INTRODUCTION TO

git

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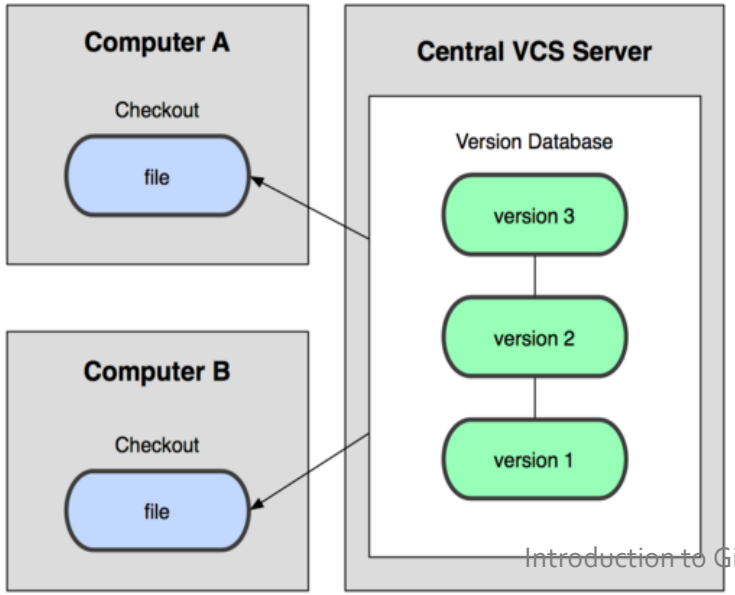
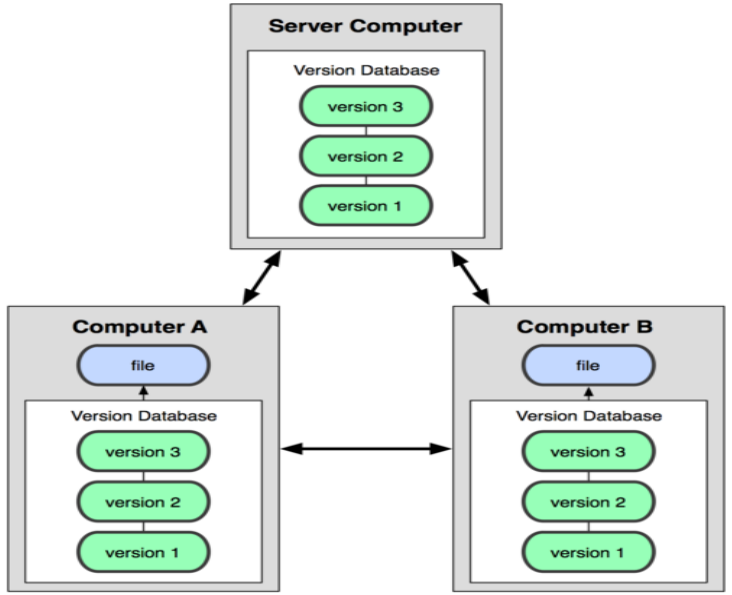
Version Control System

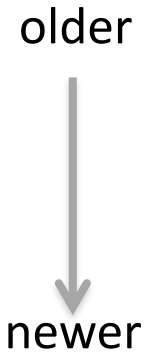
- A system that records changes to a file or set of files over time so that you can recall specific versions later.
- Functions
  - Allows developers to work simultaneously.
  - Does not allow overwriting each other's changes.
  - Maintains a history of every version
- Types
  - Centralized version control system (CVCS).
  - Distributed/decentralized version control system (DVCS)





Version Control Systems (VCSs)

- Help you track/manage/distribute revisions
- Standard in modern development
- Examples:
  - Revision Control System (RCS)
  - Concurrent Versions System (CVS)
  - Subversion (SVN)
  - Git



Distributed Version Control System

- CVCS uses a central server to store all files.
- Single point of failure.
- DVCS clients -check out the latest snapshot of the directory and fully mirror the repository.
- If the server goes down, then the repository from any client can be copied back to the server to restore it.
  - *Every checkout is a full backup of the repository.*
- Git does not rely on the central server.
- Commit changes, create branches, view logs, and perform other operations when you are offline.
- Network connection only to publish your changes and take the latest changes.

Terminologies

Repository
Working Directory and Staging Area or Index
Commits
Branches
Clone
Pull
Push
URL

- Local/Remote Repository
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- Commits
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"a kind of database where your VCS stores all the versions and metadata that accumulate in the course of your project."

- **Local Repository**
- A "local" repository resides on your local computer, as a ".git" folder inside your project's root folder. You are the only person that can work with this repository, by committing changes to it.
- A "**Remote**" repository, in contrast, is typically located on a remote server on the internet or in your local network.
- The purpose of a remote repository (eg, GitHub) is to publish your code to the world (or to some people) and allow them to read or write it.

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- **Working Directory and Staging Area or Index**
- The working directory is the place where files are checked out. In other CVCS, developers generally make modifications and commit their changes directly to the repository.
- Git doesn't track each and every modified file. Whenever you do commit an operation, Git looks for the files present in the staging area.
  - *Only those files present in the staging area are considered for commit and not all the modified files*

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- **Commits**
- A **commit** is a record of what files you have changed since the last time you made a commit. Essentially, you make changes to your repo (for example, adding a file or modifying one) and then tell git to put those files into a commit.
    - *A commit is a wrapper for a specific set of changes.*

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- **Branches**
- Branches are used to create another line of development.
- By default, Git has a master branch. Usually, a branch is created to work on a new feature.
- Once the feature is completed, it is merged back with the master branch and we delete the branch.

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- **Clone**
- Clone operation *creates the instance of the repository*. Clone operation not only checks out the working copy, but it also mirrors the complete repository.
- Users can perform many operations with this local repository. The only time networking gets involved is when the repository instances are being synchronized.

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- **Pull**
- Pull operation copies the changes from a remote repository instance to a local one.
- The pull operation is used **for synchronization** between two repository instances.

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- **Push**
- Push operation copies changes from **a local repository instance to a remote one.**
- This is used to **store the changes permanently into the Git repository**.

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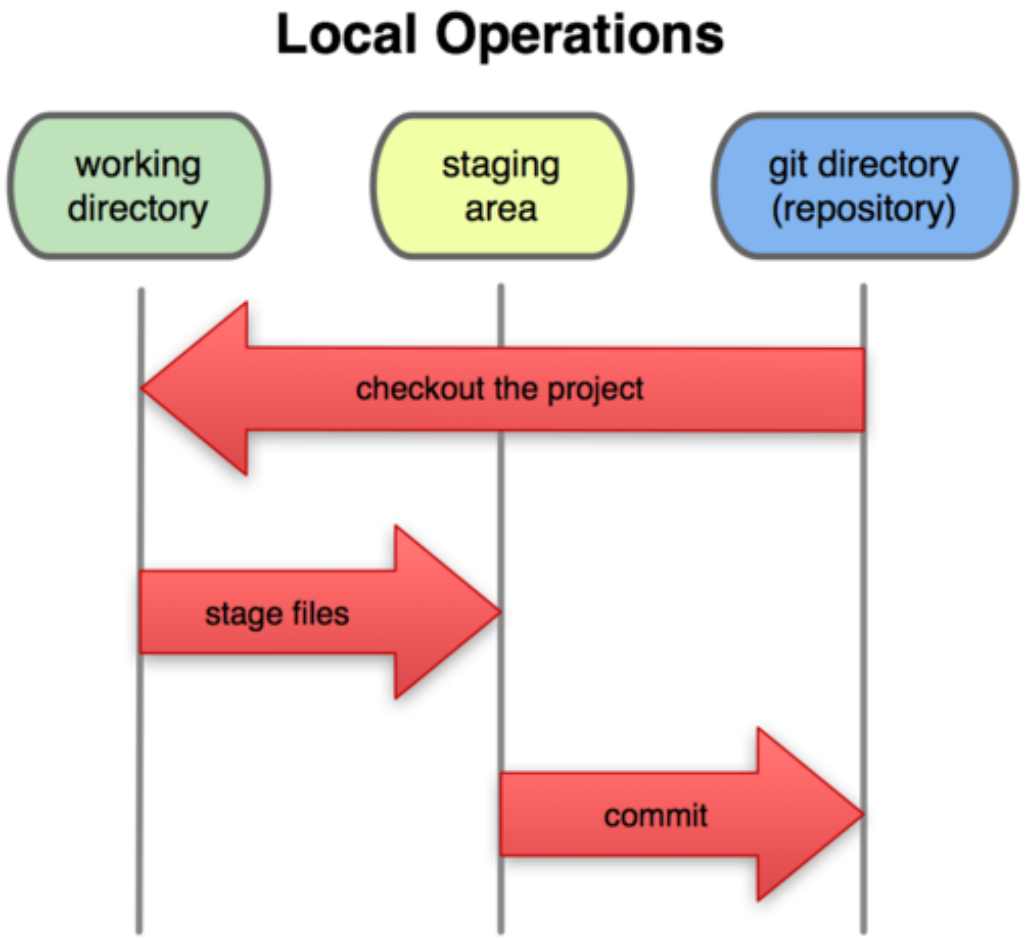
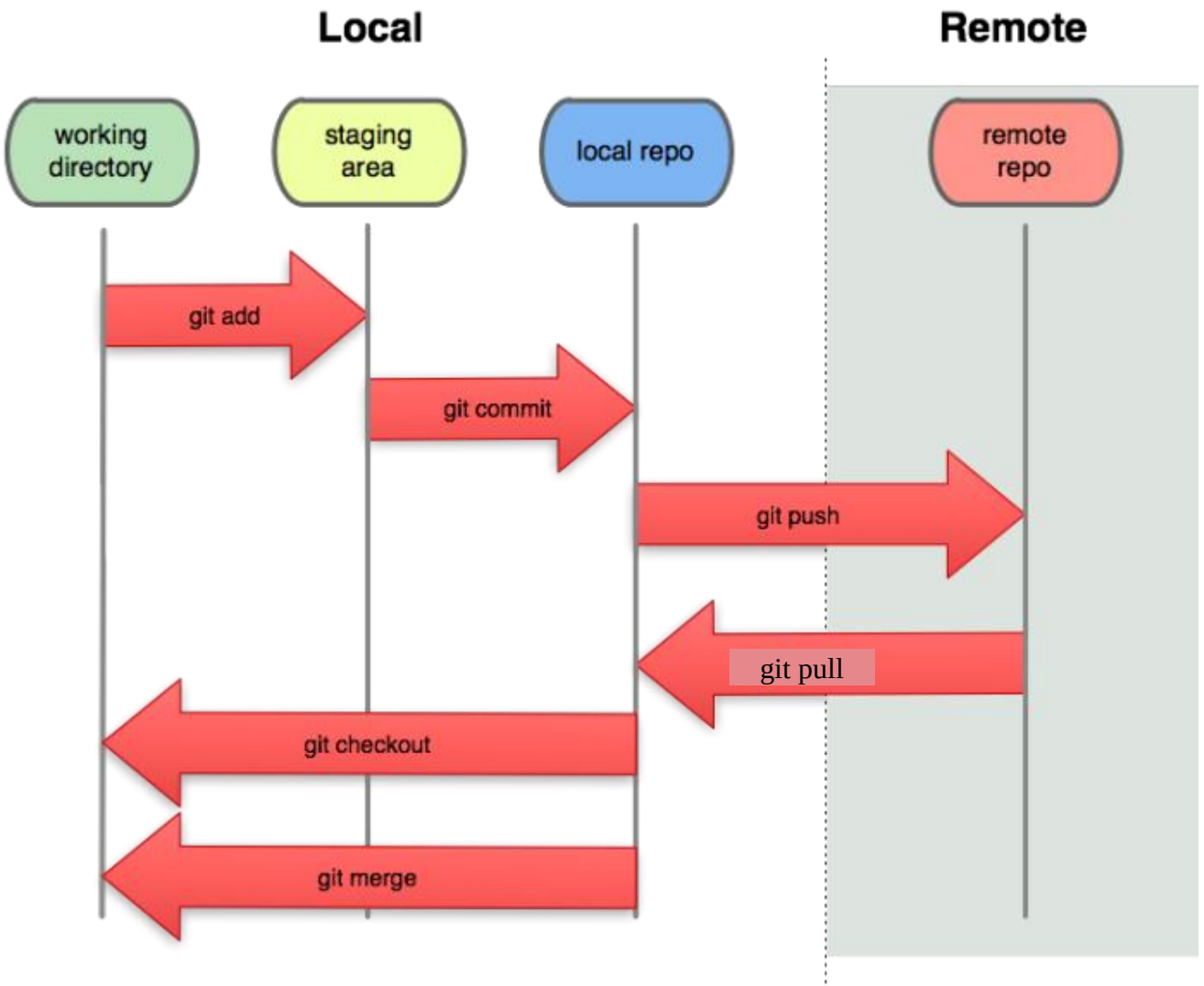
- **URL**
- URL represents the location of the Git repository.

Basic Workflow in Git

- **The Three States**
- Files can reside in: *modified*, *staged*, and *committed.*
- Modified means that you have changed the file but have not committed it to your database yet.
- Staged means that you have marked a modified file in its current version to go into your next commit snapshot.
- Committed means that the data is safely stored in your local database

Local Operations




Local
Remote
working directory
staging area
local repo
remote repo
git add
git commit
git push
git pull
git checkout
git merge

Groups of Git commands

- Setup and branch management
  - init, checkout, branch
- Modify
  - add, delete, rename, commit
- Get information
  - status, diff, log
- Create reference points
  - tag, branch
- Remote operations
  - Push, pull

- Thank you!!!!