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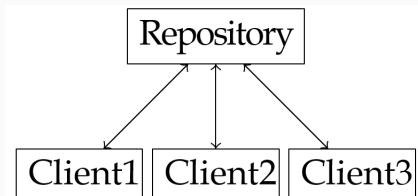
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# What is it?

- 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

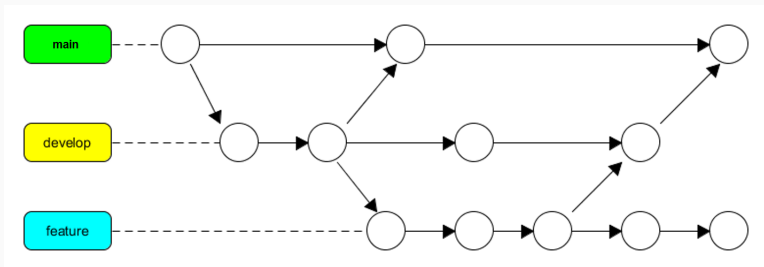


## Some client operations:

- 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 accompanied by 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
- **main** is the initial and default branch in git

# Git Branching: Gitflow

Gitflow is an alternative Git branching model that involves the use of feature branches and multiple primary branches.

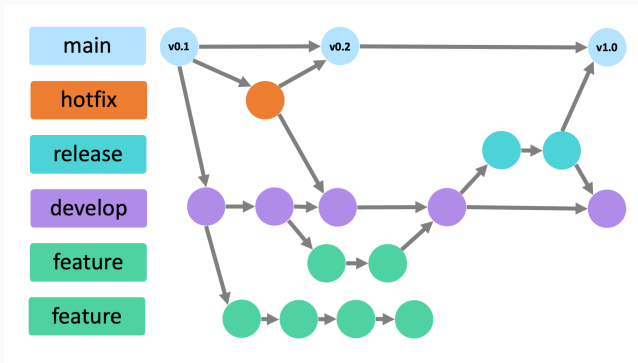
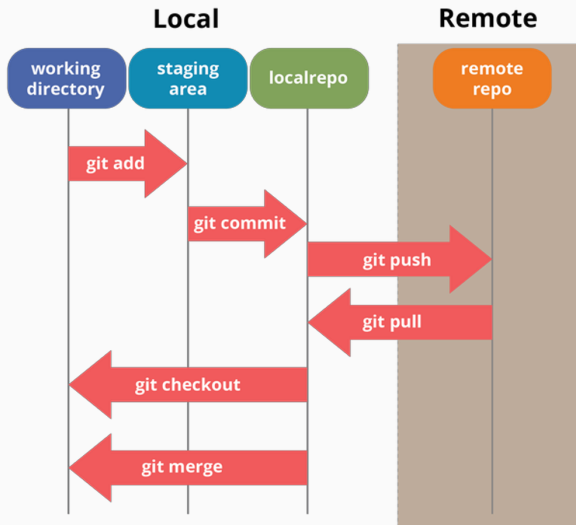


Image taken from:

<https://blog.kinto-technologies.com/posts/2023-03-07-From-Git-flow-to-GitHub-flow>

# Architecture



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) to the staging area
- `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.
- `git status`
  - Displays the state of the working directory and the staging area
- `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.



- `git checkout name`
  - 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

- `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
- `git stash`
- `git reset`
- and many others. Take a look at: <https://git-scm.com/docs>

Download Git at: <https://git-scm.com/downloads>

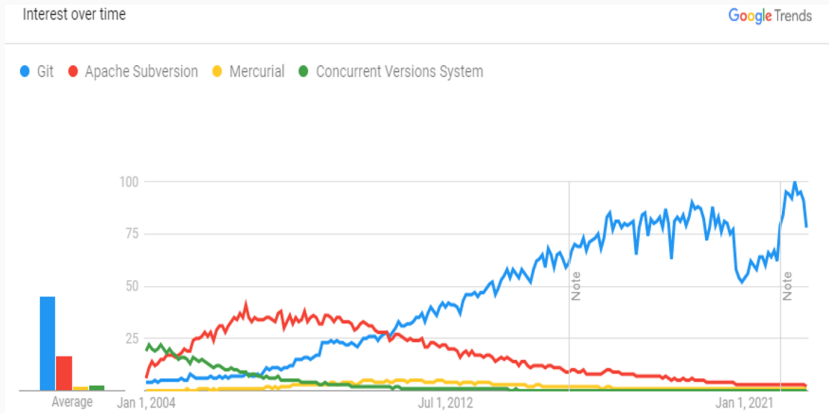
Some online GIT services are available (free, with some limitations):

- GitHub: <https://github.com>
- BitBucket: [bitbucket.org](https://bitbucket.org)
- GitLab: [gitlab.com](https://gitlab.com)

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

- GitHub Desktop: [desktop.github.com](https://desktop.github.com)
- Git Extensions: [gitextensions.github.io](https://gitextensions.github.io)
- GitKraken: [gitkraken.com](https://gitkraken.com)
- IDE specific tools

# Comparison Of Versioning Systems (Popularity)



## In case of fire



-  1. `git commit`
-  2. `git push`
-  3. `leave building`

Image taken from: <https://github.com/hendrixroa/in-case-of-fire>

# Practice

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