Git's Three-Stage Model

Git operates on a three-stage model, which includes:

1. **Working Directory:**
    - This is where you directly interact with your files.
    - You edit, create, and delete files here.
2. **Staging Area (Index):**
    - A temporary holding area for files you've marked for inclusion in your next commit.
    - You use `git add` to stage changes.
3. **Local Repository:**
    - A database that stores the complete history of your project.
    - Each commit creates a snapshot of the entire project at that point in time.
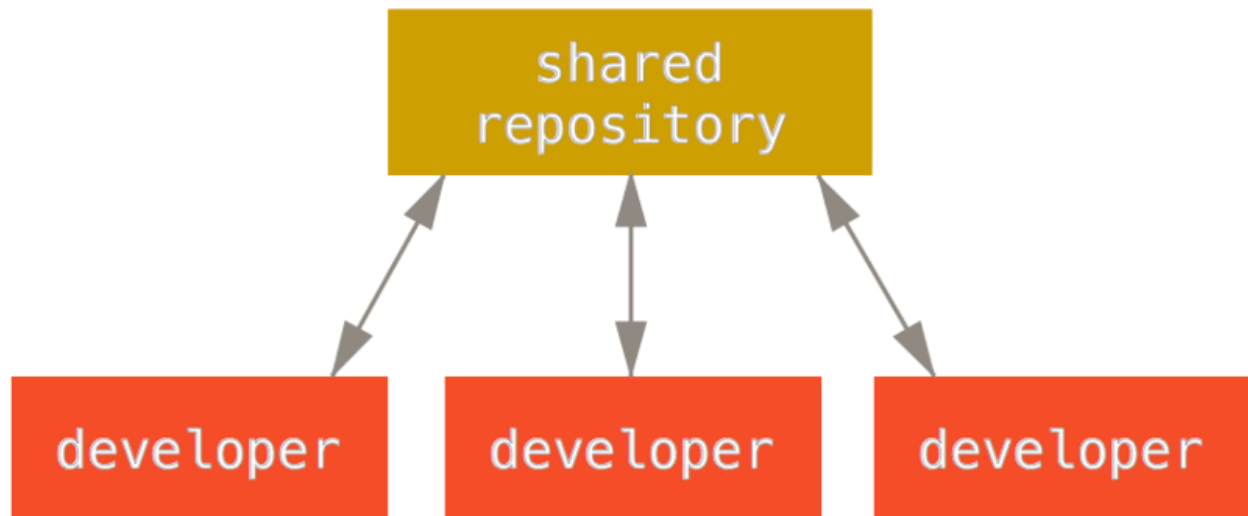
Local Operations

working directory

staging area

git directory (repository)

checkout the project

stage files

commit
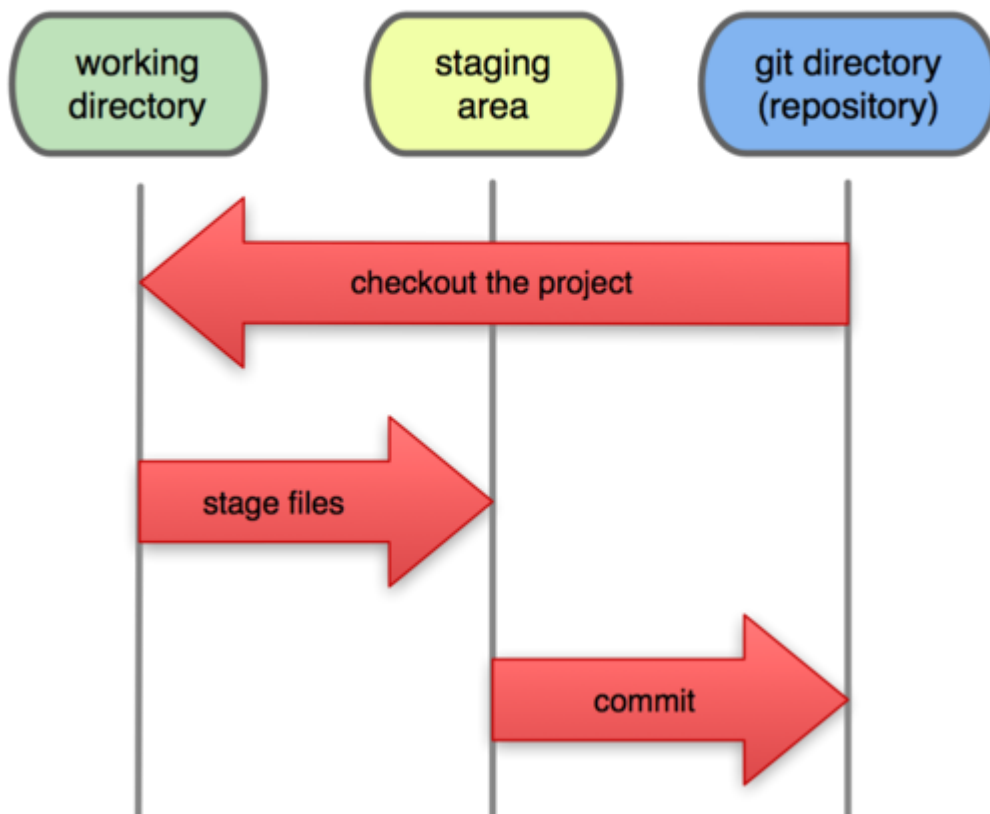
Git's ThreeStage Model

Distributed Nature of Git

Unlike centralized version control systems, Git is a distributed system. This means that each developer has a complete copy of the repository, including its entire history.

Git's Distributed Nature

Key Git Operations

- **Committing:**
    - Creates a snapshot of the current state of the project.
    - Stores the snapshot in the local repository.
- **Branching:**
    - Creates a new line of development.
    - Allows you to work on different features or bug fixes simultaneously.
- **Merging:**
    - Combines changes from different branches into a single branch.
- **Pushing:**
    - Sends local commits to a remote repository.
- **Pulling:**
    - Fetches commits from a remote repository and merges them into the local branch.
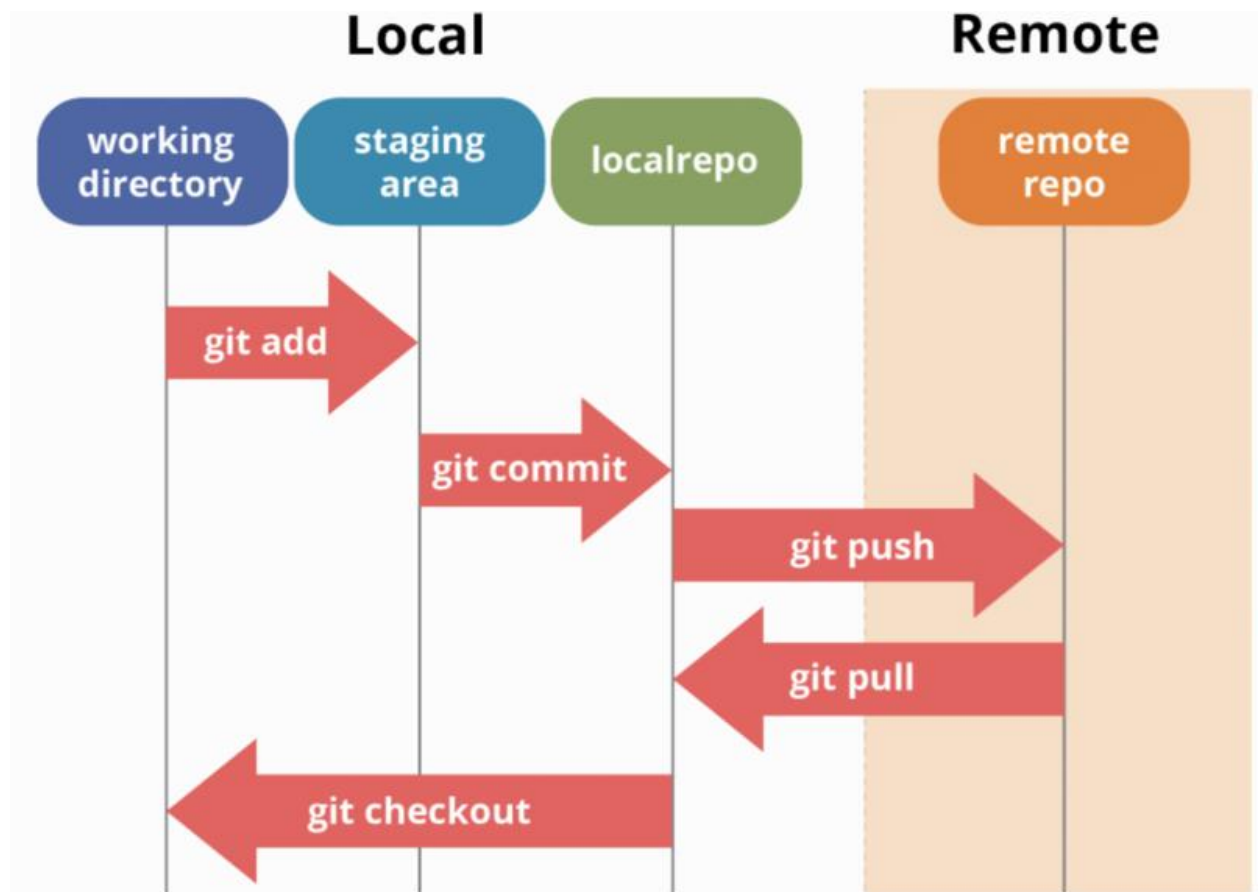
Git's Basic Workflow

Additional Concepts

- **HEAD:** A pointer to the current branch or commit.
- **Remote Repository:** A copy of the repository hosted on a server.
- **Forking:** Creating a copy of a remote repository.
- **Pull Request:** A request to merge changes from one branch into another.