

Version Control Systems (aka VCSs)

Athanasis Zolotas

Outline

- Introduction
 - Why VCS?
- History
 - Which VCS?
- Let's try Git
 - 3 parts

Introduction

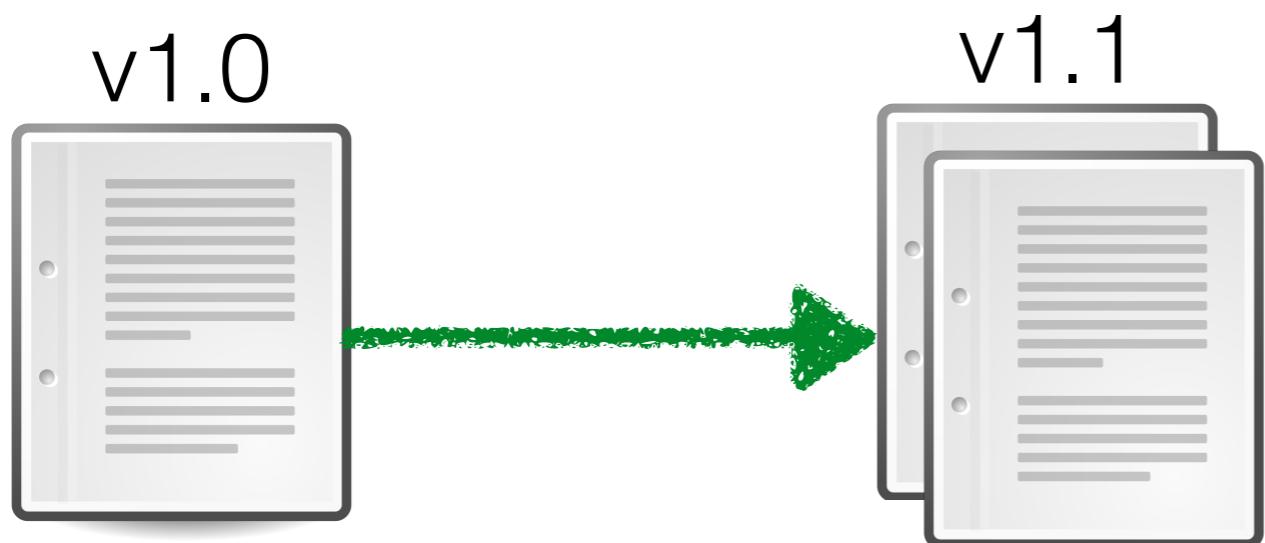
- As the name suggests its a technology to control versions of an artefact
 - Most probably code
 - It's quite common for text project

Introduction

v1.0



Introduction



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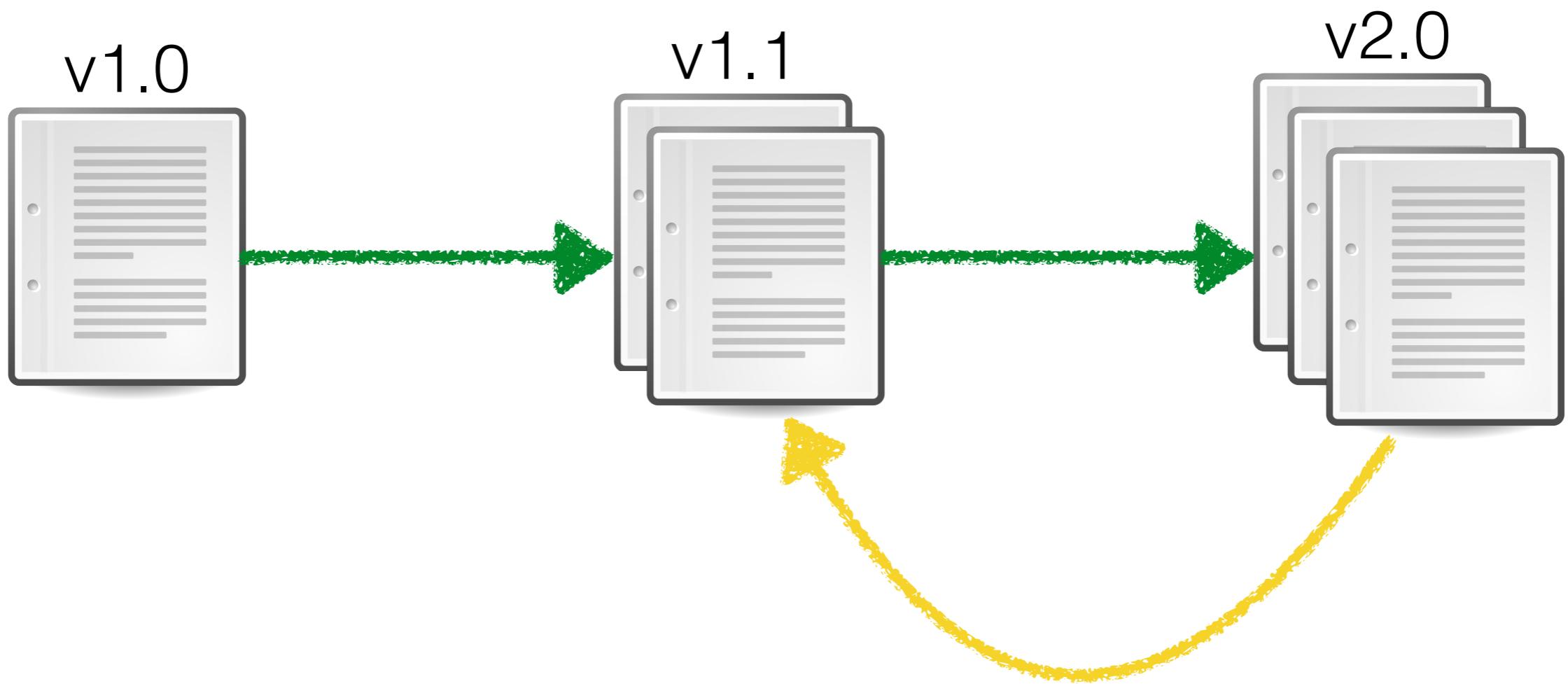
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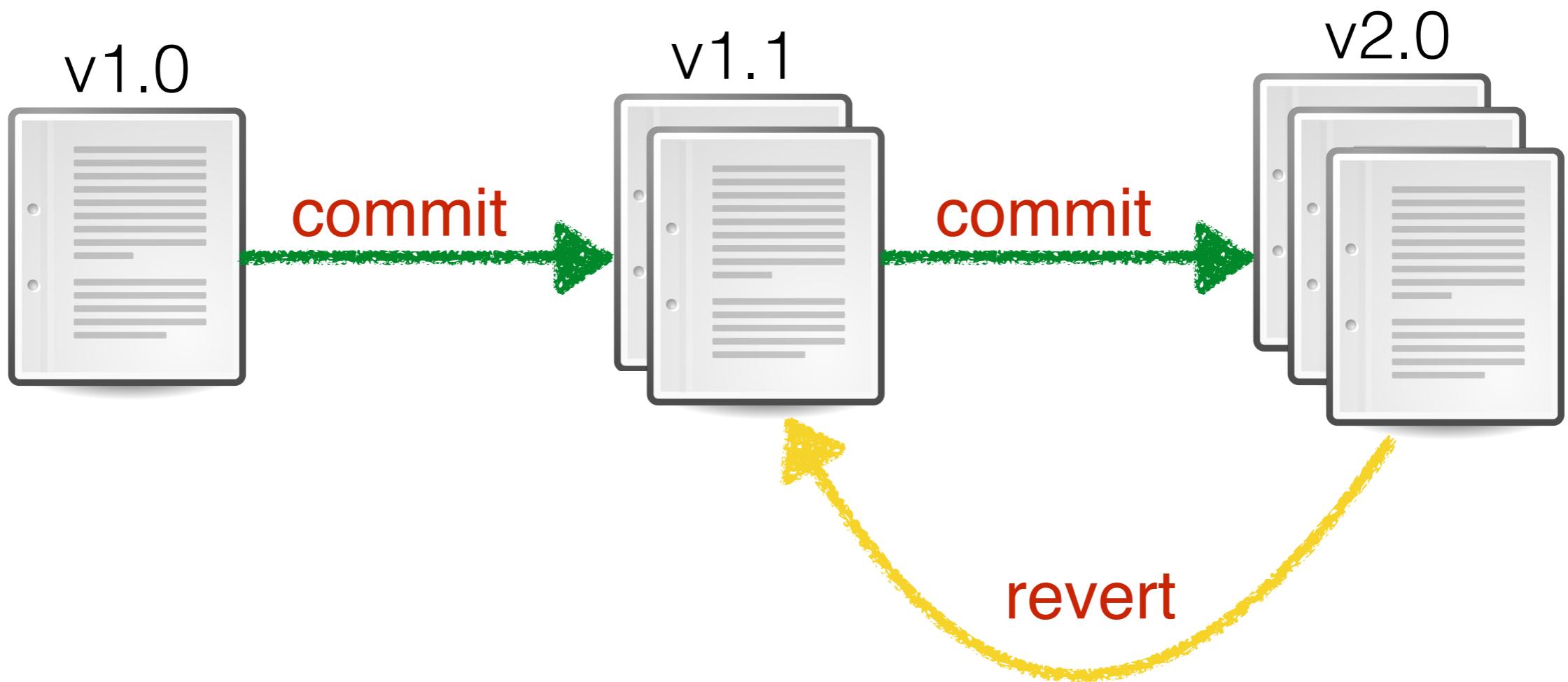
Introduction



Introduction



Introduction



Why VCS?

- Control / Store different versions, historical data of your application / documents
- Bug fixes (find at which step the error happened)
- But VCSs have more uses:
 - Enable collaboration
 - Work as a backup

History

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- Filenames:
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- Post-its or cups

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Modern VCSSs

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Modern VCSs

- **Apache Subversion - SVN**
- Darcs
- **Git**
- Mercurial
- Bazaar
- ...

Approaches

- Centralised
- Decentralised (or Distributed)

Terminology

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Conflict : Changes performed at the same files cannot be resolved automatically.

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 - Unique, central repository
 - Changes are committed to this central copy of the project

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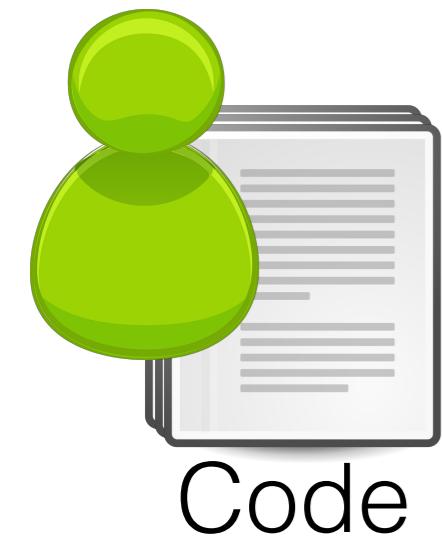
- Centralised:
 - Unique, central repository
 - Changes are committed to this central copy of the project
- Decentralised / Distributed:
 - Different copies, each copy is equally valid
 - Commits are happening to your local repository

SVN

- Apache Subversion
 - Is a centralised VCS
 - When a new version is committed, its id increments sequentially (e.g. 1, 2, 3, ...)

SVN Example

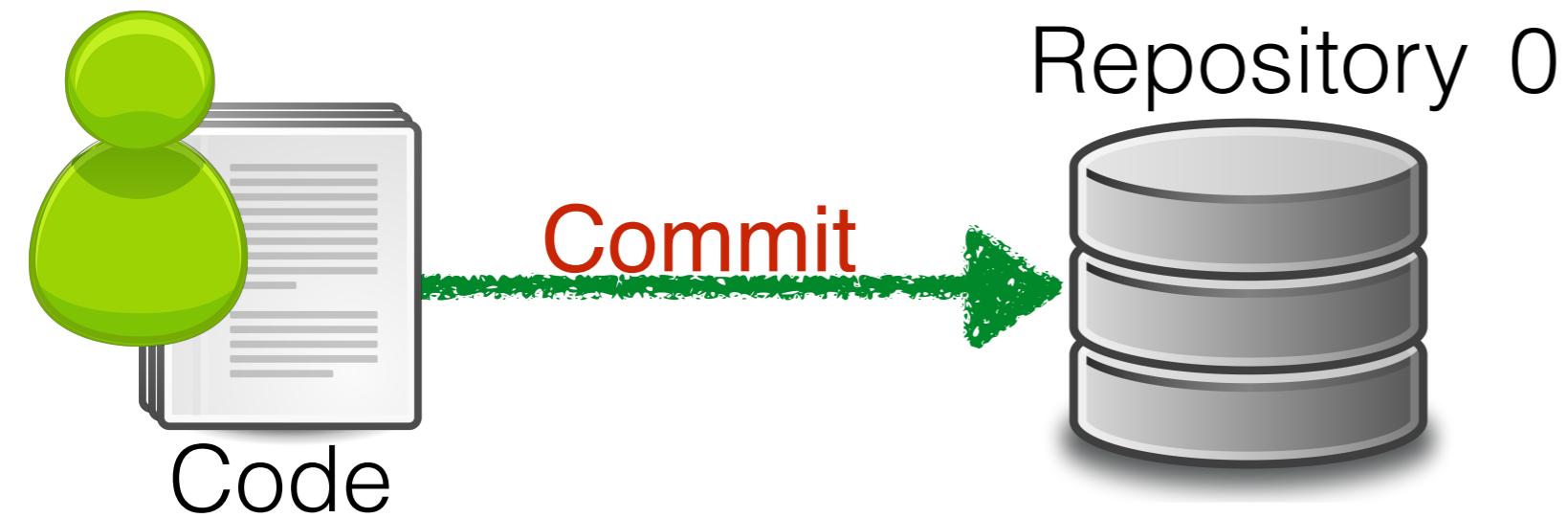
SVN Example



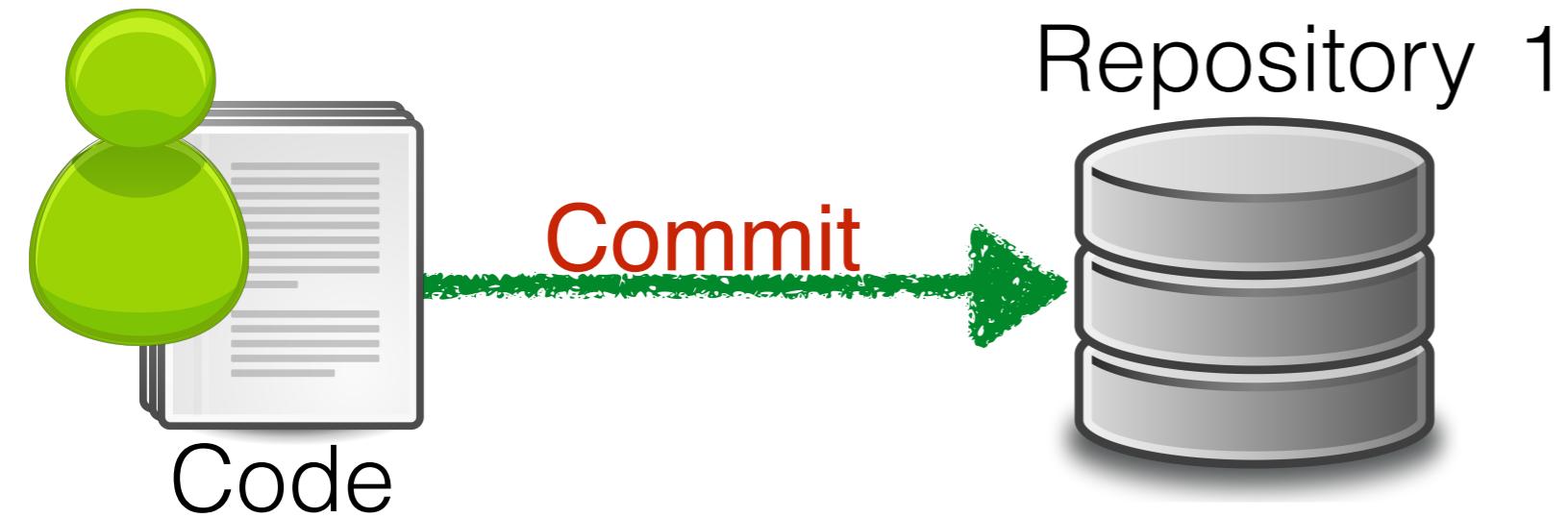
Repository 0



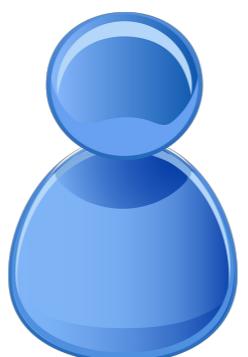
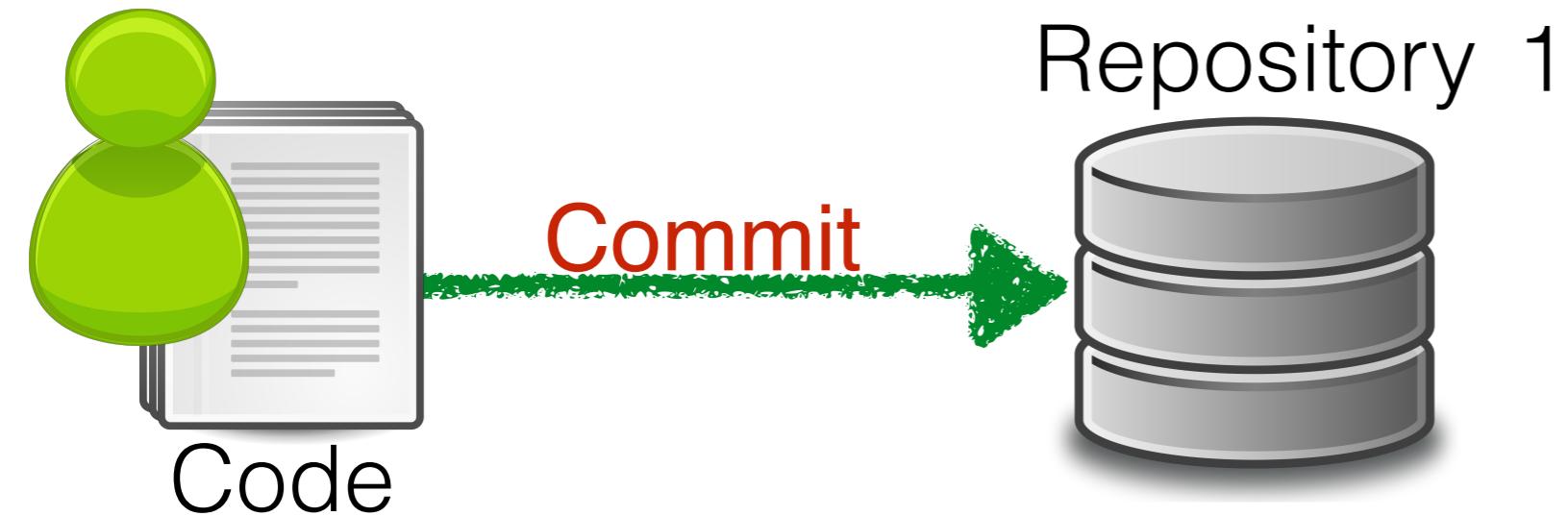
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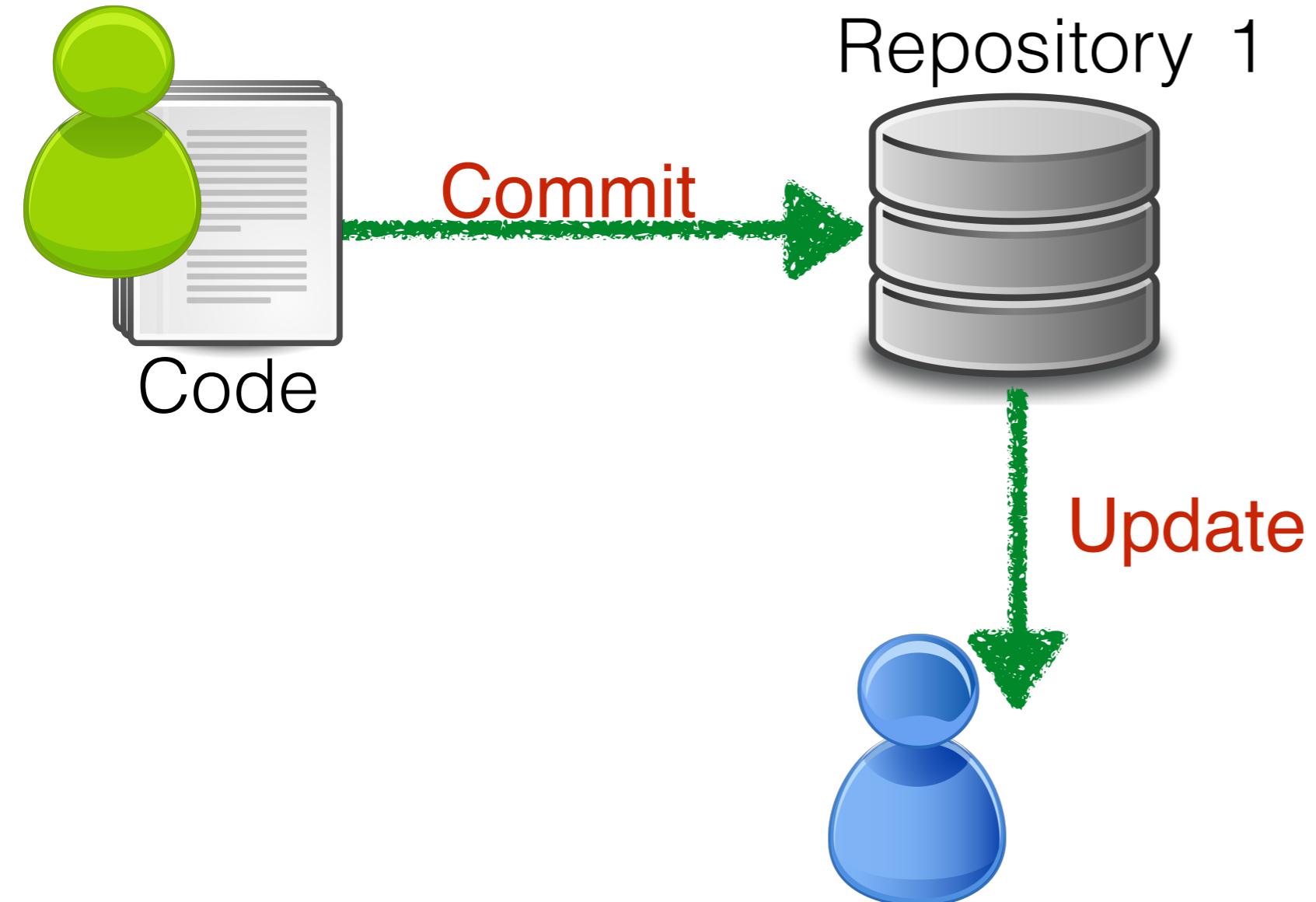
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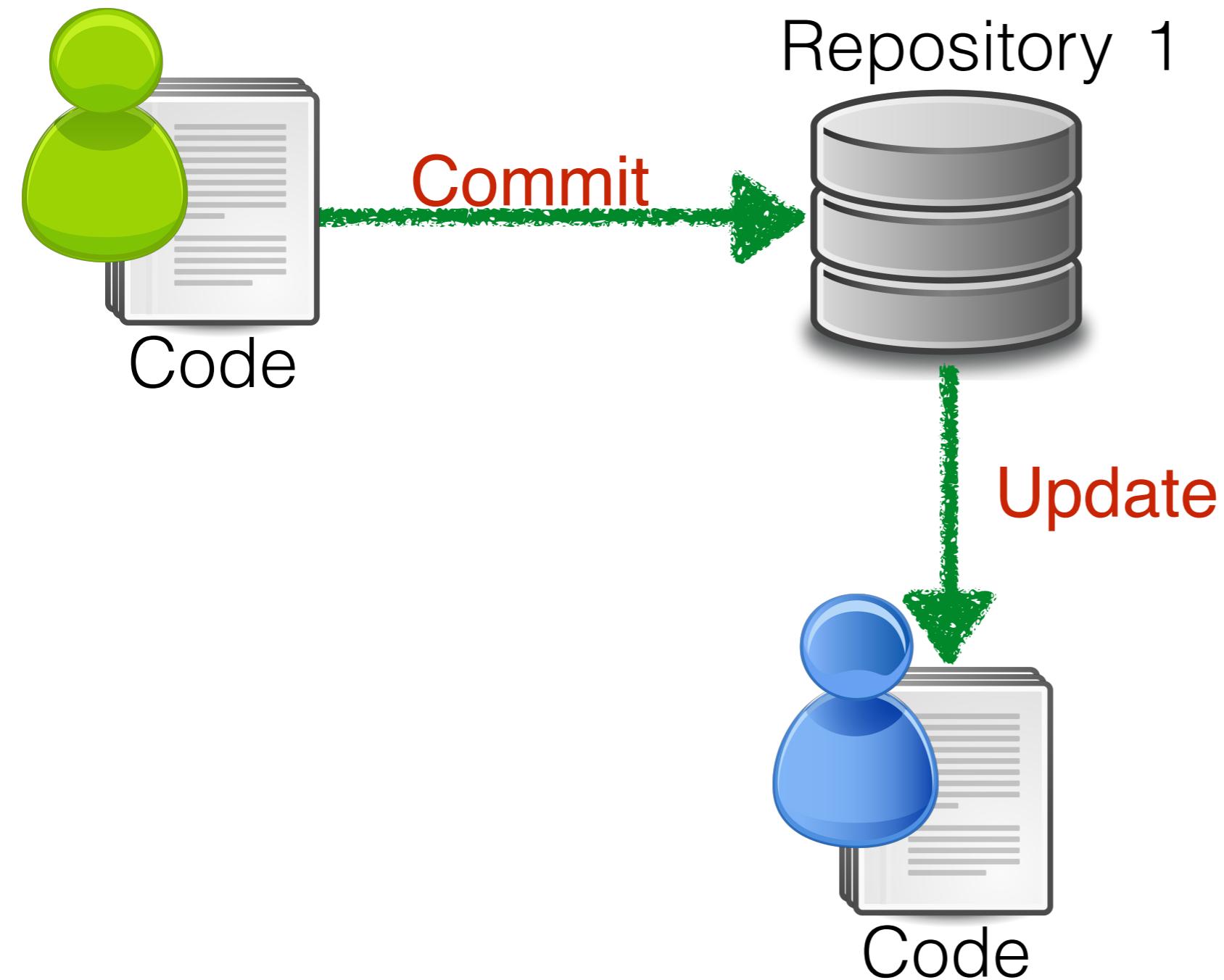
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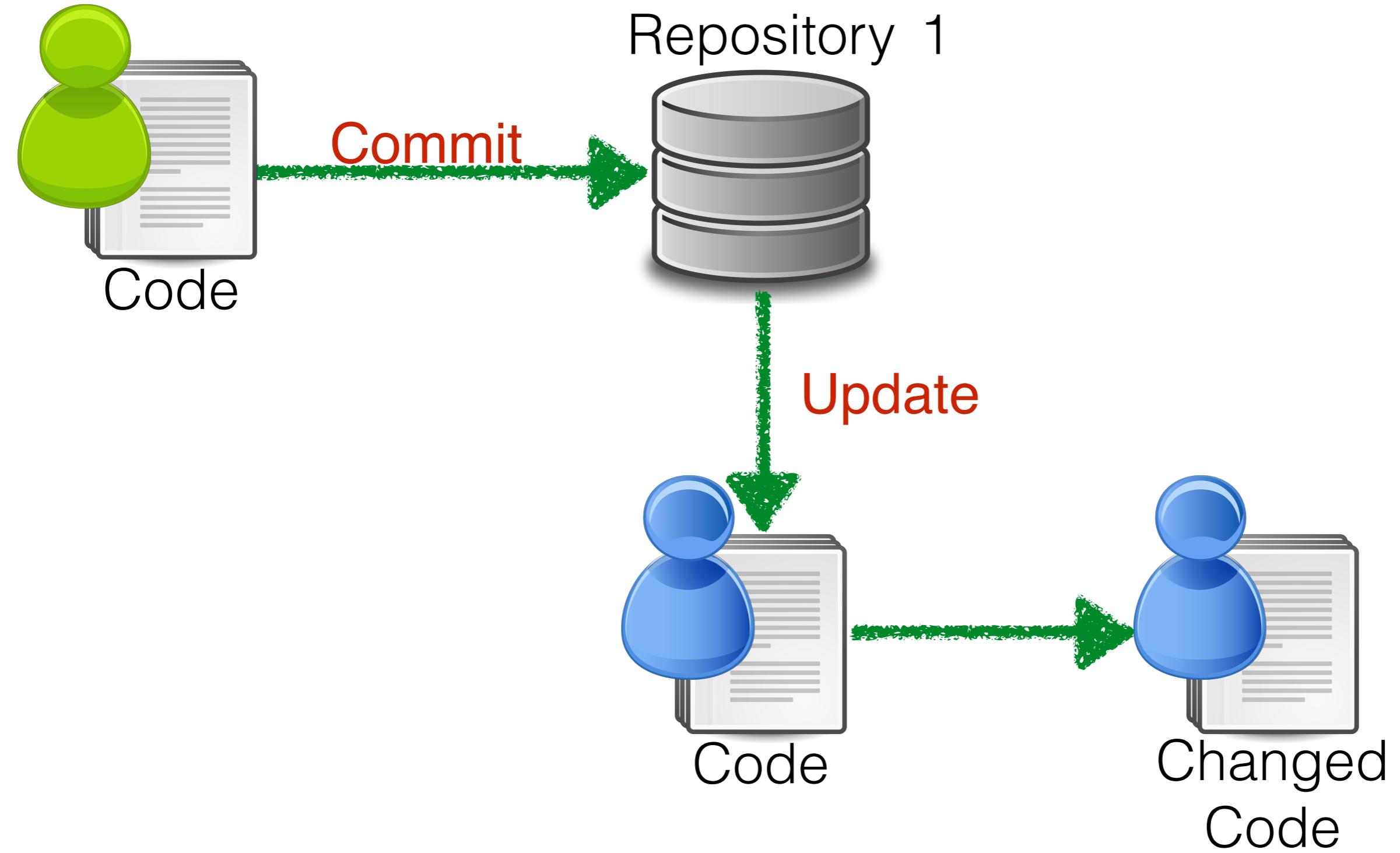
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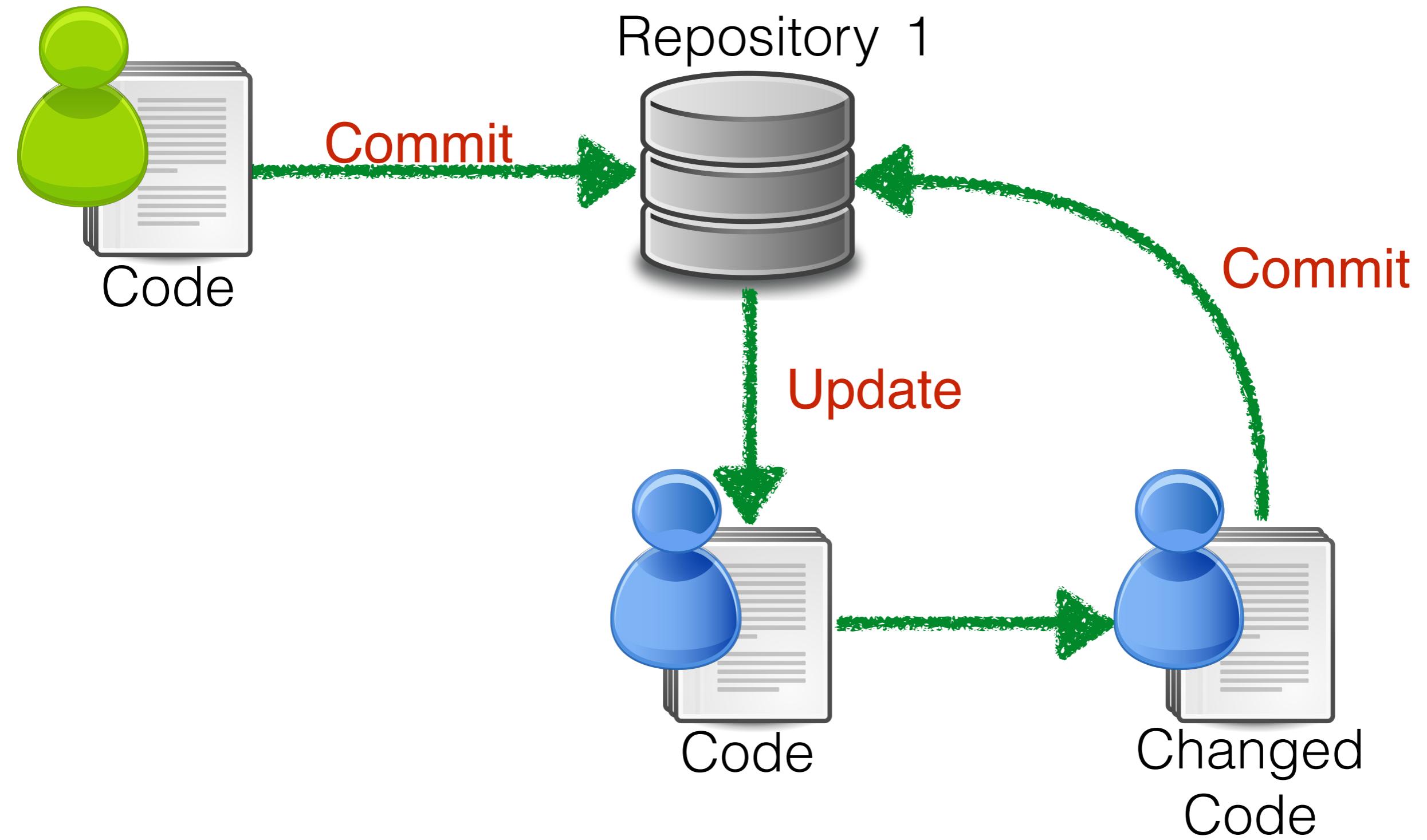
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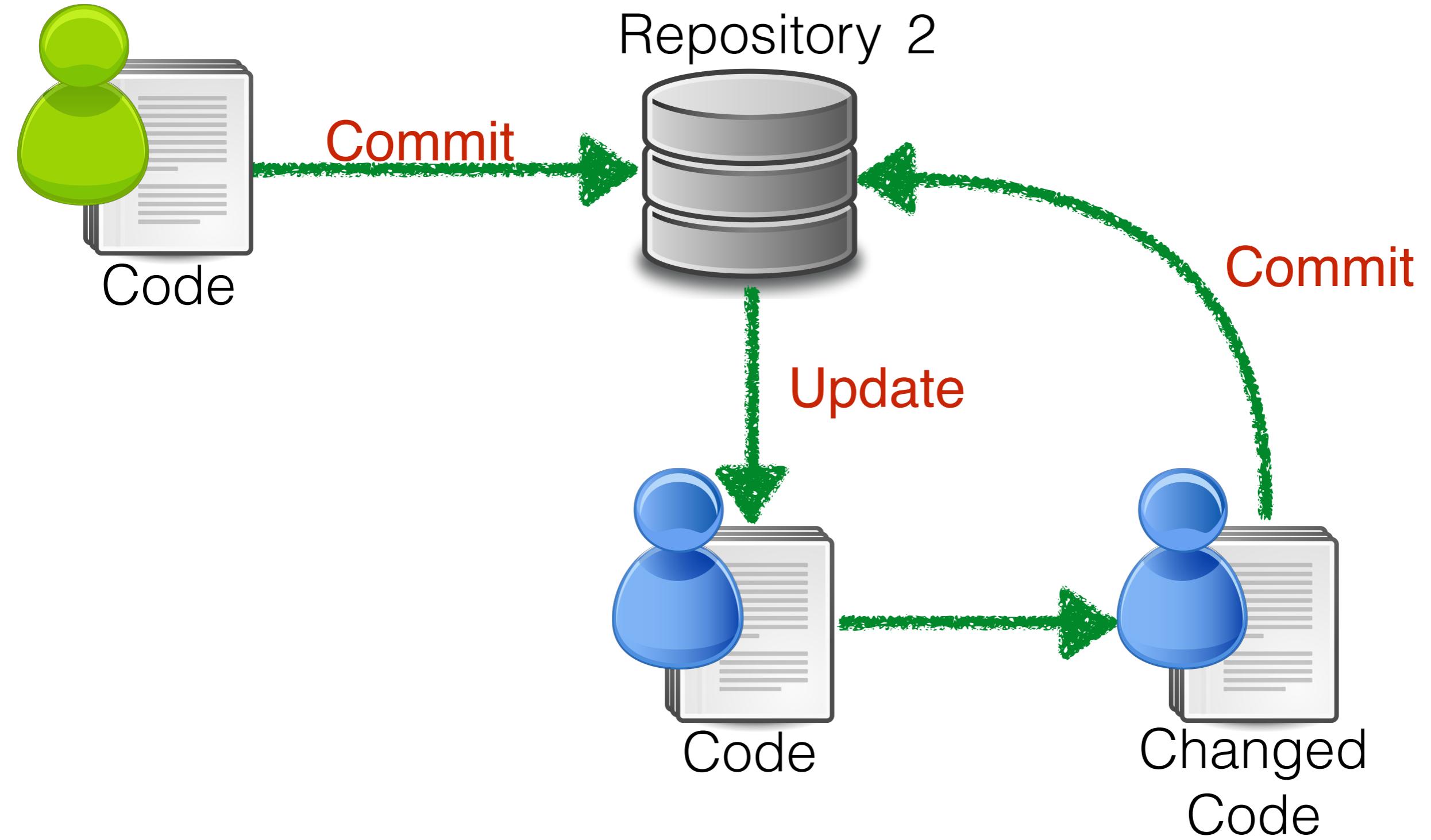
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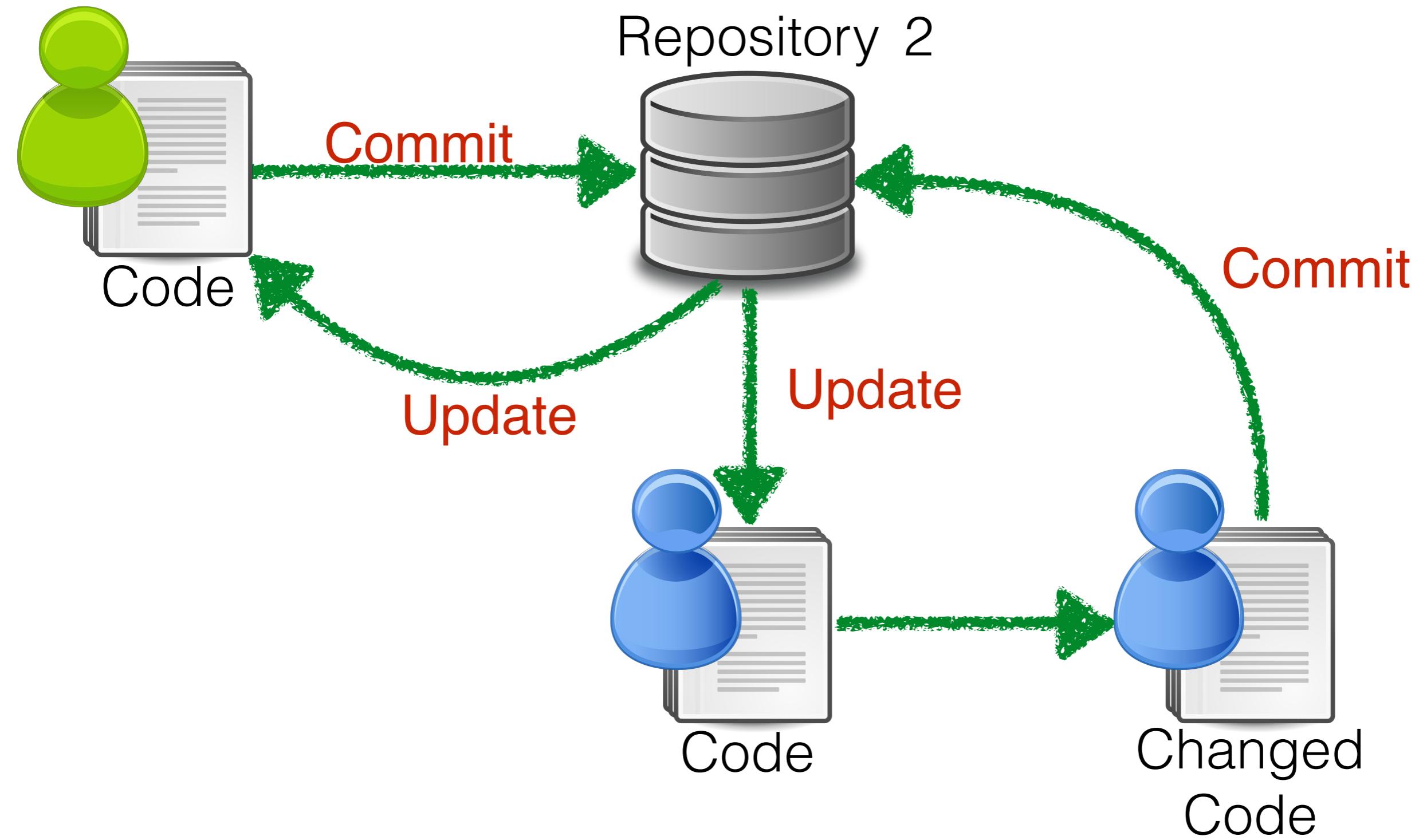
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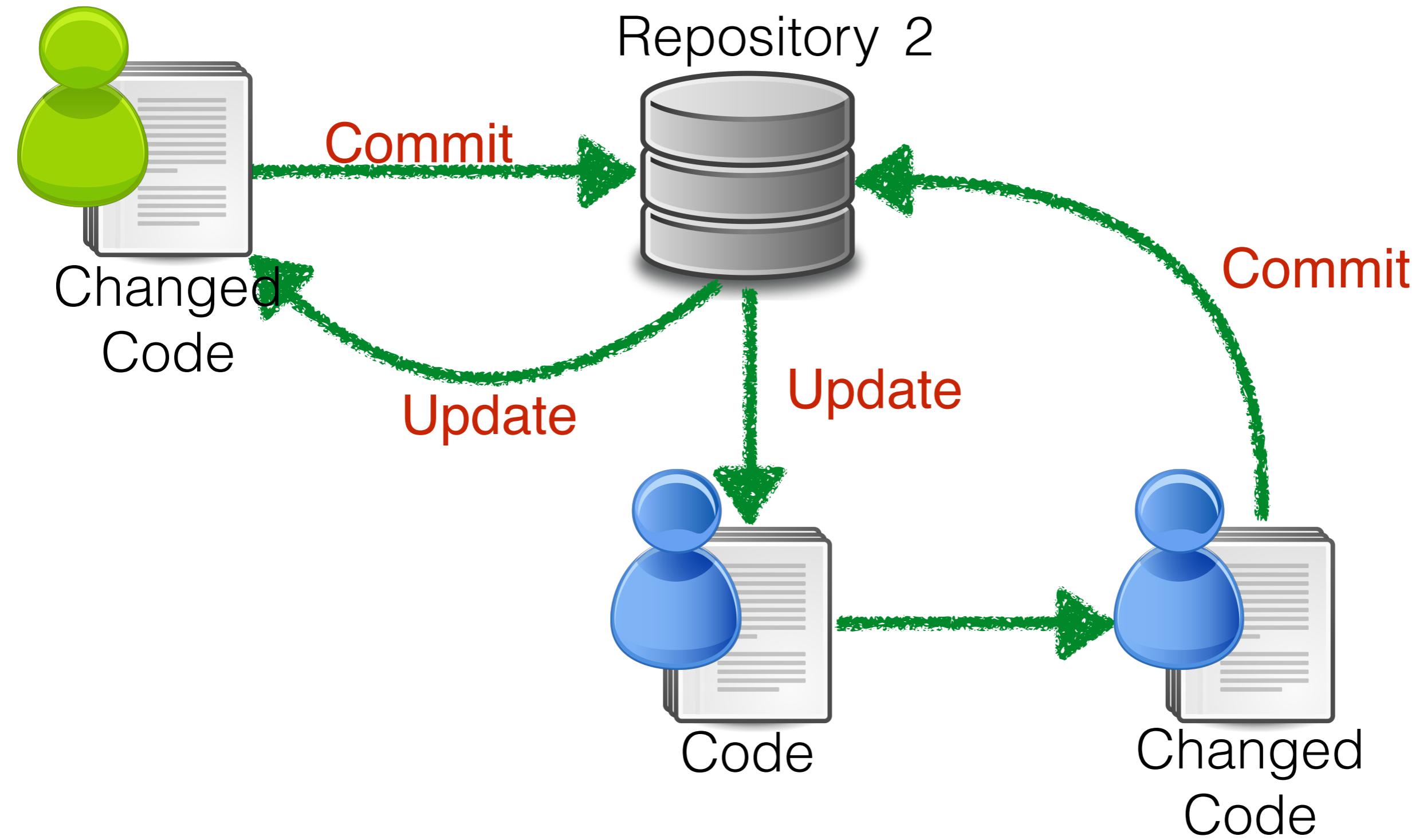
SVN Example



SVN Example



SVN Example



SVN Software

- Windows:
 - **TortoiseSVN** - free
- Mac OS:
 - Versions - \$
 - **SmartSVN** - free/\$
- Linux:
 - RapidSVN - free
- Or Eclipse:
 - **Subversive** - free
 - Subclipse - free

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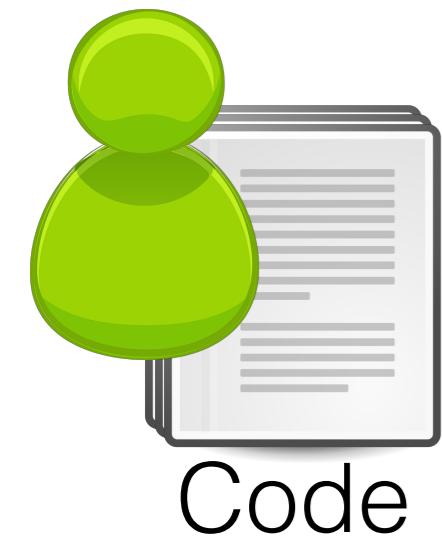
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- Discourages branching

Git

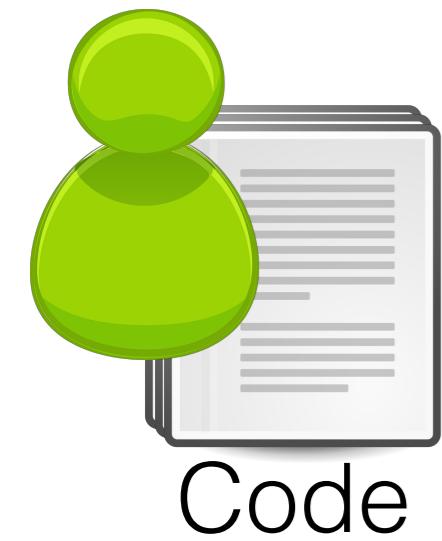
- Is a decentralised (distributed) VCS
- 40 hexadecimal numbers for commit versions (e.g. f3abe64fc121b75f3f0566c73f2f1a4e8ffd68e)
 - Constructed based on author, commit message, previous version, ...

Git Example

Git Example



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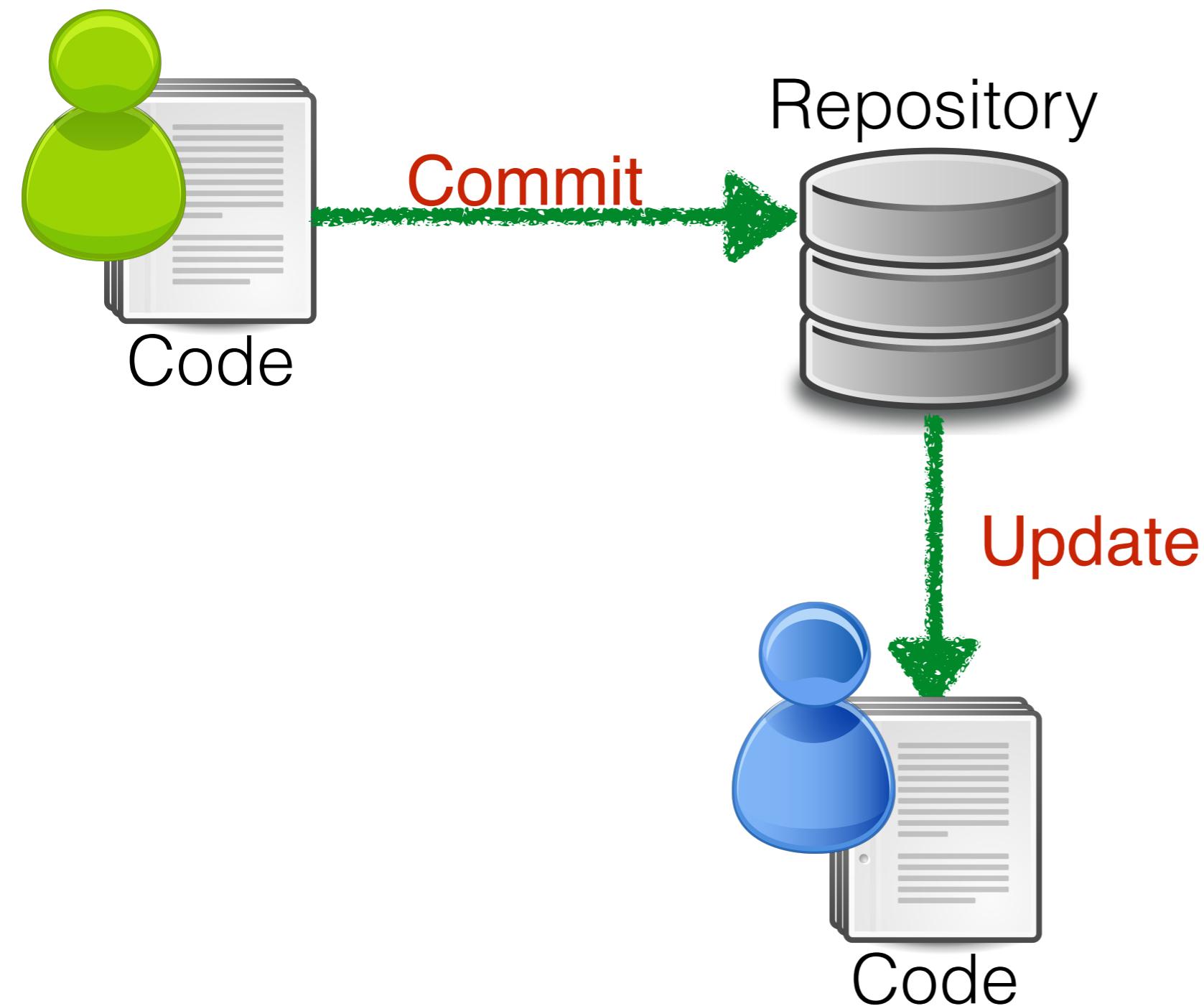
Repository



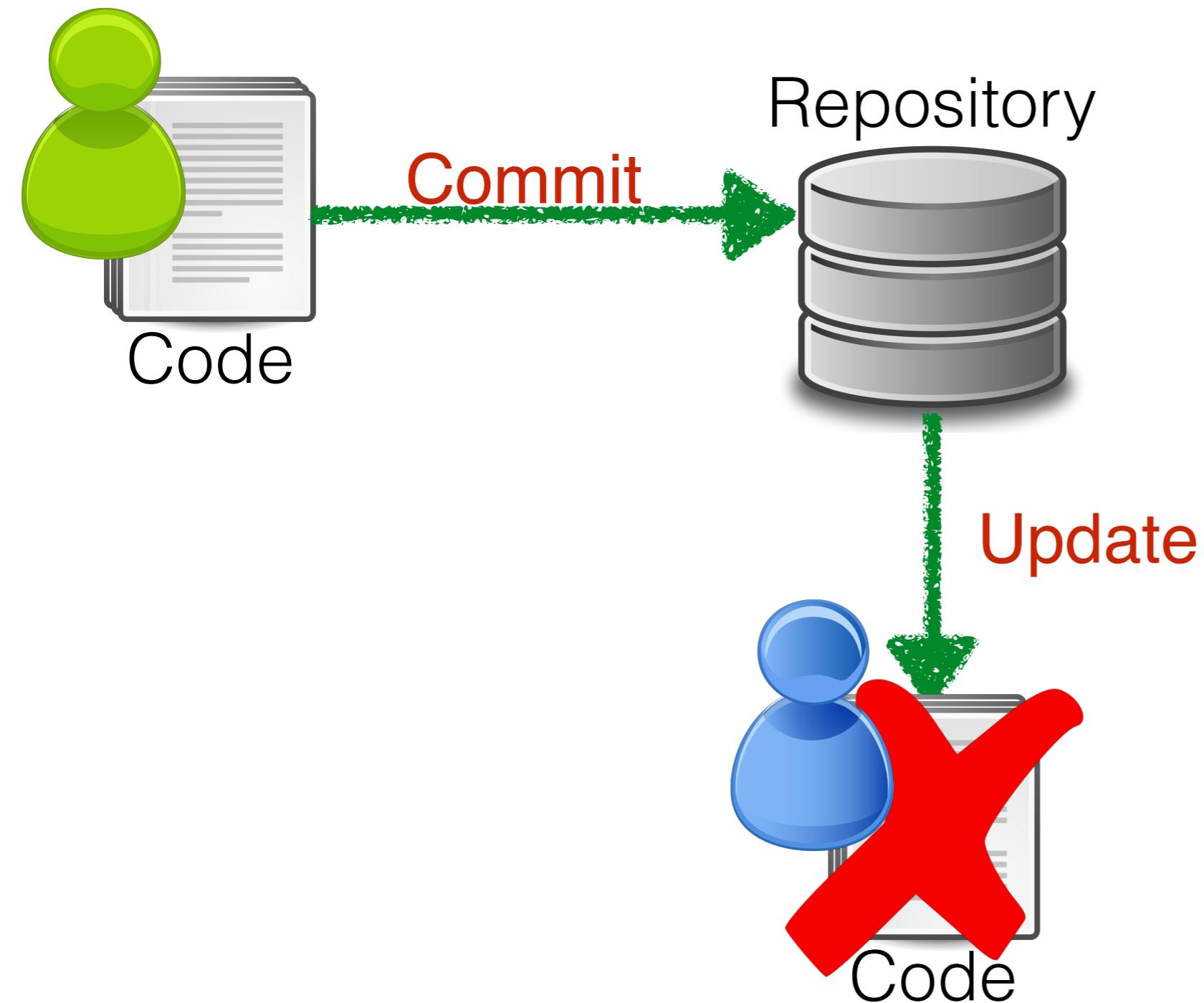
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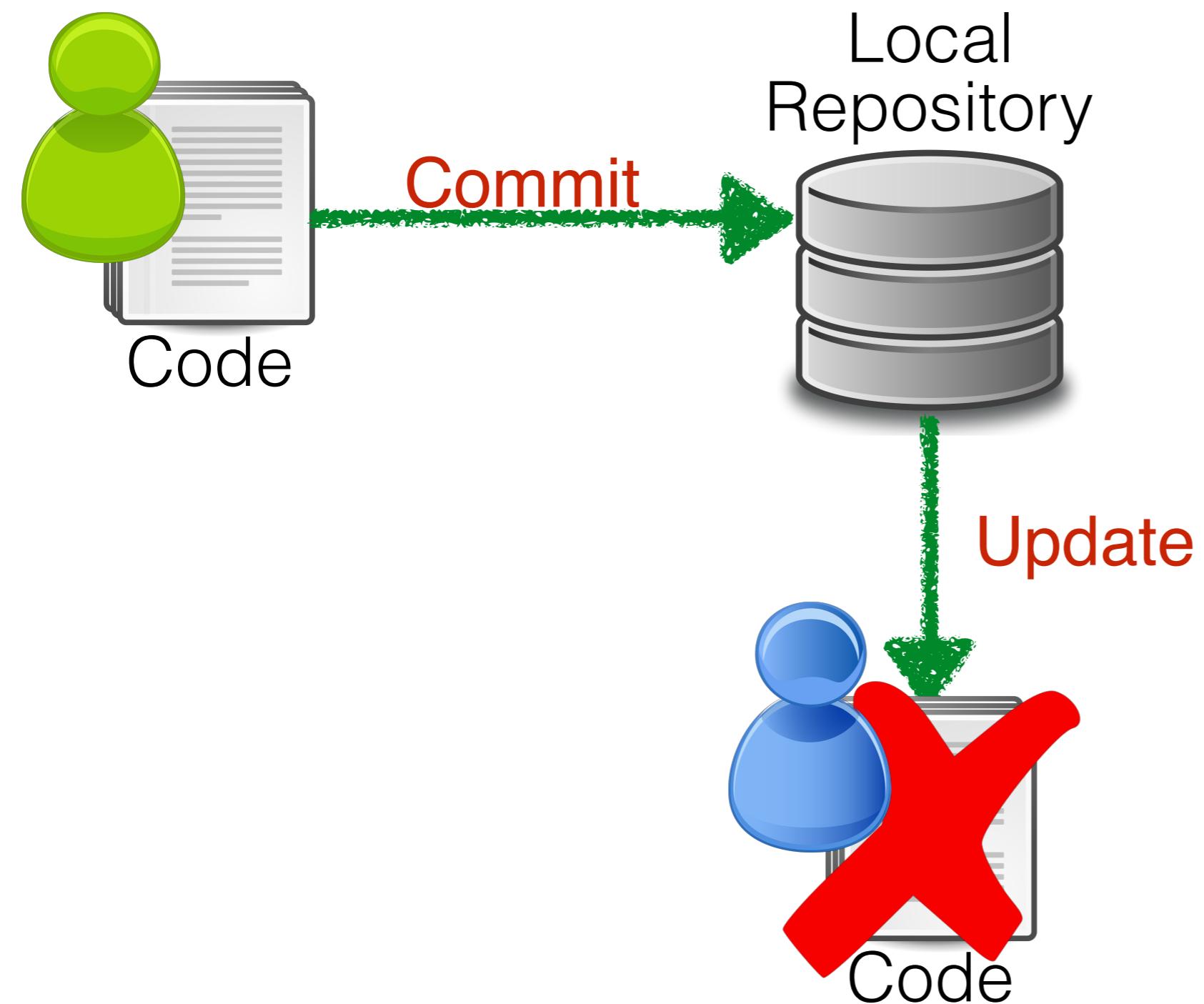
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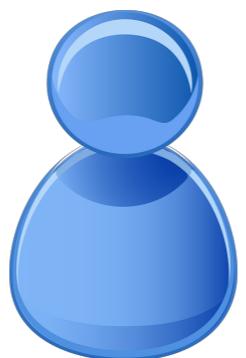
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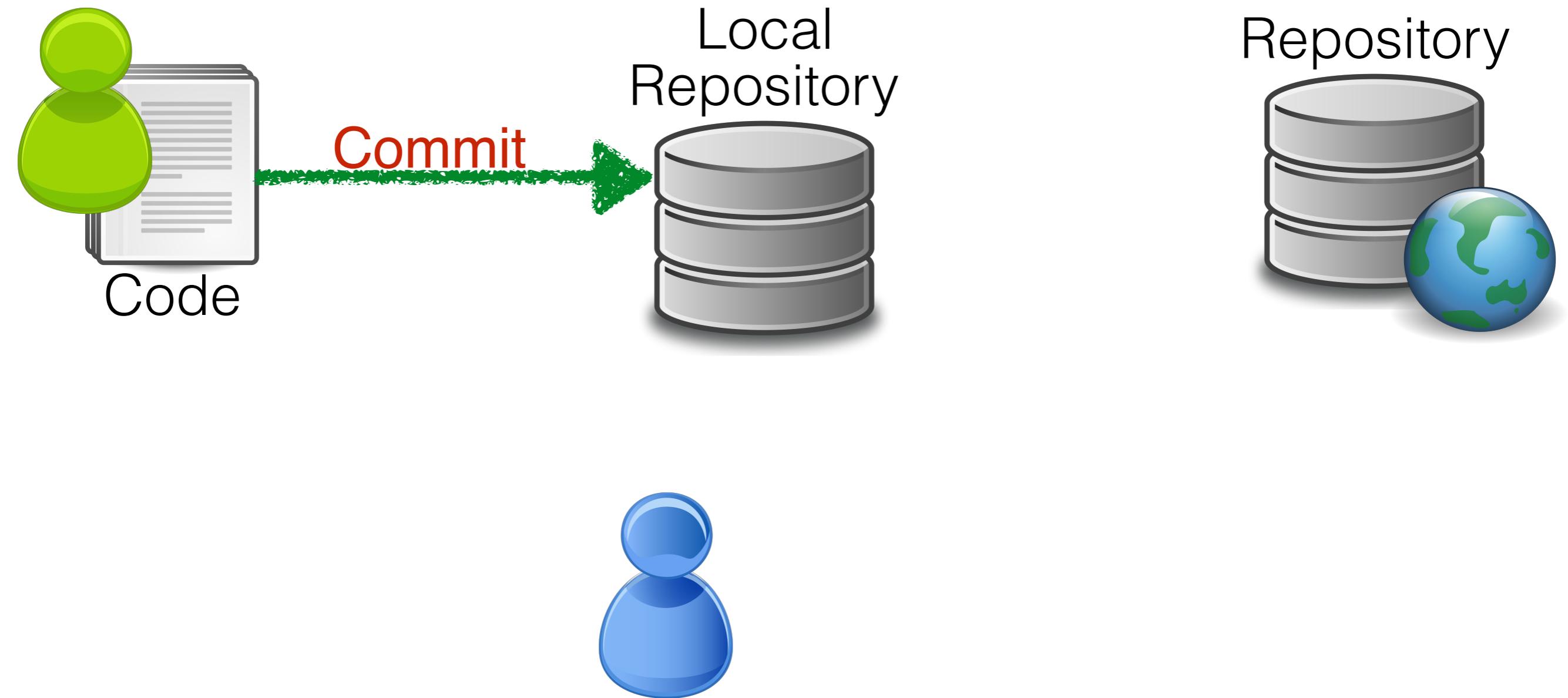
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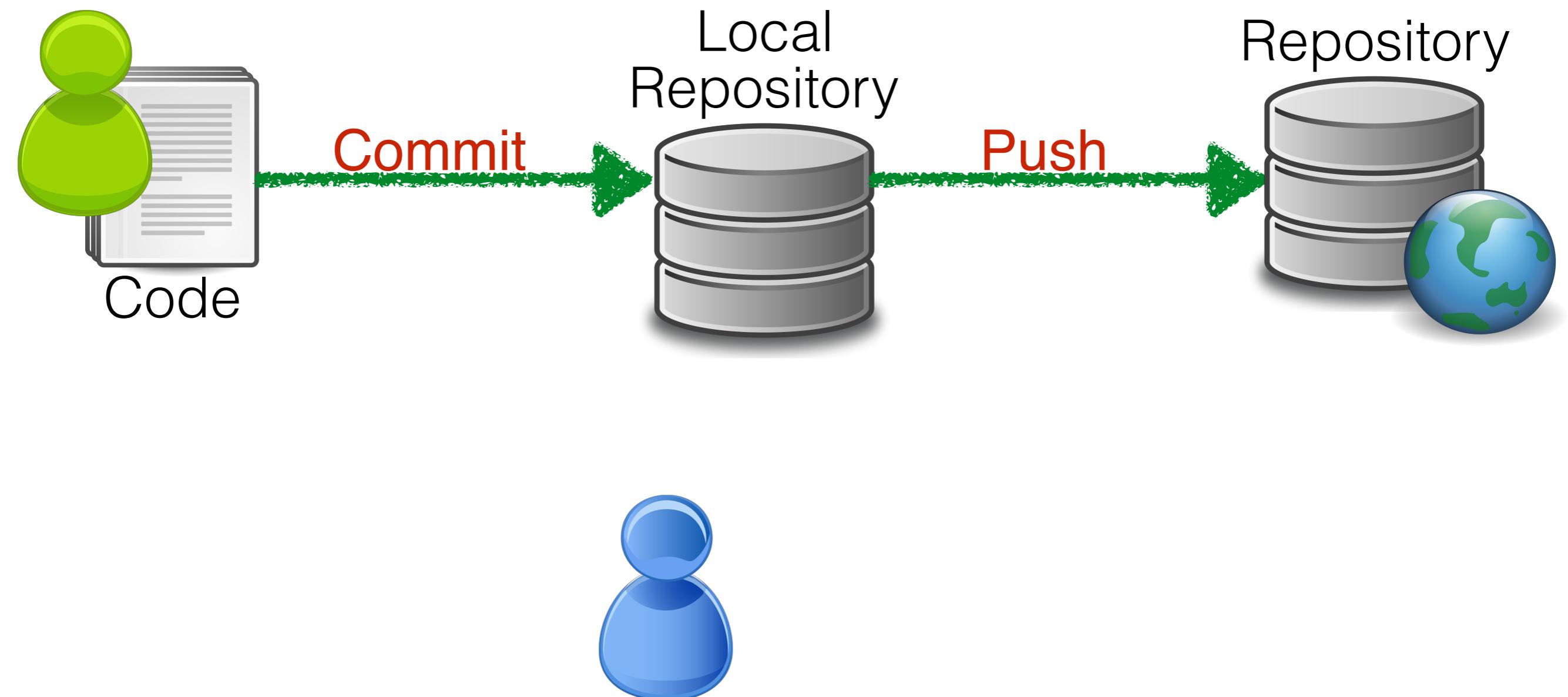
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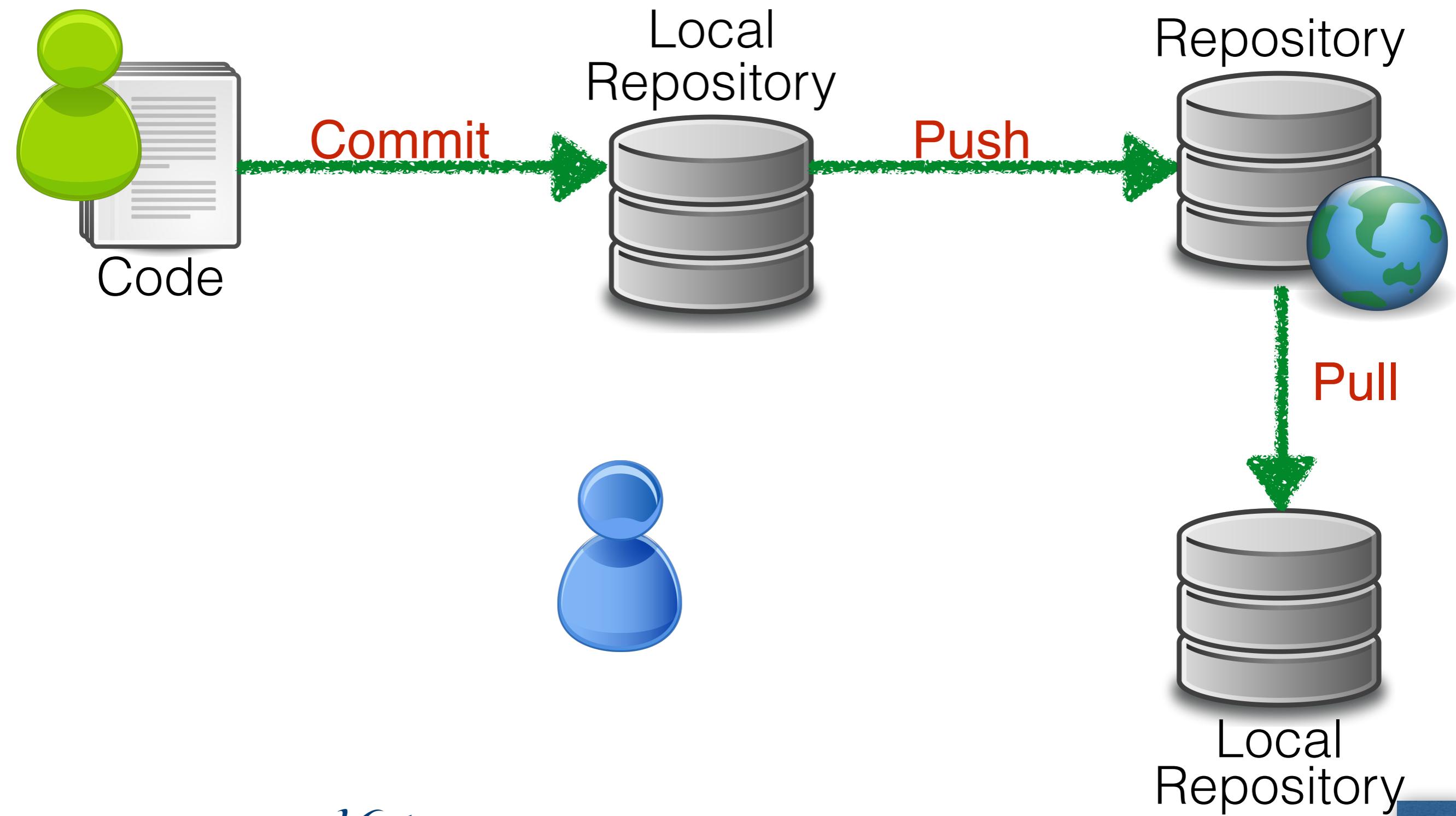
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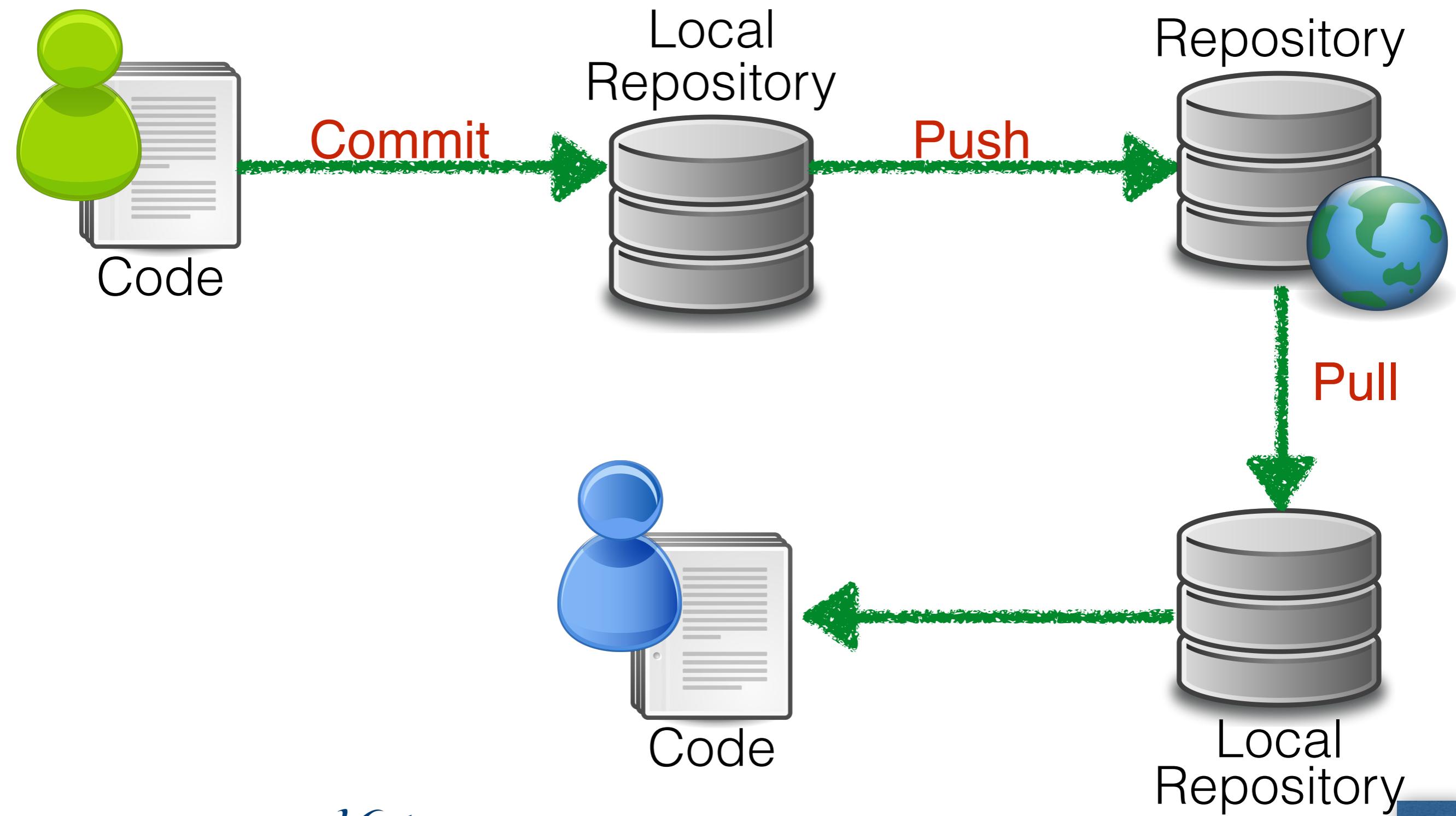
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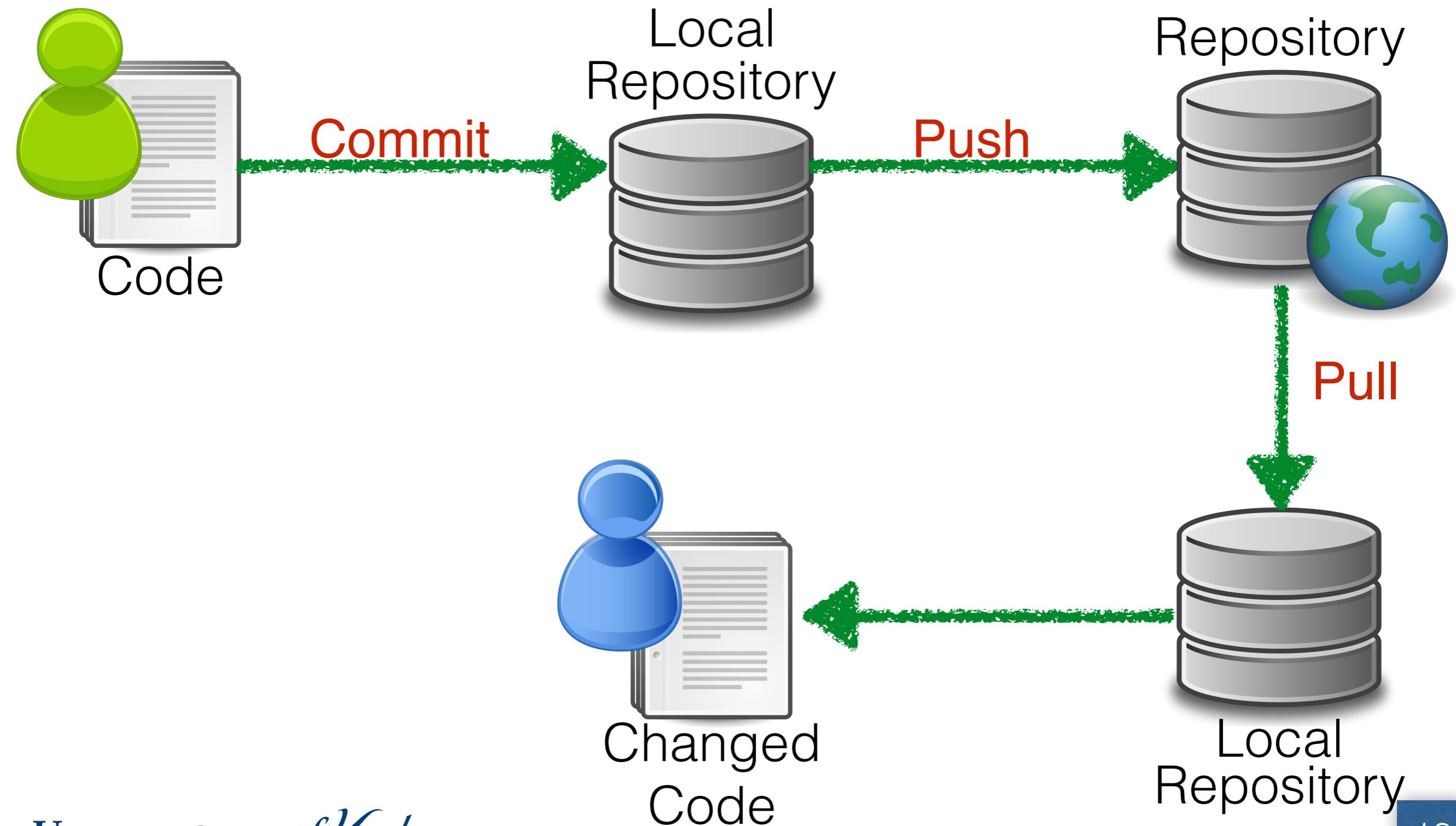
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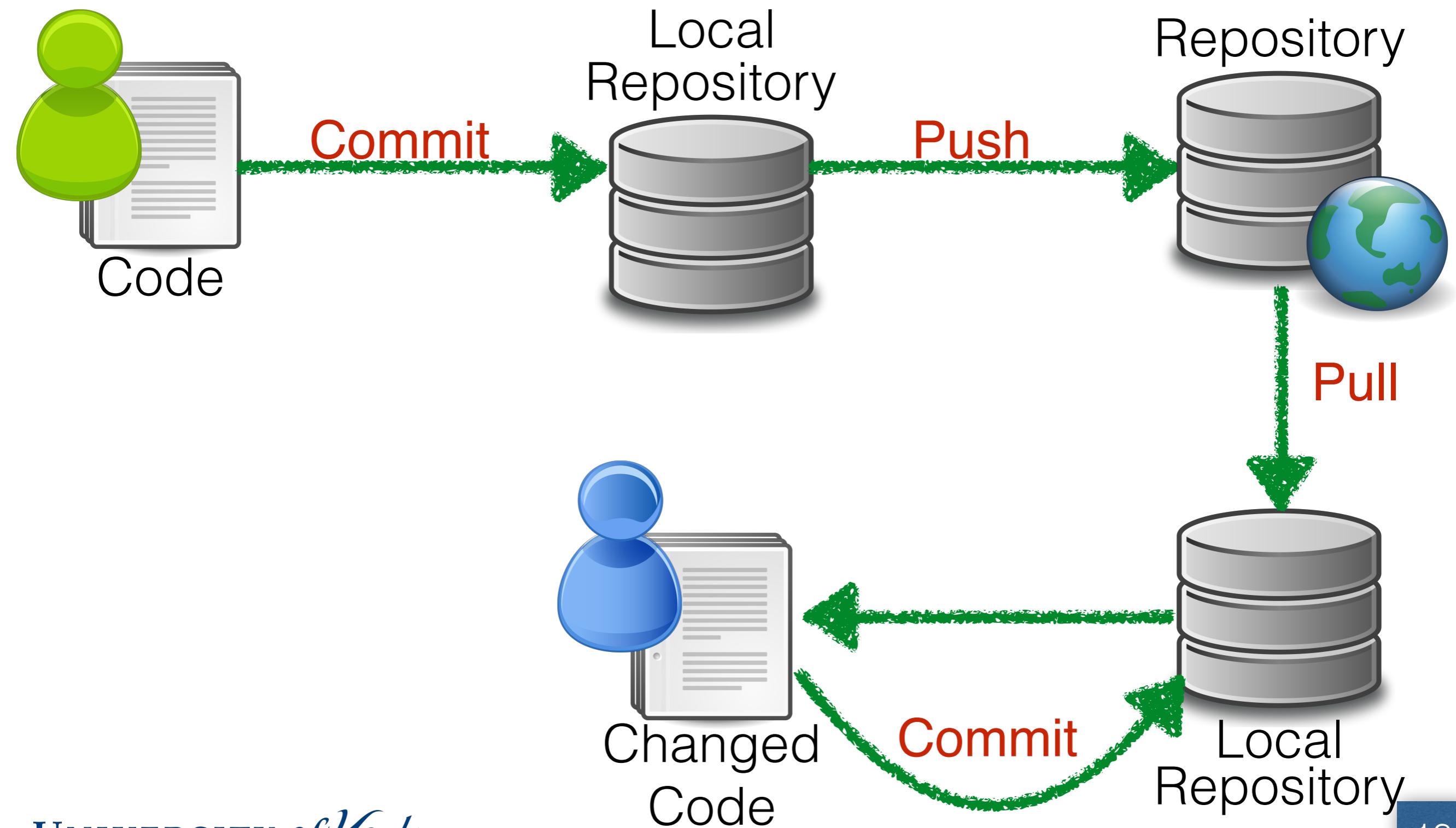
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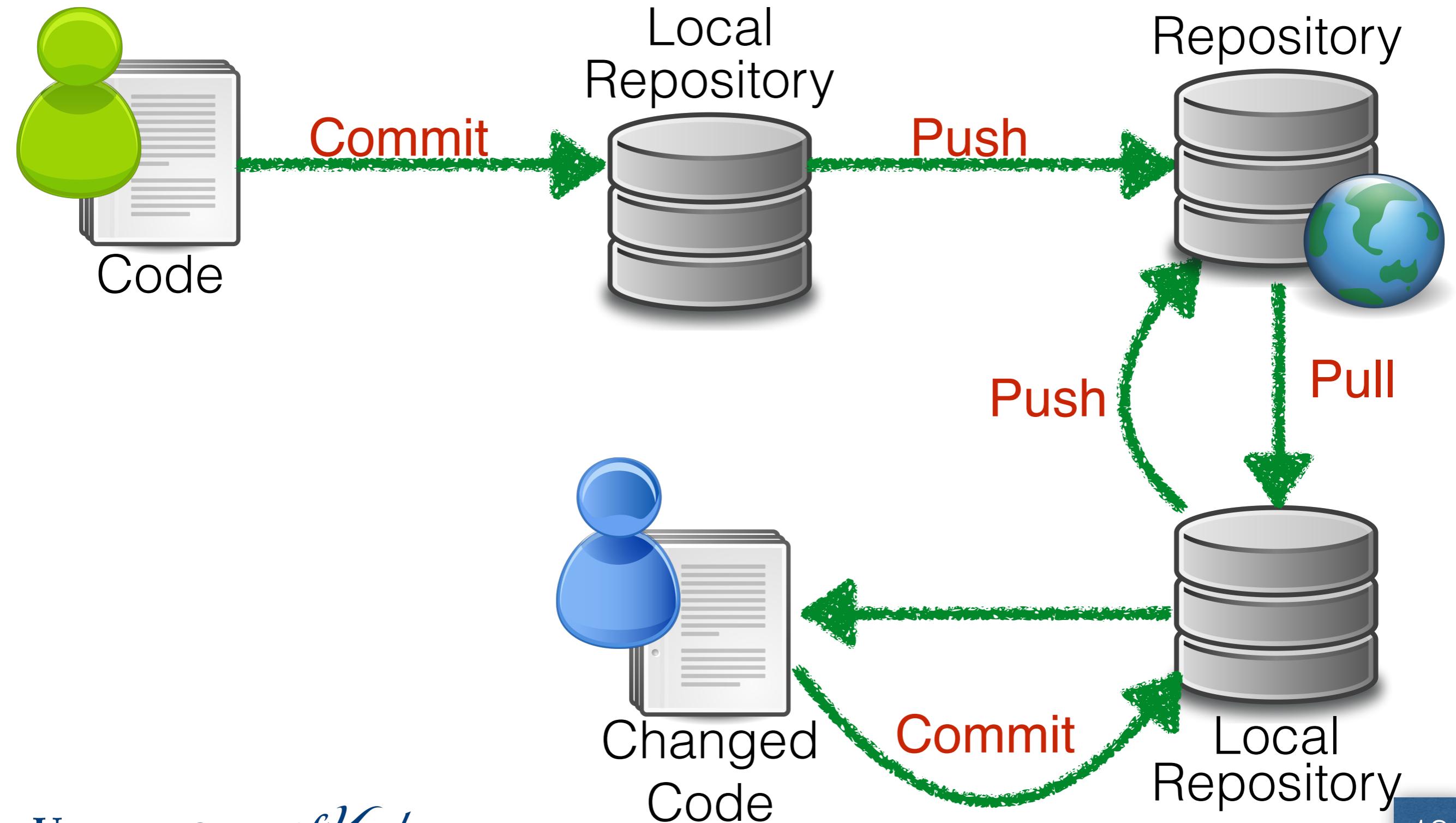
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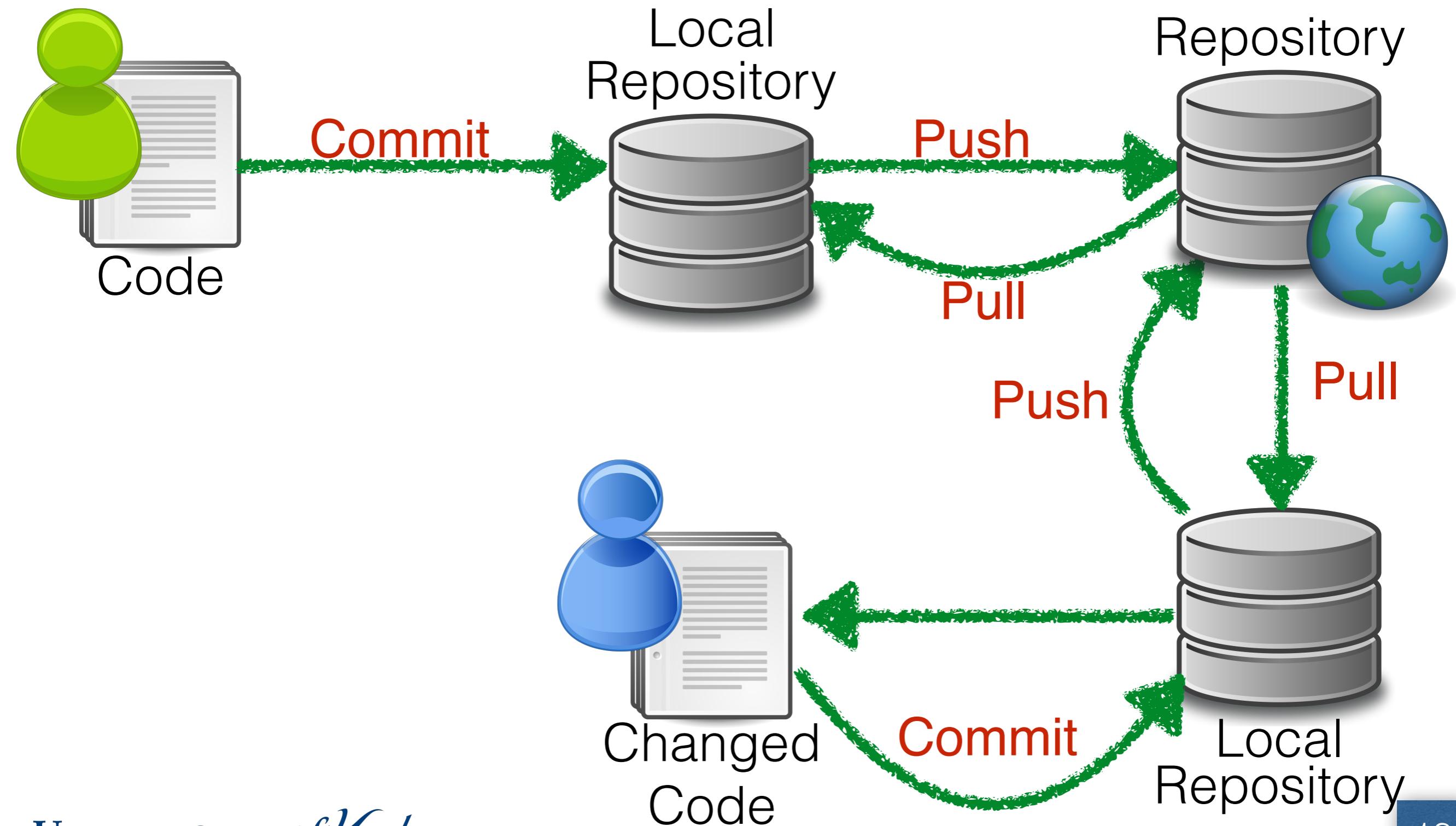
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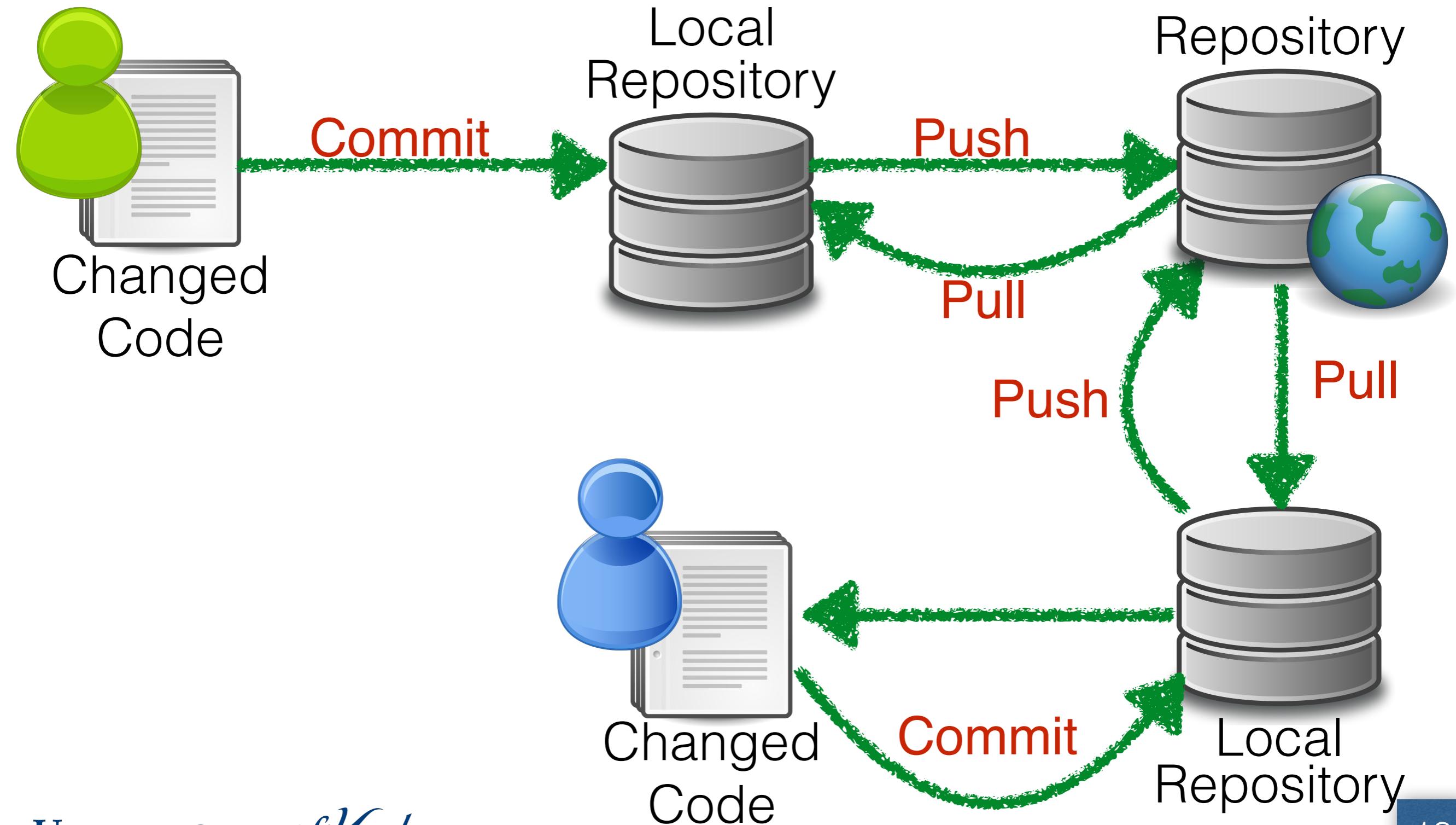
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Git Example



Decentralised



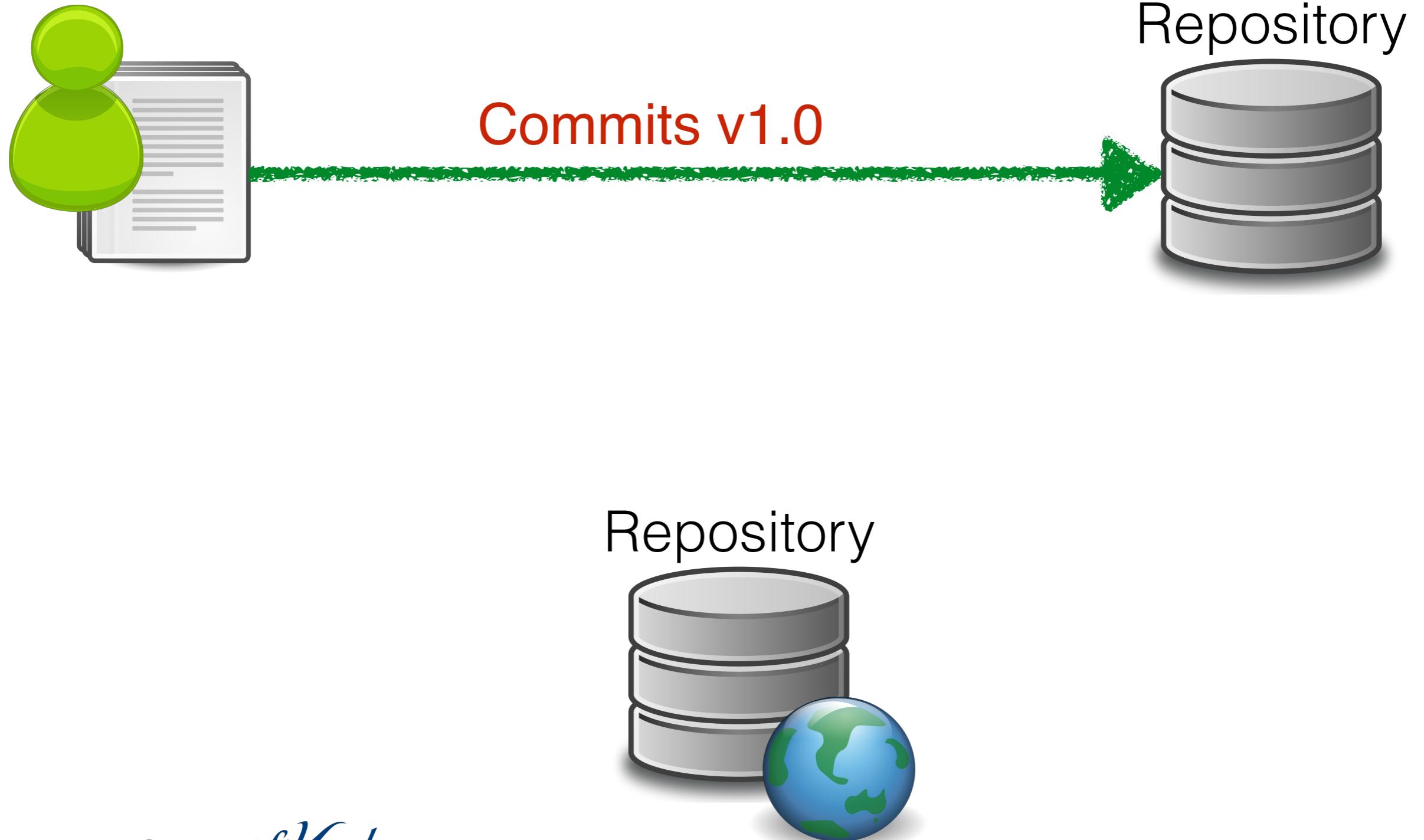
Local
Repository



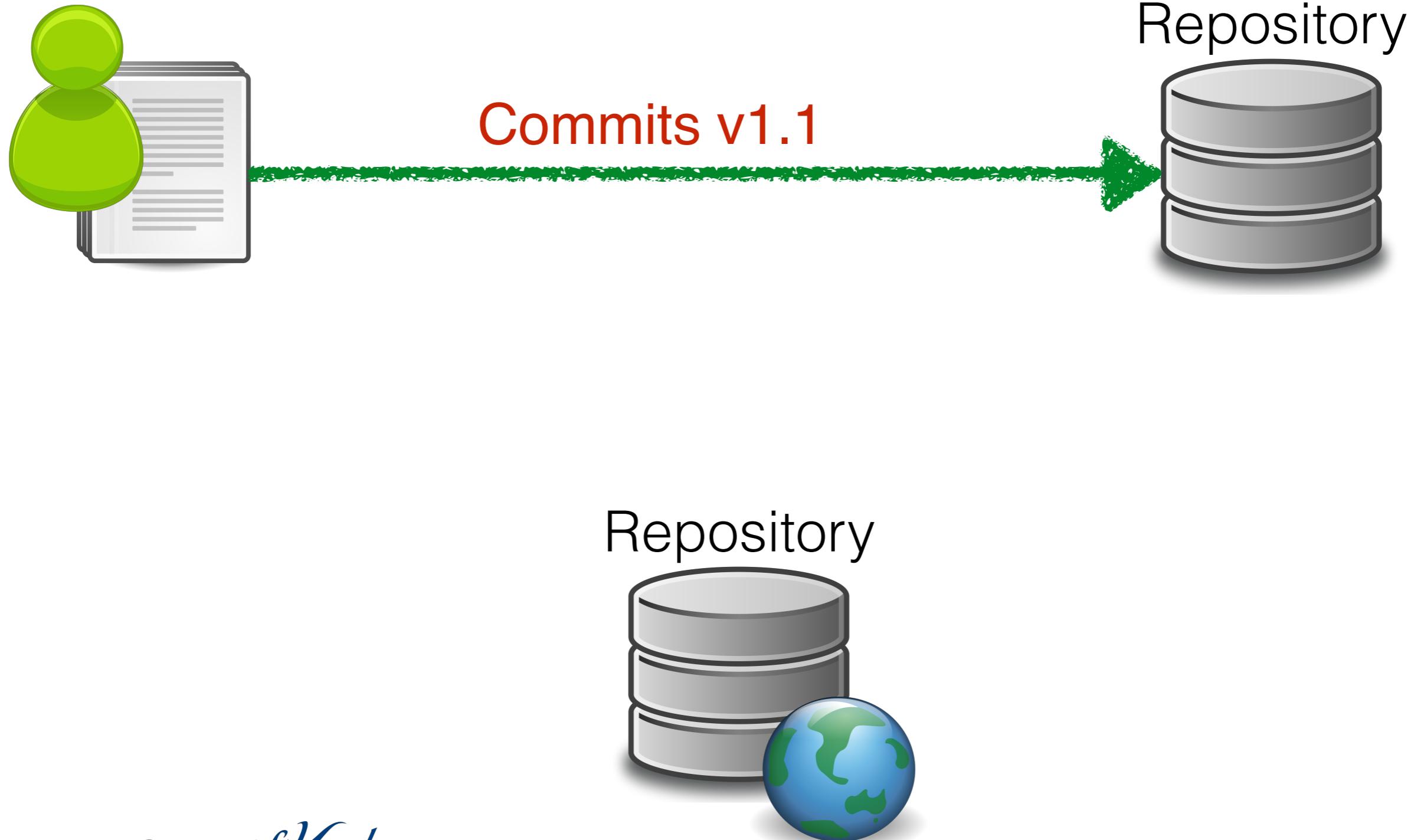
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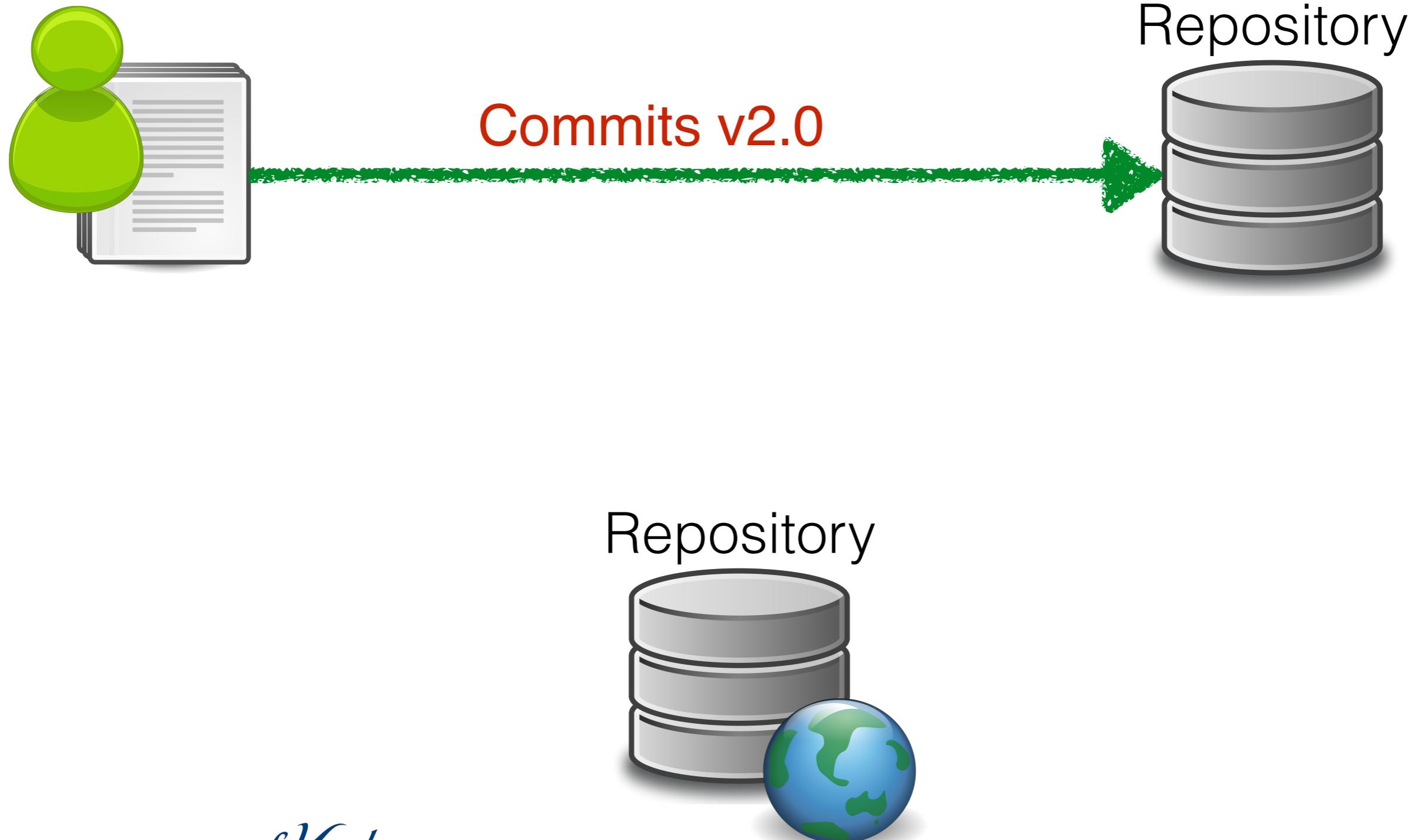
Decentralised



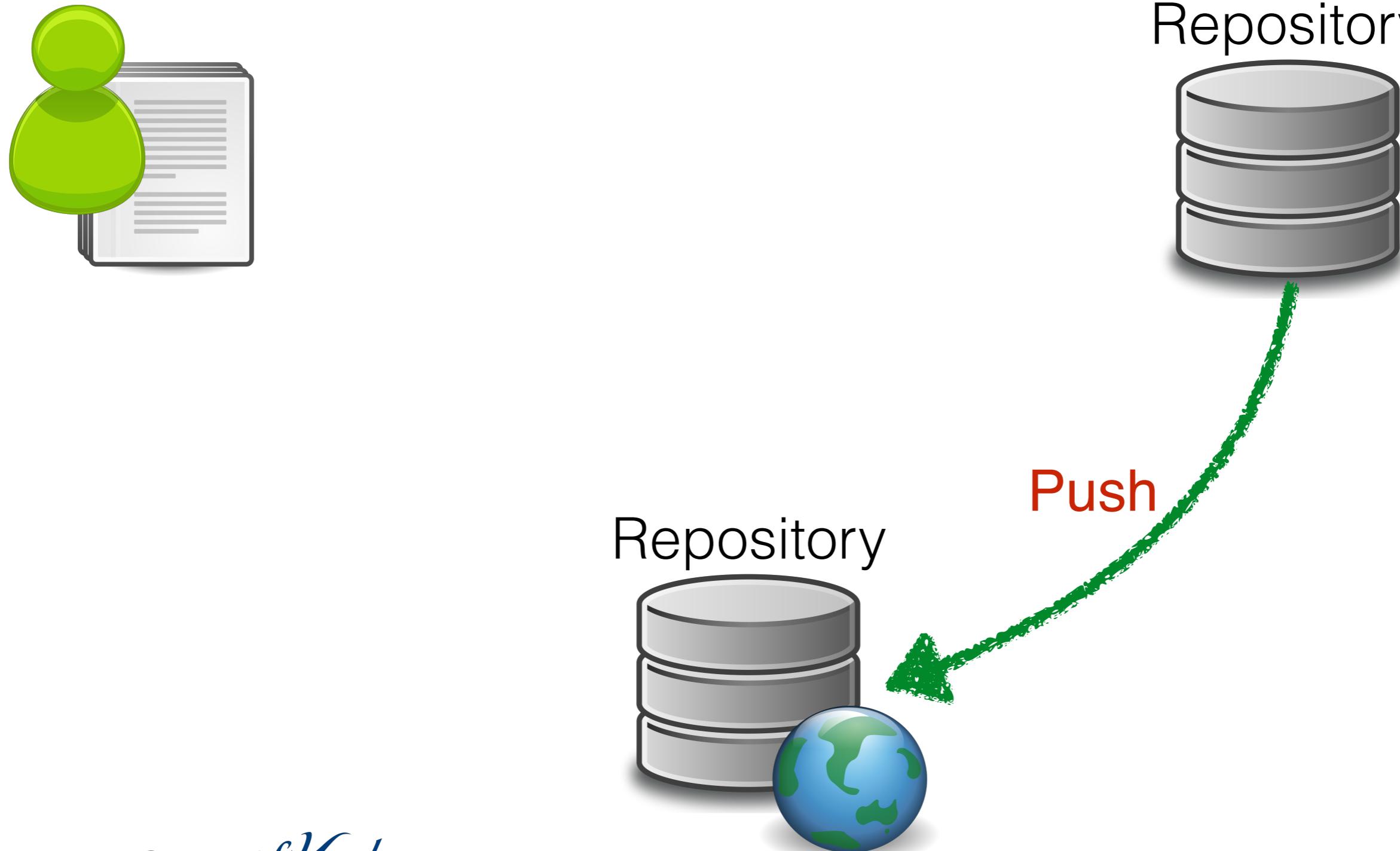
Decentralised



Decentralised



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Decentralised



Local
Repository



Repository



Decentralised



Git Software

- Windows:
 - **Git-bash** (command line) - free
 - **SourceTree** - free
- Mac OS:
 - **Terminal** - free
 - **SourceTree** - free
- Linux:
 - Git Cola - free
 - GitK - free
 - Terminal - free
- Eclipse (cross-platform):
 - EGit - free
- GitKraken (cross-platform)

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- ✓ More features than SVN
- Can be difficult
 - Yes, more difficult than SVN (but after a while it is going to be your best friend in group projects)

Practical

- Let's try Git
- 1st part: single-user exercises
- 2nd part: branches, collaboration & conflicts
- 3rd part: work with your teams

Part 1

- Navigate to this practical's git repo: <https://github.com/zolotas4/VersionControlLecture>
 - <https://tinyurl.com/git-sepr> (or this that will redirect you to the above)
- Follow the instructions under Part 1
- IF YOU'VE FINISHED TAKE A BREAK. WE WILL BE BACK AT **13:30** FOR PART 2.

Part 2

- Collaboration through GUI (SourceTree). I will:
 - Create a repo on GitHub
 - Clone it locally
 - Create files, stage them and commit
 - Invite a collaborator
 - Work together
 - Create and resolve conflicts

Part 3 (optional)

- Having a VCS for your team project is not a requirement
- ... however, I encourage you to do or at least give it a try
- If you are thinking of having one then spent the remaining time on:
 - Choosing which is the best for your needs
 - Experiment with different GUIs and choose which fits you best (or reject them all and use terminal)
 - If you pick Git, then create a repository online (Github or Bitbucket are good services)
 - Add the files you have so far created for your project
 - Try to collaborate
 - If conflicts appear don't panic - try to resolve them