Git

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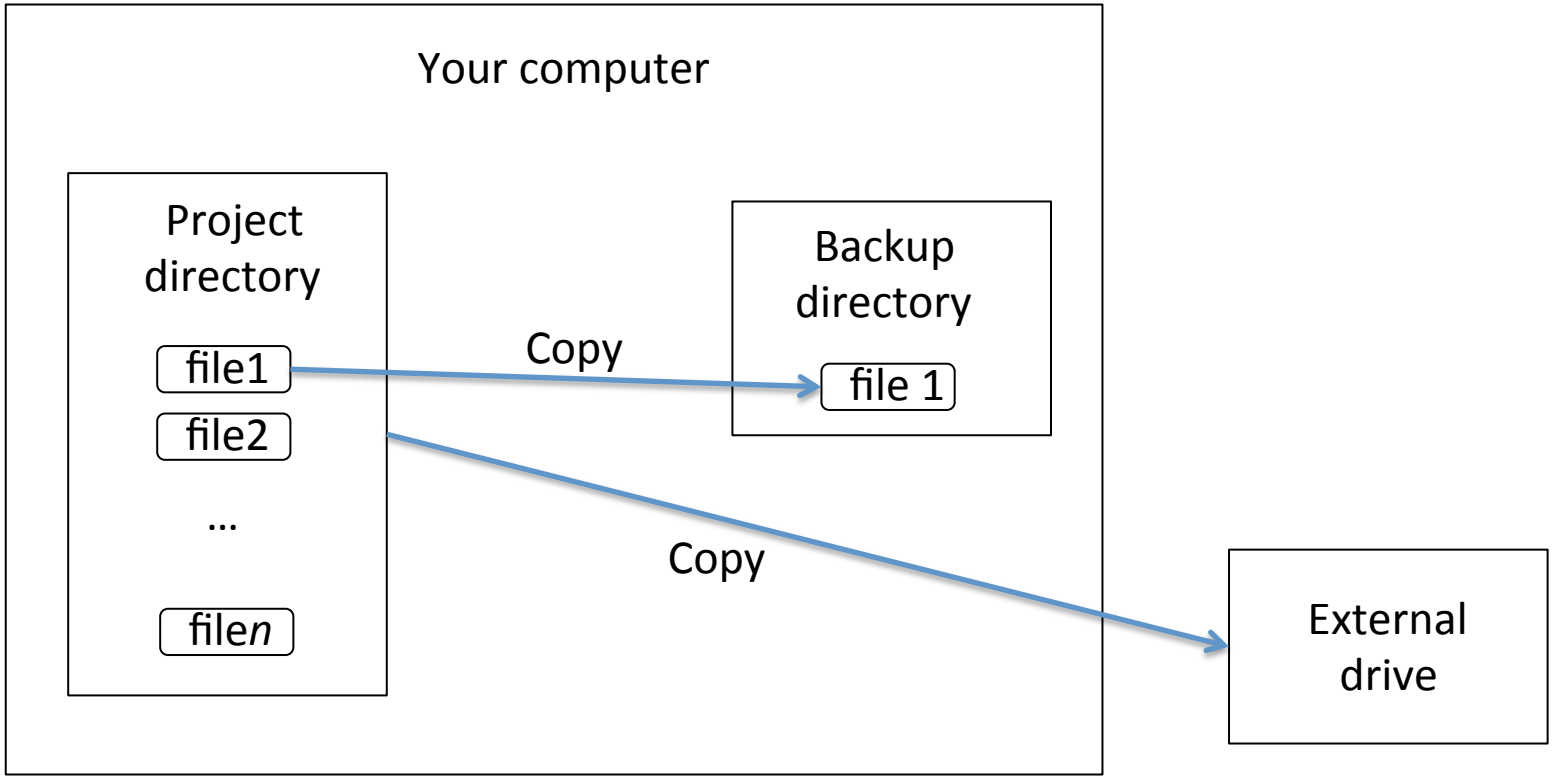
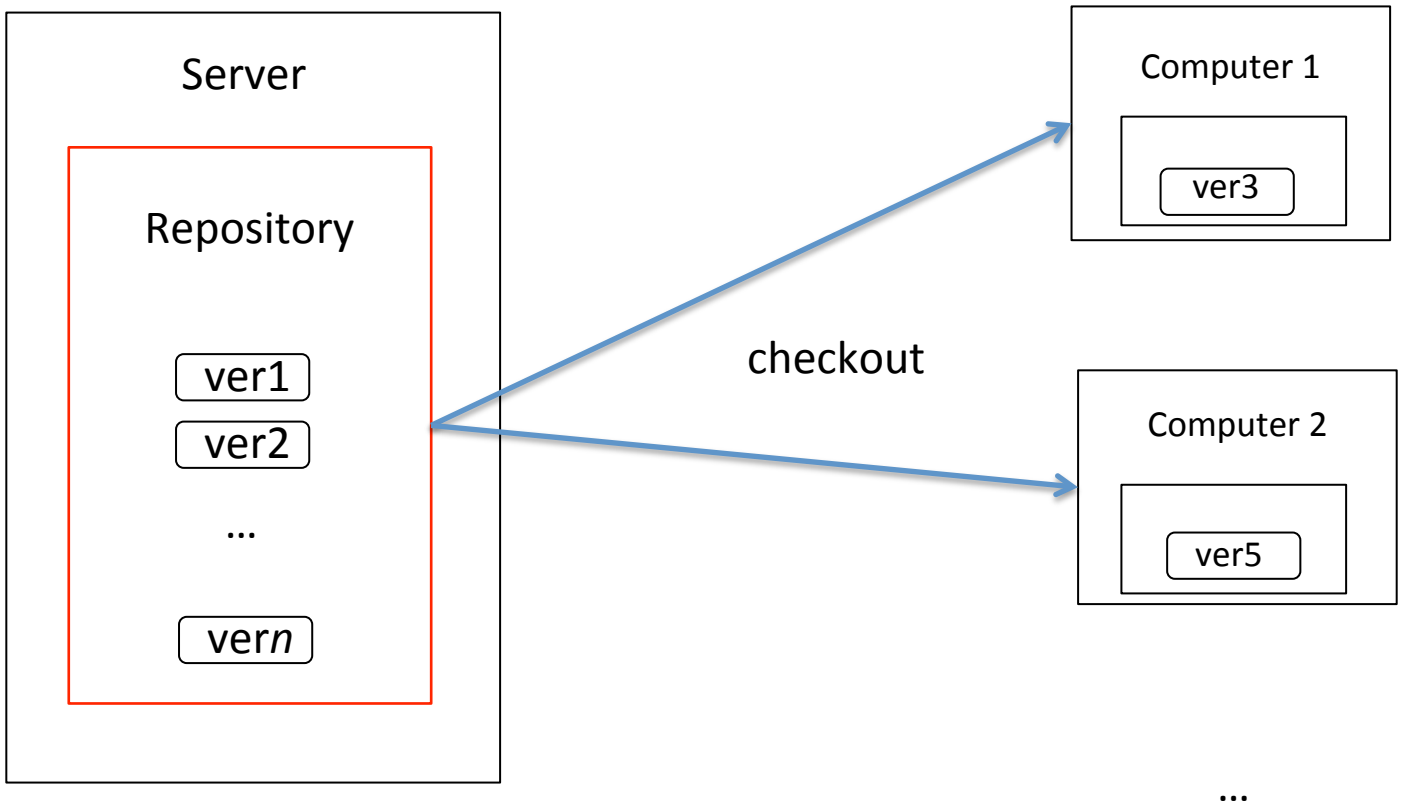
Version control system

A version control system is a program that can record multiple versions of a source file, storing information such as the creation time of each version, who made it, and a description of what was changed.

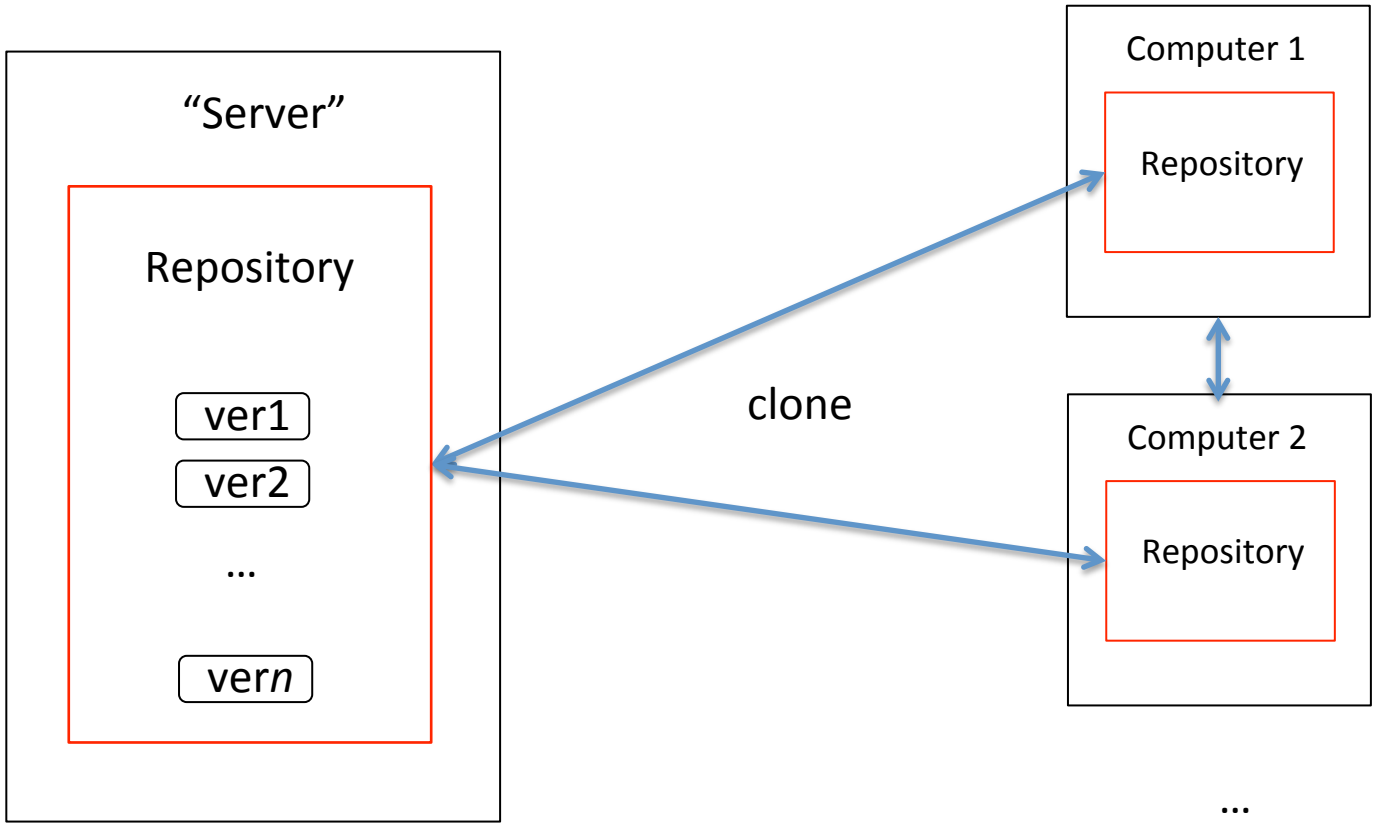
Why version control?



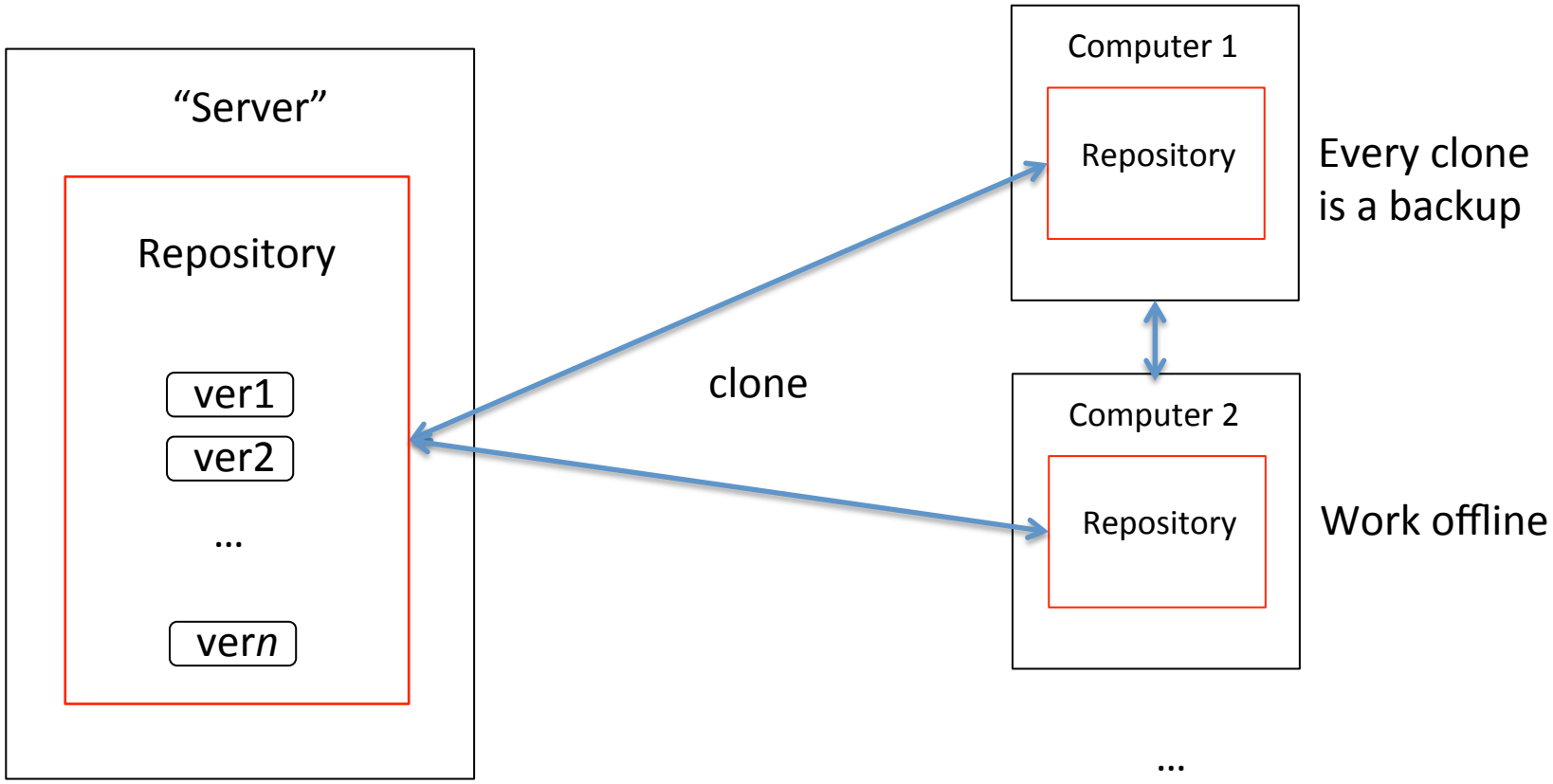
Centralized VCS



Distributed VCS



Distributed VCS



There is by convention – an upstream repo – to stay in sync

Getting started

- Install git ✓
- Configure git

Configure git

Git customization

- System /etc/gitconfig
- User $HOME/.gitconfig
- Project my_project/.git/config

Git commands to edit configuration:

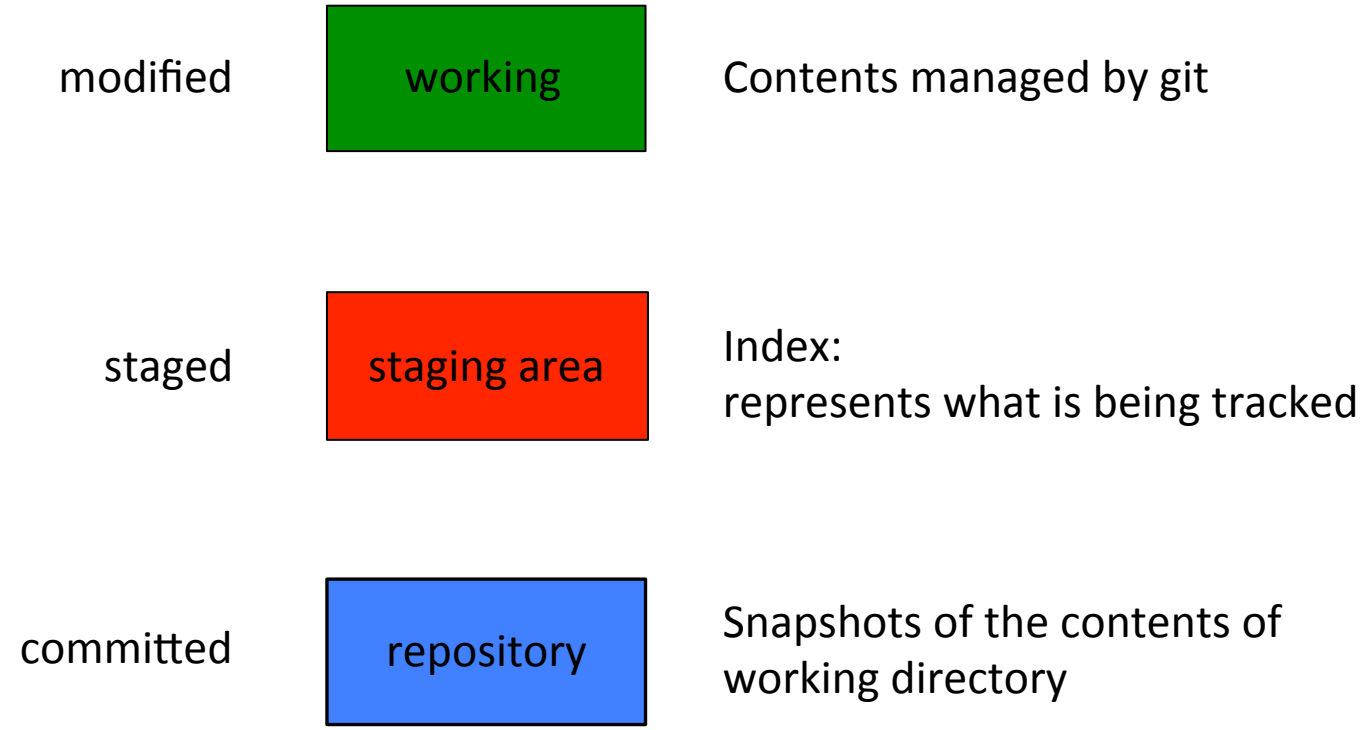
git config --system (system)
git config --global (user)
git config (project)

$ git config --global user.name "[name]"
Sets the name you want atached to your commit transactions
$ git config --global user.email "[email address]"
Sets the email you want atached to your commit transactions
$ git config --global color.ui auto
Enables helpful colorization of command line output

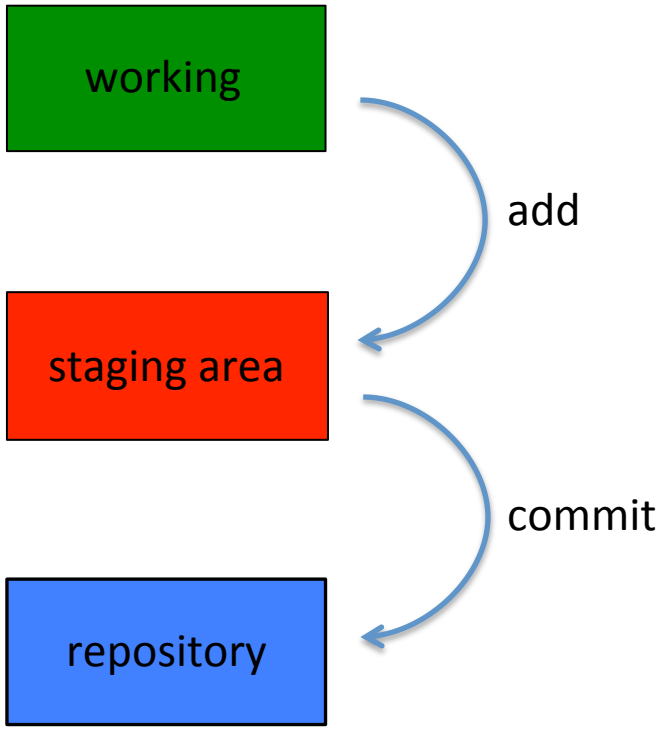
Getting started

- Install git ✓
- Configure git ✓
- Git concepts
- Demo
  - Initialize a repository
    - Working with repository
    - add, commit, etc…
  - Working with a remote repository
    - Pushing changes

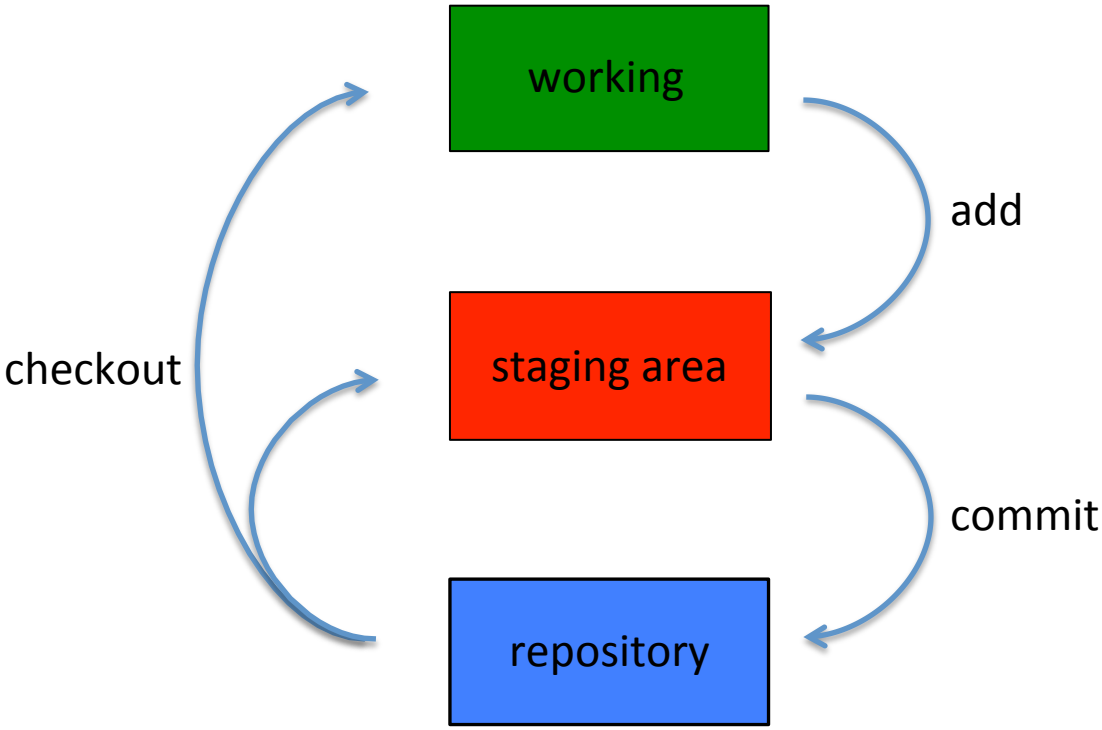
Git concepts



Git concepts



Git concepts



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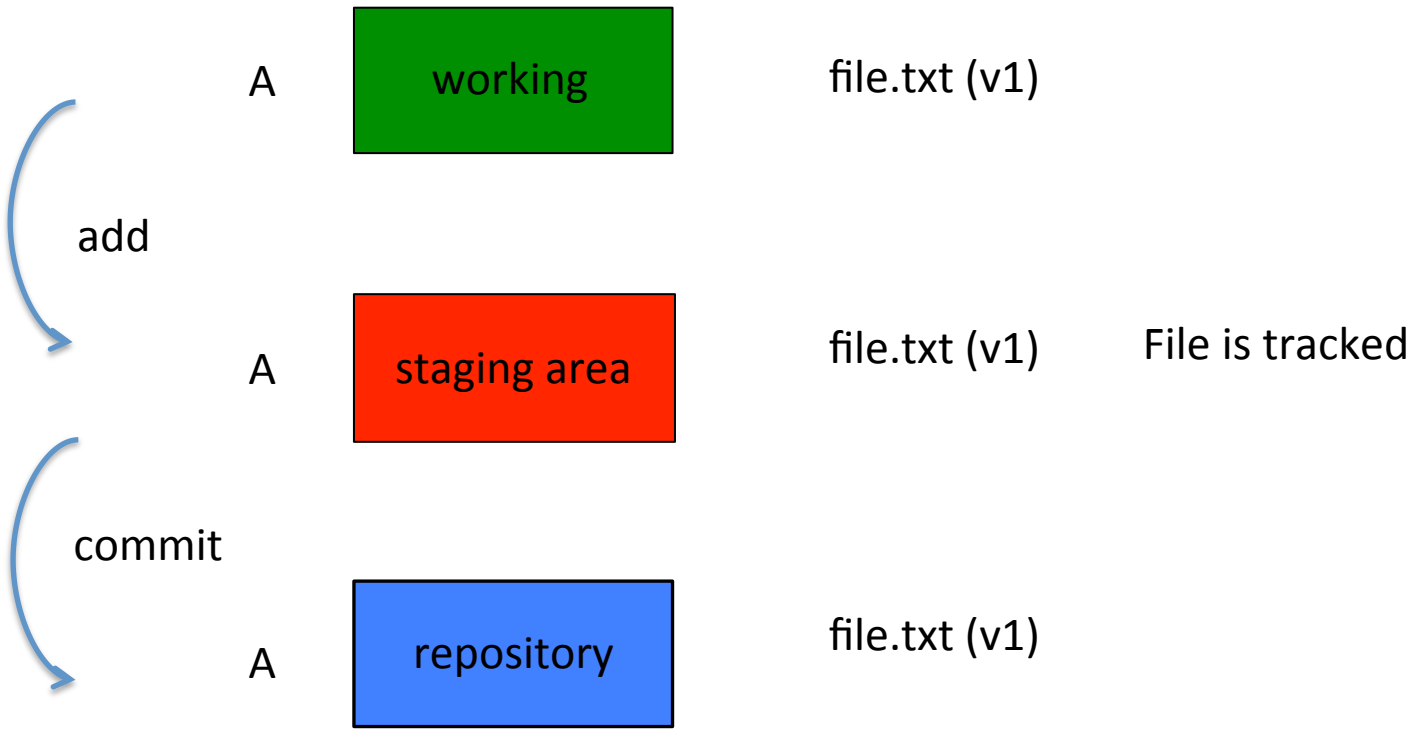

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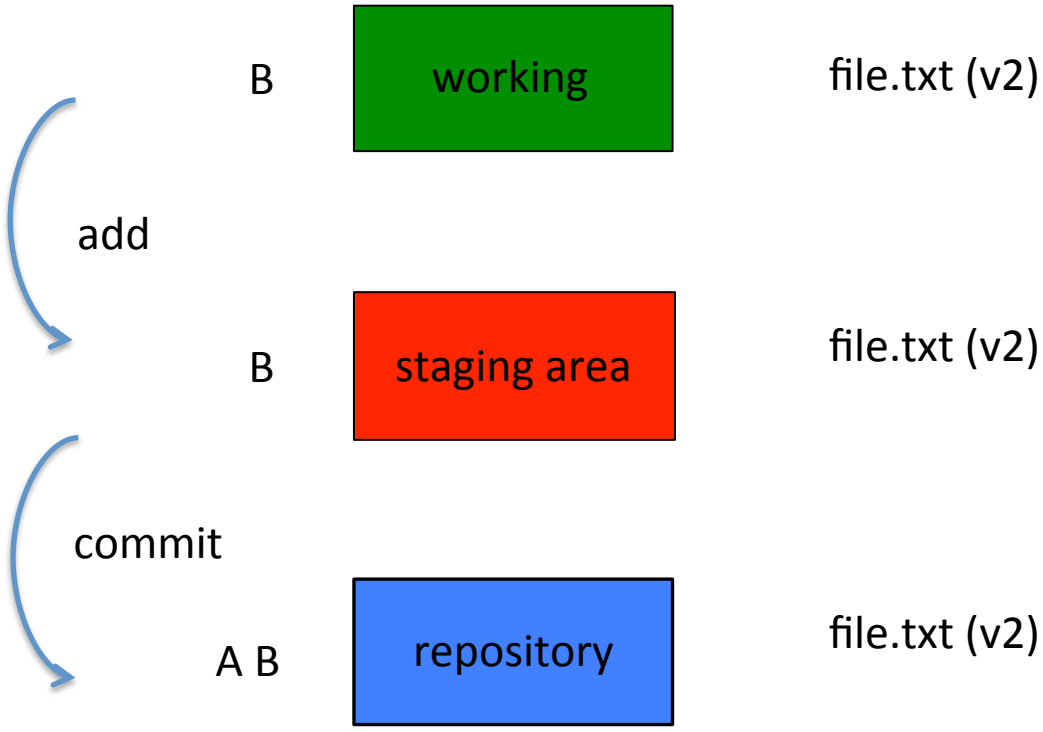
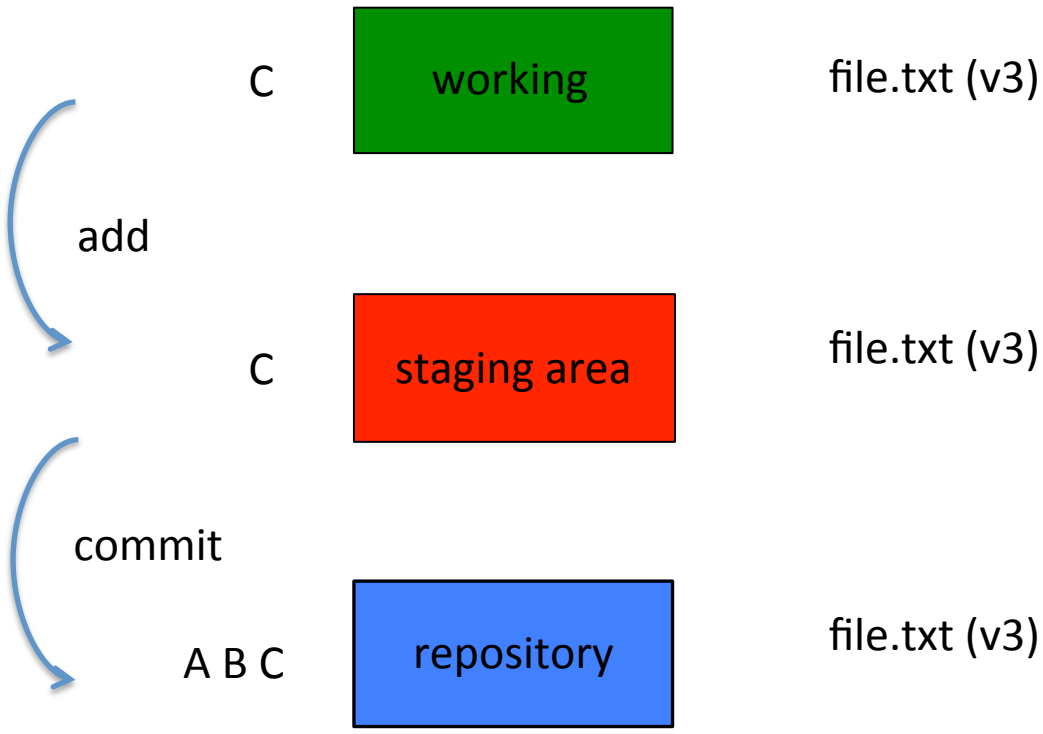


Git concepts



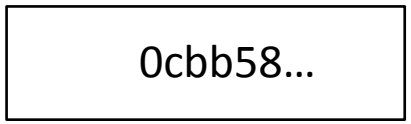
A, B and C are change sets

Git concepts

For each change set (i.e. each commit A,B,C):

- Git generates a checksum
- Git uses SHA-1 algorithm to create checksums
  - 40-character hexadecimal string
  - e.g. 1fbb5af06b9e4facff4170fc687ecdd143daad50

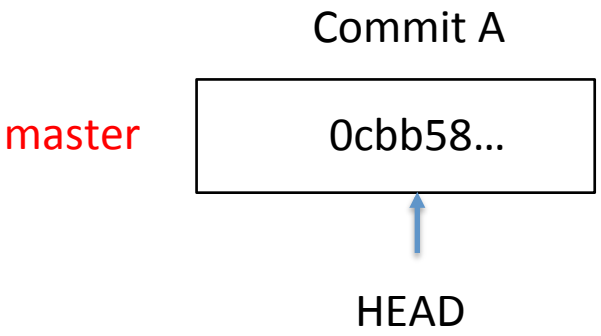
Git concepts



Commit:

Represented by 40-char hex string
Author
Timestamp
Message
Parent

Git concepts



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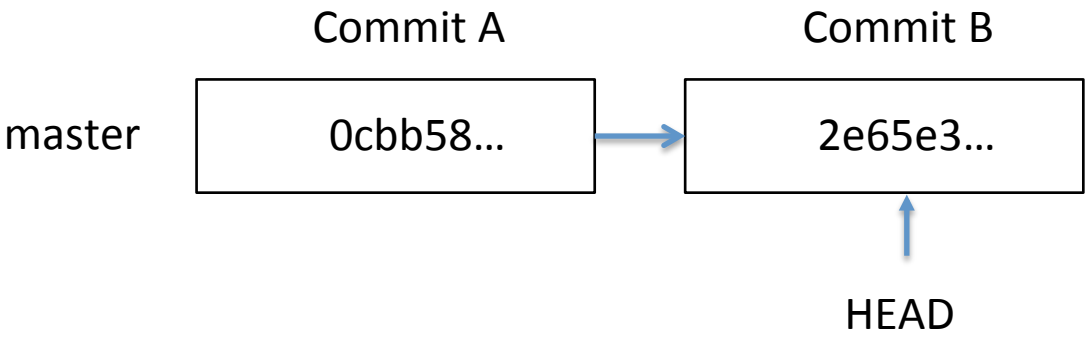

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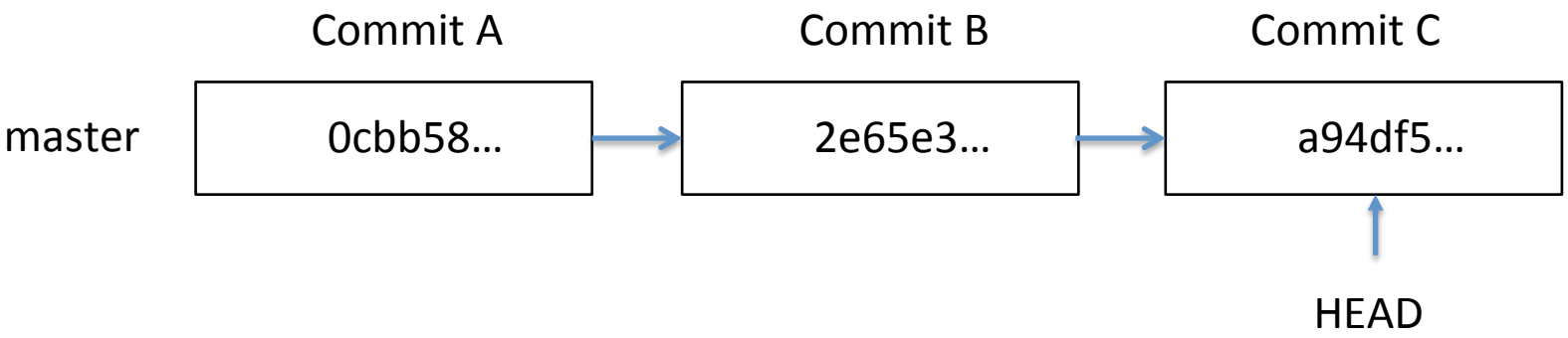

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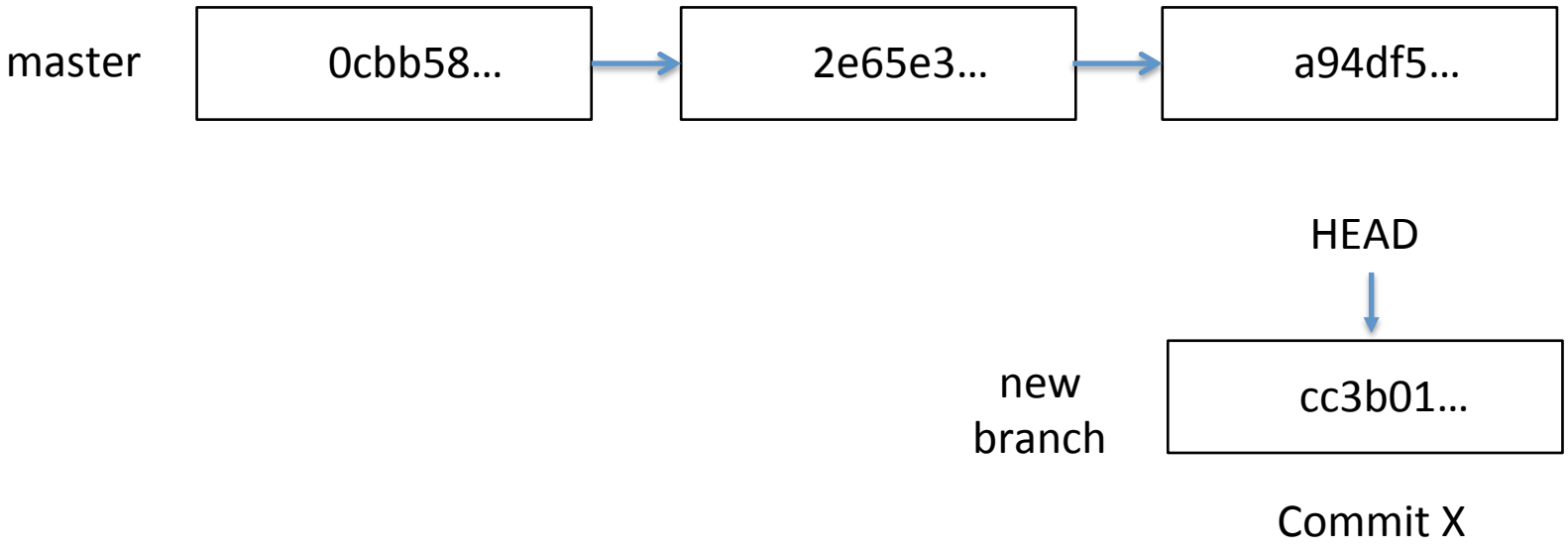
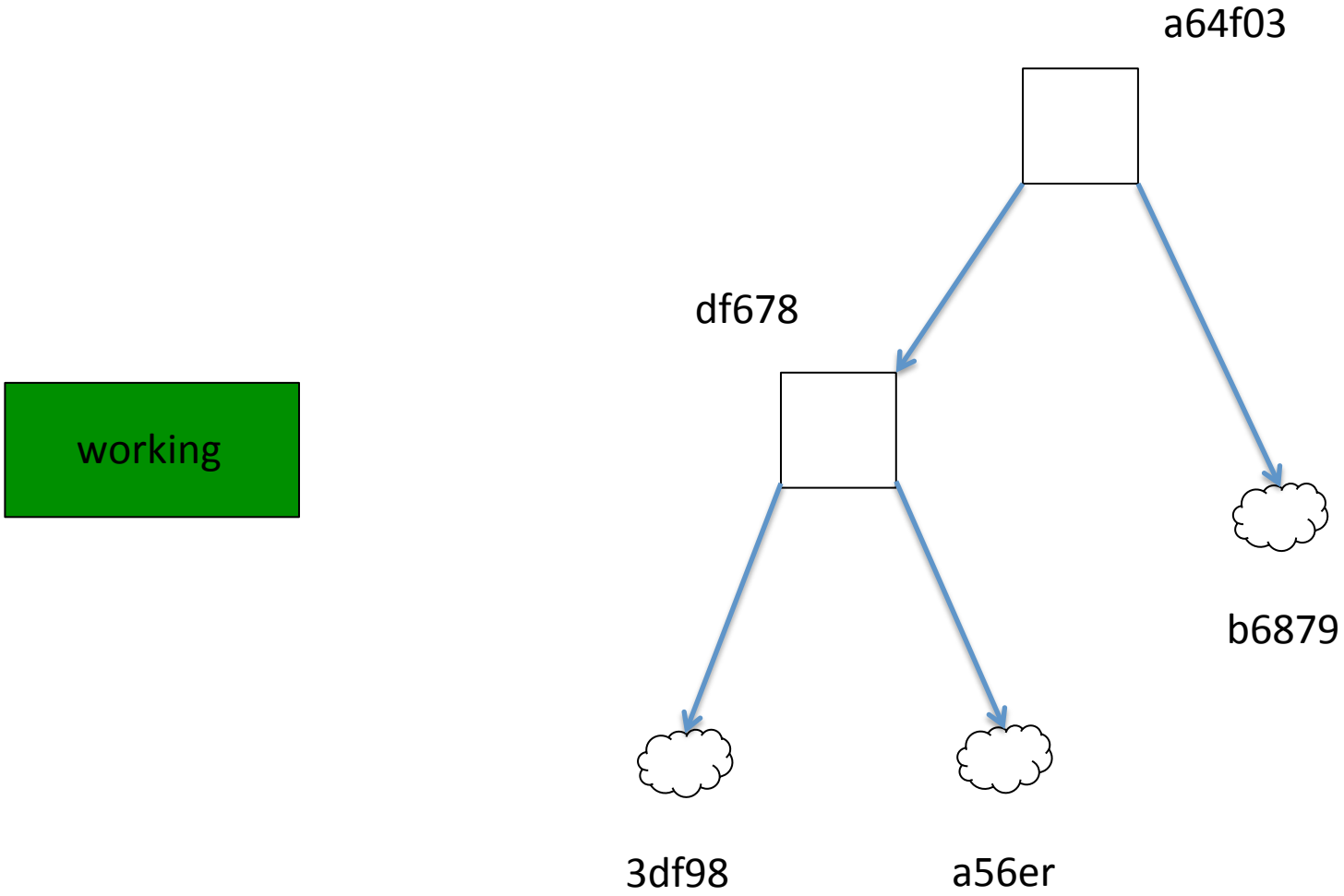


HEAD points to tip of current branch in repository

Git concepts



Demo

Common commands

Create repositories

$ 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

$ git status

Lists all new or modified files to be commited

$ git add [file]

Snapshots the file in preparation for versioning

$ git reset [file]

Unstages the file, but preserve its contents

$ git diff

Shows file differences not yet staged

$ git diff --staged

Shows file differences between staging and the last file version

$ git commit -m "[descriptive message]"

Records file snapshots permanently in version history

Group changes

$ 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

Review history

$ 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

References

- https://git-scm.com/doc
- http://gitref.org/