FEniCS Course

Lecture 21: Tools for online collaboration

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Introduction

Working on projects with other people becomes easier and smoother with the right tools.

- **Chat applications**
  Slack, HipChat, Fleep
  `https://slack.com`
- **Version control systems (VCSs)**
  Git, Mercurial, Subversion
  `https://git-scm.com`
- **Hosting services for VCS-projects**
  Bitbucket, GitHub
  `https://bitbucket.org`

Slack

Slack is a cloud-based team collaboration tool [Wikipedia].

A nice chat application that is:

- An alternative to email
- Well structured for teams
- Informal
- Quick and easy
- Free

Homepage: `https://slack.com`

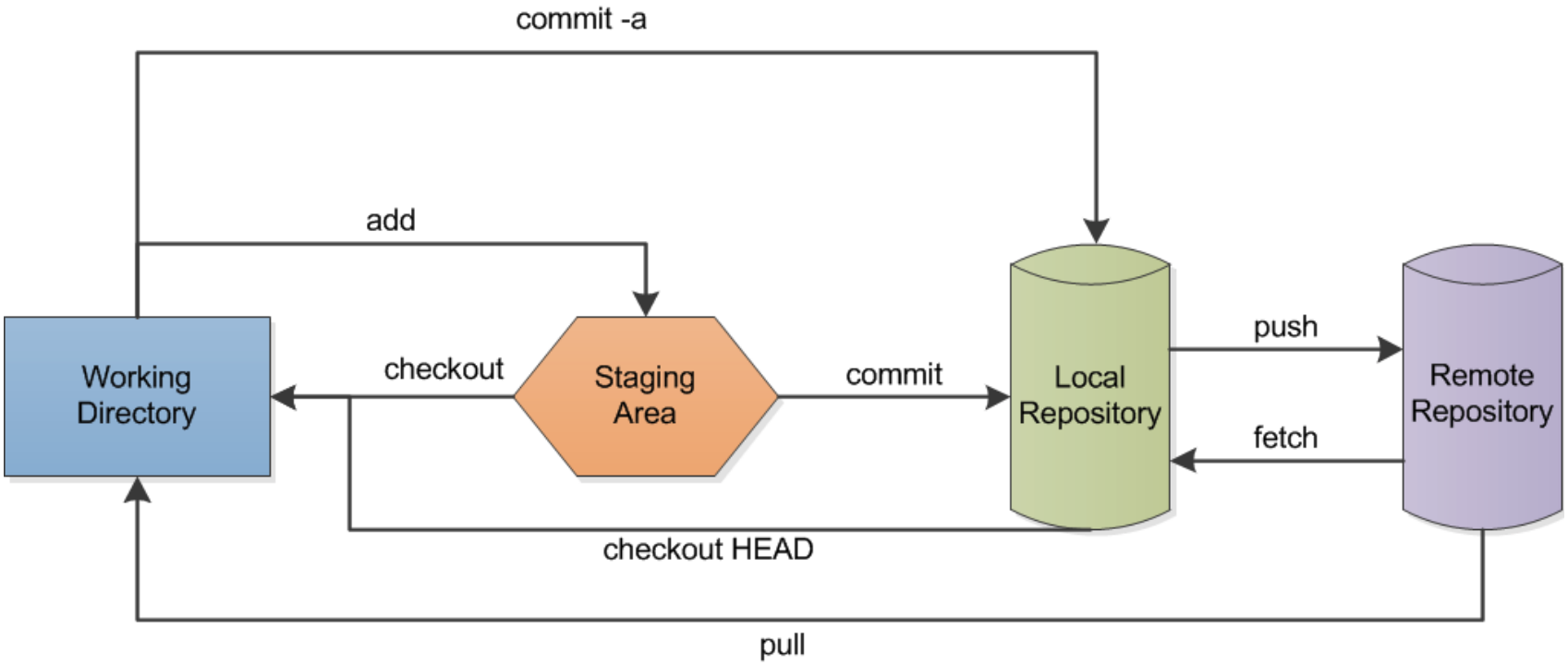
Git: Introduction

Git is a command-line based VCS.

A tool for managing and tracking different versions of a code.

- Homepage (downloads for Windows, Linux, Mac OS X)
  https://git-scm.com
- The Pro Git book
  https://git-scm.com/book/en/v2
- git - the simple guide (downloads and basic commands)
  http://rogerdudler.github.io/git-guide/

Git: How it works



- Working directory - local directory with project files.
- Staging area - file with snapshots of project files.
- Local repository - local Git directory.
- Remote repository - remote Git directory.

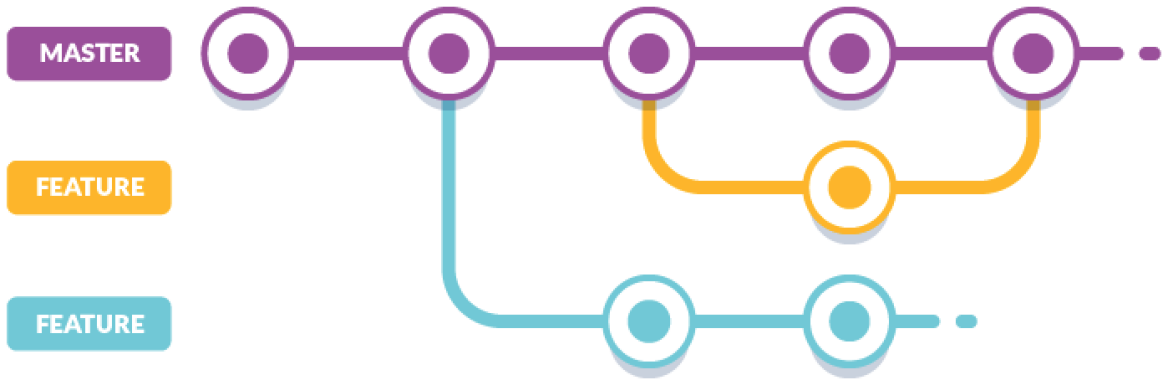
Git: Common commands

- `git status` - displays file status.
- `git add` - adds files to staging area.
- `git commit` - commits staged files to local repository.
- `git push` - pushes from local to remote repository.
- `git fetch` - fetches remote to local repository.
- `git merge` - merges local repository with working directory.
- `git pull` - pulls from remote repository directly to working directory (= `git fetch && git merge`).

For more commands, type `git` or `git help` or see e.g.
https://git-scm.com/docs
https://confluence.atlassian.com/bitbucketserver/basic-git-commands-776639767.html

Git: Branches and merging

Branches are different versions of the code e.g. master (main) branch and various feature and test branches.



Merging is joining two branches together.

- Tips to avoid merge conflicts:
  1. Commit often. Better with many small commits than few big ones.
  2. Work on different parts of the code.
- Resolve merge conflicts with `git mergetool`. There are different mergetools e.g. meld and vimdiff.

Bitbucket

Bitbucket is an online hosting service for Git projects.

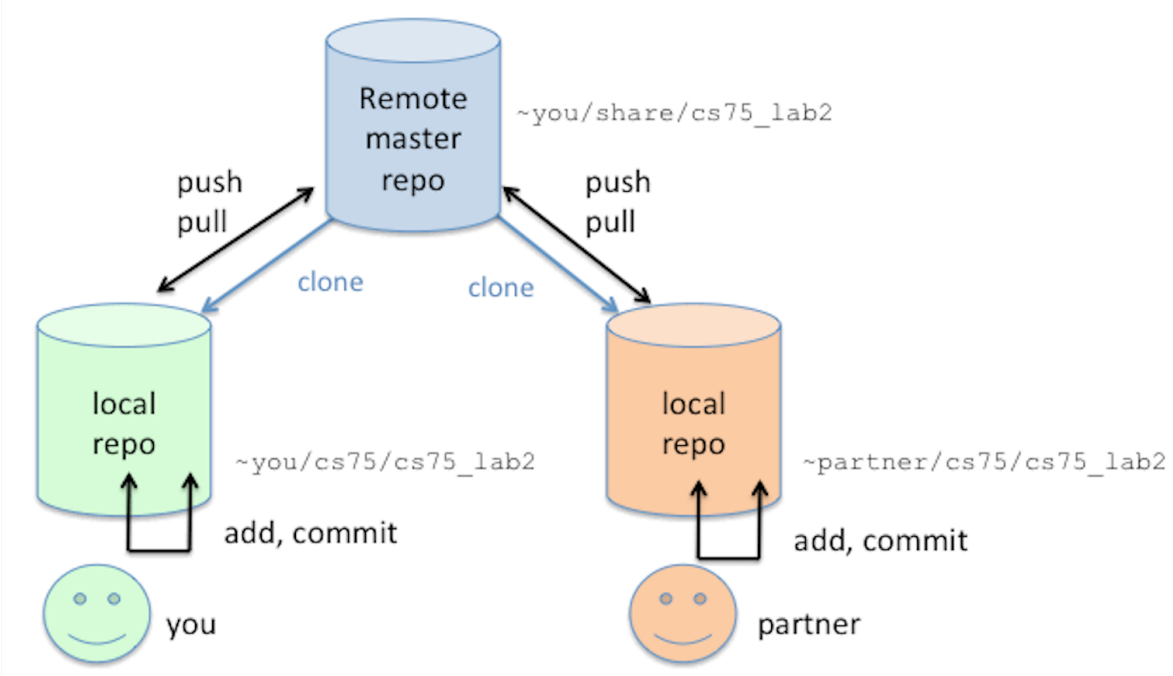
Git has a command-line user interface (CLI). Bitbucket provides a more visual representation of Git projects.

Bitbucket is also used by FEniCS developers
https://bitbucket.org/fenics-project/

Homepage: https://bitbucket.org

Exercise: Using Git and Bitbucket

Team up with a partner and practice using Git to push and pull files to and from repositories on Bitbucket.



Exercise: Using Git and Bitbucket (Detailed)

Every course member is supposed to:

1. Choose an exercise partner.
2. Create an account and a remote Git repository on Bitbucket.
3. Download and install Git.
4. `git clone` the remote repository.
5. Copy a file to the working directory (the folder that was created after cloning). `git add`, `git commit`, and `git push` the file to the remote repository.
6. Share the repository on Bitbucket with your exercise partner.
7. `git clone` the repository you have been invited to.
8. Modify your partner's file and upload it to your partner's remote repository.
9. `git pull` your own updated remote repository.