GIT: FAST VERSION CONTROL

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About version control: VCS

- A system that records changes to a file or set of files over time so that you can recall specific versions later.
- Yep...you can do this yourself: error prone
- Types of VCS:
  - Local VCSs: on local pc keeps all changes to files under revision control.
    - Your pc gone...all gone 
  - Centralized VCS CVCSs: collaboration—single server contains all the versioned files, an number of clients check out files from that central place.
    - Server goes down, no collaboration or saving your own versions...if server gets corrupted: everyone loses everything. 
  - Distributed VCS DVCSs (Git): clients don't just check out latest snapshot of files: they fully mirror the repository. Server dies, any of the client repositories can be copied back to restore it: Every clone is full backup of the data. 

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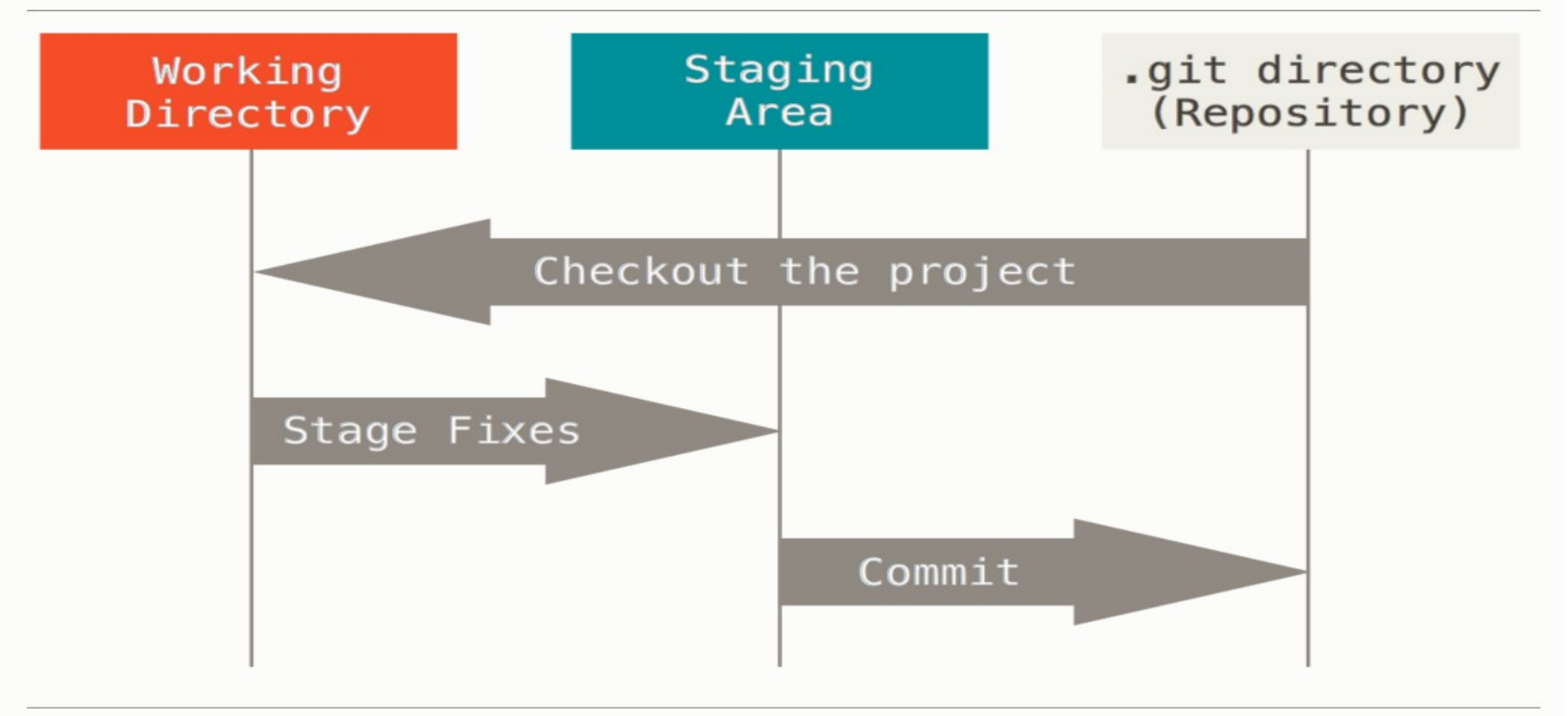
Basic Git workflow

- Modify → stage → commit:



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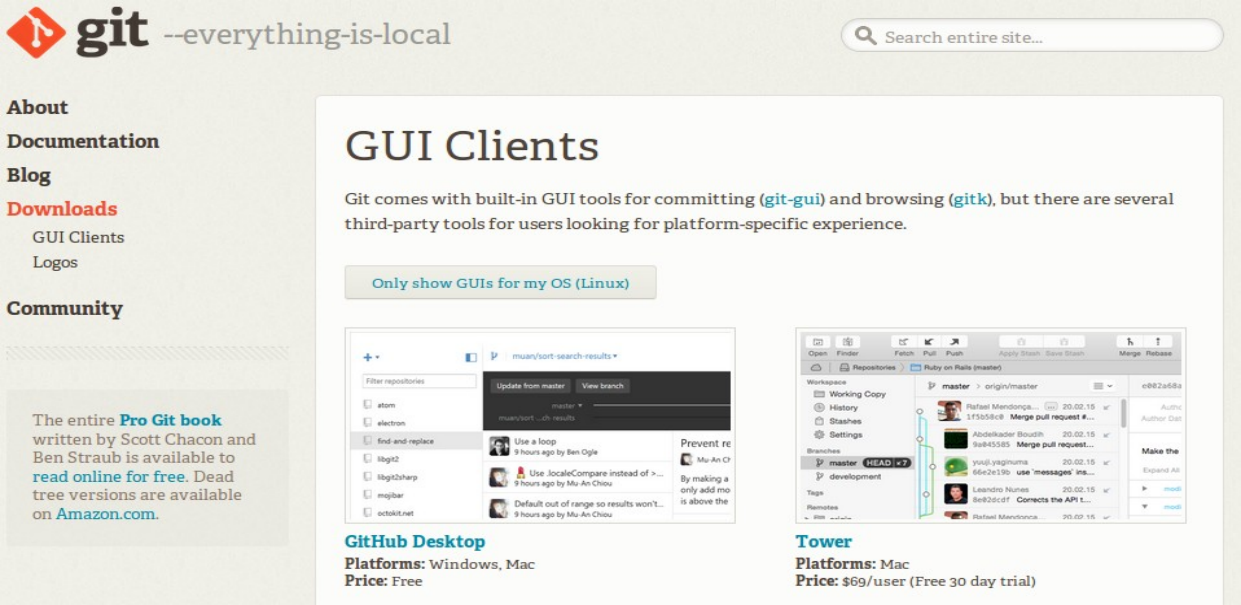
Getting started: Installing

- Linux:
  - $ sudo apt-get install git-all
- Mac: Mavericks (10.9) or above you can do this simply by trying to run git from the Terminal
- Windows: https://git-scm.com/download/win
-



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First-time Git setup

- Set your user name and email address.
  - $ git config --global user.name "Jane Doe"
  - $ git config --global user.email janedoe@example.com
- Only once if you pass –global command: this is info git will use for anything you do on the system
- Configure default text editor:
  - $ git config --global core.editor emacs/scite/

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Git basics: Getting a git repo

- Two main approaches:
  - Initializing repo in an existing directory:
    - Navigate to the directory
    - Type: $ git init
    - Creates a **.git** directory
    - Excluding files: create .gitignore
      - Add files to be excluded into .gitignore
    - Add files you want to start version-controlling
      - $ git add *.f90
      - $ git add *.doc
      - $ git commit -m 'initial project version'
  - Cloning an existing repository:
    - $ git clone ‹path to remote repo›

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Start working!

- Check status of your files:
  - $ git status
- Should have a clean directory, your branch is master
- Create a new file in the directory
  - $ git status: nothing added to commit
  - $ git add README
  - $ git commit
- Removing files you added but decided not to track:
  - $ git rm --cached *filename*
  - $ git add .
  - $ git commit -am “Removed ignored Files”

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Viewing exact differences

- Viewing difference between committed and modified:
  - $ git diff
  - $ git diff --staged
- Git Diff in an External Tool: I ♥ meld
- http://www.wiredforcode.com/blog/2011/06/04/git-with-meld-diff-viewer-on-ubuntu/
- Viewing a list of your commits:
  - $ git log --oneline
- Viewing diffs between two checkouts:
  - $ git diff e3c0709 1c58e1e

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Branches

- Create a branch for something your not yet sure about:
  - $ git branch <crazy experiment>
  - $ git branch
  - $ git checkout crazy experiment
- Start doing wacky stuff
- Commit wacky stuff and view log:
  - $ git commit -m 'experiment00'
  - $ git log --oneline
- It works? Want to keep it? Let's merge
- Git merges into the current branch:
  - $ git checkout master
  - $ git merge --no-ff *branchname*

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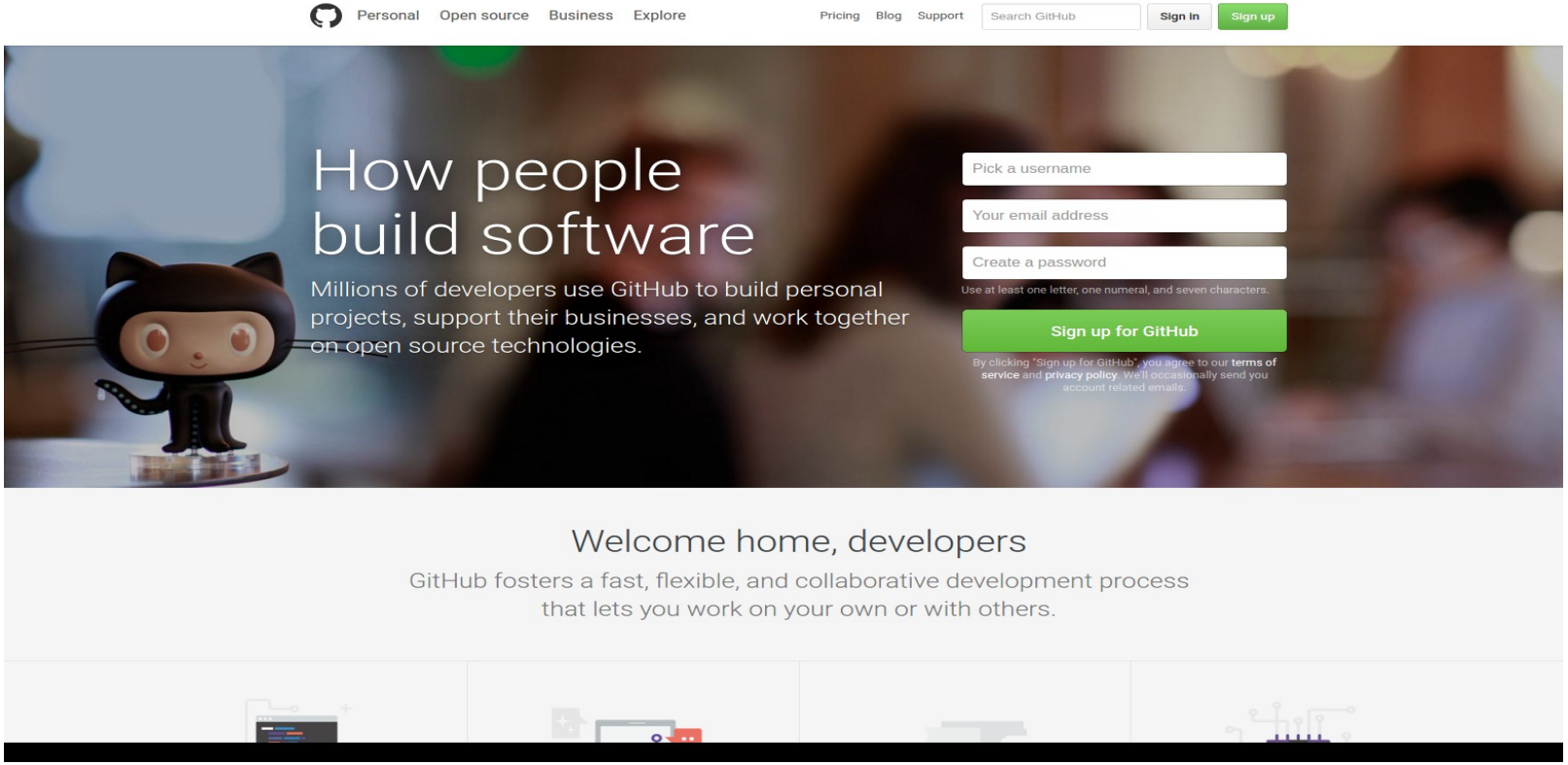
Using the distributed idea

- https://github.com/
- 

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Pushing from local to online repo

- Create new repository
- On Local machine:
  - $ git remote add origin https://github.com/FineWilms/newrepo.git
- Check it:
  - $ git remote -v
- Push your local to the remote site:
  - $ git push origin master
- Now we have backup safely on server.
- Work on local machine, commit there, push to remote

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Cloning: Recovery or collaboration

- Just shift-delete your thesis??
- Clone it: COMPLETE COPY
  - $ git clone <path to remote repo>
- Collaboration:
  - $ git fetch
  - $ git merge
- Automated back-ups: crontab
- https://help.ubuntu.com/community/CronHowto
- Create shell script

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Example of shell script:

- Create empty file run-git-push.sh and paste in working dir
- Contents:

```
#!/bin/bash
cd /home/jwilms/test/
git add .
git commit -m "auto update via crontab"
git push https://UserName:password@github.com/FineWilms/test master

#send yourself an email:
mail -s "Git Backup" fine.wilms@gmail.com < /dev/null
```

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Example of $ crontab -e

```
  GNU nano 2.2.6                                                File: /tmp/crontab

# Edit this file to introduce tasks to be run by cron.
#
# Each task to run has to be defined through a single line
# indicating with different fields when the task will be run
# and what command to run for the task
#
# To define the time you can provide concrete values for
# minute (m), hour (h), day of month (dom), month (mon),
# and day of week (dow) or use '*' in these fields (for 'any').#
# Notice that tasks will be started based on the cron's system
# daemon's notion of time and timezones.
#
# Output of the crontab jobs (including errors) is sent through
# email to the user the crontab file belongs to (unless redirected).
#
# For example, you can run a backup of all your user accounts
# at 5 a.m every week with:
# 0 5 * * 1 tar -zcf /var/backups/home.tgz /home/
#
# For more information see the manual pages of crontab(5) and cron(8)
#
# m h  dom mon dow   command
#
MAILTO="fine.wilms@gmail.com"
0 * * * * /home/jwilms/test/touch.sh > /home/jwilms/test/cron.log 2>&1
0 * * * * /home/jwilms/test/git-backup-script.sh > /home/jwilms/test/cron2.log 2>&1
```

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