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Version Control Systems & Git

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based on a presentation by Steven Lamerton

Version Control Systems

"Version control is a system that records changes to a file or set of files over time so that you can recall specific versions later." – Pro Git Book

Version Control Systems

- No longer need to copy files around to keep previous versions
  - No more mazes of folders
  - No more copying files to USB drives
- Find out why changes were made, who made them and when
- Makes collaboration easier
  - No fear about overwriting work
  - No copying to network drives / emailing files around
  - Support for better workflows

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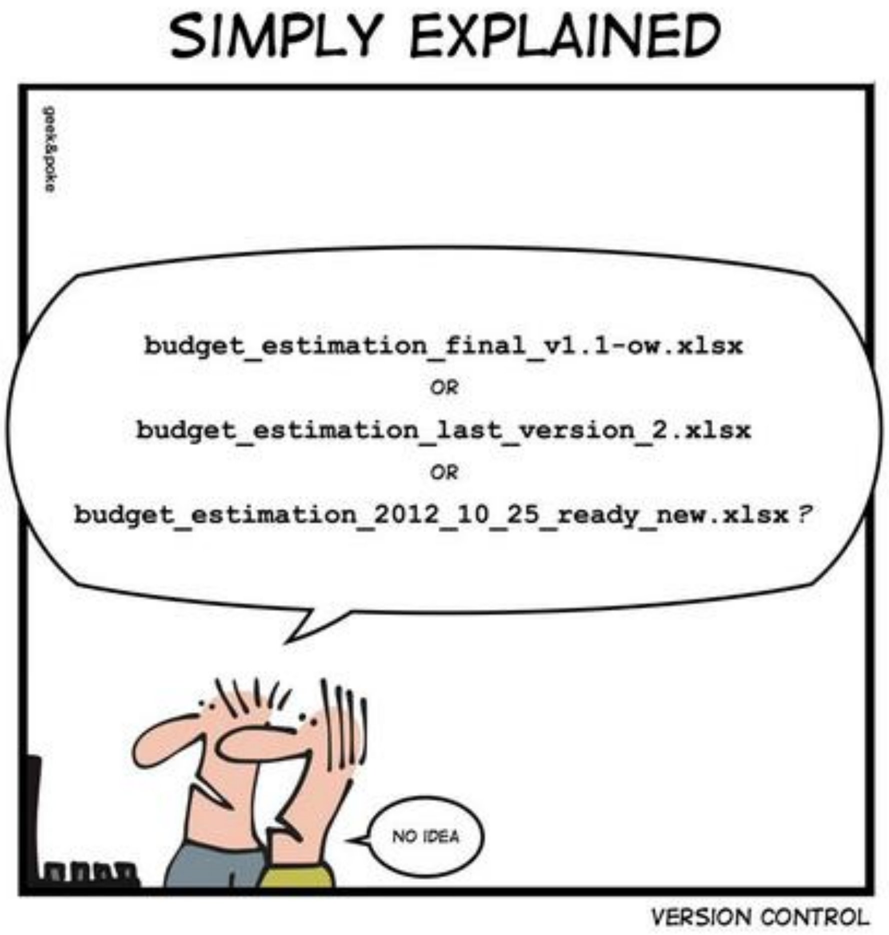
SIMPLY EXPLAINED
geek&poke
budget_estimation_final_v1.1-ow.xlsx
OR
budget_estimation_last_version_2.xlsx
OR
budget_estimation_2012_10_25_ready_new.xlsx ?
NO IDEA
VERSION CONTROL

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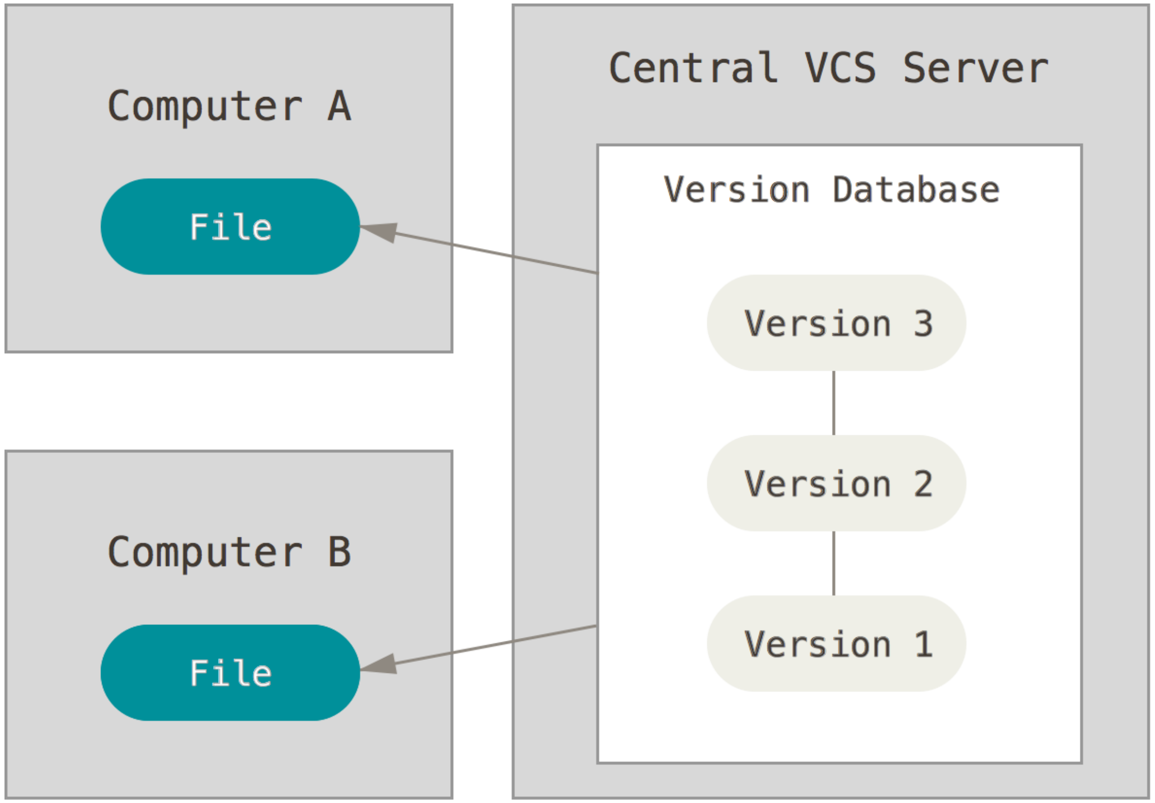
Centralised Version Control



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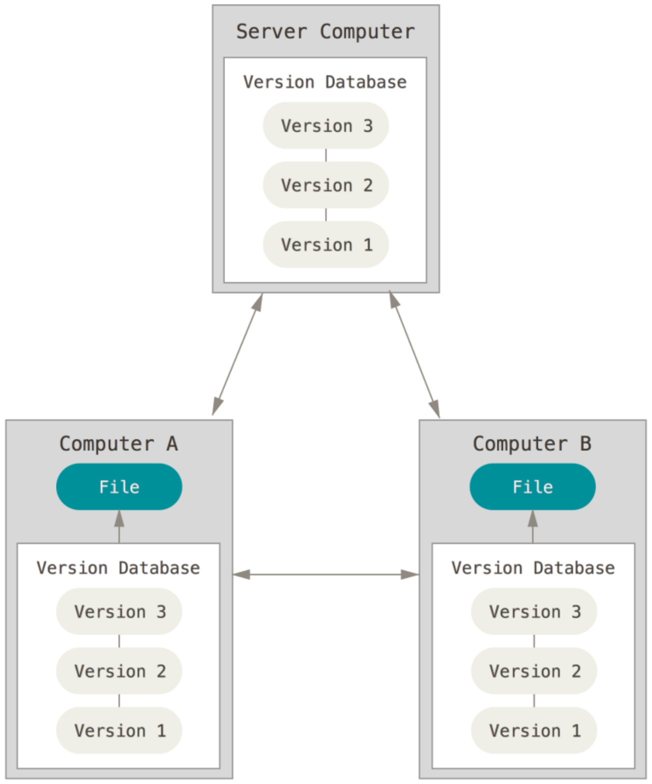
Distributed Version Control



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Version Control Systems

- Centralised
  - CVS
  - SVN
  - Perforce
  - Team Foundation Server
- Distributed:
  - ***Git***
  - Mercurial
  - Bazaar
  - BitKeeper
  - Darcs

Git has been chosen for the CCP-WSI code repository

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Git

- Started in 2005 by Linus Torvalds, the founder of Linux, to manage the code for the Linux kernel
- Features:
  - Fully distributed
  - Fast
  - Widely supported: hosting, GUIs, tools & documentation
- Widely used by other projects including:
  - Android
  - GCC
  - OpenFOAM

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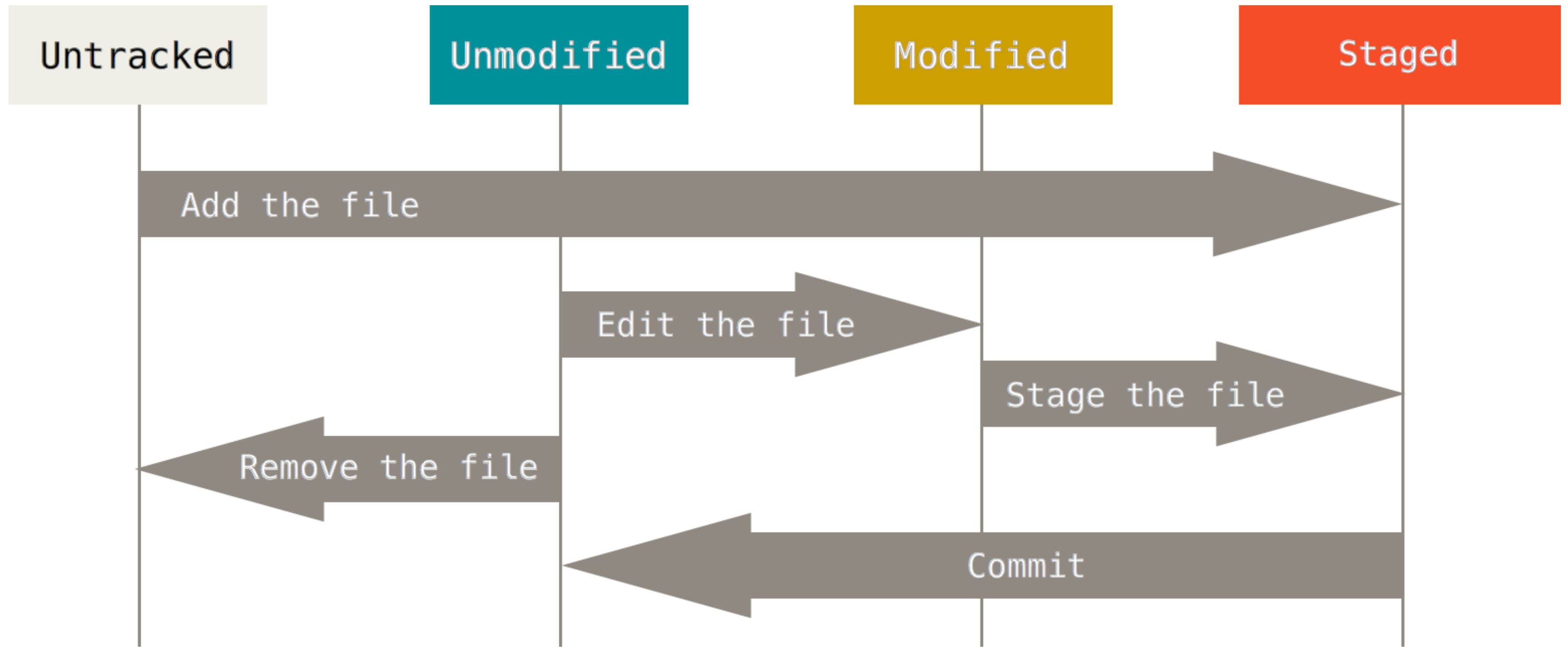
Overview

- Files can be in one of four states
  - Untracked – not managed by Git
  - Unmodified – managed by Git, no changes
  - Modified – managed by Git, has changes since the last version
  - Staged – managed by Git, has changes which are marked to be part of the next commit
- Once you are happy with the staged changes you commit them, adding a descriptive message

Basic Commands



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Branching & Merging

- Branches simplify development
  - Allows divergence from the master branch to avoid breaking it
  - Useful to separate development of different features and bug fixes
  - Especially useful with many collaborators
- Once work is finished it can be merged back into the master branch again
  - Possibility causing conflicts if others have worked on the same areas of the files

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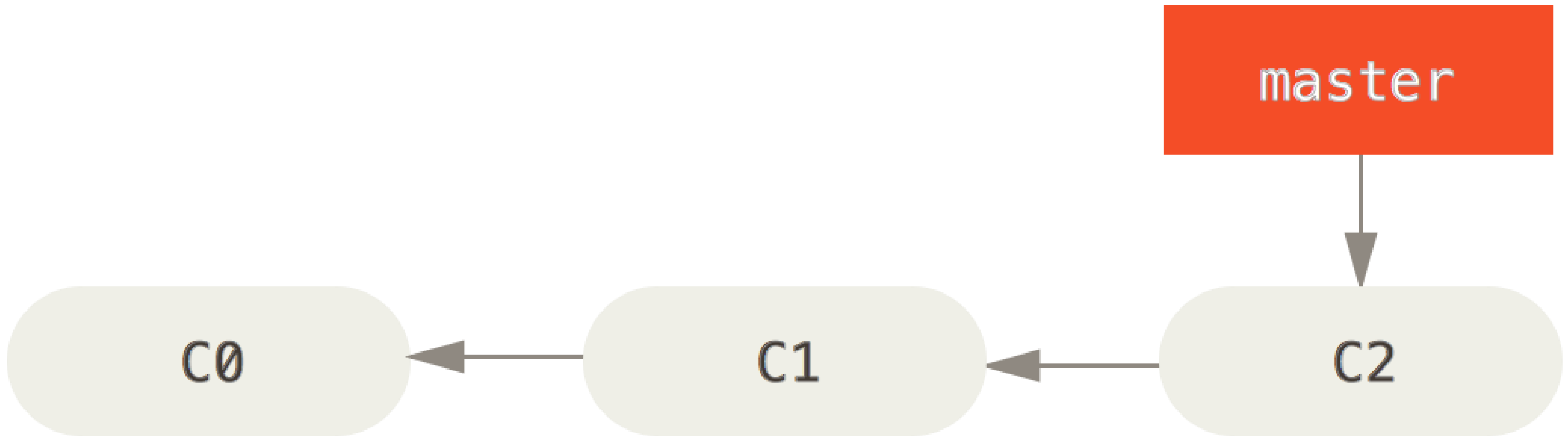
Basic History



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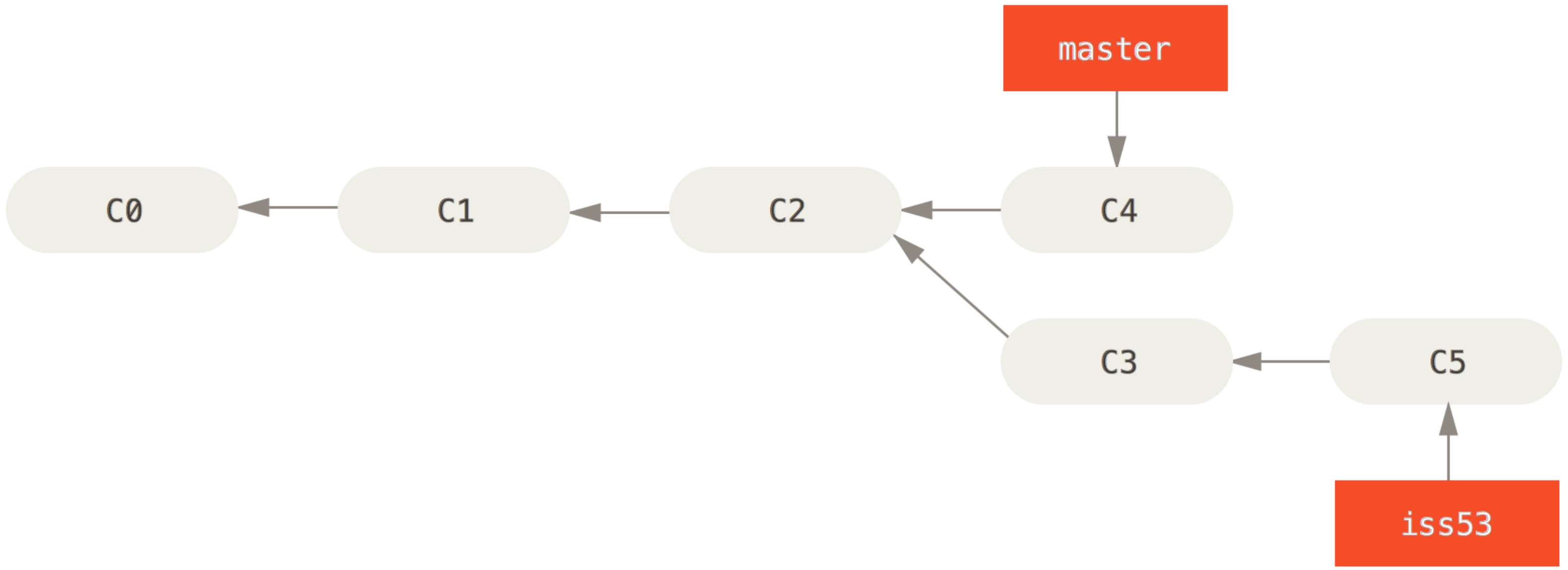
Basic Branch



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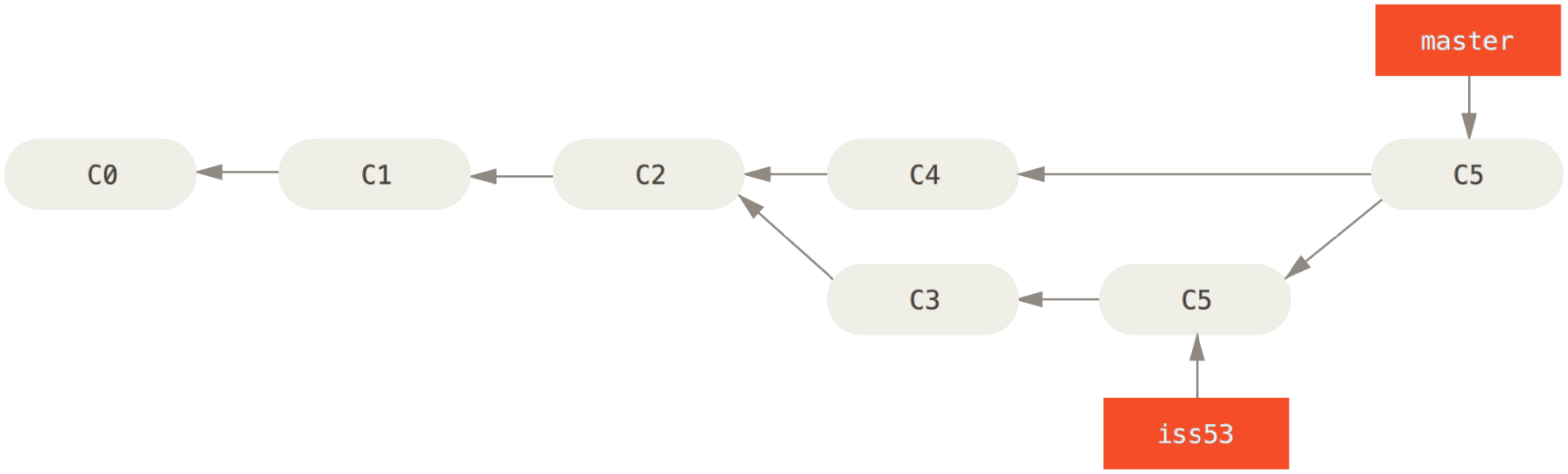
Basic Merge



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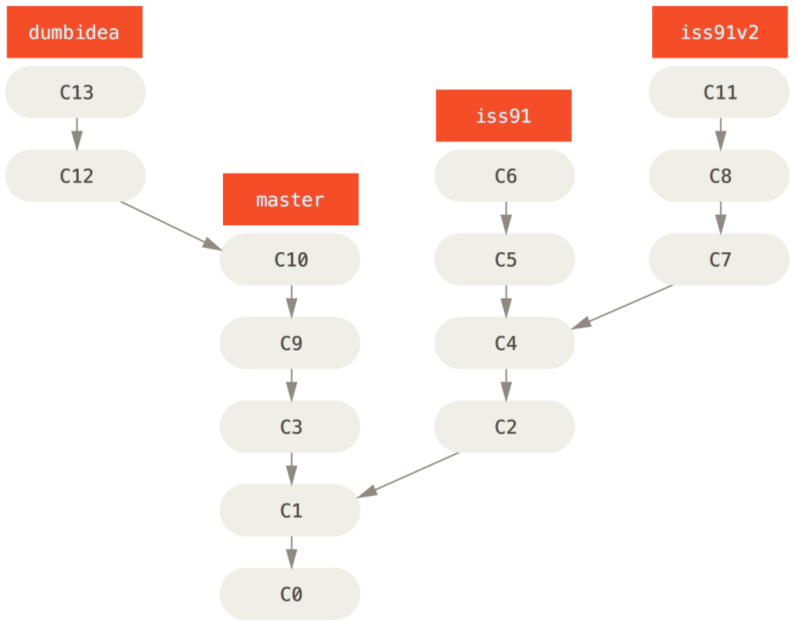
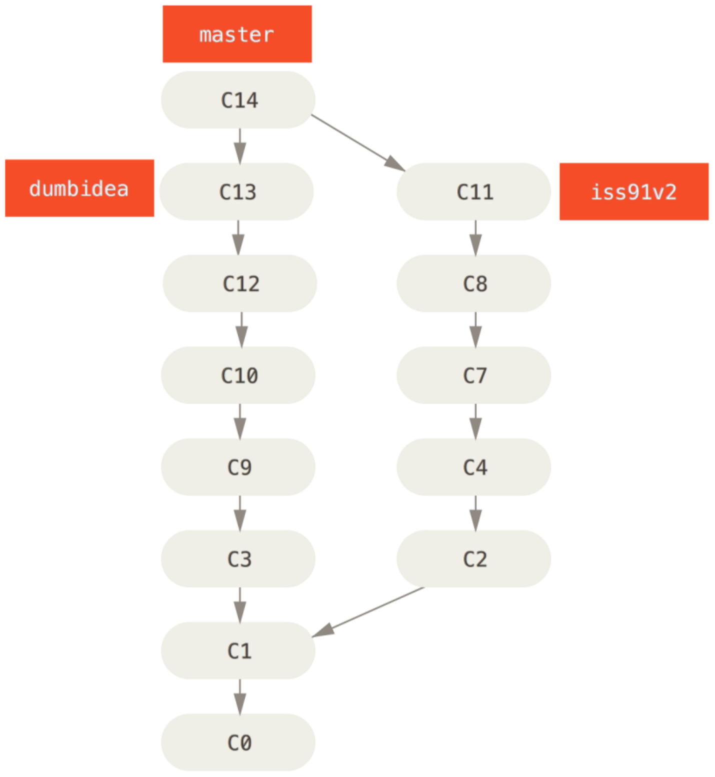
Complex History





Distributed Working

- Examples so far have been for a local repository, the concepts are exactly the same for working as a group
- Can add other repositories as *remotes*
  - For example the repository on CCPForge
  - Could also be another developers repository
- Code can be pushed and pulled between repositories
  - Essentially branches, which can be merged into the local copy

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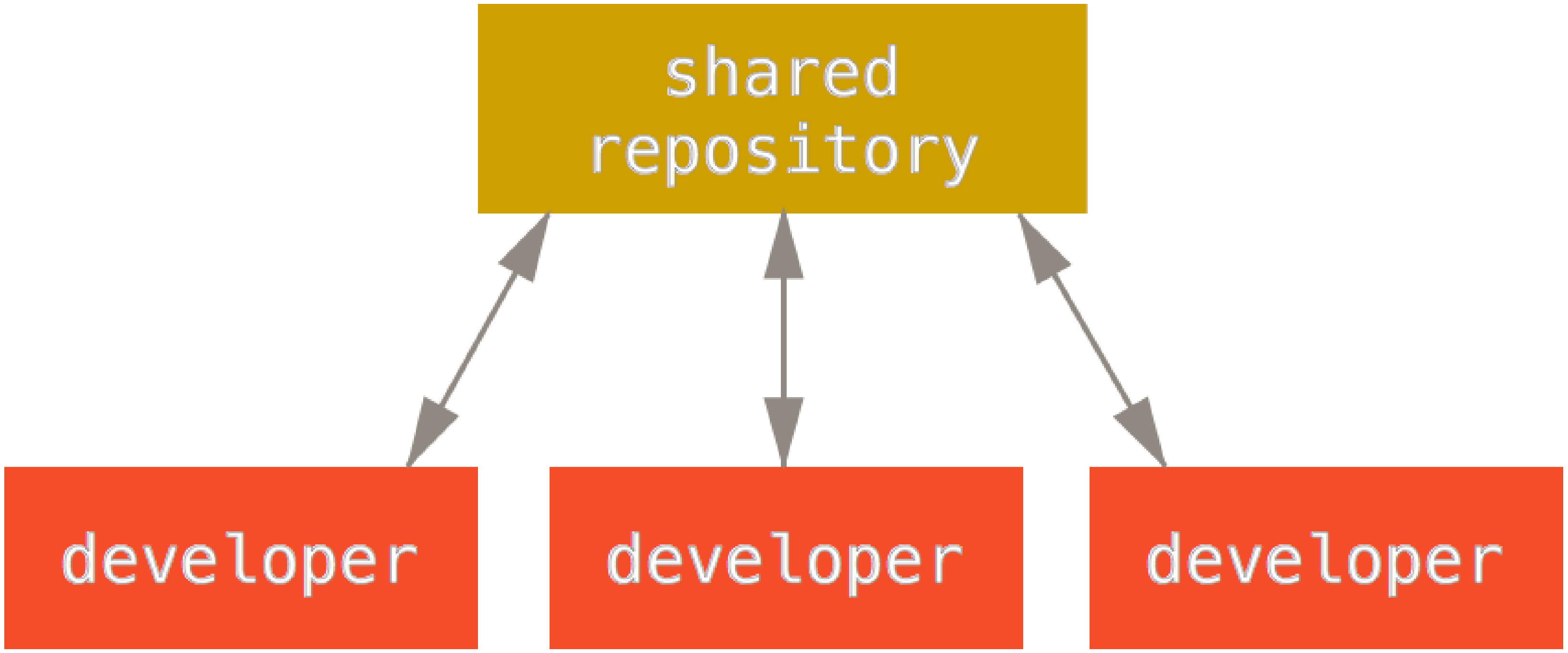
Distributed Workflow



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Don’t Panic!

- Lots of new concepts in this presentation
  - Practical sessions later today
  - Plenty of time to discuss over coffee / lunch
- By the end of today you should be able to:
  - Get the CCP-WSI repository
  - Make your own changes on a branch
  - Merge that branch into the development branch
  - Push the changes back to the repository

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Acknowledgements

- All diagrams and the leading quote are from the Pro Git book and licensed under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License.
- The Version Control comic is from Geek & Poke and licensed under the Creative Commons Attribution 3.0 License
- These slides were created by Steven Lamerton

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