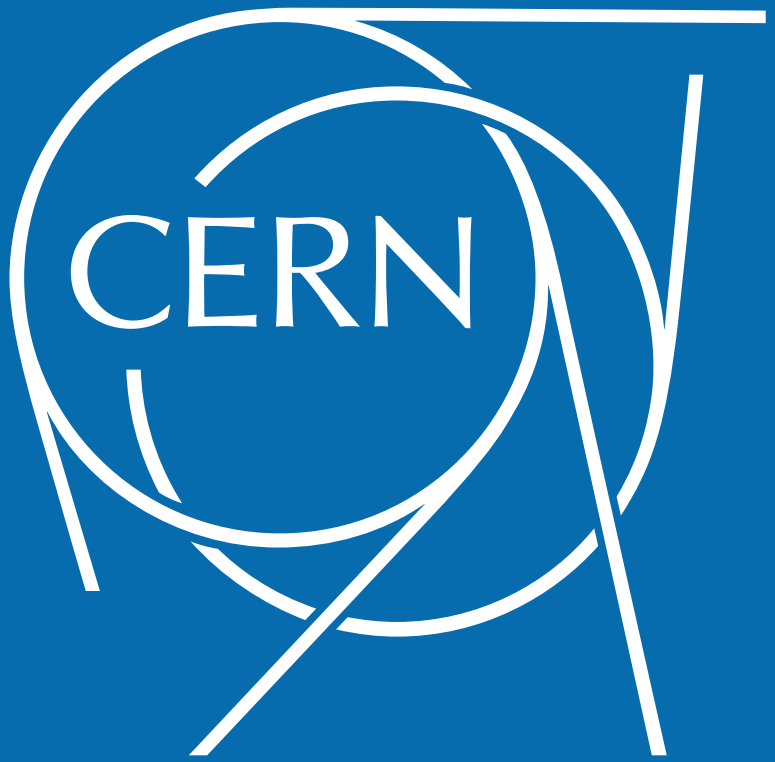
SU Development Forum

Introduction to Git - Save your projects!



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Git – Distributed Version Control System

What is it?

- Created by Linus Torvalds in 2005
  - For Linux kernel
- Tool – to be integrated in your workflow
- Manage your project files
  - Save them on a server (security)
  - Keep a track of the modifications (history)
- Ease team working

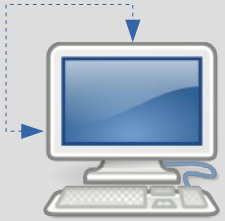
Git – Distributed Version Control System

Distributed?

- Distributed: main difference with SVN
  - No need for server

Remote

Local

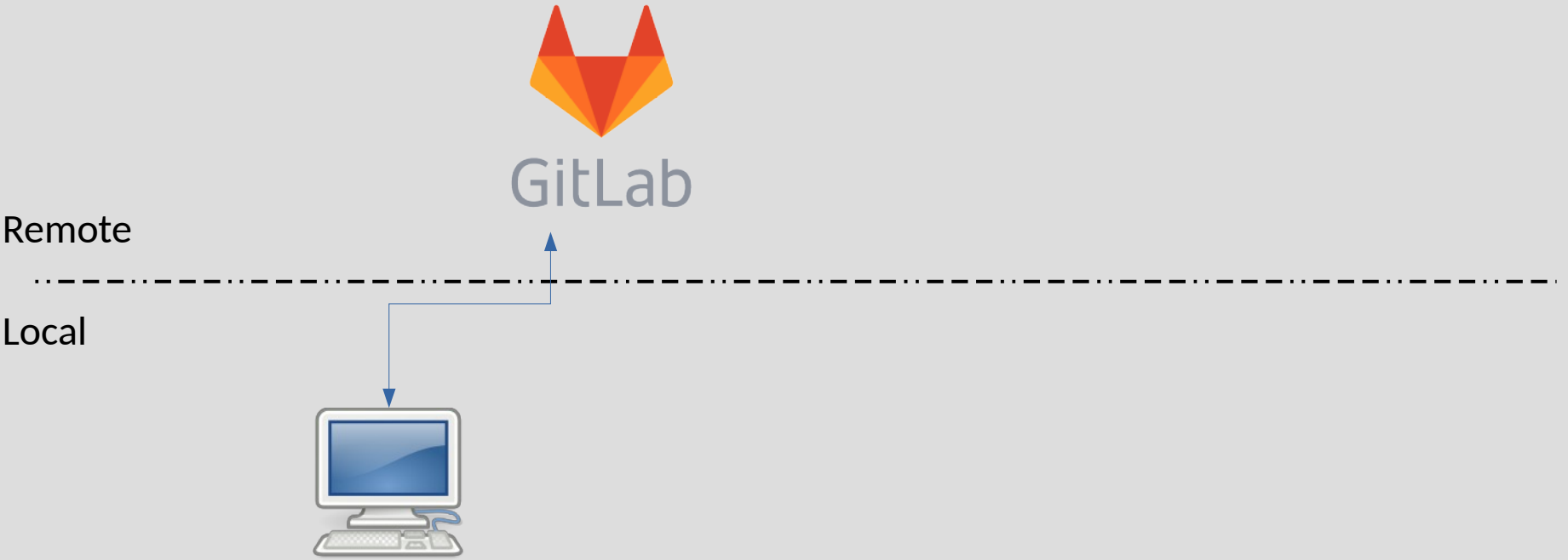


WARNING: No data duplication !

Git – Distributed Version Control System

Distributed?

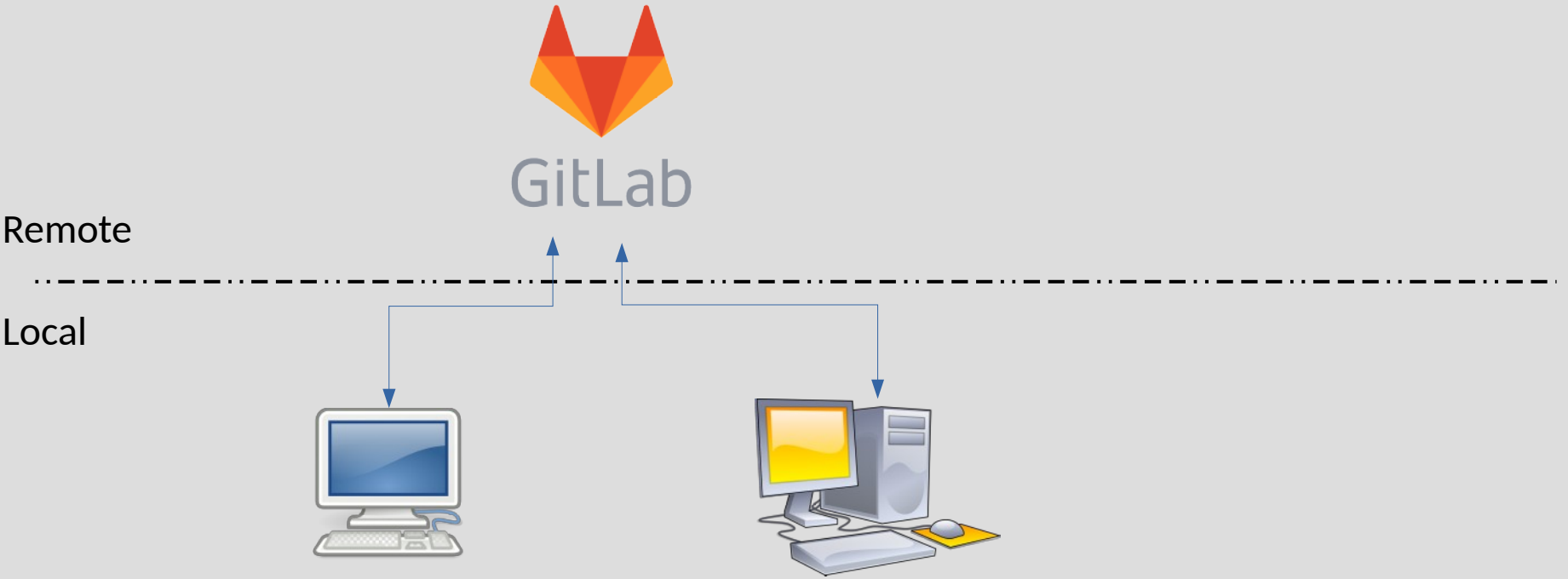
- Distributed: main difference with SVN
  - SVN style – mono user



Git – Distributed Version Control System

Distributed?

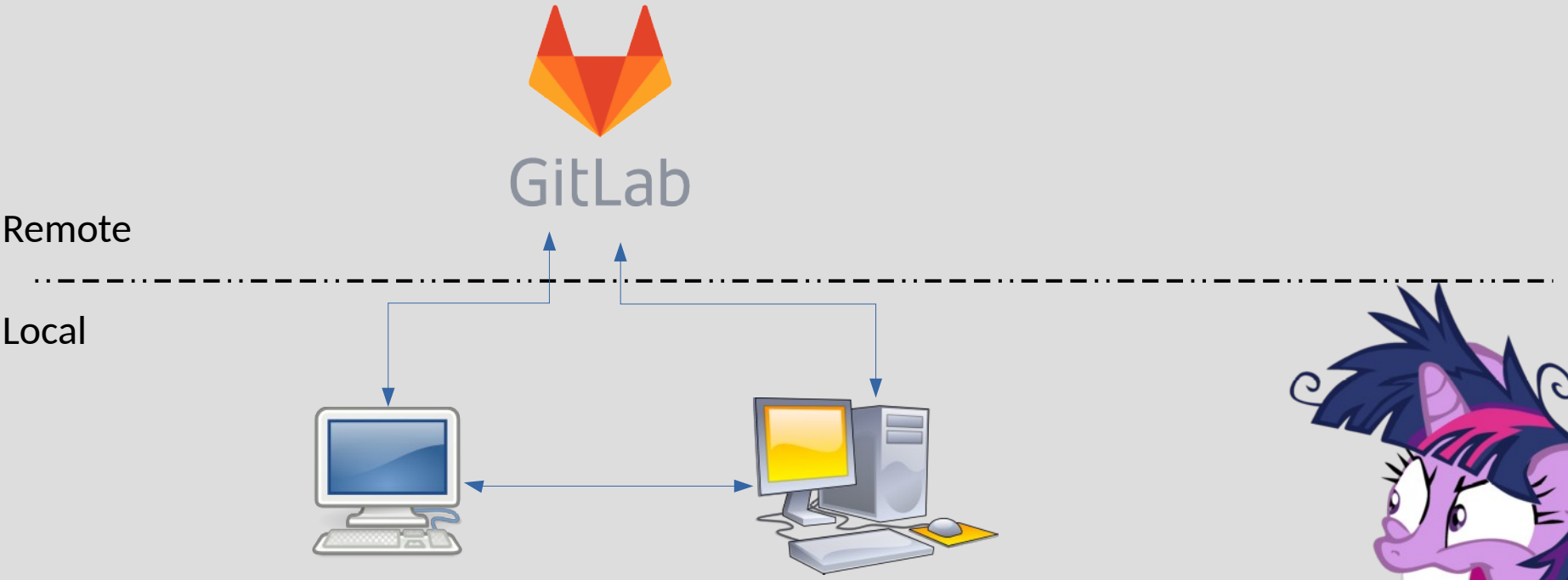
- Distributed: main difference with SVN
  - SVN style – multi user



Git – Distributed Version Control System

Distributed?

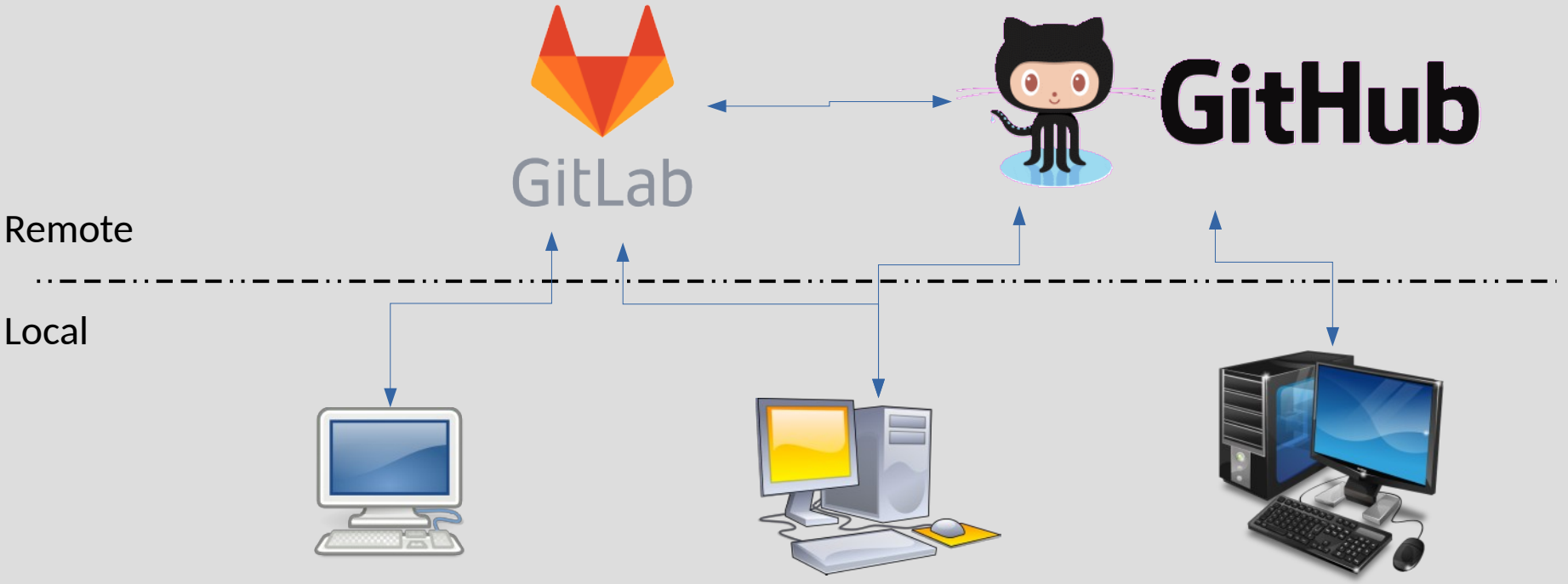
- Distributed: main difference with SVN
  - Distributed: peer to peer



Git – Distributed Version Control System

Distributed?

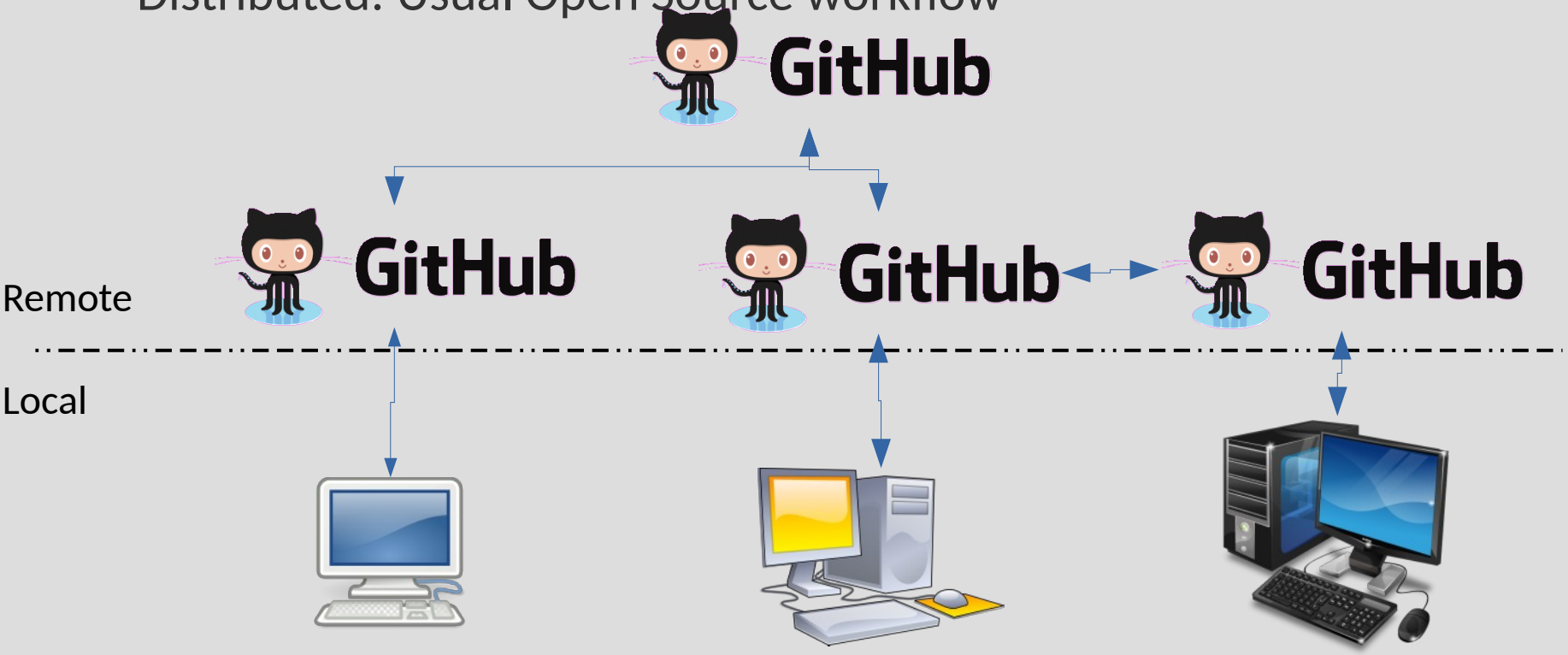
- Distributed: main difference with SVN
  - Distributed: multi remote



Git – Distributed Version Control System

Distributed?

- Distributed: main difference with SVN
  - Distributed: Usual Open Source workflow



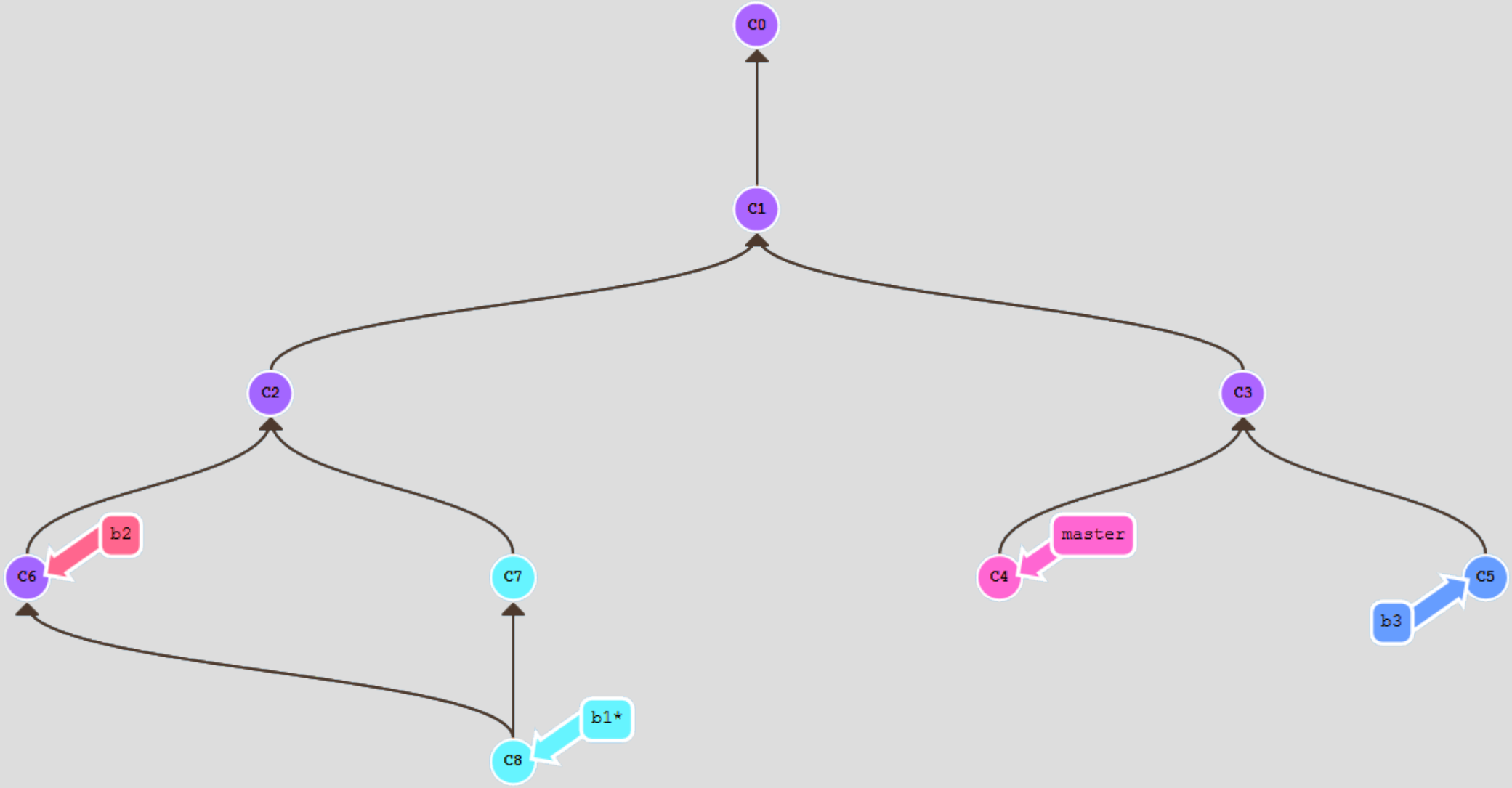
Git – Concepts

Commits

- What is a *commit*?
  - Contains the state of all the files at one moment
  - Contains a message explaining the reasons of the changes
  - Contains the the whole history that leads to it
- Commits are organized in a graph
  - 1 or more parents (history)
  - 1 or more children (future)
- Commits have name
  - A hash: `76e22ab887fe24de6a7b3d19809af392de3036e6`
    - Will be simplified in this presentation

Git – Concepts

Graph

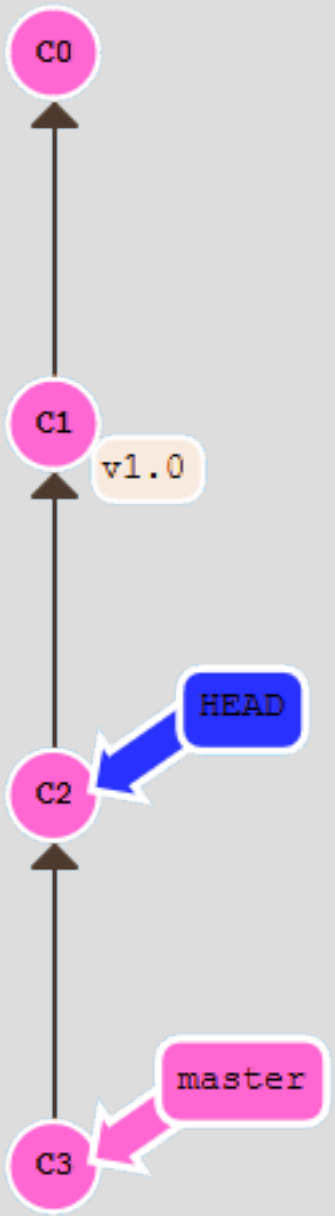


Git – Concepts
References

- How to organize the commits?
  - Use references:
    - Tag → direct pointer to a commit (label)
    - Branch → dynamic pointer
      - Points to one commit
      - Moves to the most recent commit dynamically
      - Default branch = `master`
    - HEAD → current position in the tree

Git – Concepts
References

- How to move in the graph?
  - Git checkout:
    - to commit name (`ad65ert5gd12`)
    - to relative position (`HEAD~2`)
    - to tag
    - to branch



Git – Setup your environment

Install Git

- Windows
  - Install Git for Windows
    - https://git-scm.com/downloads
    - Do not use the CMF version: not up to date
      - Min version to install: 2.16
  - Some UI exists (Tortoise Git, Github Desktop)
    - CLI is easy to learn
      - See the CheatSheet → 5 commands for basics
    - CLI is way more powerful
    - You will need CLI at one point anyway
- Linux: `yum install git`

Git – Setup your environment

Basics

- Tell git who you are
  - `git config --global user.name "Rémi Ducceschi"`
  - `git config --global user.email "remi.ducceschi@cern.ch"`
- Change default editor (nano)
  - `git config --global core.editor "C:/Program\ Files/Notepad++/notepad++.exe -multiInst -notabbar -nosession -noPlugin"`
- Colors (on by default)
  - `git config --global color.ui true`
- Stored in `~/.gitconfig`
  - Can be overwritten in project by adding a `.gitconfig`

Git[lab] – Workflow

From editing, publishing to integrating the code

- Create a branch
  - One branch per feature
- Edit files
- Commit your changes
  - Do it several times
    - To save your work (end of the day, lunch time…)
    - To separate minor states of development
- Push to remote
- Create a Pull Request (PR) / Merge Request

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Git[lab] – Workflow

Create a branch

- Checkout on master and update it
  - `git checkout master`
  - `git pull`
- Create your branch and checkout on it
  - `git checkout -b my_branch`
- You can push your branch now
  - Even without any modifications
  - `git push --set-upstream origin my_branch`

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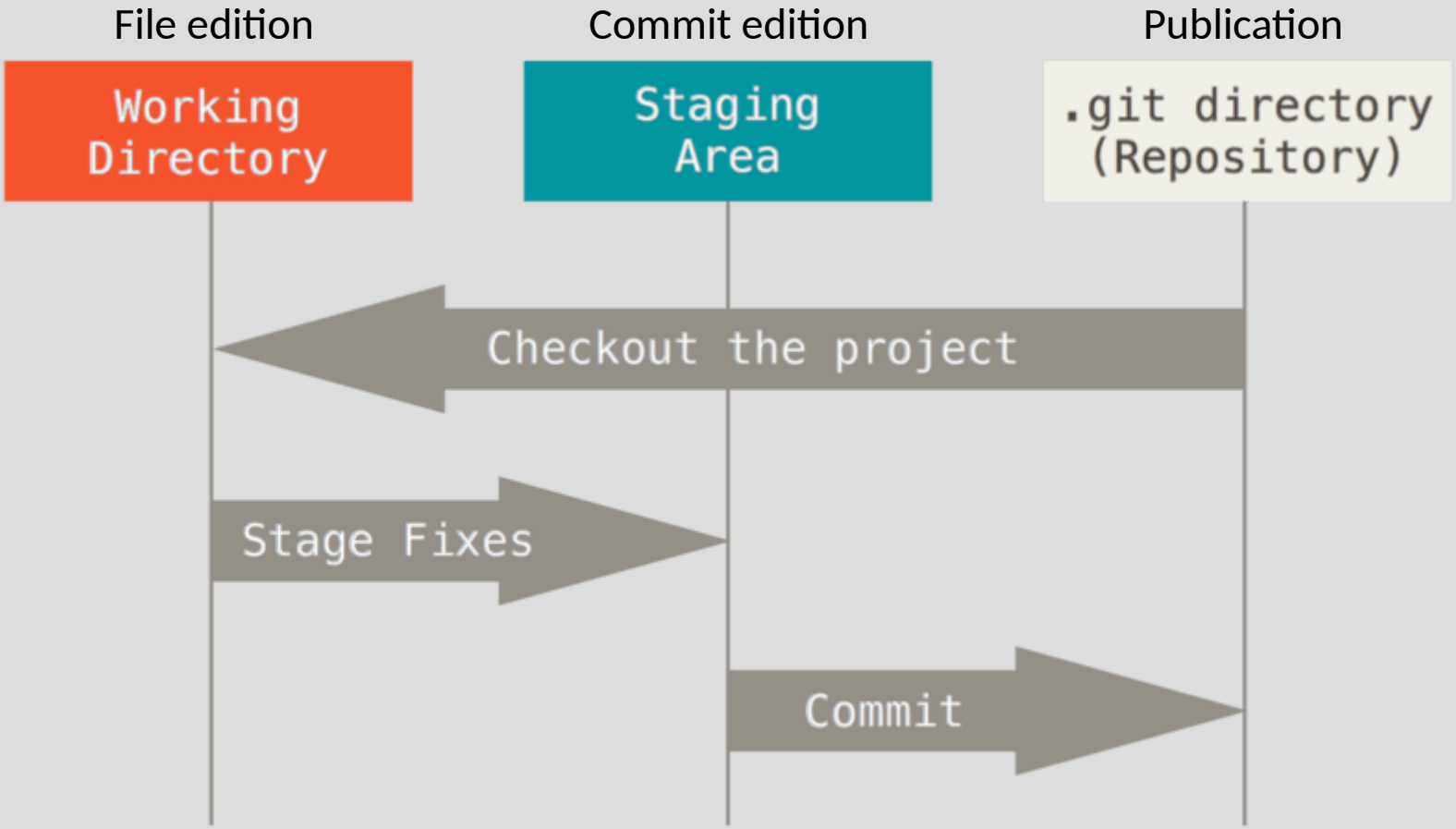
Git[lab] – Workflow

How to commit

- A bit of theory:
  - 3 states



Git[lab] – Workflow

How to commit

- Edit files
  - `git status` to see changes
- Add the changes
  - `git add file1 file2...`
- Commit
  - `git commit`

Git[lab] – Workflow

From editing, publishing to integrating the code

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Git[lab] – Workflow

How to publish

- First we update the branch
  - `git pull`
- Then we push
  - `git push`
  - `git push --set-upstream origin my_branch`
    - Needed if the branch has never been pushed

Git[lab] – Workflow

From editing, publishing to integrating the code

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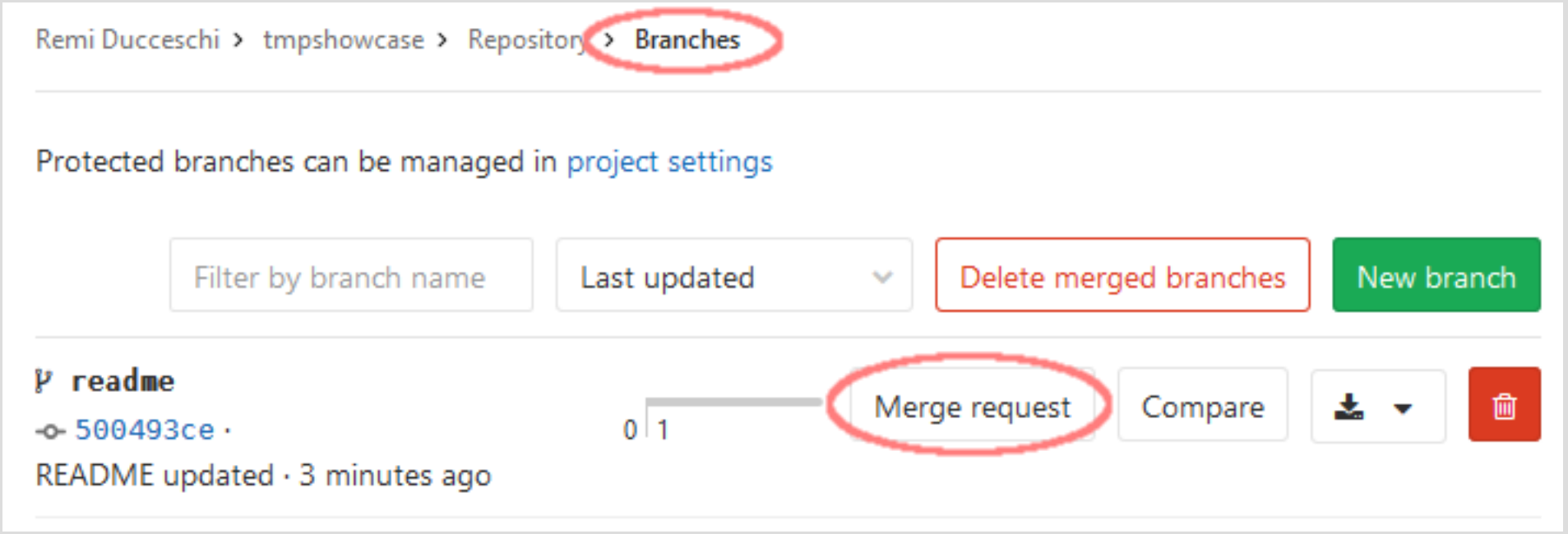
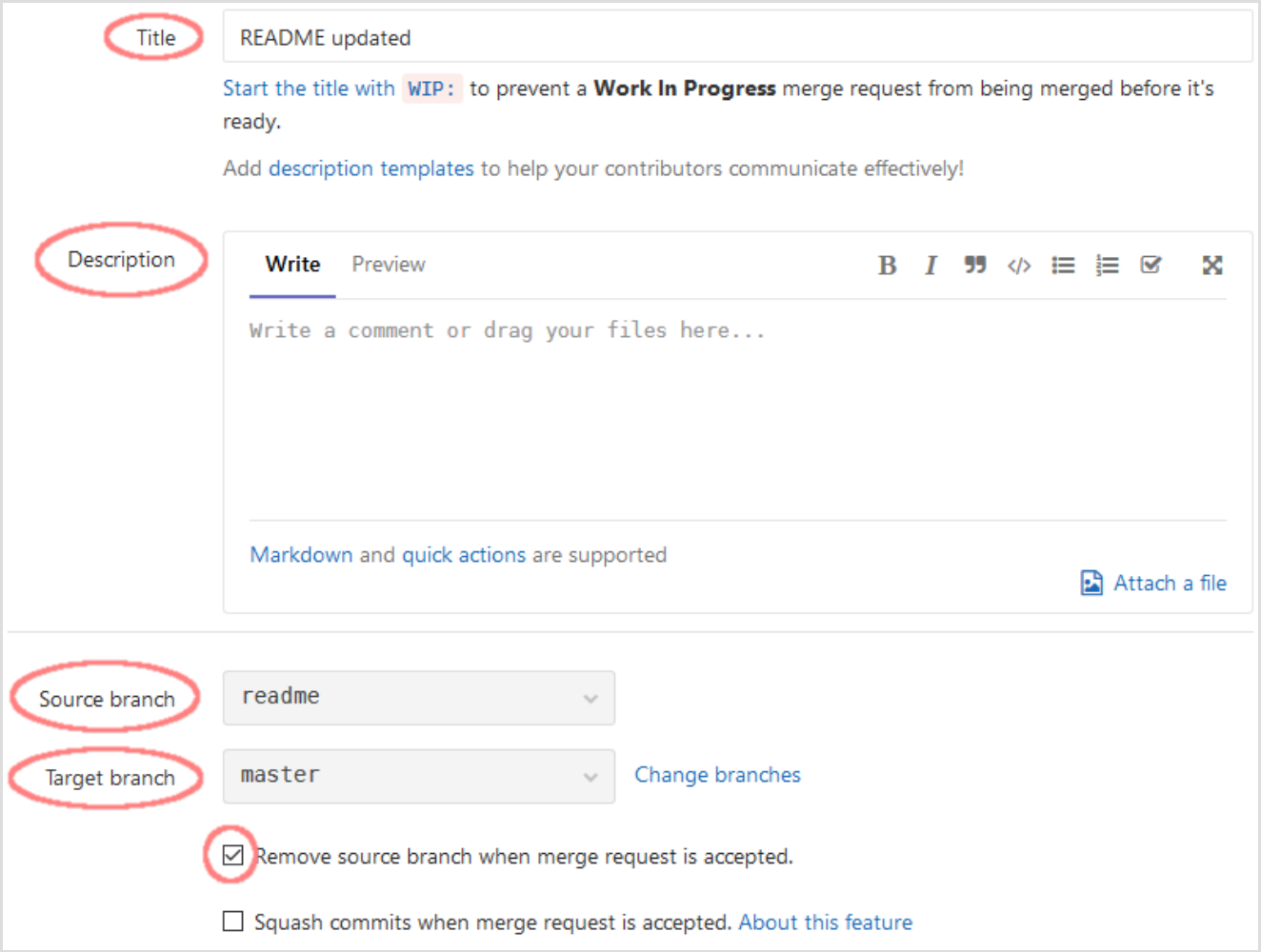
Git[lab] – Workflow

How to Pull request (PR)



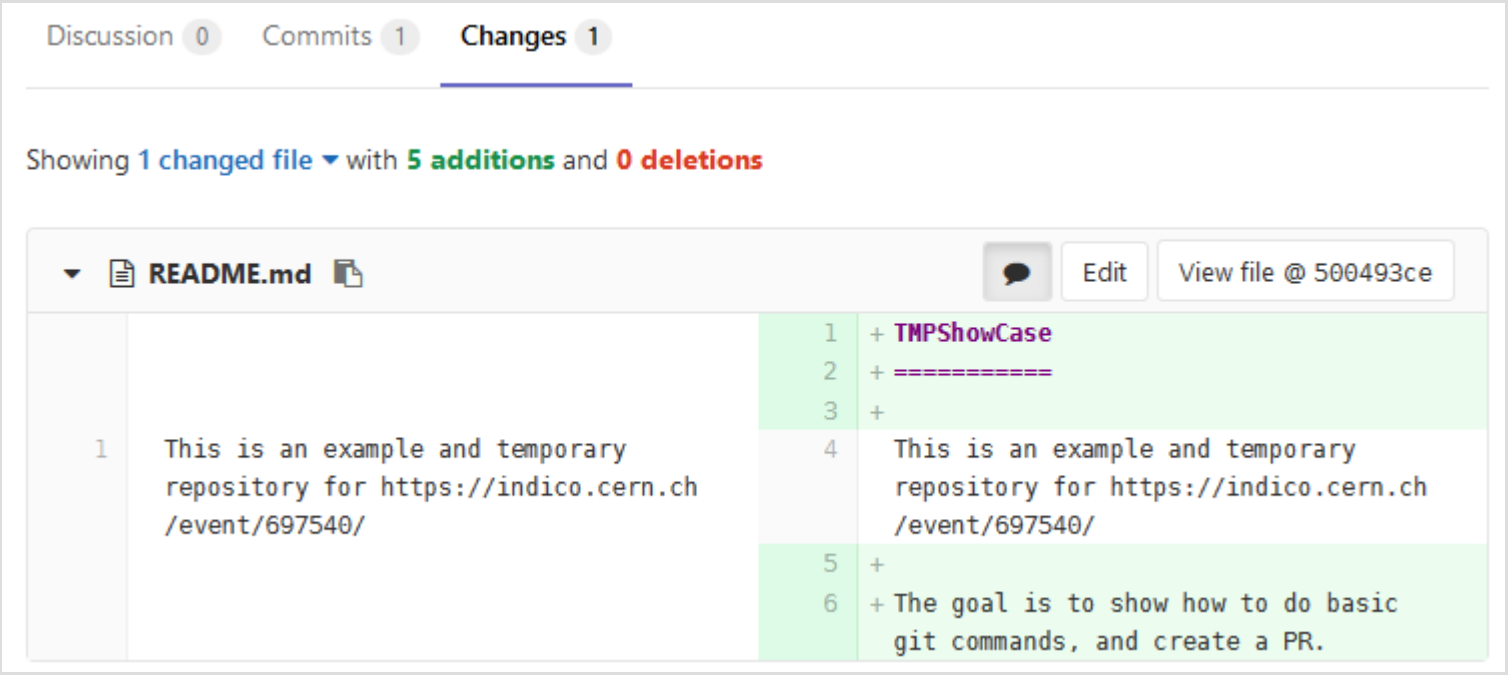
Git[lab] – Workflow

How to Pull request (PR)



Git[lab] – Workflow

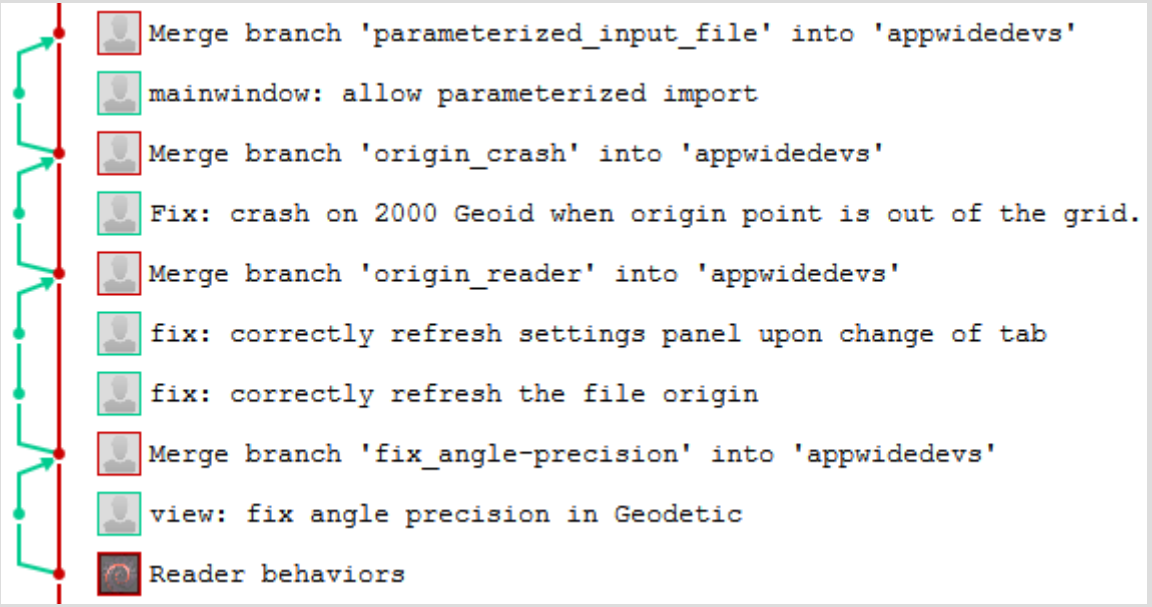
How to Pull request (PR)



Git[lab] – Workflow

How to Pull request (PR)

- With good repository setup
  - Click merge when ready!



Git - Conclusion

- I didn’t talked about merge
  - You shouldn’t merge by hand!
    - Only merge via Pull Requests
    - Except rare occasion
  - Rebase only!
- Advanced git possibilities
  - Rewrite history
  - Reflogs
  - …

Git – External links

Very useful!

- Learn git from basics to expert
  - https://learngitbranching.js.org/
- Customize your environment with aliases
  - https://git-scm.com/book/tr/v2/Git-Basics-Git-Aliases

Questions