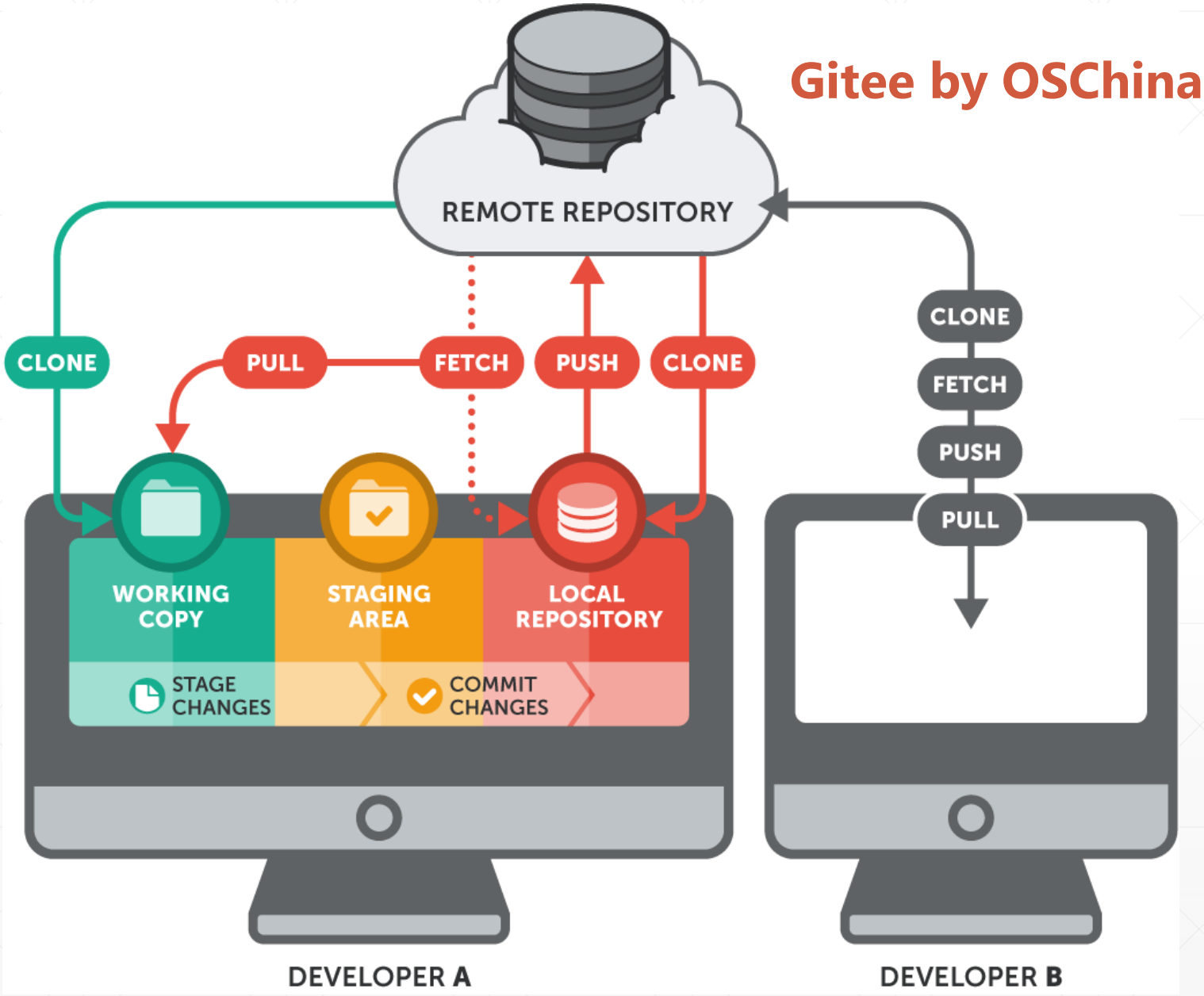
Using Branches (Cont'd)



Credit: http://nvie.com/img/git-model@2x.png

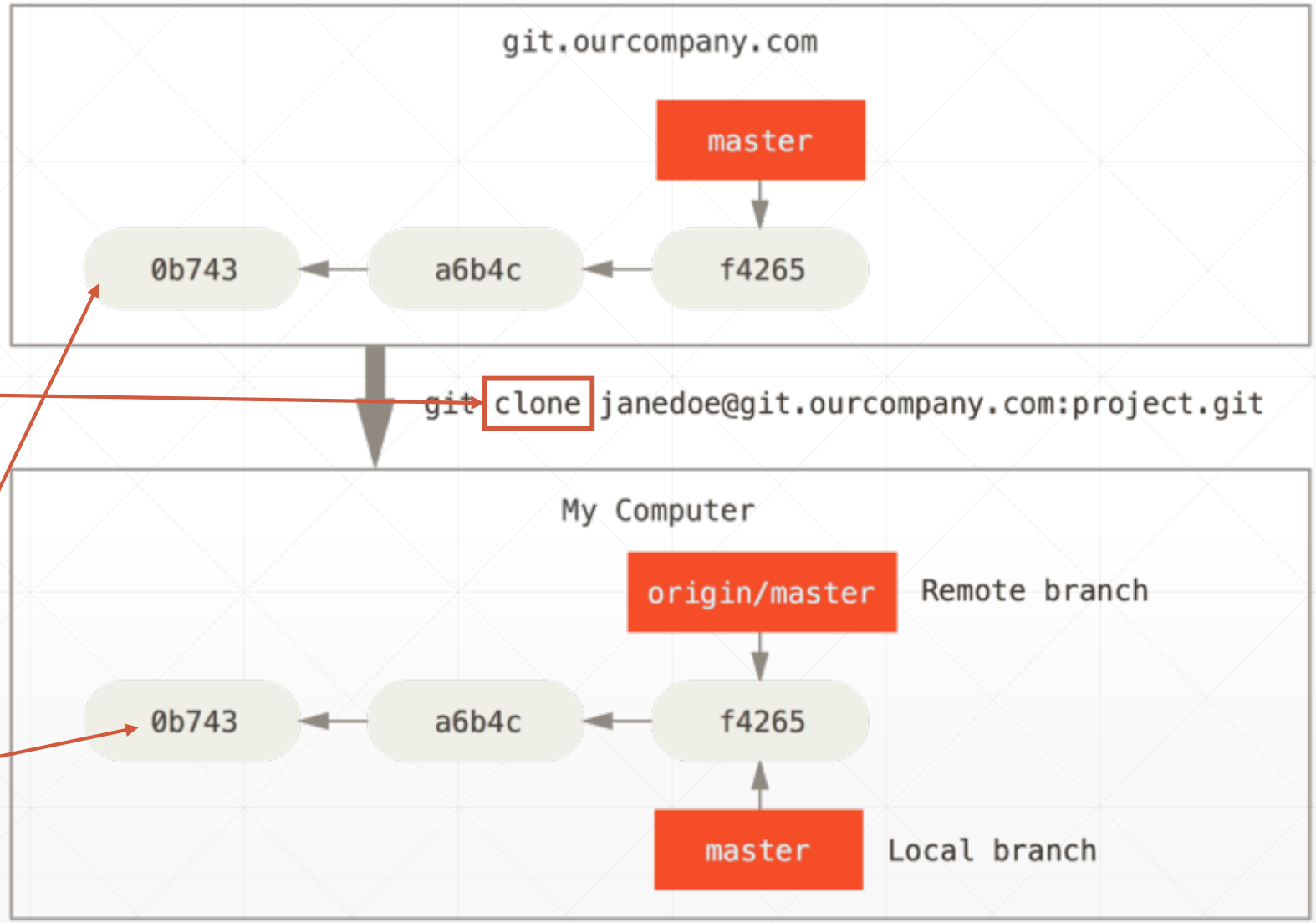
Working with Git Remotely

Gitee by OSChina (开源中国社区)



Credit: https://www.git-tower.com/learn/git/ebook/en/command-line/remote-repositories/introduction

Remote Branches

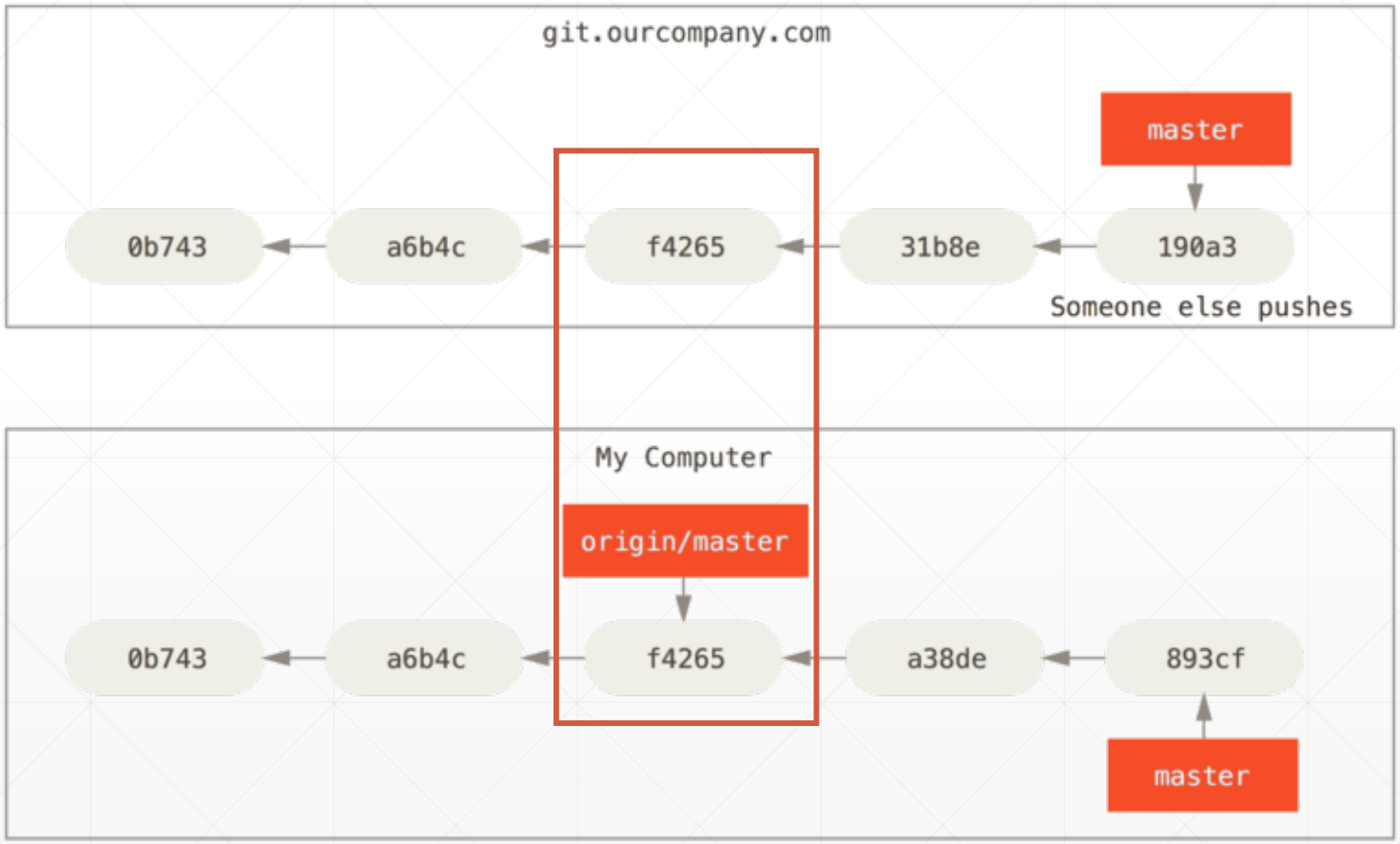


Clone: An exactly same copy

Commits

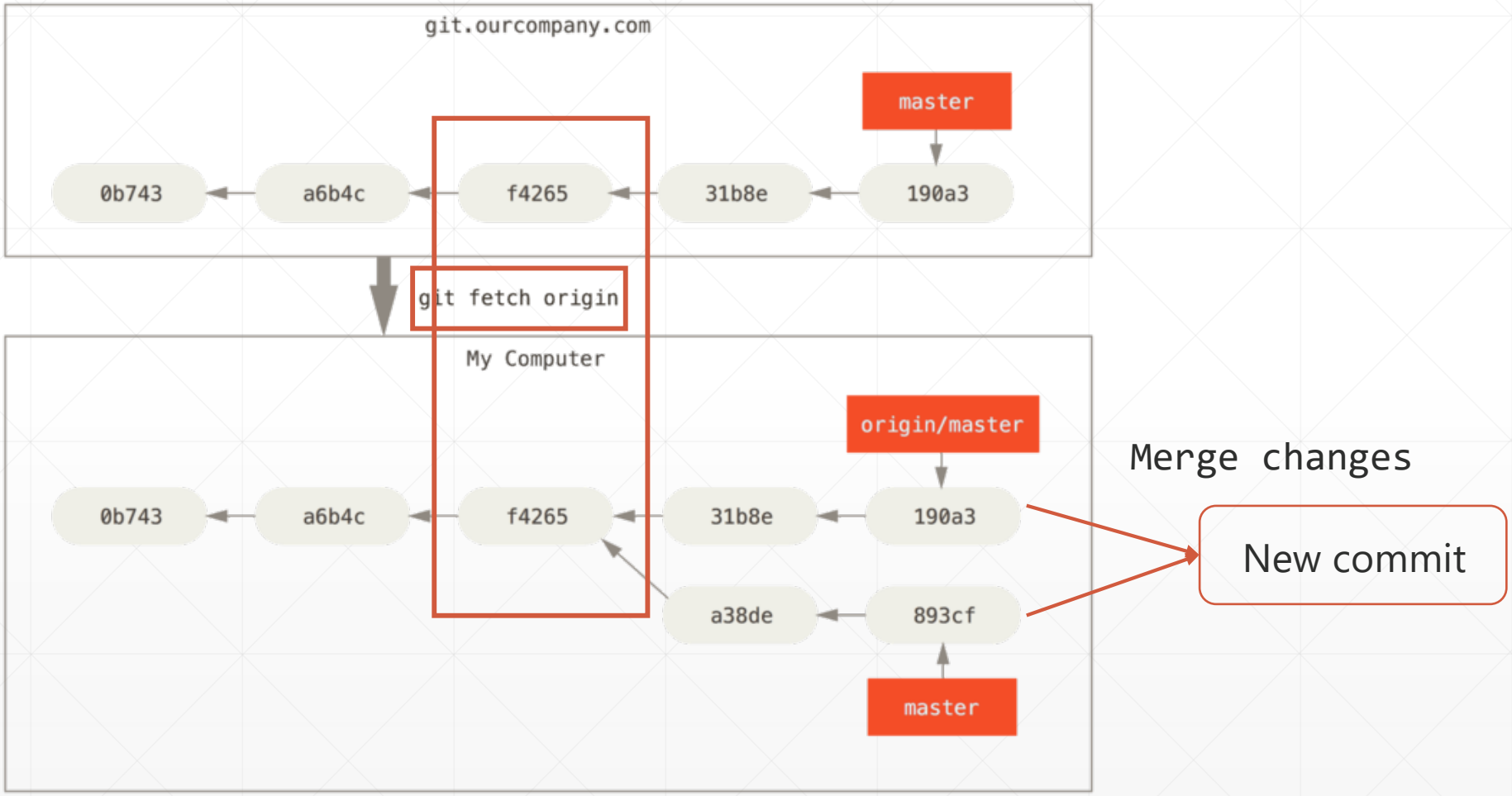
Credit: https://git-scm.com/book/en/v2/Git-Branching-Remote-Branches

Handling *Fast-forward* Problem



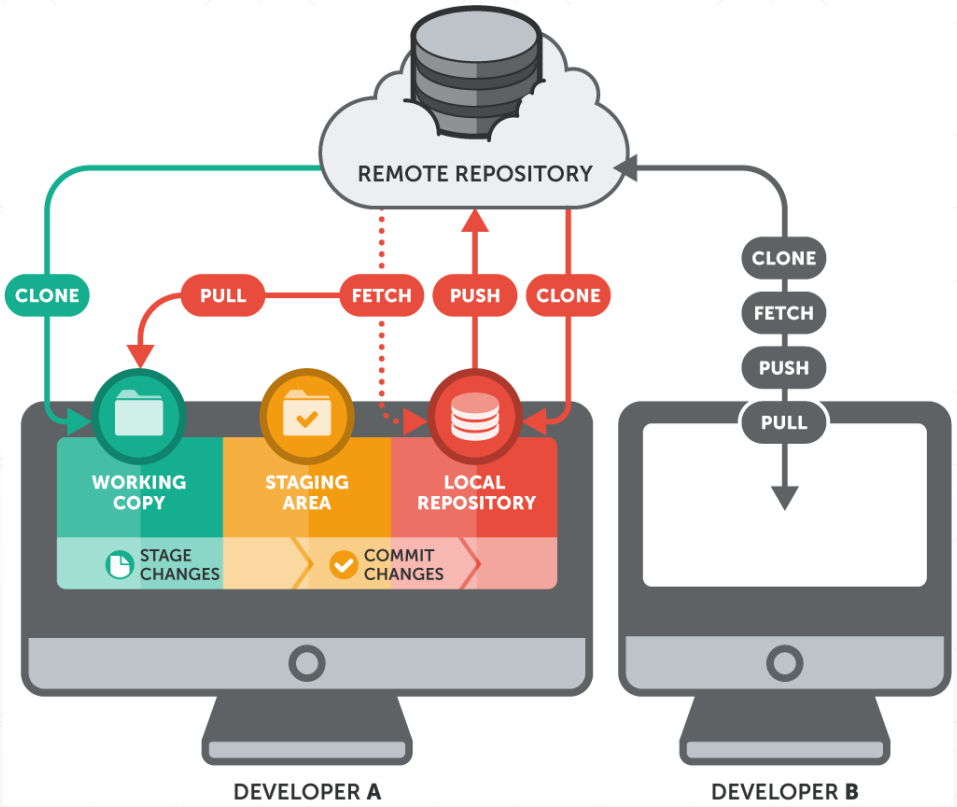
Credit: https://git-scm.com/book/en/v2/Git-Branching-Remote-Branches

Handling *Fast-forward* Problem (Cont'd)



Credit: https://git-scm.com/book/en/v2/Git-Branching-Remote-Branches

Basic Operations (with remote)

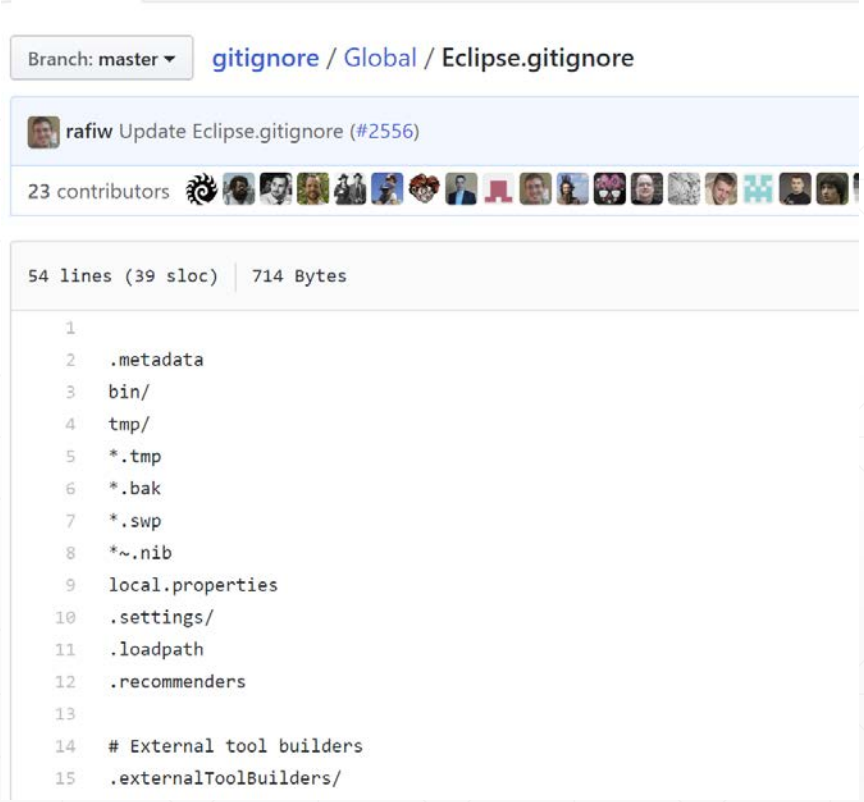


- **From remote to local:**
  - `$ git clone #from a remote repo`
  - `$ git fetch #changes`
  - `$ git pull`

    `#Fetch changes and merge to local repo.`
- ***After staged, committed your changes:***
  - `$ git push #local changes to remote`
- **Add a remote repo. to a local repo.:**
  - `$ git remote add #to a local repo.`

Useful Tips

The .gitignore File



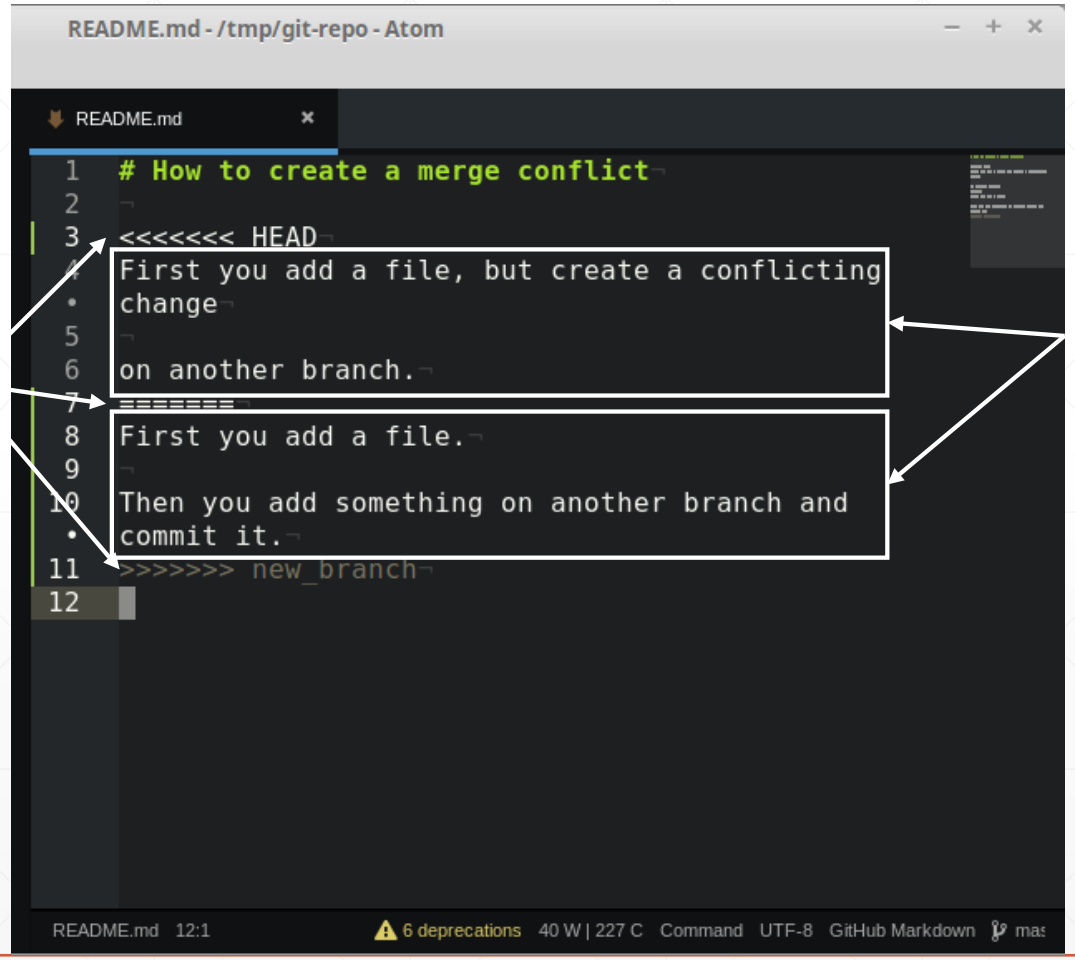
- **Tells Git to ignore some files.**
- **Avoid conflicts.**
- Download templates from:
  - https://github.com/github/gitignore
  - according to your source languages, editors, IDEs.
- Put it in your tracked directories with file name "`.gitignore`".

Handling Conflicts

- Conflict changes from different branches
  - e.g. Different modifications in a same line.
- Git don’t know how to merge changes.
- Requires human to make choices.
  - Accept changes from one branch.

Handling Conflicts (Cont'd)

Notations added by Git

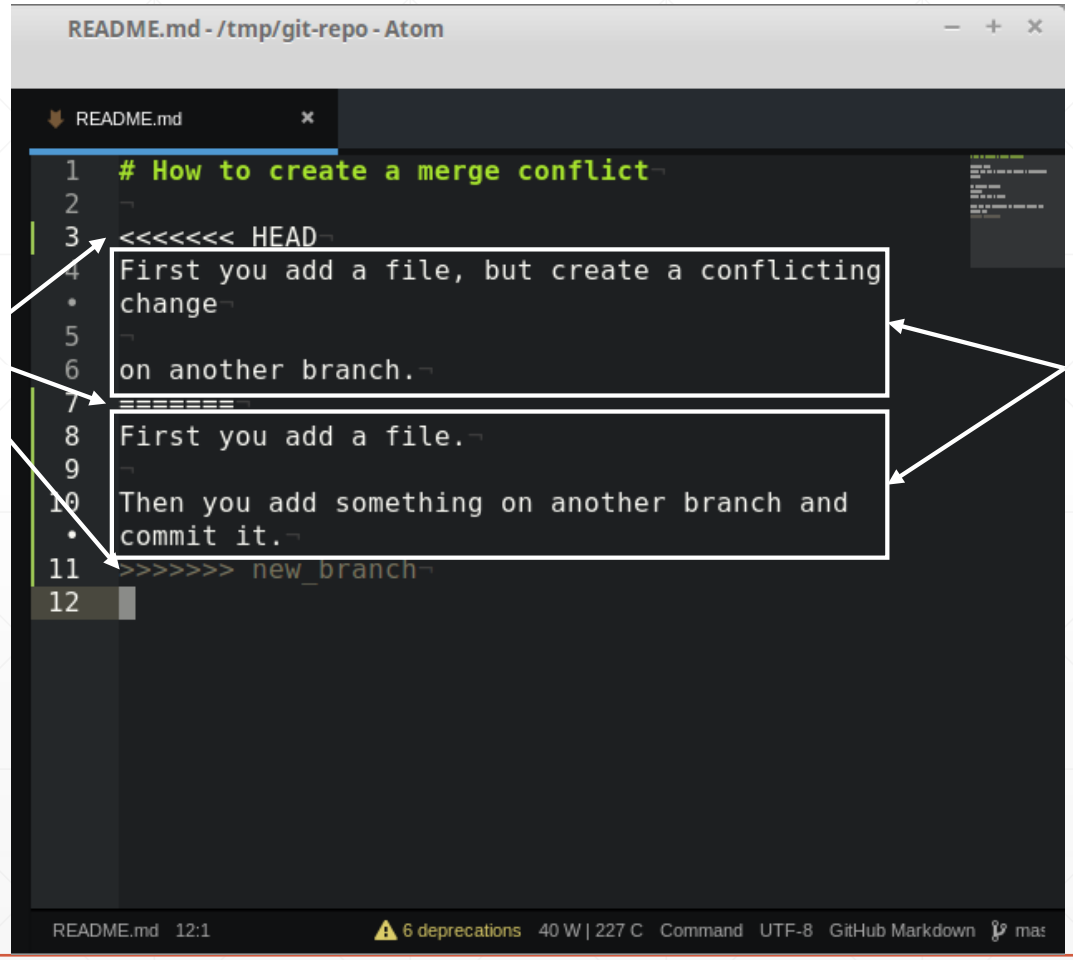


Changes from all branches

Credit: http://jonathanmh.com/wp-content/uploads/2015/06/temporary-git-merge-conflict-files.png

Handling Conflicts (Cont'd)

Delete all notations



Leave the correct change
Delete change you don't want
Commit and push again.

Credit: http://jonathanmh.com/wp-content/uploads/2015/06/temporary-git-merge-conflict-files.png

Useful Tips

- Always create repository with a `.gitignore` file.
- Always `pull` before modify files.
- Always `commit` with **meaningful** information.
- Try to make use of **branches** by `forking`.
- Try to work with git by **command line**.
- Be social in git communities!

References & Useful Resources

- GitHub Guides: https://guides.github.com/
- Git Cheat sheet: https://services.github.com/on-demand/resources/cheatsheets/
- GitHub Help: https://help.github.com/
- Gitee Documentation (Chinese): http://git.mydoc.io/
- The Book *Pro Git*: https://git-scm.com/book/en/v2
- Handling Conflicts: https://stackoverflow.com/questions/161813/how-to-resolve-merge-conflicts-in-git