BIM A+

European Master in
Building Information Modelling

Introduction to Git and GitHub

Topic 2: Fundamentals of programming

BIM A+3: Parametric Modelling in BIM

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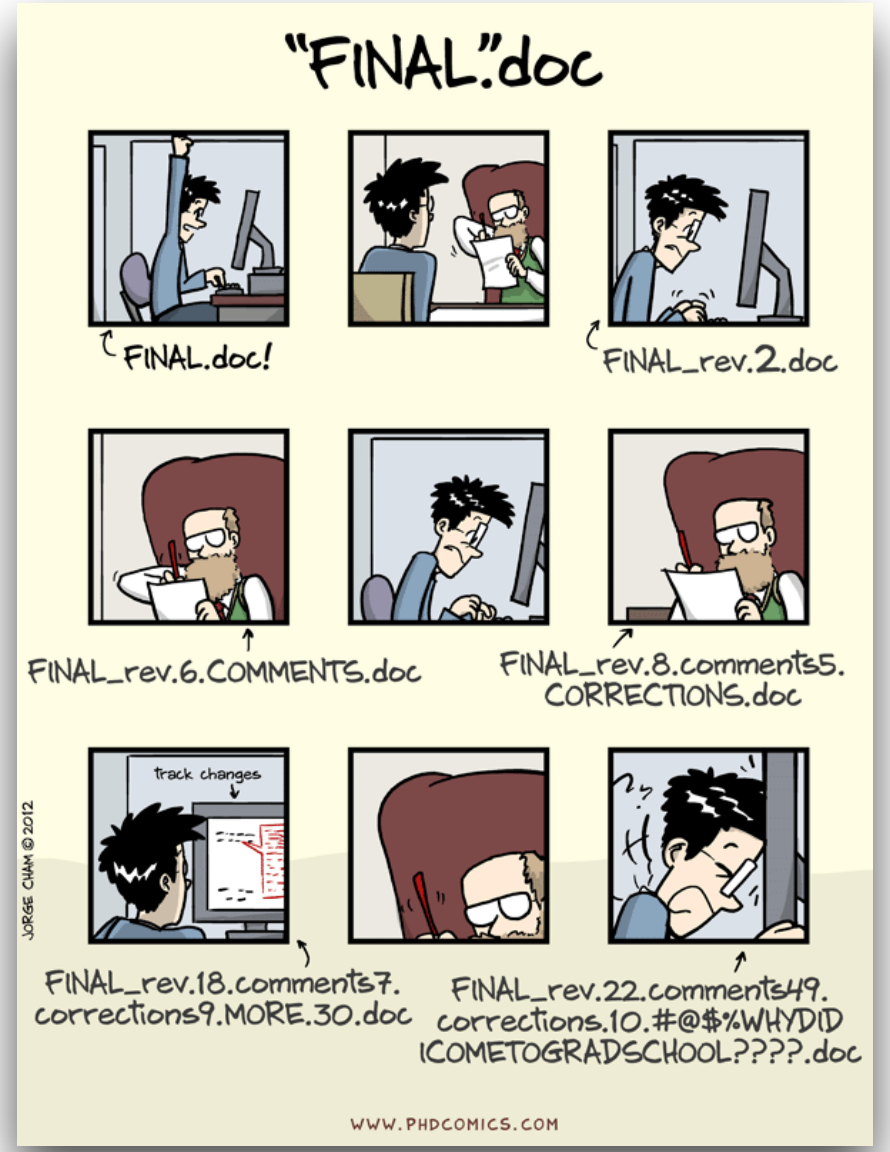

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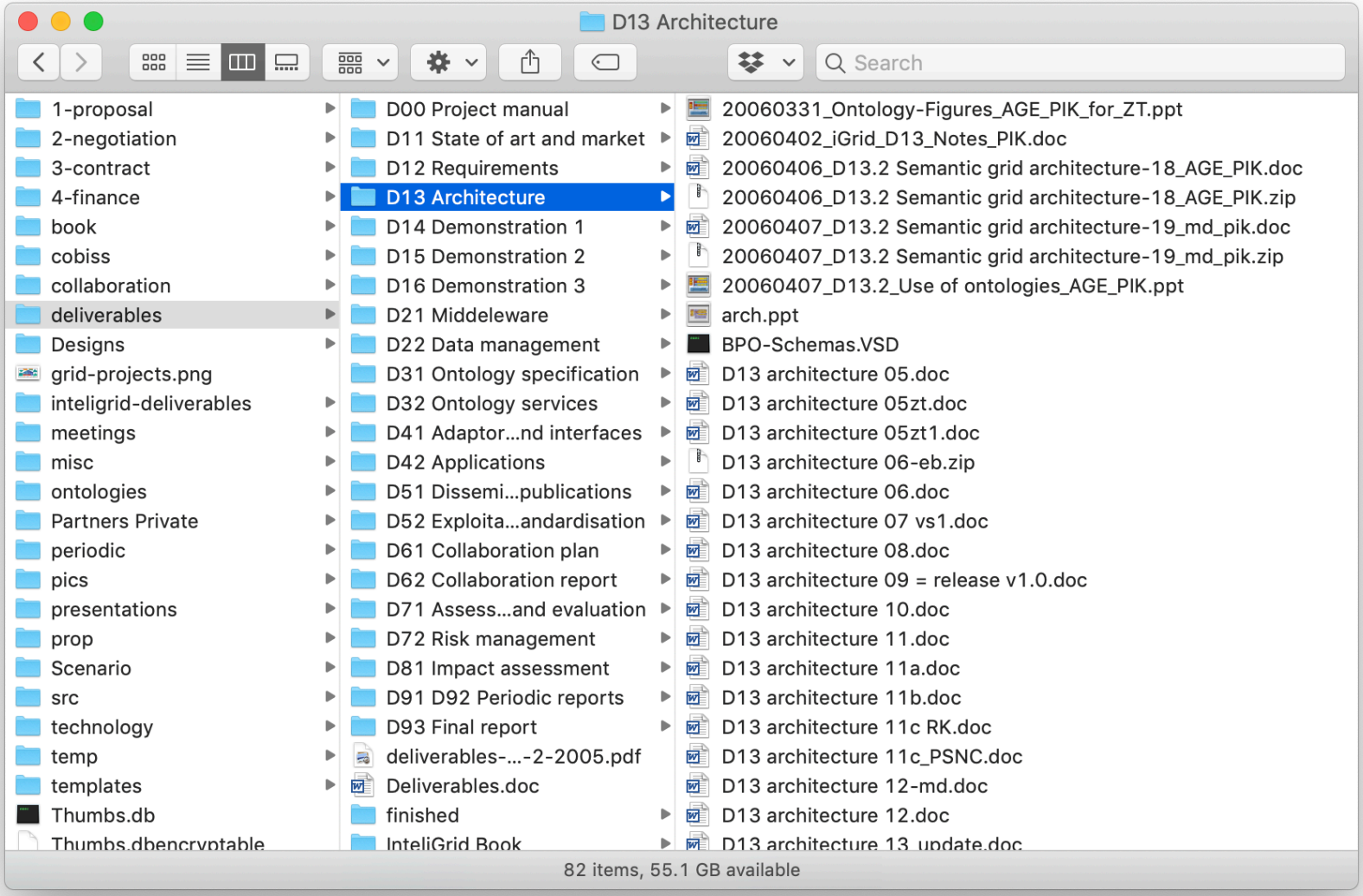
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82 items, 55.1 GB available

What is Version Control System (VCS)

- A way to keep track of changes to files & folders
- Between multiple authors (developers)
  - A record of who did what, when
  - Why is provided by commit messages!
  - Non-distributed (Subversion, CVS) – Server has the master repo, all commits go to the server
  - Distributed (Git, Mercurial) – Server has the master repo, but you have a copy (clone) of the repo on your machine

What is Git

- An open source VCS designed for speed and efficiency
- Created by Linus Torvalds (for managing Linux kernel)
- Your best insurance policy against:
  - Accidental mistakes like deleting work
  - Remembering what you changed, when, why
- Hosted solutions include Github or Bitbucket …
  … or running your own Git server

Tech Talk: Linus Torvalds on git

Google 2.1M views • 12 years ago

Linus Torvalds visits **Google** to share his thoughts on **git**, the source control management system he created two years ago.

CC

Getting Git

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- Download the software - it's free
  - http://git-scm.com/downloads or on Mac (homebrew), $ brew install git

- Download a GUI, optional
  - http://git-scm.com/downloads/guis

- Read the manual and/or the book
  - http://git-scm.com/docs, http://git-scm.com/book

Understanding Git workflow

- Obtain a repository
  - Either via git init,or git clone, or if you already have the repo, pull changes!
- Make some edits
  - Use your favorite text editor or source code IDE - Most IDEs have Git integration, including VSCode
  - Git tracks changes to binary files too:images, pdf, etc. – Less useful though, than text-based files
- Stage your changes
  - using git add
- Commit your work
  - git commit -m “Always write clear commit messages!"
- Push to remote
  - git push remote_name local_branch

GitHub
GIT CHEAT SHEET

Git is the open source distributed version control system that facilitates GitHub activities on your laptop or desktop. This cheat sheet summarizes commonly used Git command line instructions for quick reference.

INSTALL GIT
GitHub provides desktop clients that include a graphical user interface for the most common repository actions and an automatically updating command line edition of Git for advanced scenarios.

GitHub for Windows
https://windows.github.com

GitHub for Mac
https://mac.github.com

Git distributions for Linux and POSIX systems are available on the official Git SCM web site.

Git for All Platforms
http://git-scm.com

CONFIGURE TOOLING
Configure user information for all local repositories

```
$ git config --global user.name "[name]"
```
Sets the name you want attached to your commit transactions

```
$ git config --global user.email "[email address]"
```
Sets the email you want attached to your commit transactions

```
$ git config --global color.ui auto
```
Enables helpful colorization of command line output

CREATE REPOSITORIES
Start a new repository or obtain one from an existing URL

```
$ git init [project-name]
```
Creates a new local repository with the specified name

```
$ git clone [url]
```
Downloads a project and its entire version history

MAKE CHANGES
Review edits and craft a commit transaction

```
$ git status
```
Lists all new or modified files to be committed

```
$ git diff
```
Shows file differences not yet staged

```
$ git add [file]
```
Snapshots the file in preparation for versioning

```
$ git diff --staged
```
Shows file differences between staging and the last file version

```
$ git reset [file]
```
Unstages the file, but preserve its contents

```
$ git commit -m "[descriptive message]"
```
Records file snapshots permanently in version history

GROUP CHANGES
Name a series of commits and combine completed efforts

```
$ git branch
```
Lists all local branches in the current repository

```
$ git branch [branch-name]
```
Creates a new branch

```
$ git checkout [branch-name]
```
Switches to the specified branch and updates the working directory

```
$ git merge [branch]
```
Combines the specified branch's history into the current branch

```
$ git branch -d [branch-name]
```
Deletes the specified branch

GIT CHEAT SHEET

REFACTOR FILENAMES
Relocate and remove versioned files

```
$ git rm [file]
```
Deletes the file from the working directory and stages the deletion

```
$ git rm --cached [file]
```
Removes the file from version control but preserves the file locally

```
$ git mv [file-original] [file-renamed]
```
Changes the file name and prepares it for commit

SUPPRESS TRACKING
Exclude temporary files and paths

```
*.log
build/
temp-*
```
A text file named `.gitignore` suppresses accidental versioning of files and paths matching the specified patterns

```
$ git ls-files --other --ignored --exclude-standard
```
Lists all ignored files in this project

SAVE FRAGMENTS
Shelve and restore incomplete changes

```
$ git stash
```
Temporarily stores all modified tracked files

```
$ git stash pop
```
Restores the most recently stashed files

```
$ git stash list
```
Lists all stashed changesets

```
$ git stash drop
```
Discards the most recently stashed changeset

REVIEW HISTORY
Browse and inspect the evolution of project files

```
$ git log
```
Lists version history for the current branch

```
$ git log --follow [file]
```
Lists version history for a file, including renames

```
$ git diff [first-branch]...[second-branch]
```
Shows content differences between two branches

```
$ git show [commit]
```
Outputs metadata and content changes of the specified commit

REDO COMMITS
Erase mistakes and craft replacement history

```
$ git reset [commit]
```
Undoes all commits after `[commit]`, preserving changes locally

```
$ git reset --hard [commit]
```
Discards all history and changes back to the specified commit

SYNCHRONIZE CHANGES
Register a repository bookmark and exchange version history

```
$ git fetch [bookmark]
```
Downloads all history from the repository bookmark

```
$ git merge [bookmark]/[branch]
```
Combines bookmark's branch into current local branch

```
$ git push [alias] [branch]
```
Uploads all local branch commits to GitHub

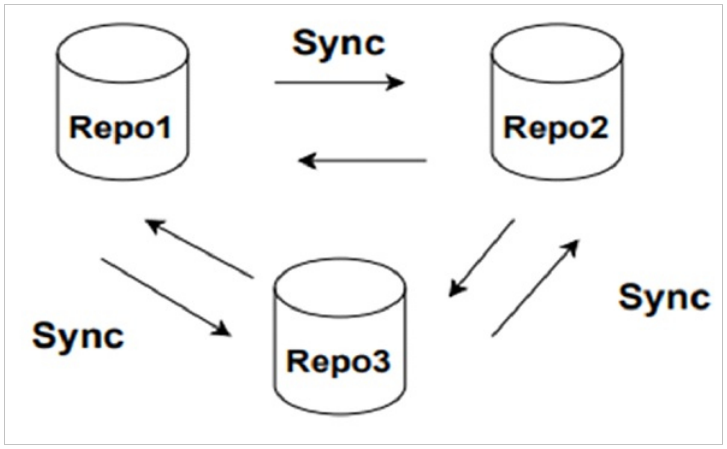
```
$ git pull
```
Downloads bookmark history and incorporates changes

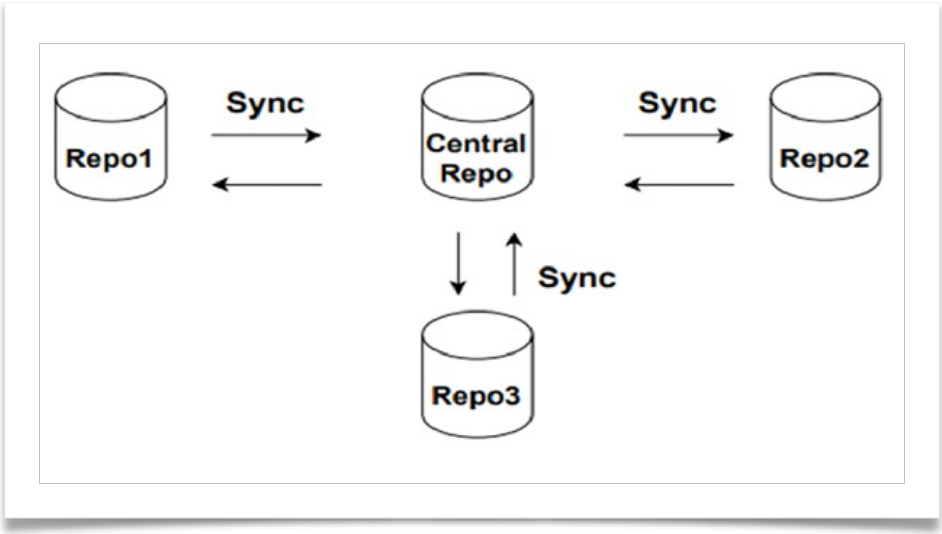
GitHub Training
Learn more about using GitHub and Git. Email the Training Team or visit our web site for learning event schedules and private class availability.

✉ training@github.com
training.github.com

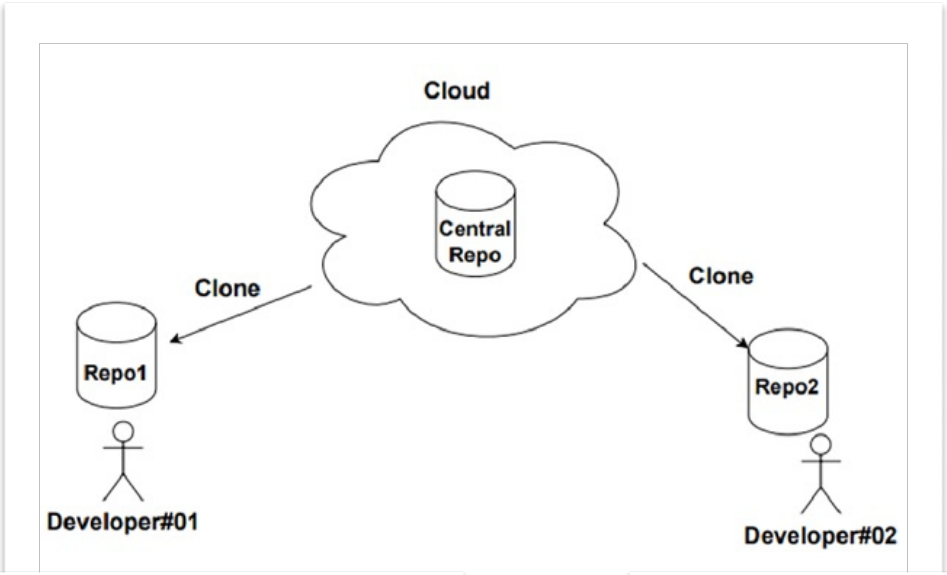
Git Cheat Sheet, https://github.github.com/training-kit/downloads/github-git-cheat-sheet.pdf

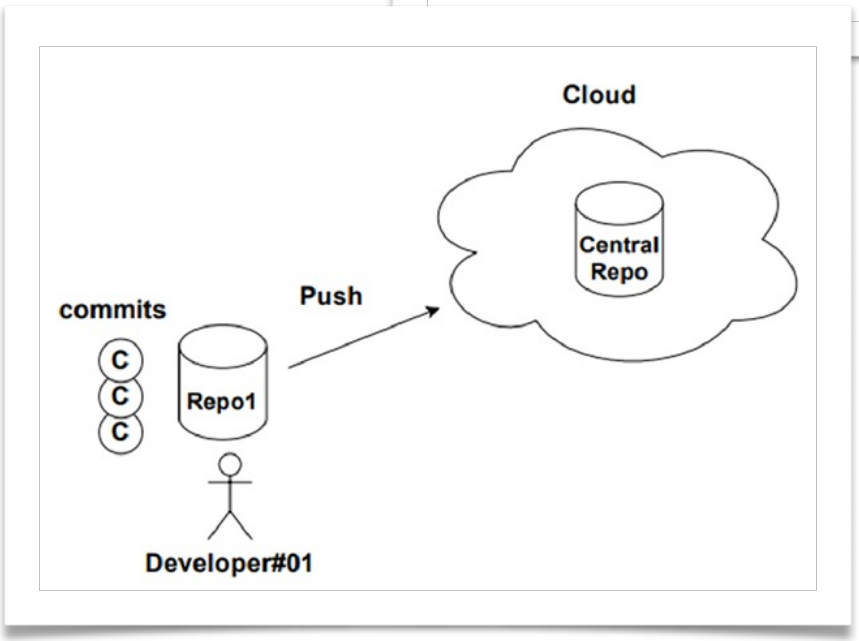
Distributed collaboration model

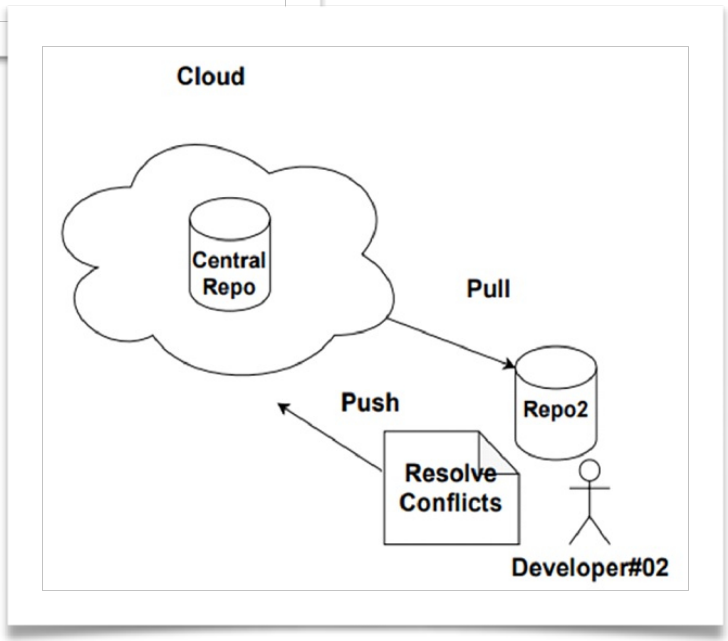




Distributed collaboration workflow







What is GitHub

- Largest web-based git repository
- Hosting service
  - Aka, hosts ‘remote repositories’
- Allows for code collaboration with anyone online
- Adds extra functionality on top of Git
  - UI, documentation, bug tracking, feature requests, pull requests, and more!