

Version Control Systems (aka VCSs)

Athanasis Zolotas

Outline

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

Introduction

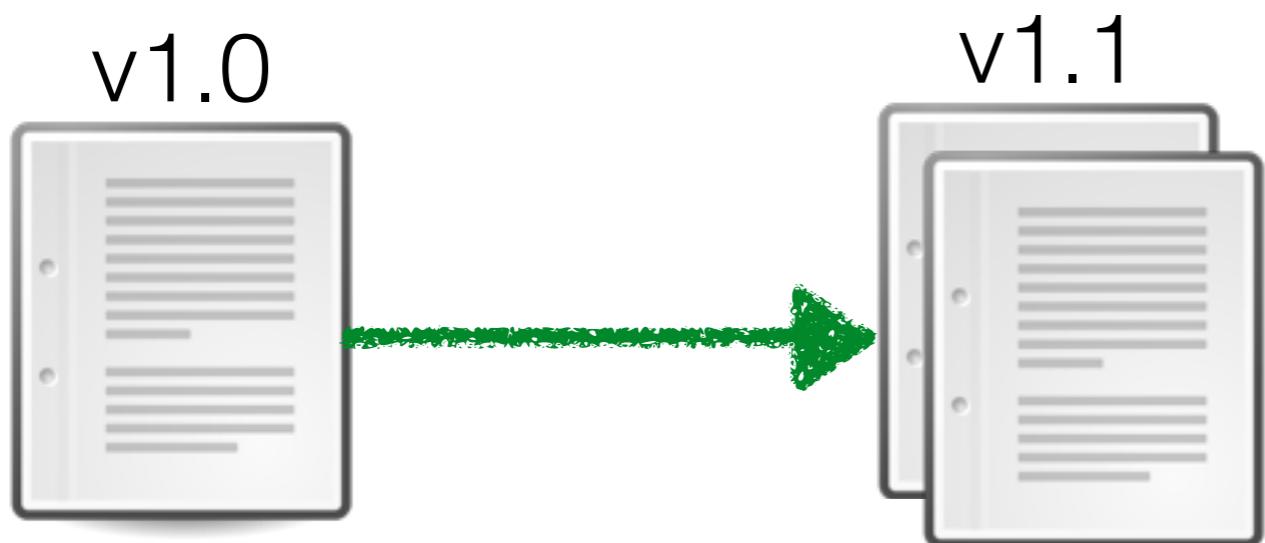
- As the name suggests its a technology to control versions of an artefact
 - Most probably code
 - It's quite common for text project

Introduction

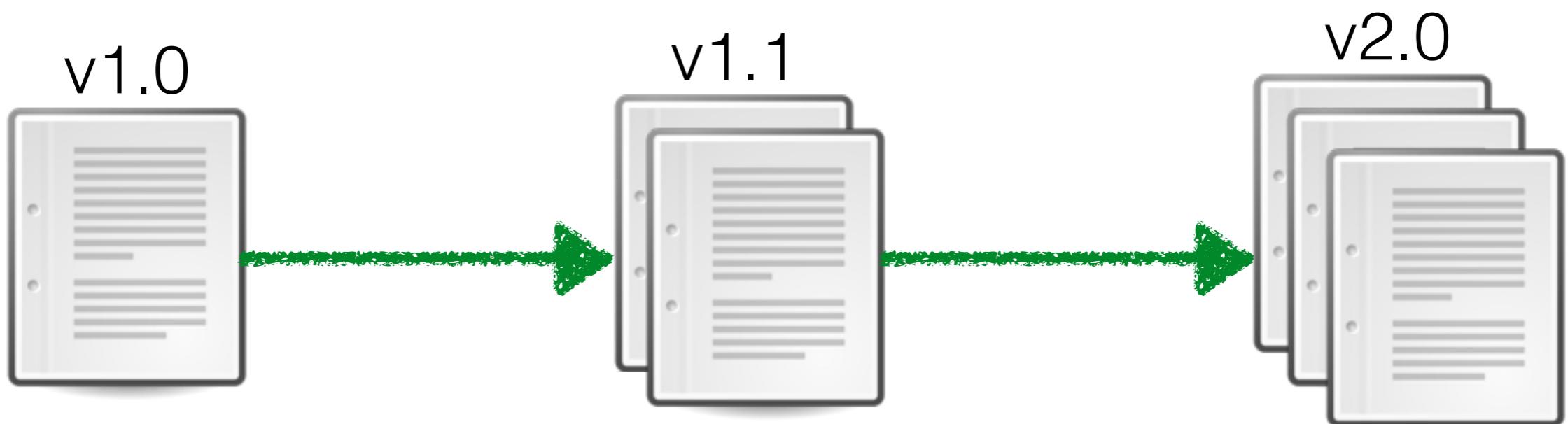
v1.0



Introduction



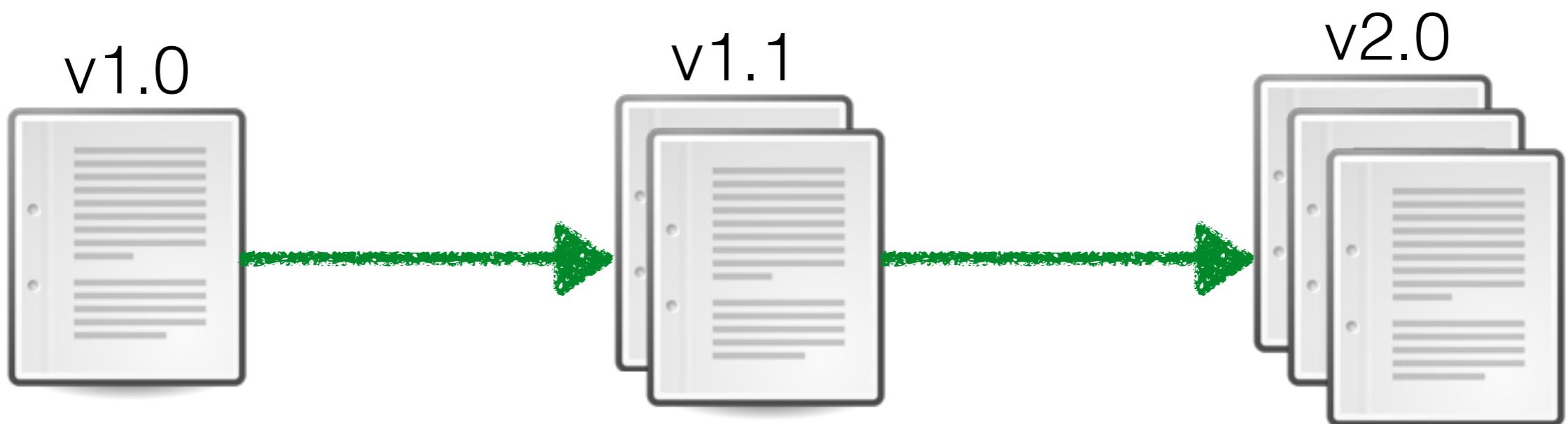
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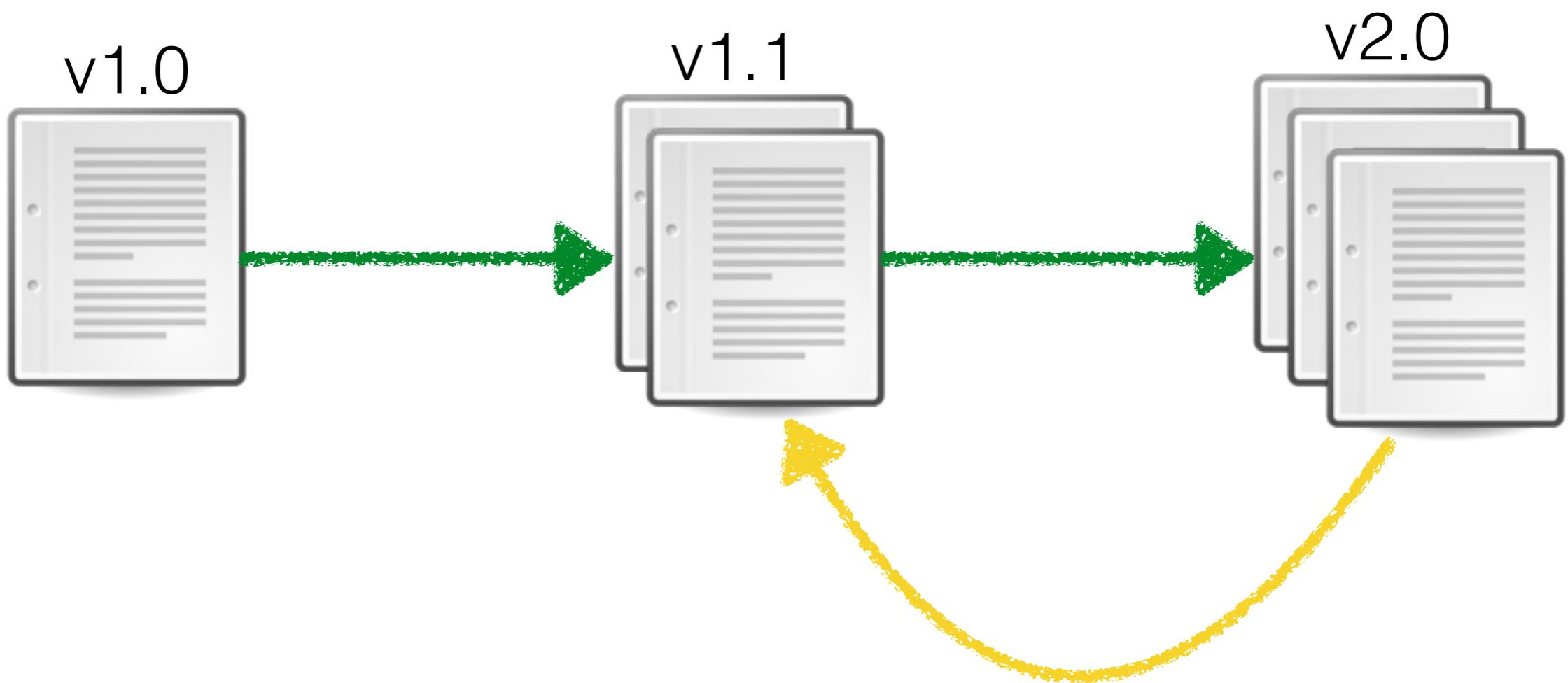
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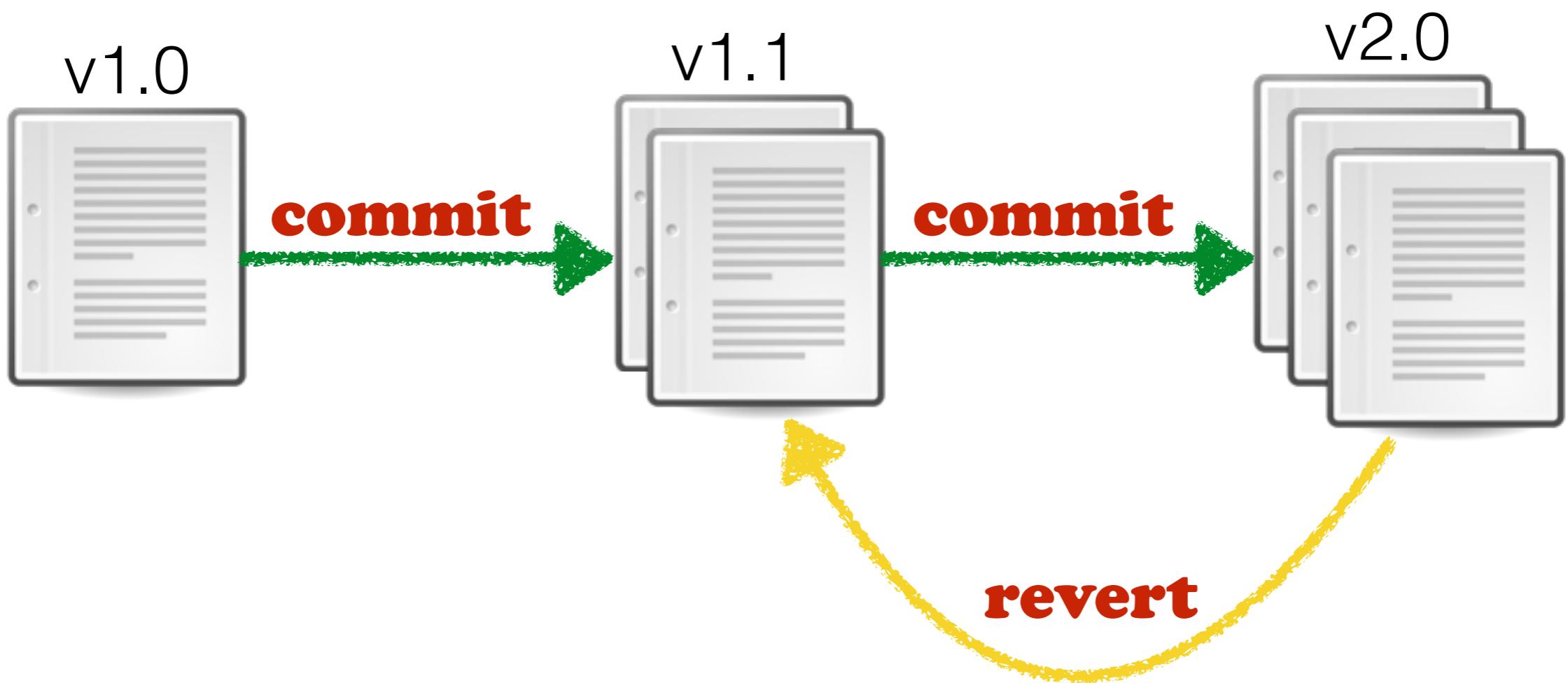
Introduction



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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:
 - Enables collaboration
 - Works as a backup

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- Filenames:
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 - project_v1.zip → project_v2.zip

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Modern VCSS

Modern VCSs

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Modern VCSs

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

Approaches

- Centralised
- Decentralised (or Distributed)

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

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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



Code

Repository 0



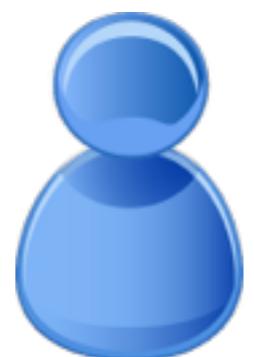
SVN Example



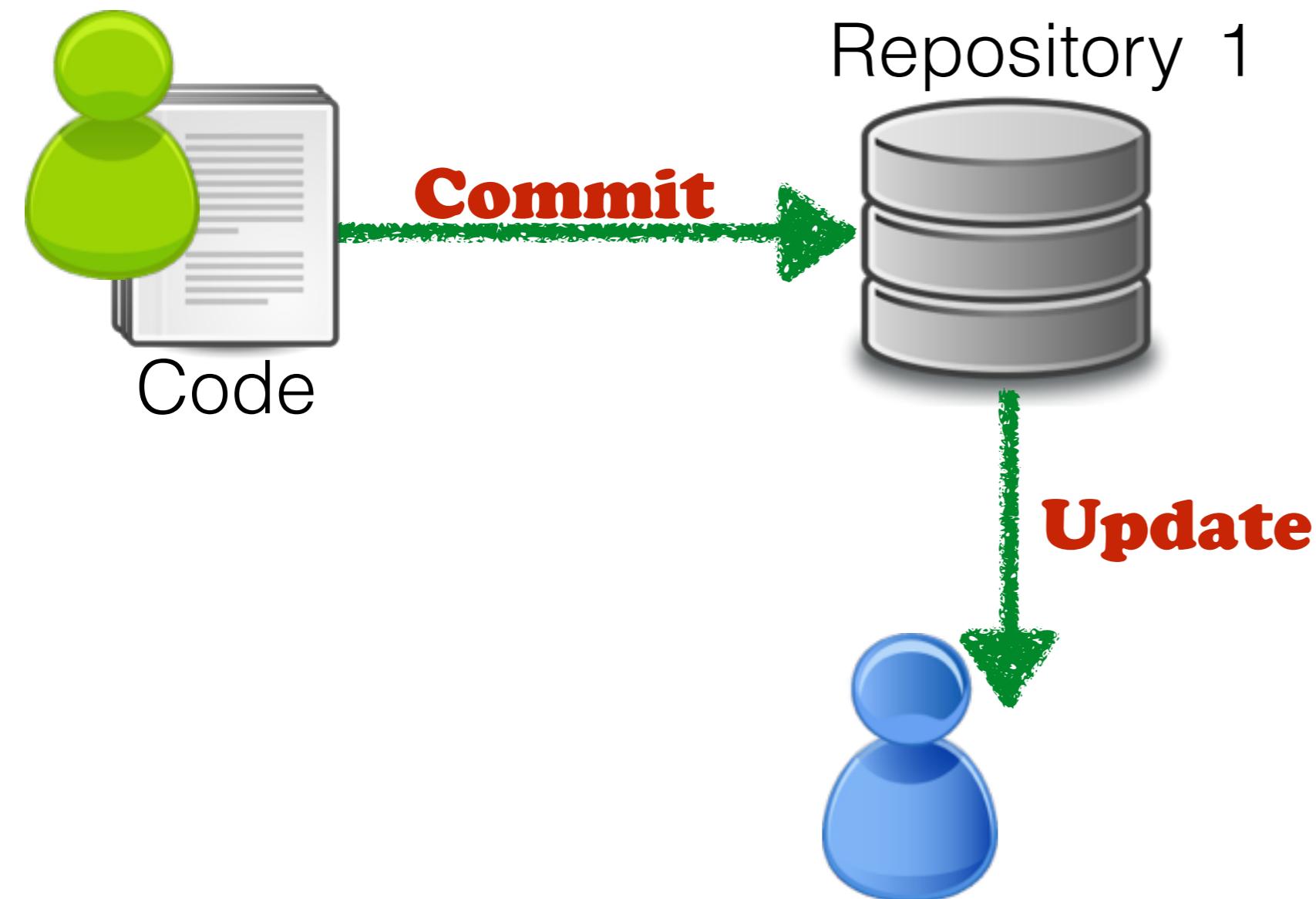
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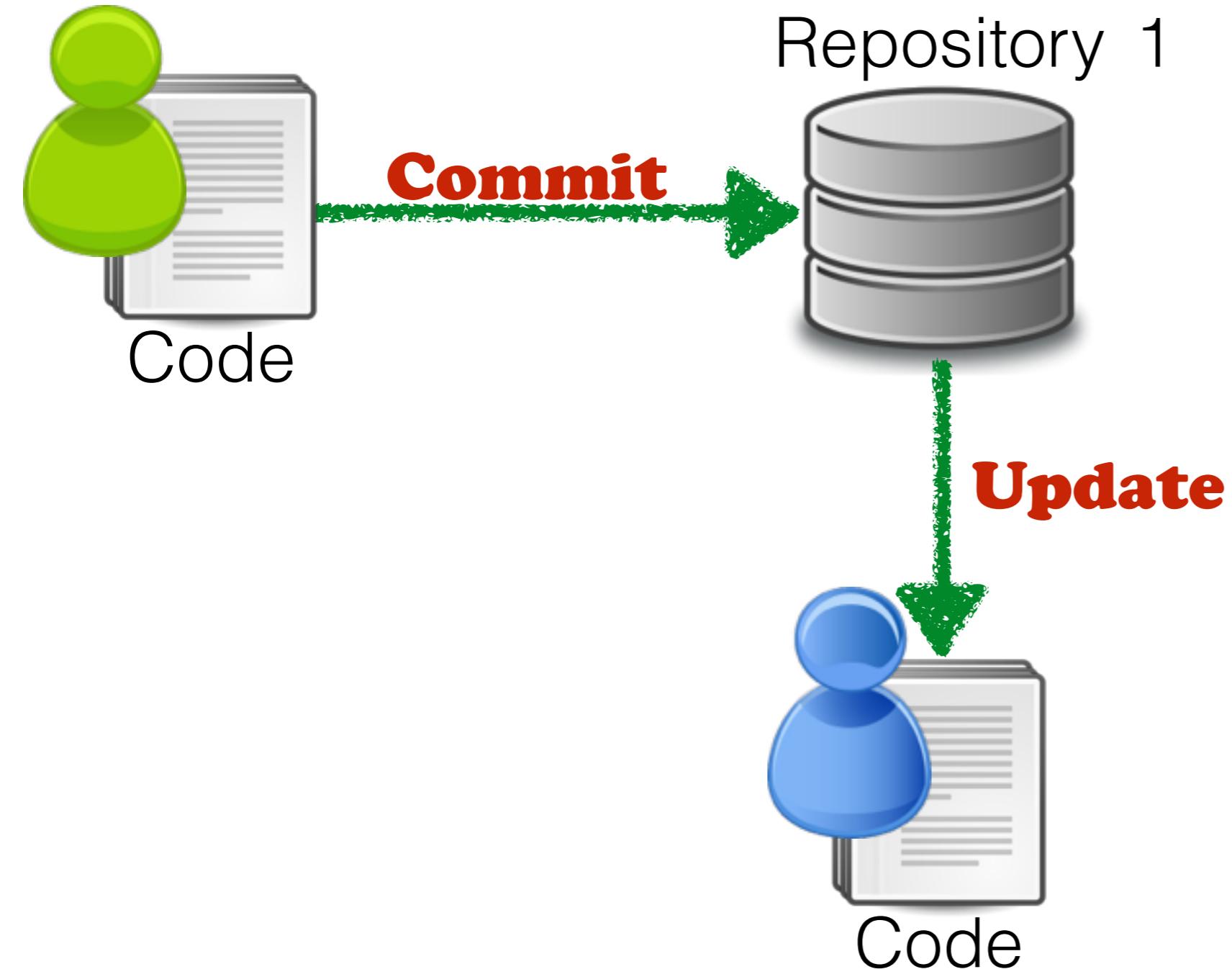
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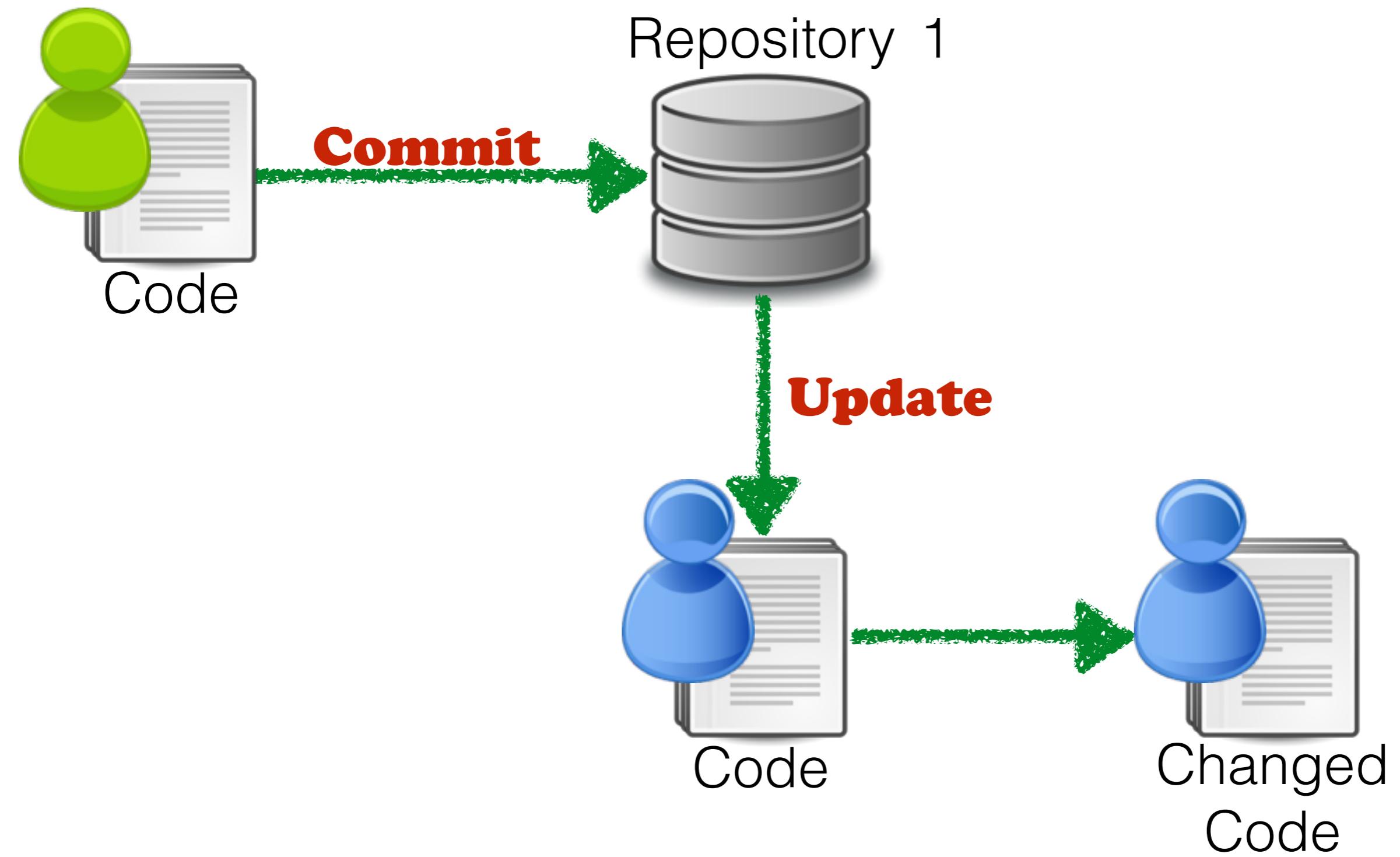
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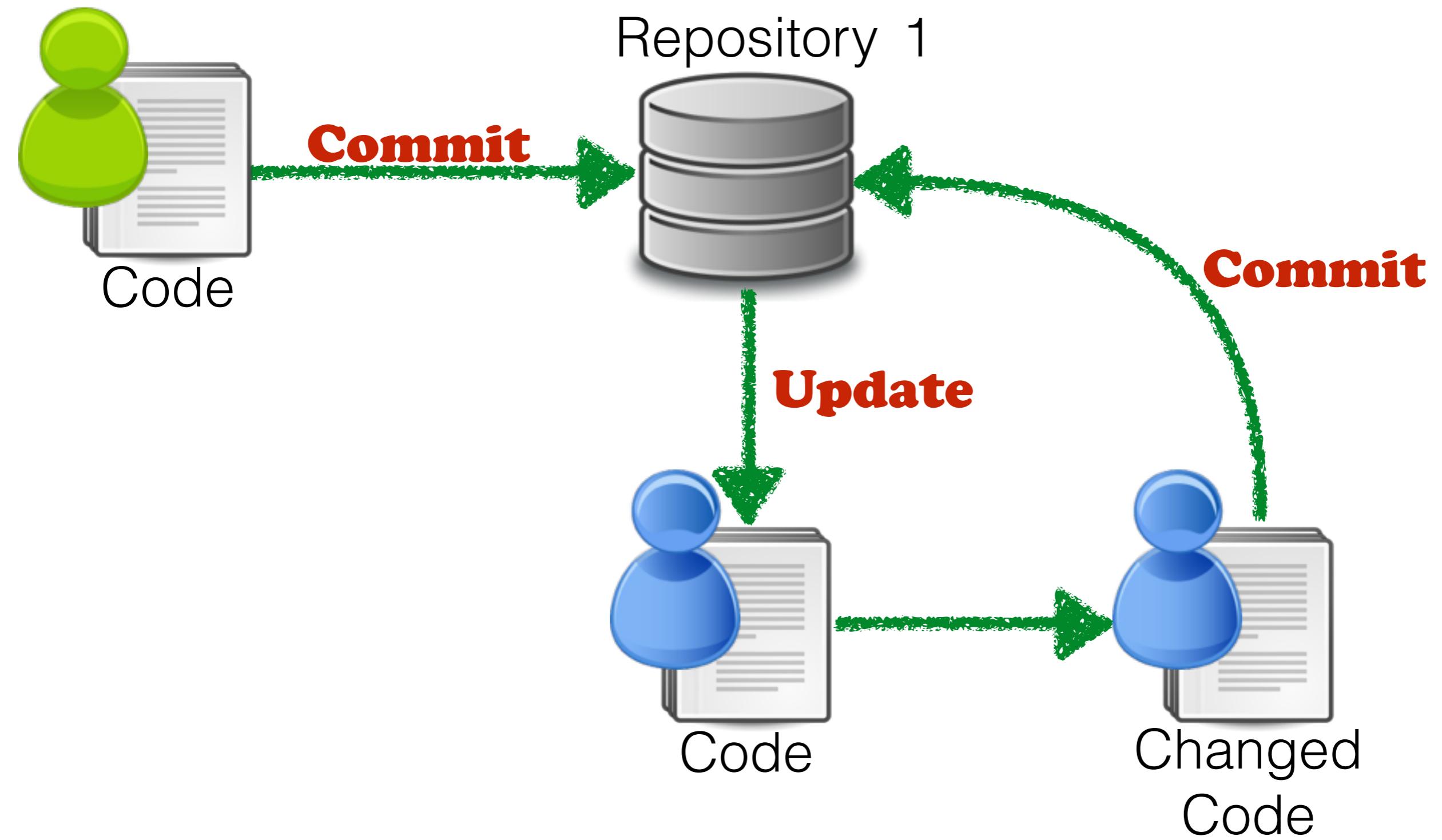
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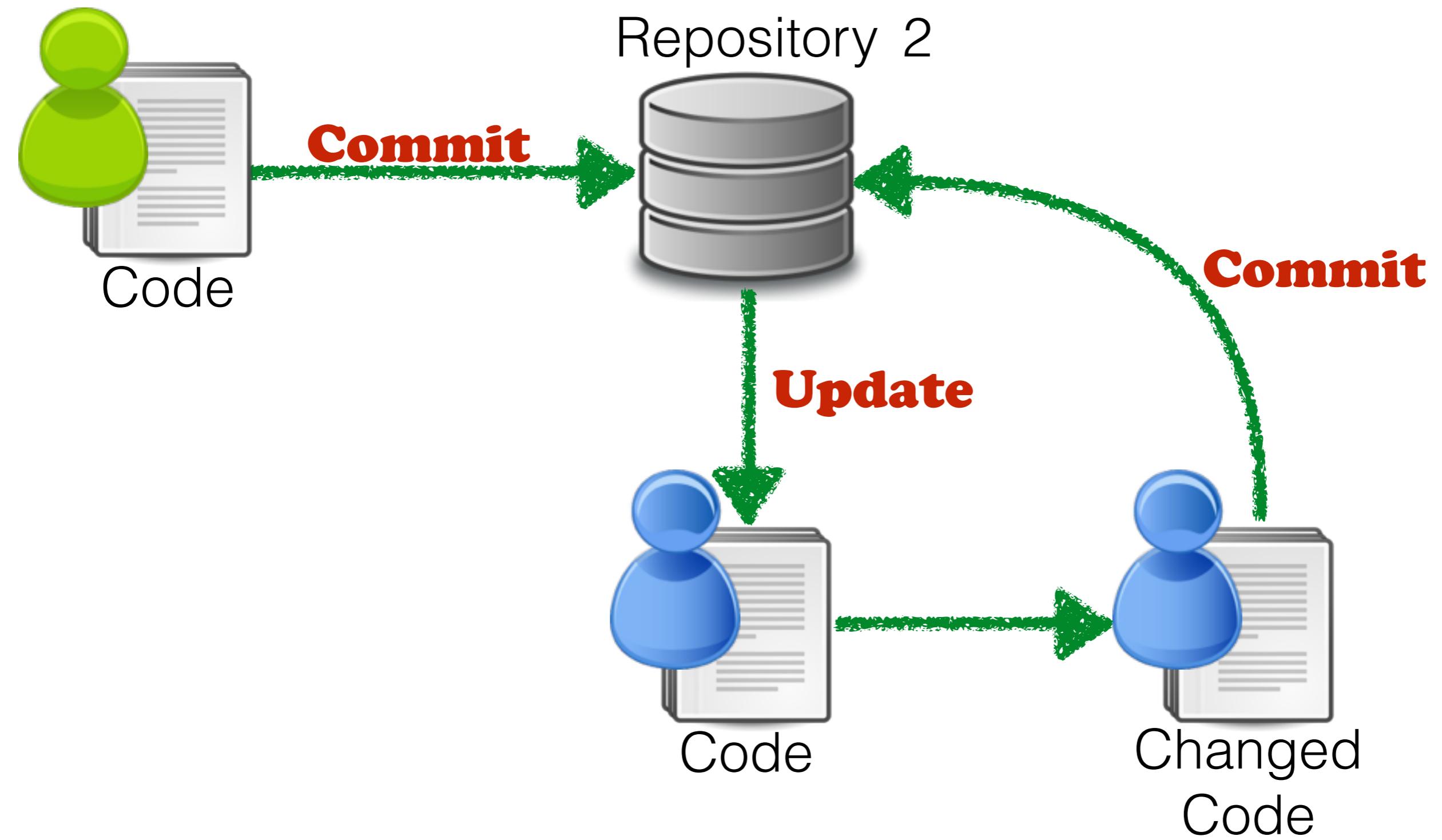
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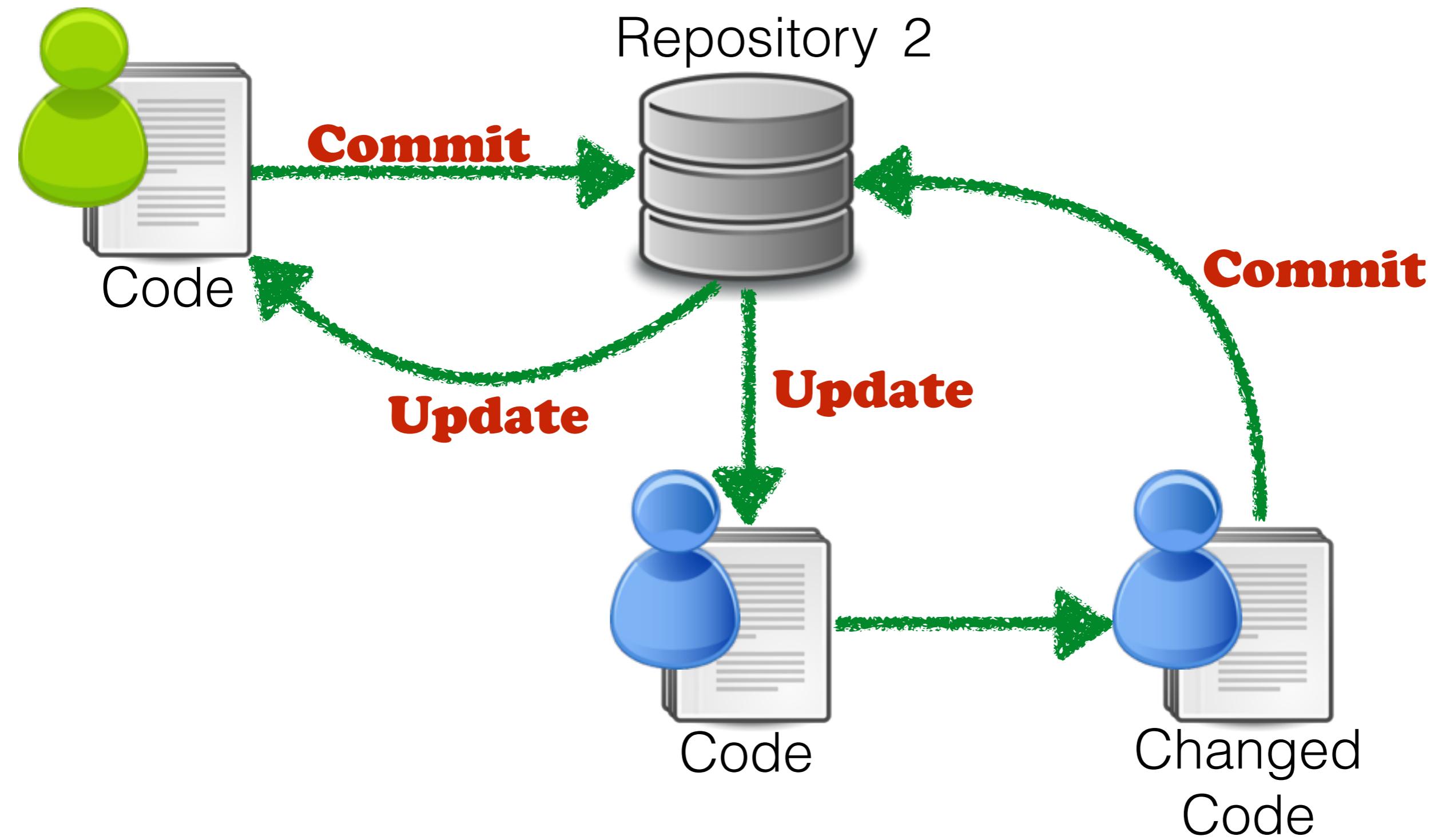
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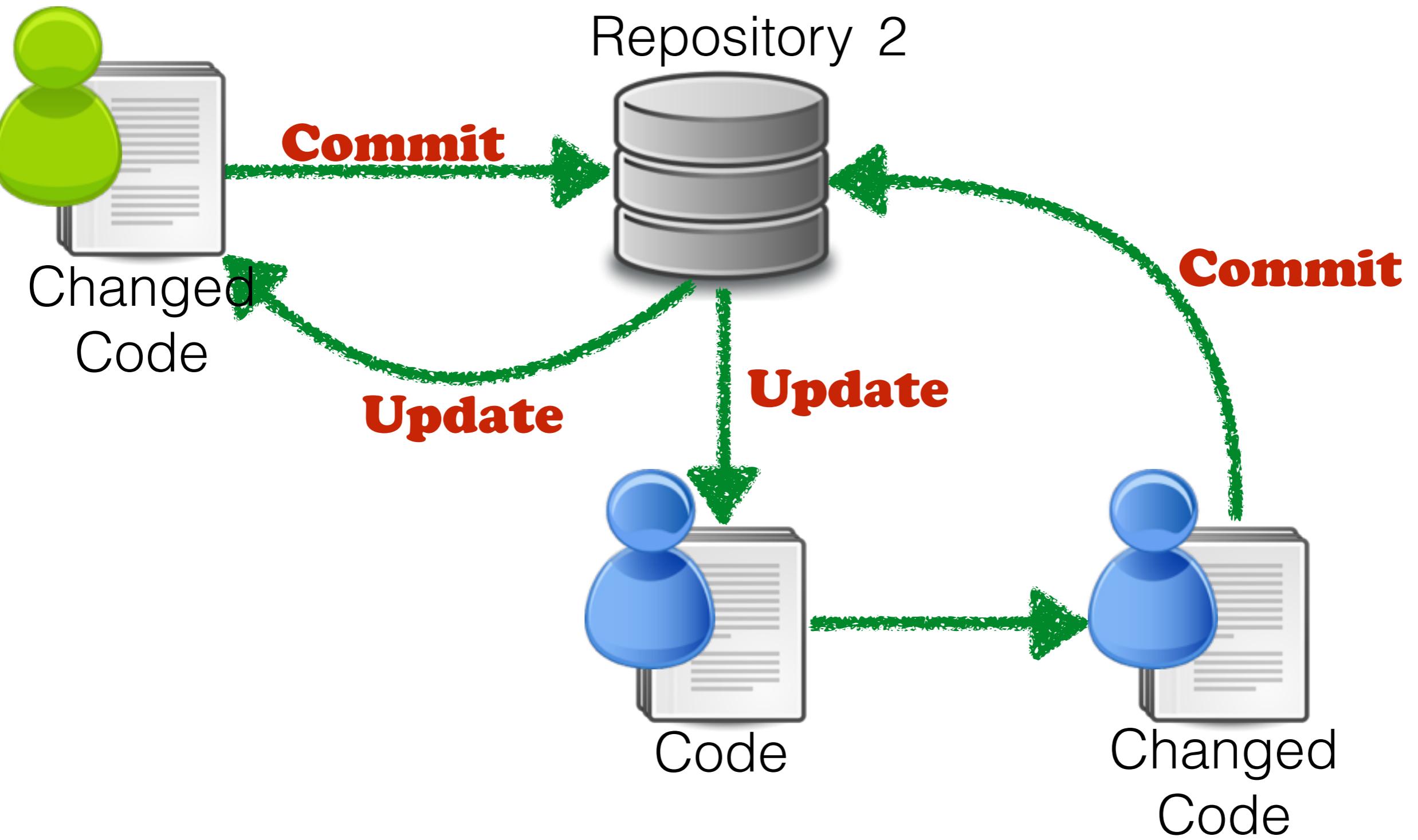
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SVN Example



SVN Example



SVN Software

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

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- Encourages large commits
- 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



Code

Git Example



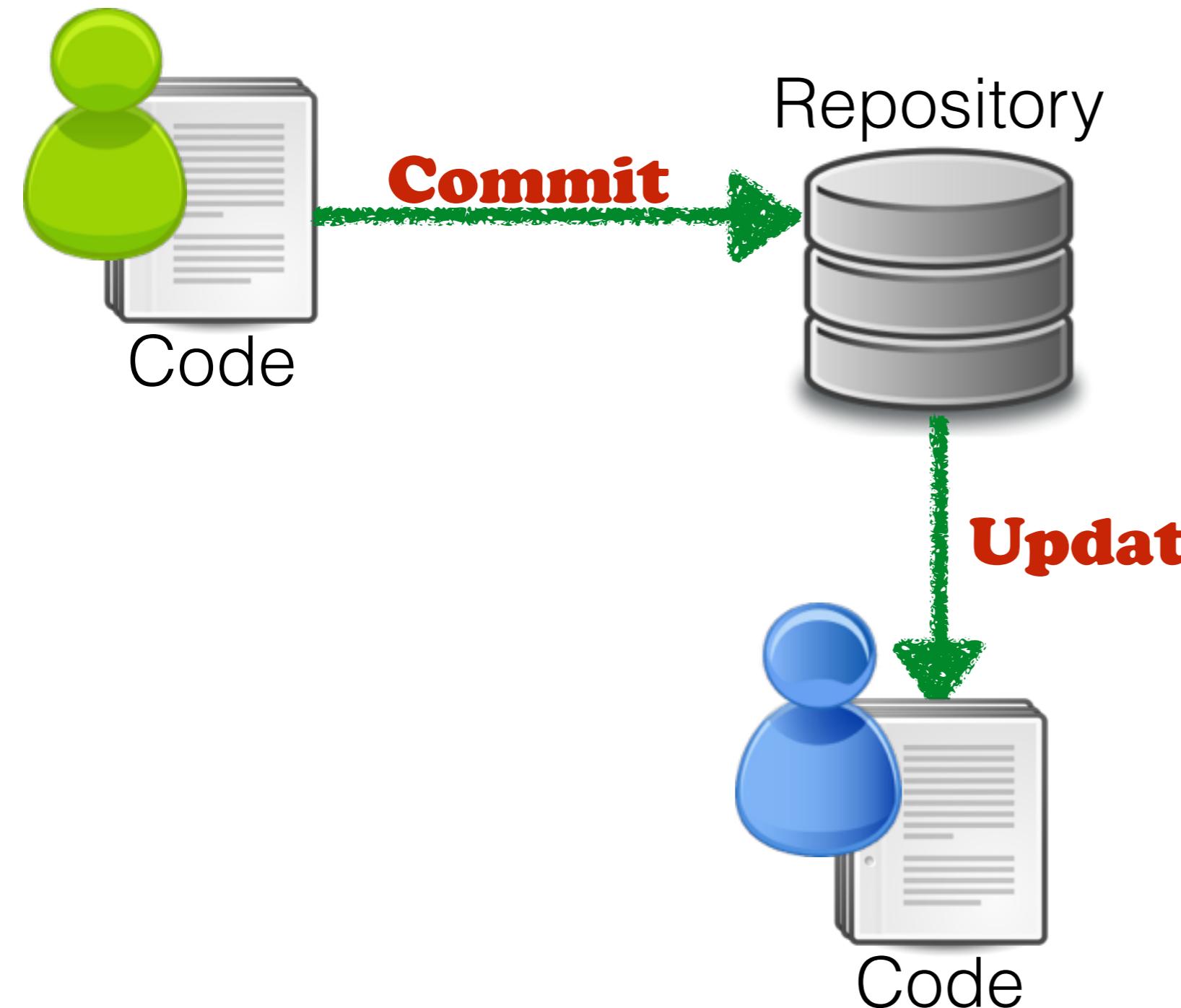
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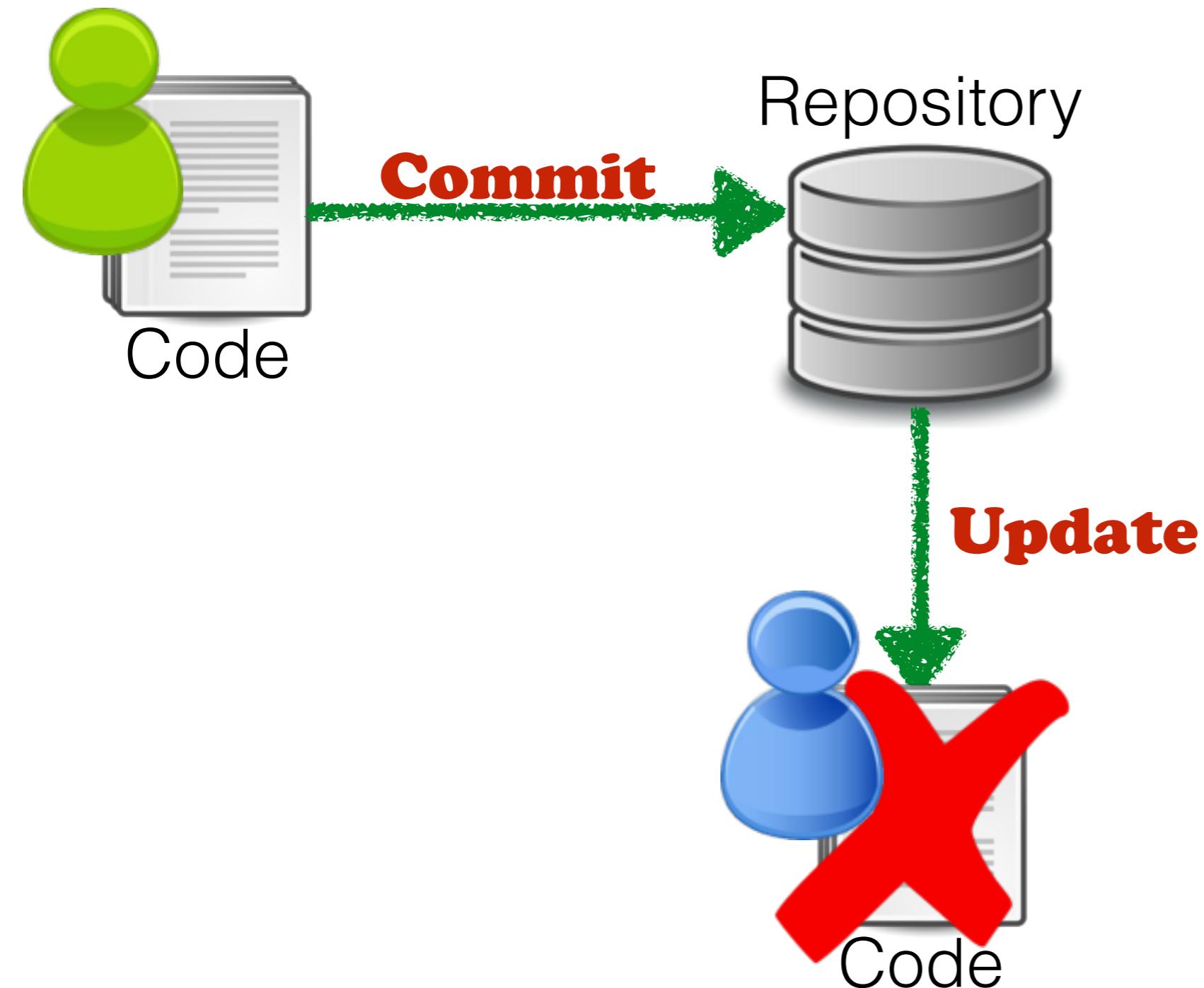
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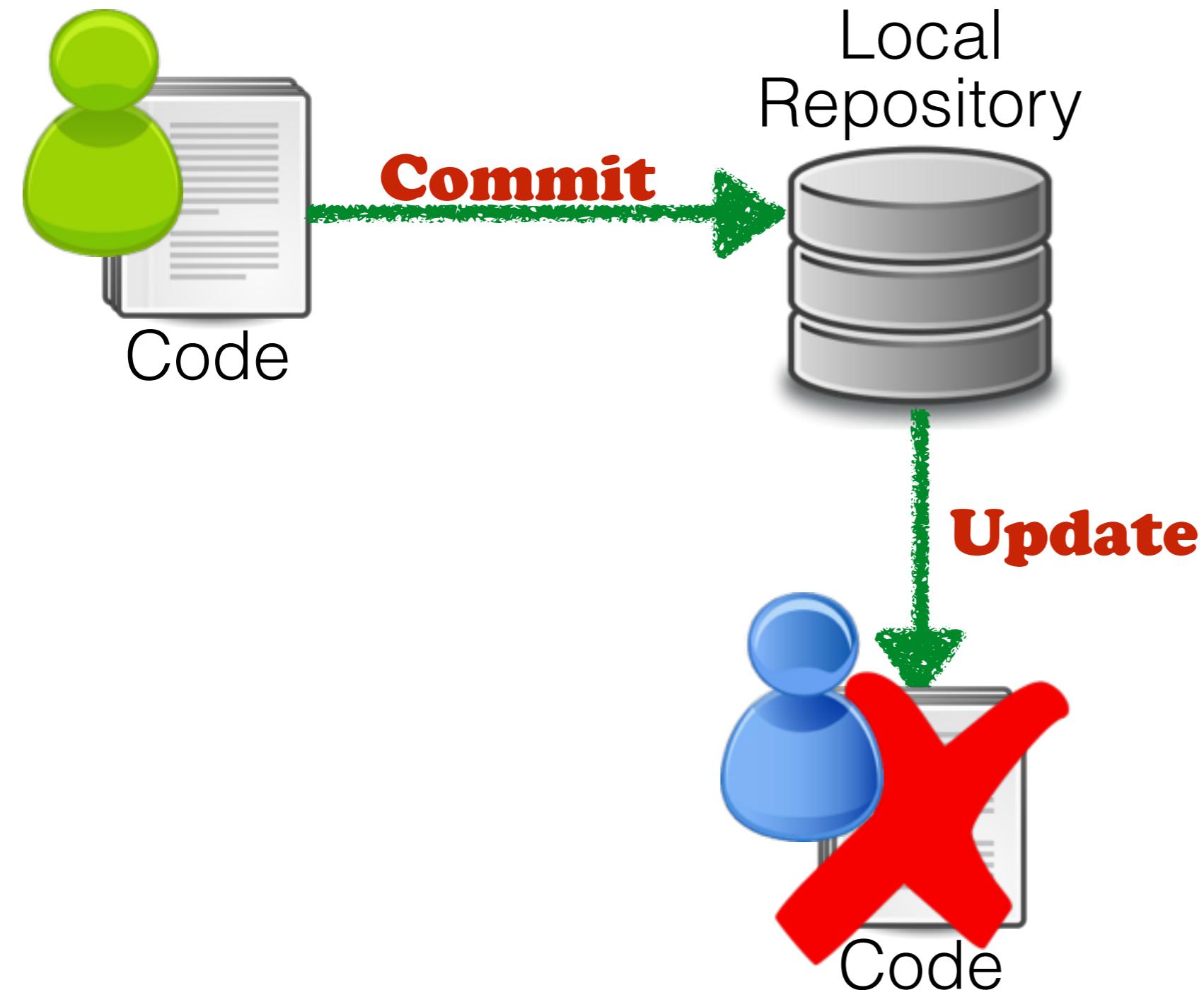
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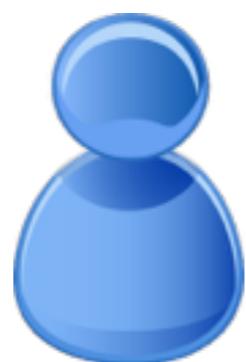
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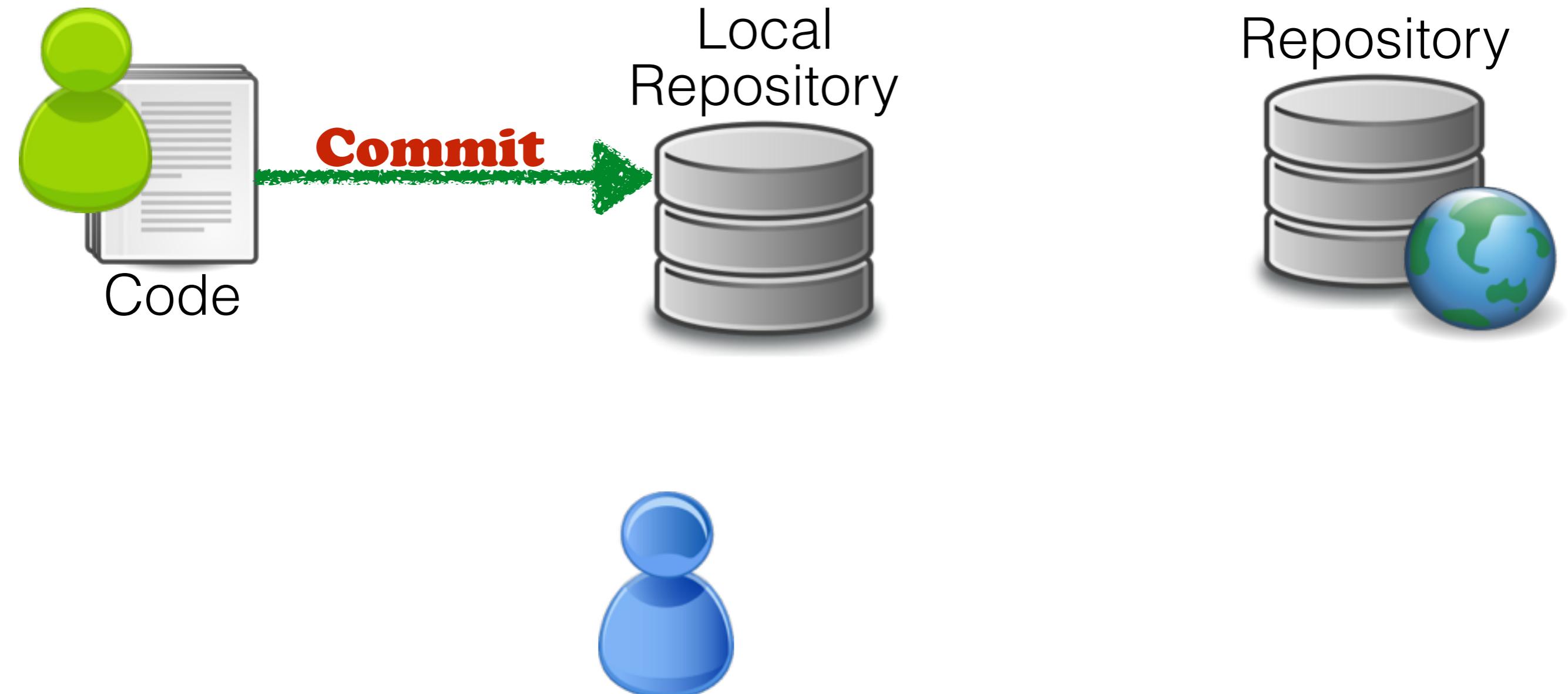
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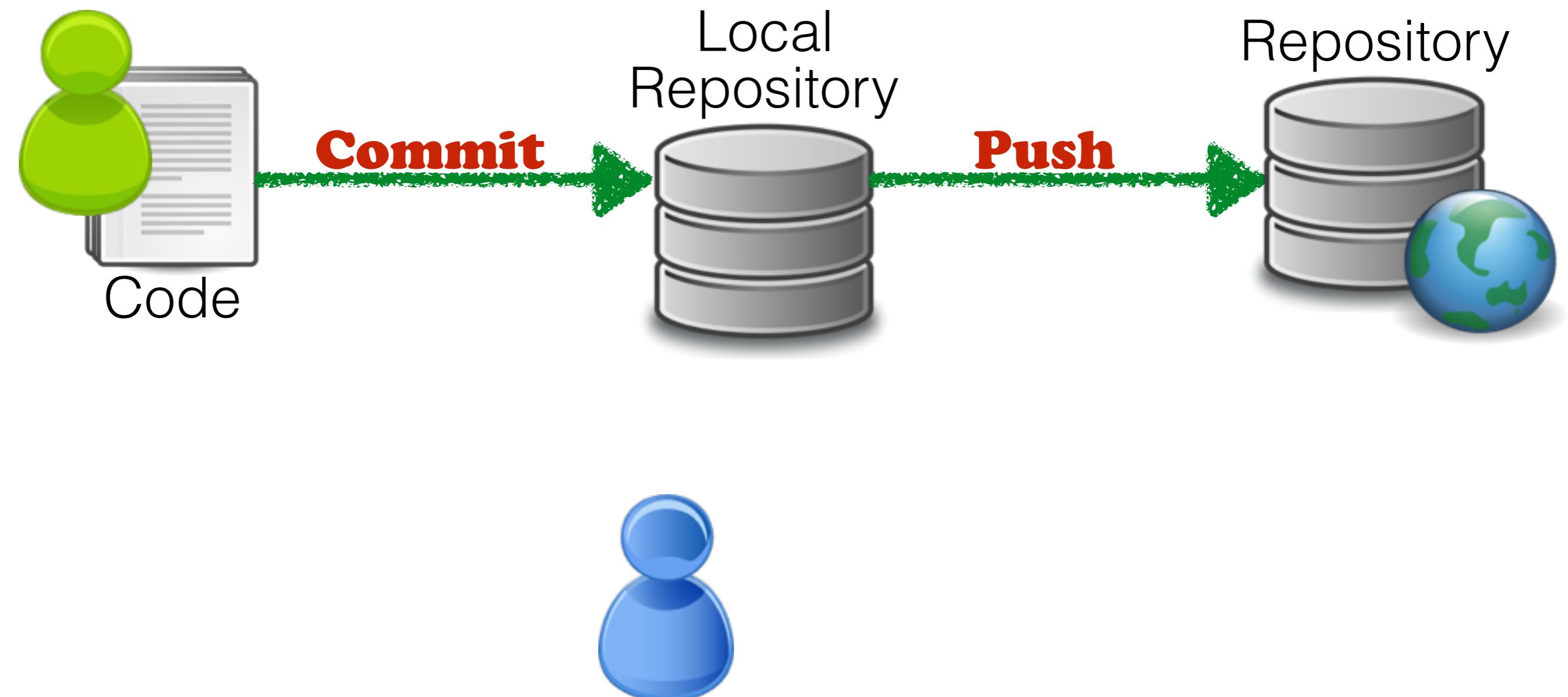
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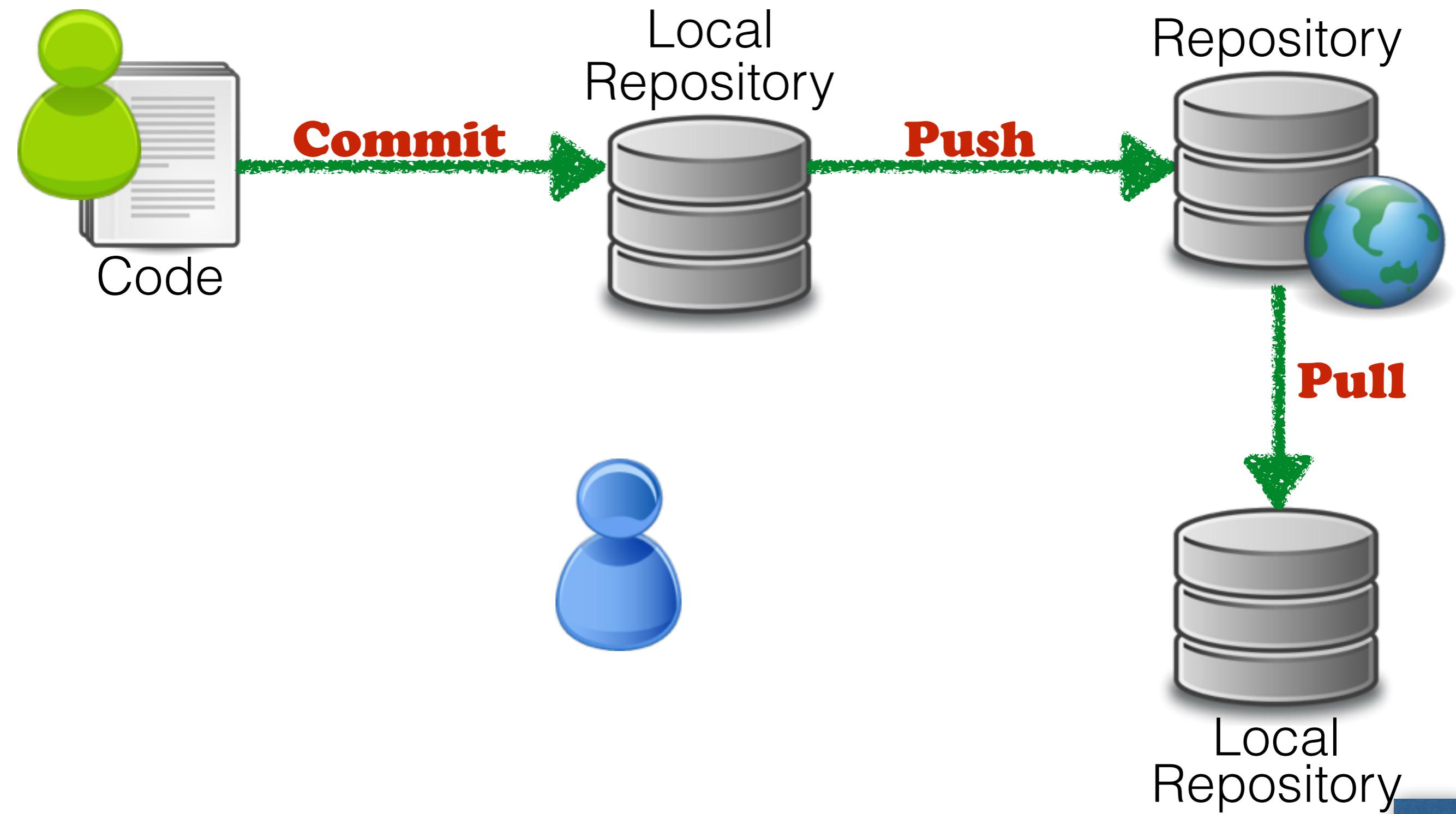
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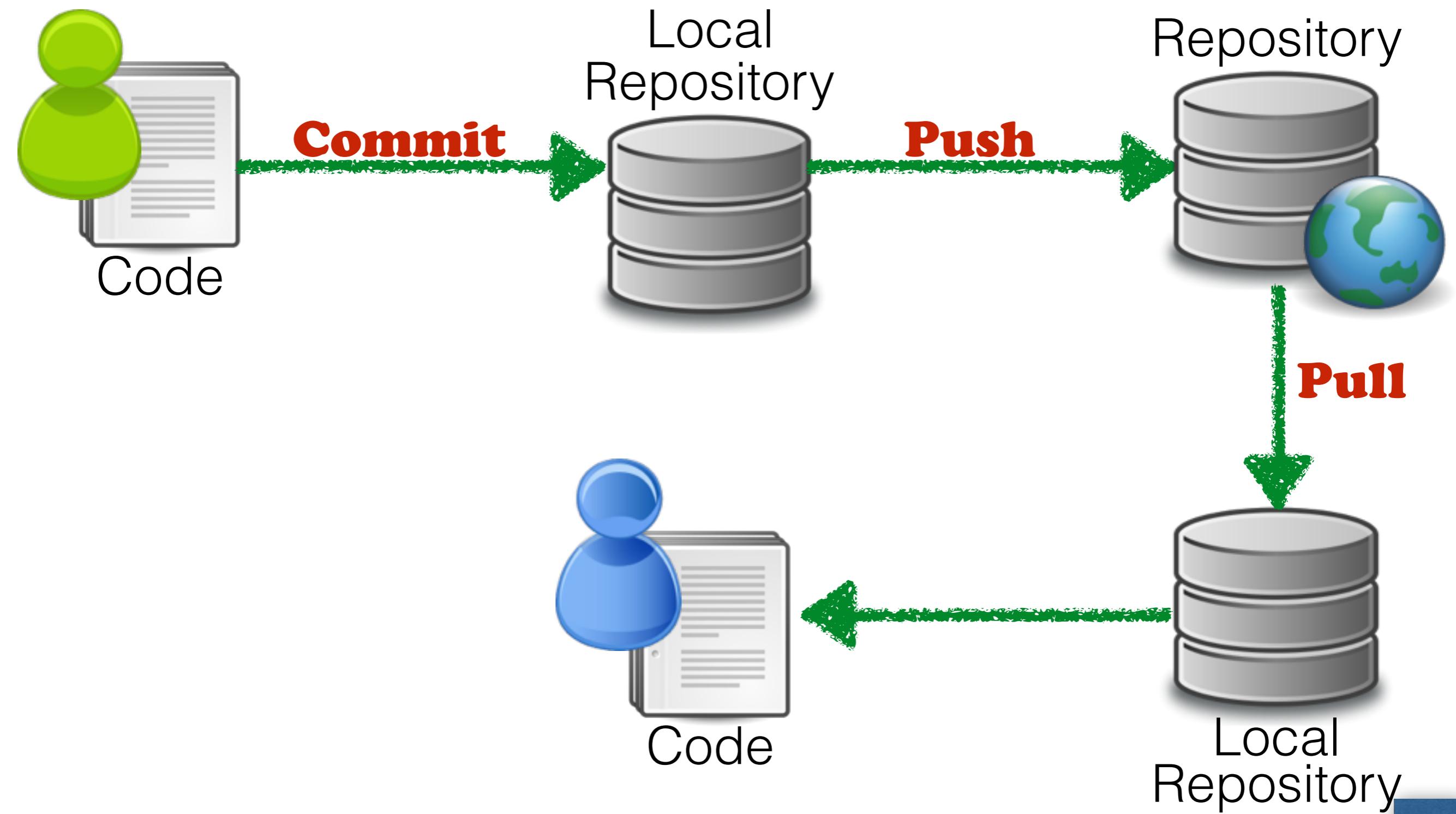
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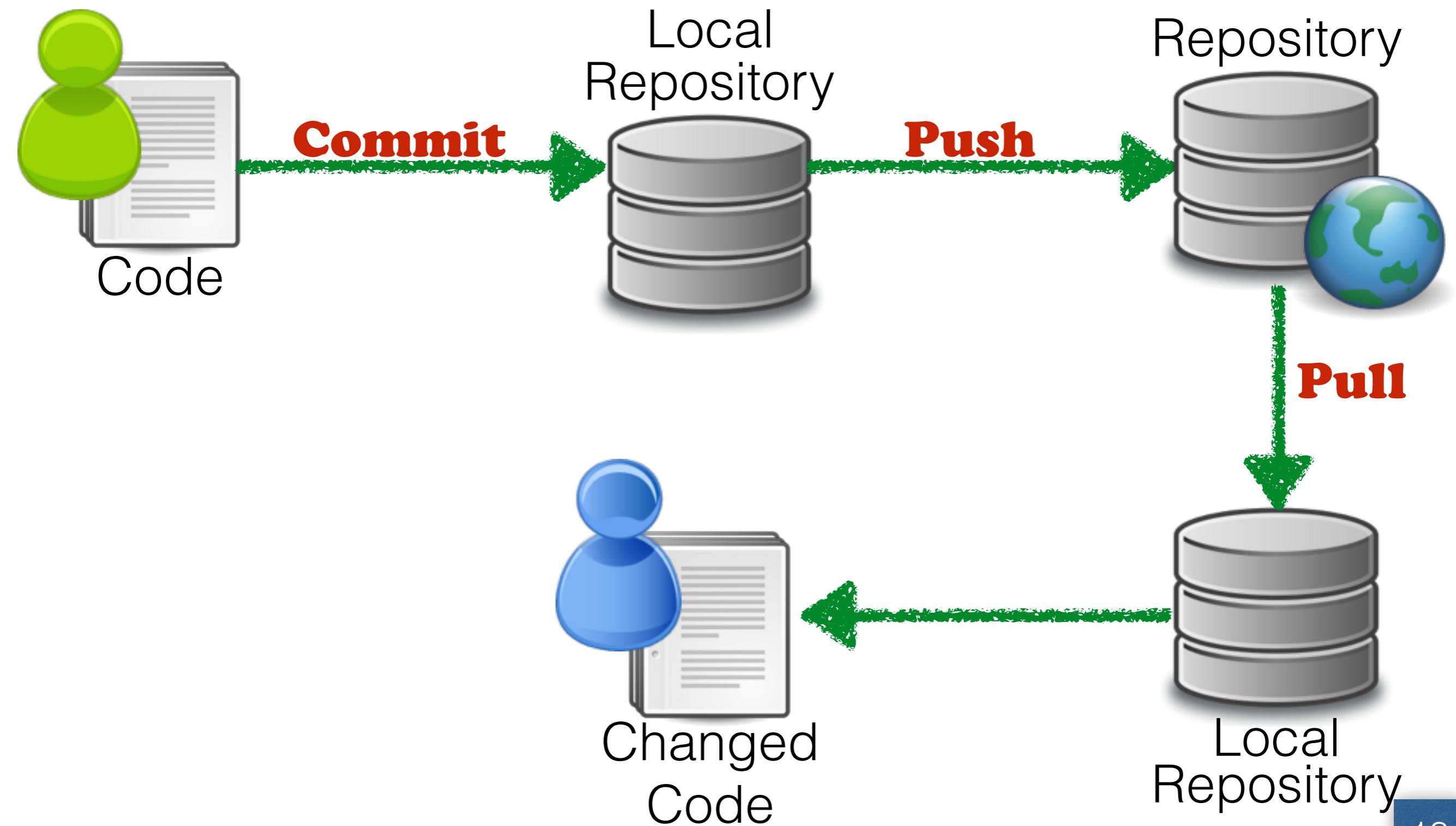
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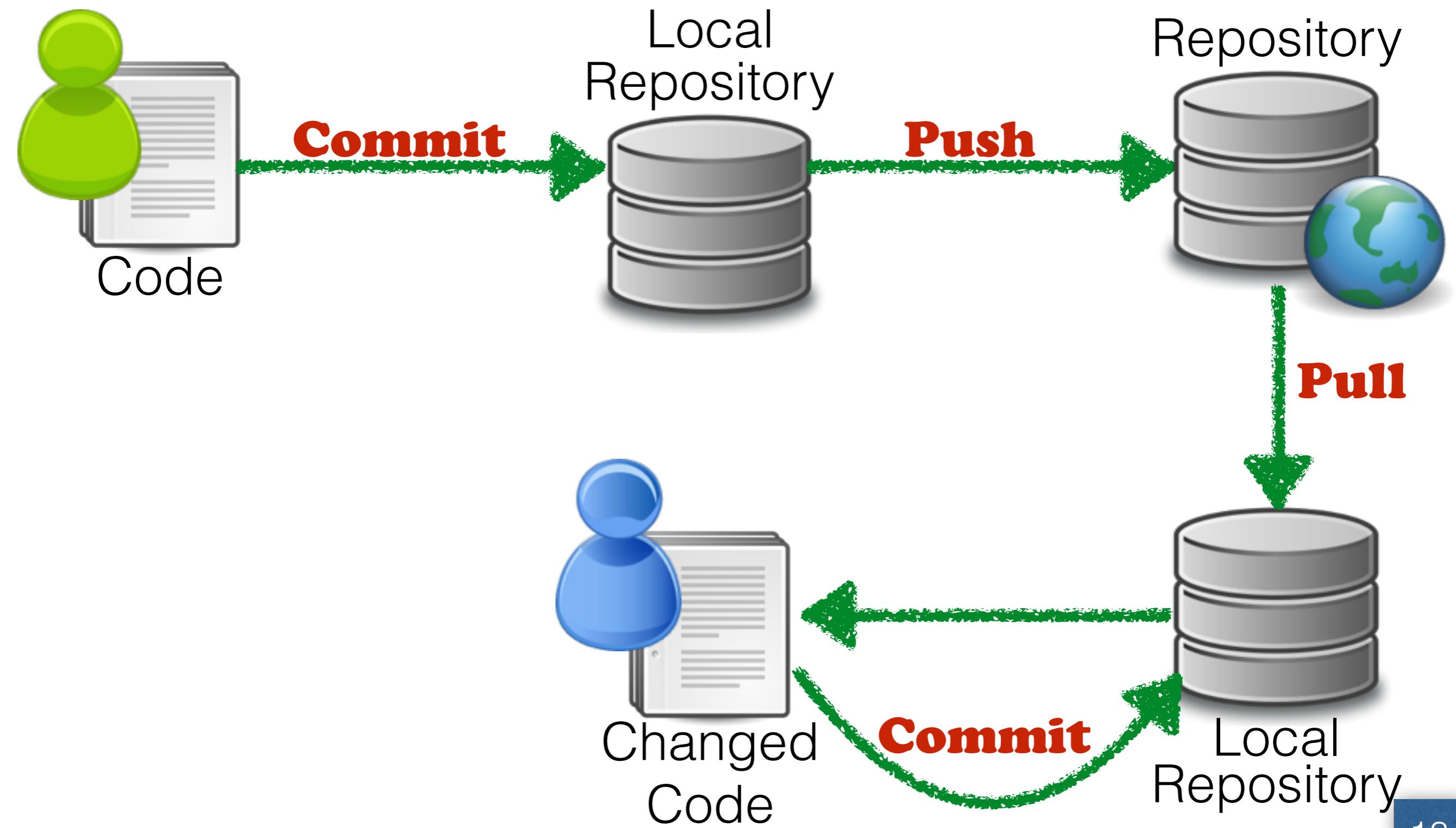
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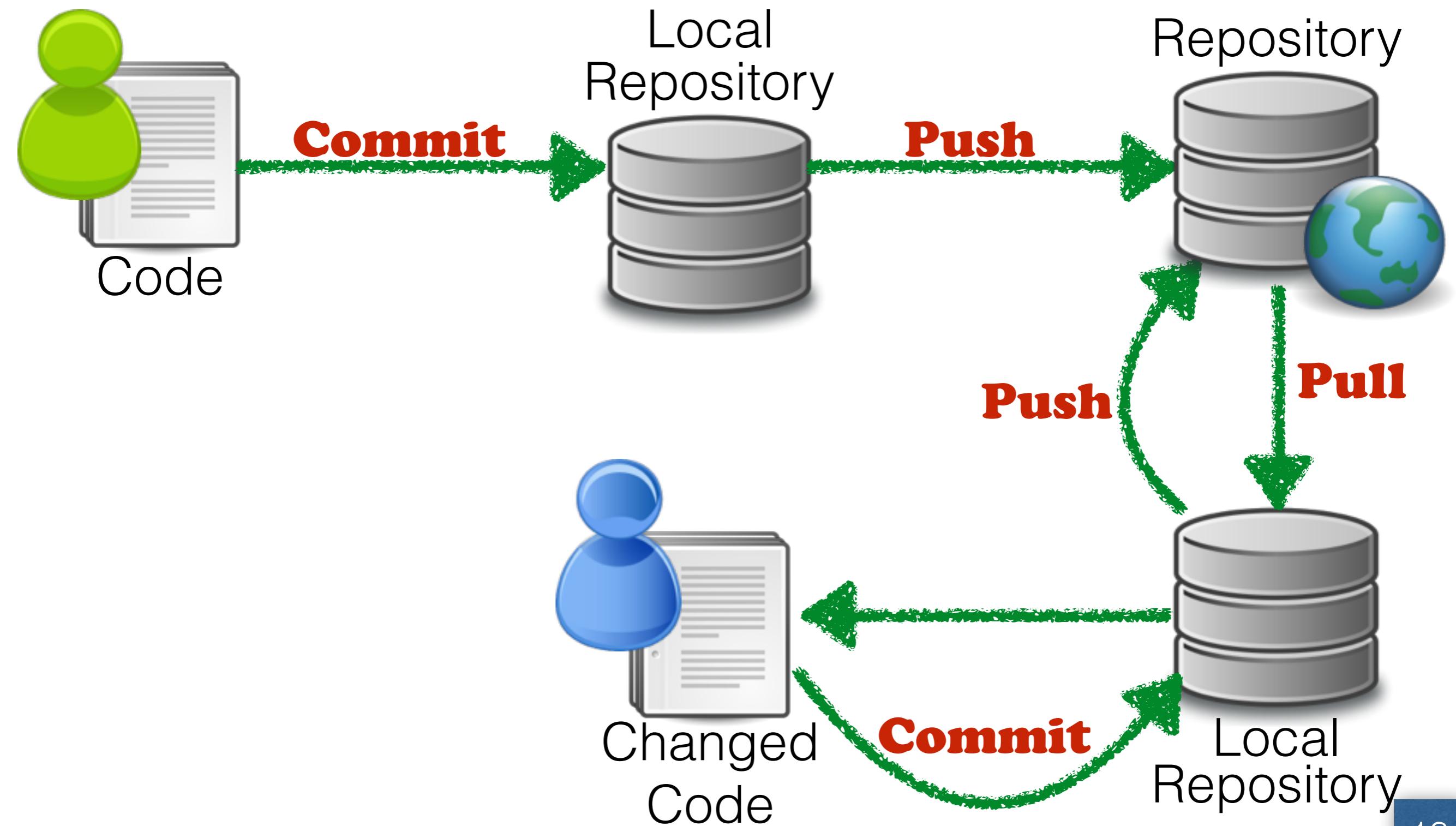
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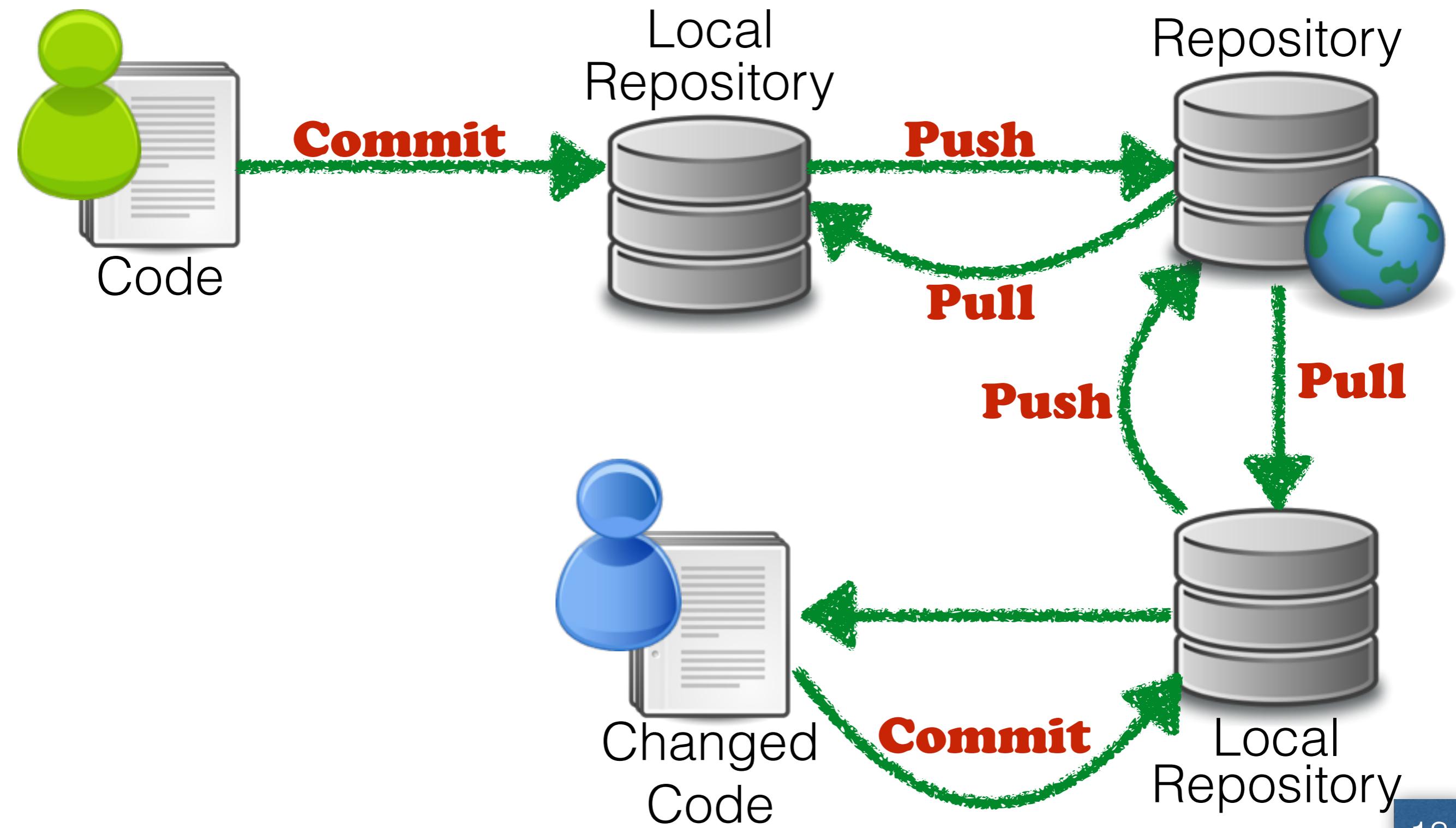
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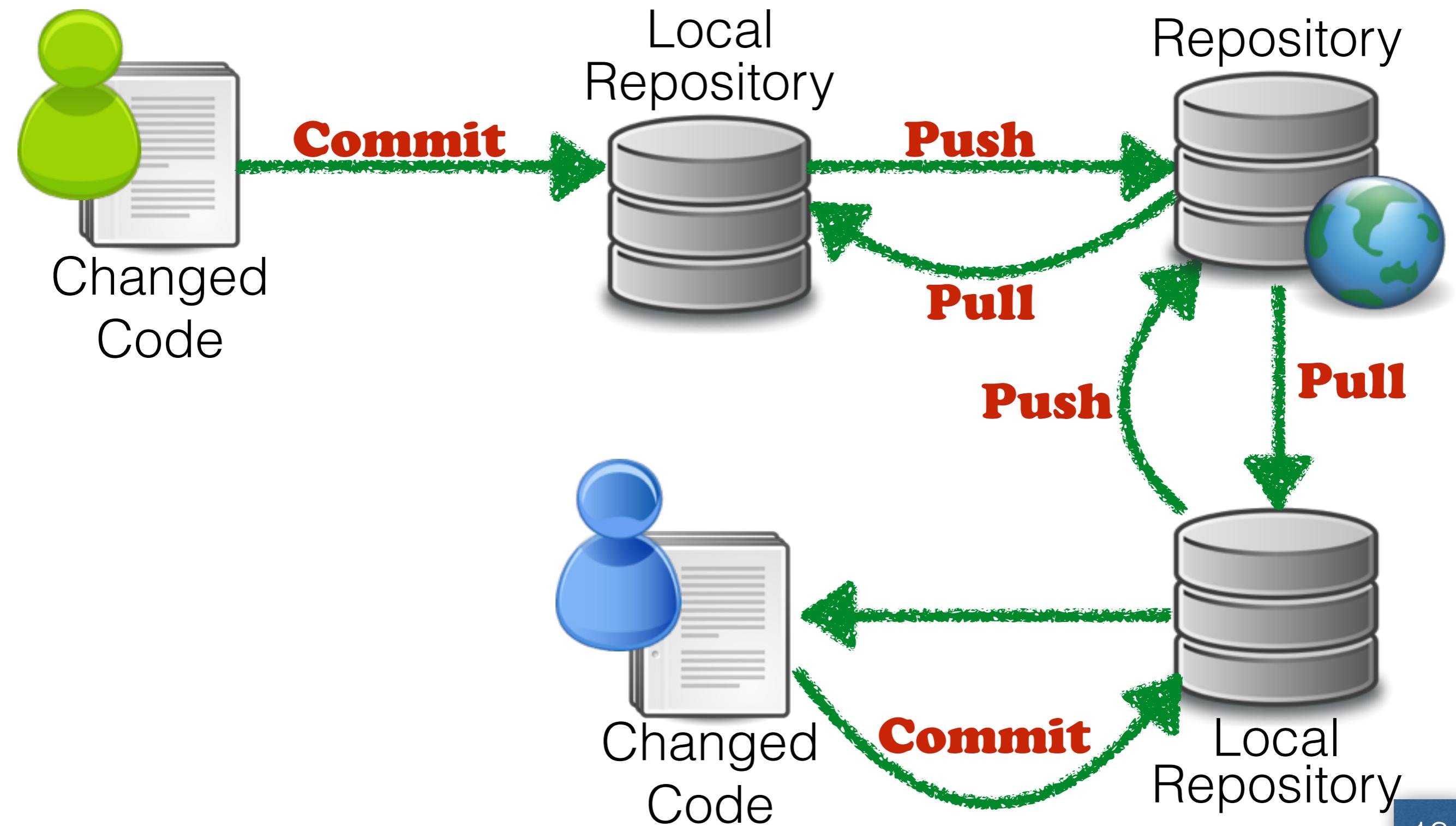
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Git Example



Decentralised



Local
Repository



Repository



Decentralised



Commits v1.0

Local
Repository



Repository



Decentralised



Commits v1.1

Local
Repository



Repository



Decentralised



Commits v2.0

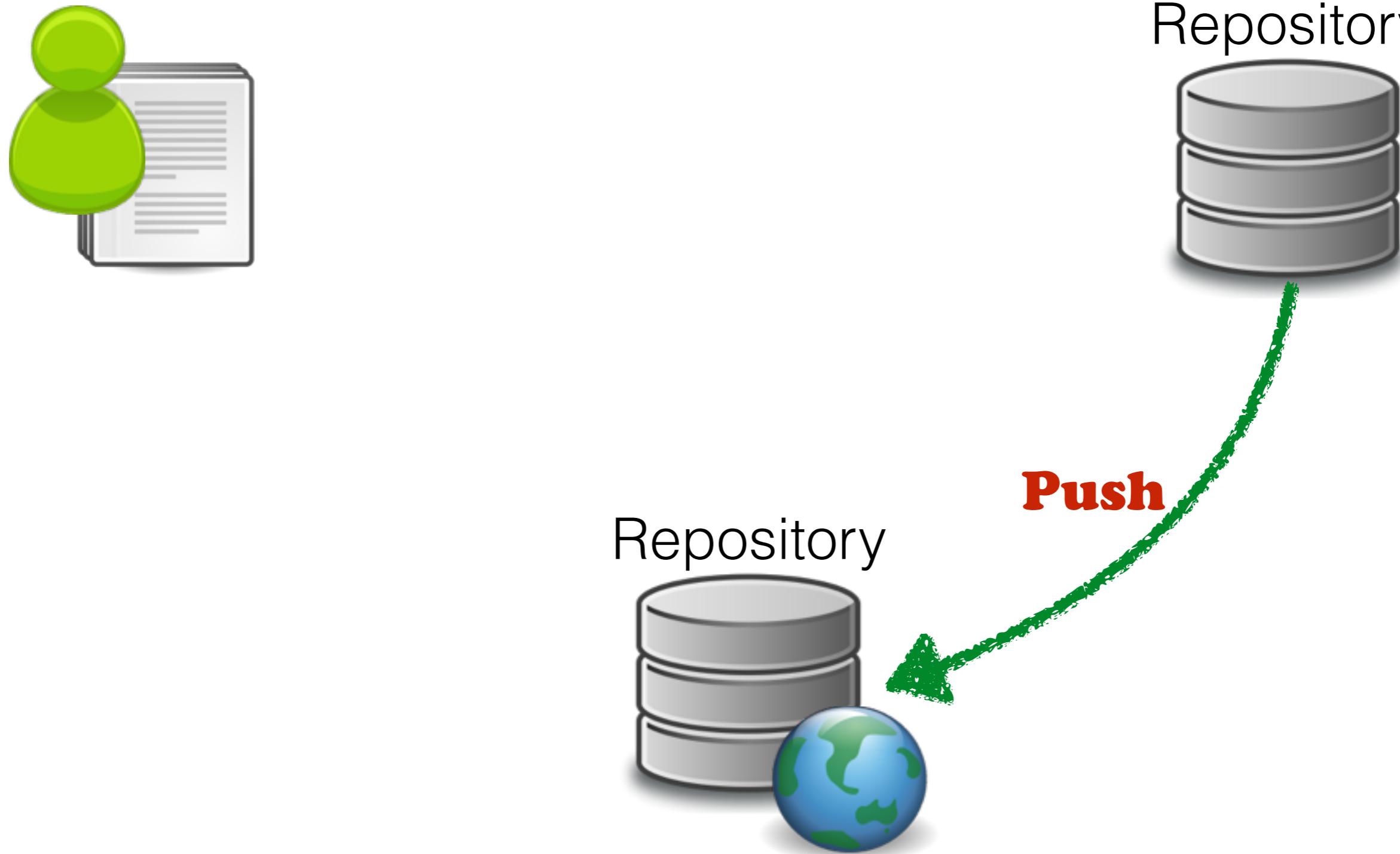
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Repository



Decentralised



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Repository



Repository



Decentralised



Git Software

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 - **Git-bash** (command line) - free
 - **SourceTree** - free
- Mac OS:
 - **Terminal** - free
 - **SourceTree** - free
- Linux:
 - Git Cola - free
 - GitK - free
 - Terminal - free
- Or Eclipse:
 - EGit - free

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

Live Demo

- Let's try Git
 - 1st part: single-user exercises
 - 2nd part: branches, collaboration & conflicts
- A guidance file with simple exercises is also uploaded so you can play with Git at home.

Live Demo

- 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