Git

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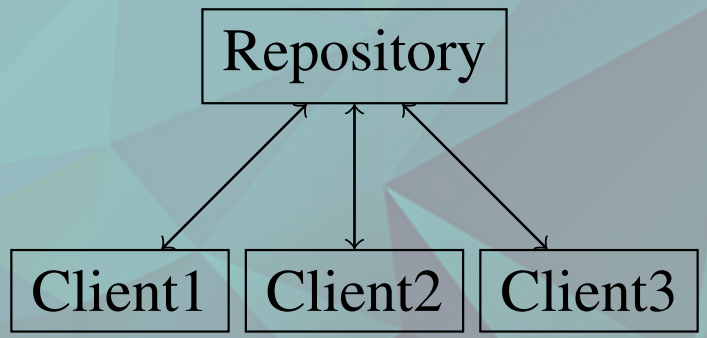
What's Git

- Git is a software for version control
- It allows groups of developers (clients) to work simultaneously on multiple files
- Files are stored in a shared repository (typically online) and copies are stored locally on clients

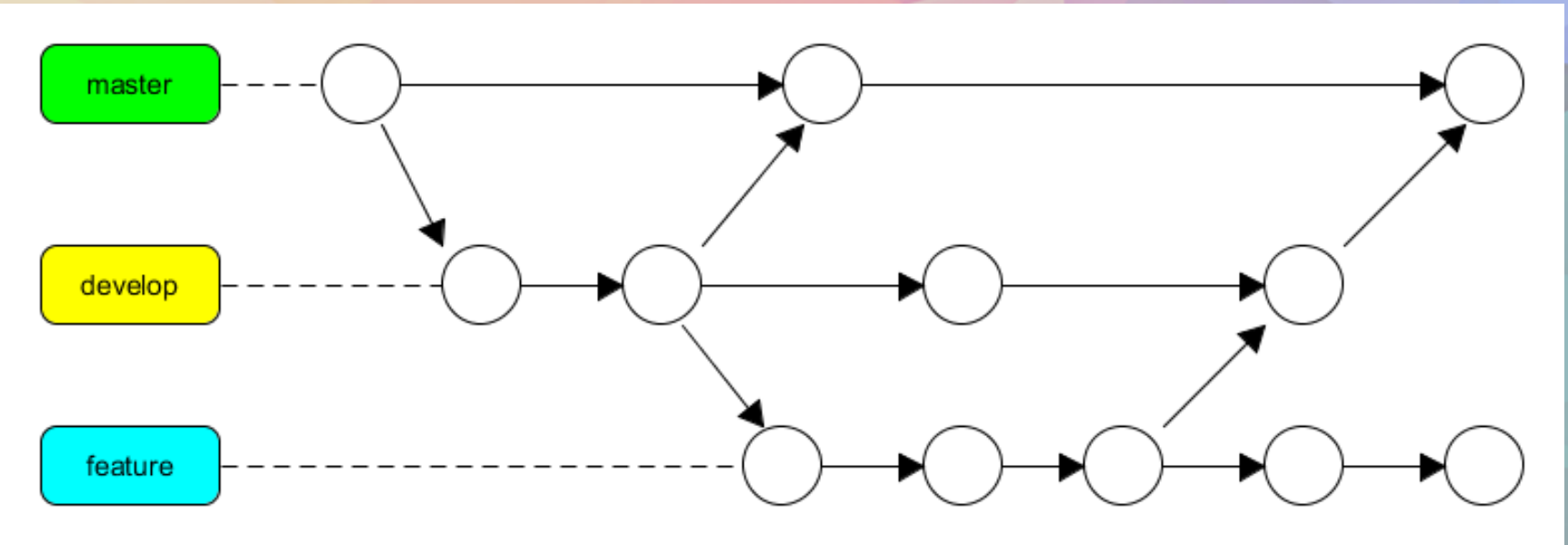


Some client operations:

- Create a working copy of the files as they are in the online repository
- Edit the local copy of the files offline
- Commit the changes with a commit message that specifies what has been changed
- Push its copy to the central repository

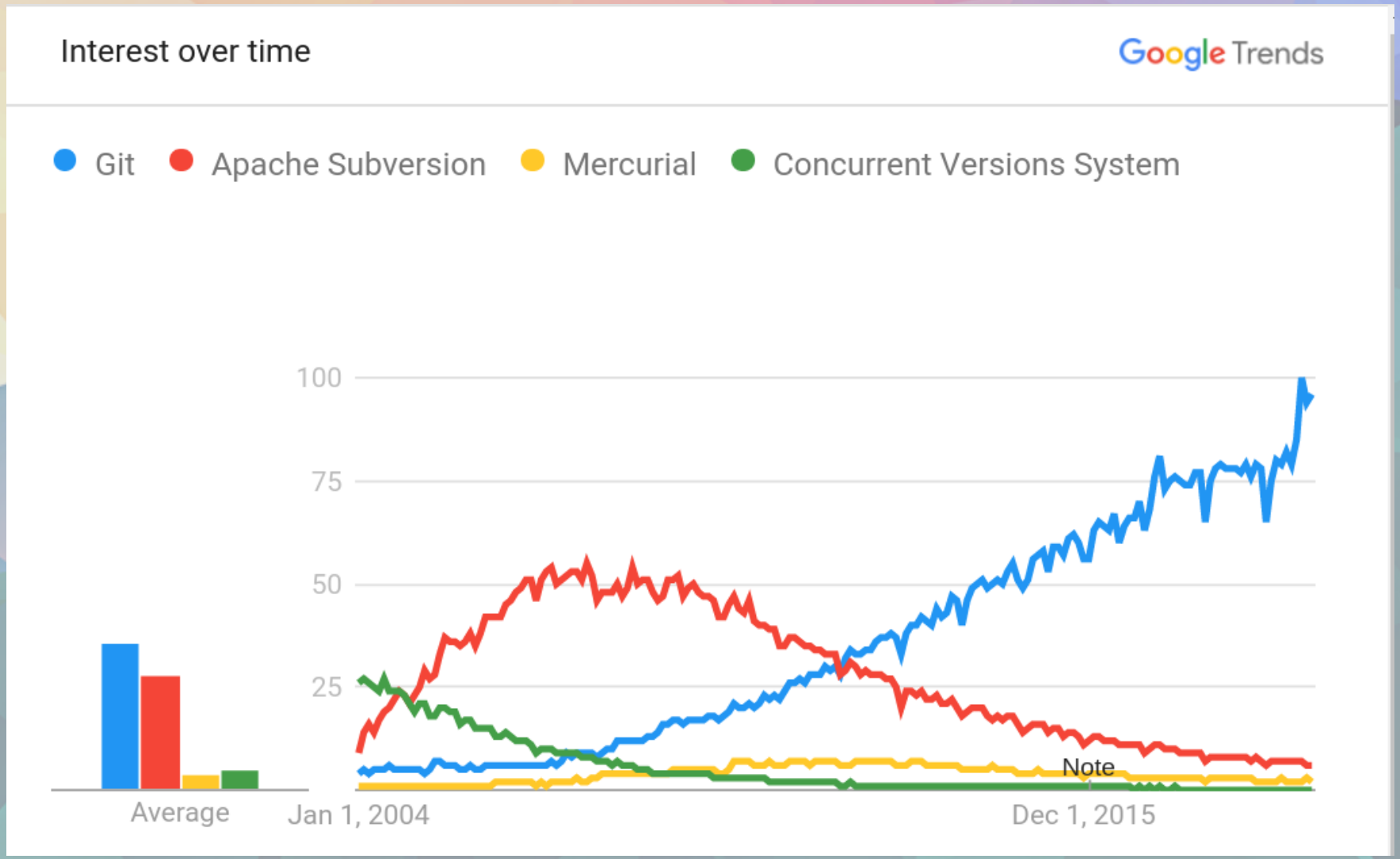
Commits are like snapshots of the code accompained with a message. Commits can be reverted and users can select what files to commit and what files have to be excluded from.

Git is based on a branching system

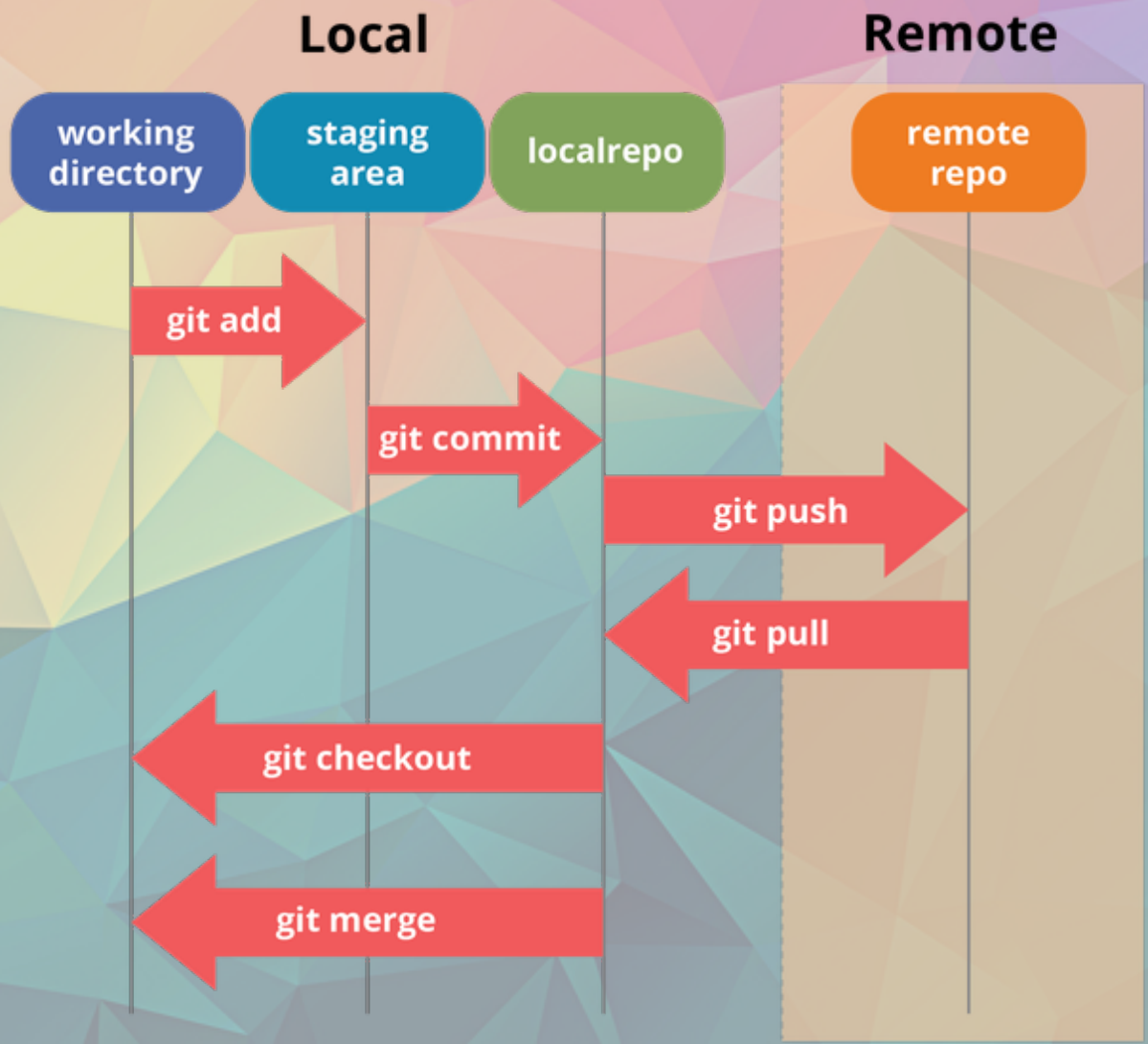


- Each row is a branch
- Circles represent commits
- A new branch can be created as a copy of another branch
- Arrows moving back to an older branch are merges
- *master* is the initial and default branch in git

Comparison of versoning systems (popularity)



ARCHITECTURE



BRANCHES AND COMMANDS

Branches can be:

- Remote
- Local

Clients work on local branches and can synchronize them with remote branches:

- git pull
  - Updates your working copy (working branch) with any changes from the remote repository
- git add
  - Adds a file(s) you want to share
- git commit
  - Commits your changes to your local working copy
- git push
  - Pushes local committed changes to the remote repository. Note: if someone else has pushed its code to the remote repository after we performed the last pull, then we have to perform another pull, otherwise we can not push.

Basic Commands (2)

- git status
  - Compares the local branch (working copy) with the copy of the corresponding remote branch
- git branch
  - Lists, creates or deletes branches.
- git checkout *name*
  - Moves to another branch or to a specific commit. It can also be used to create and move to a new branch at once.
  - with git checkout, uncommitted changes are carried over, and the command will fail if uncommitted changes conflict with the destination branch
- git merge *name*
  - Merges a given branch to the current branch (i.e. it merges all modifications) creating a merge commit
  - When the divergent commits in the two branches do not modify the same file in the same area then the merge command will merge the modifications automatically
  - Otherwise, the developer will be asked to resolve conflicts
  - Conflicts are highlighted in the conflicting file by special git tags

Basic Commands (3)

- git init
  - Creates and initialize a new local git repository
- git clone *remote_url*
  - Creates a local git repository by cloning an existing remote repository

Basic Commands (4)

Much more!

- git stash
- git reset
- ...
- Take a look at:
  `https://www.youtube.com/watch?v=SWYqp7iY_Tc`

Tools and services for GIT

There exist some existing GIT providers (free, with some limitations):

- GitHub: `github.com`
- BitBucket: `bitbucket.org`

GIT can be used from the command line, but some apps might be helpful:

- GitHub Desktop: `desktop.github.com`
- Git Extensions: `gitextensions.github.io`

Practice time

Questions?