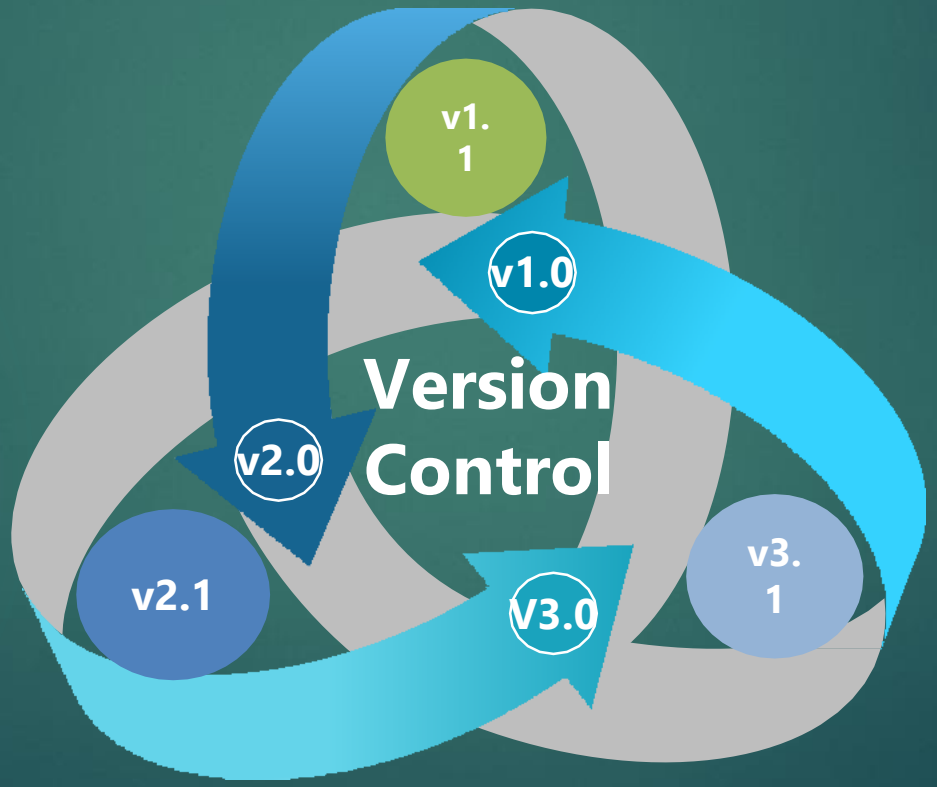
Version Control with Git

What is Version Control

Version Control is a system that documents changes made to a file or a set of files. It allows multiple users to manage multiple revisions of the same unit of information. It is a snapshot of your project over time.



What is Version Control

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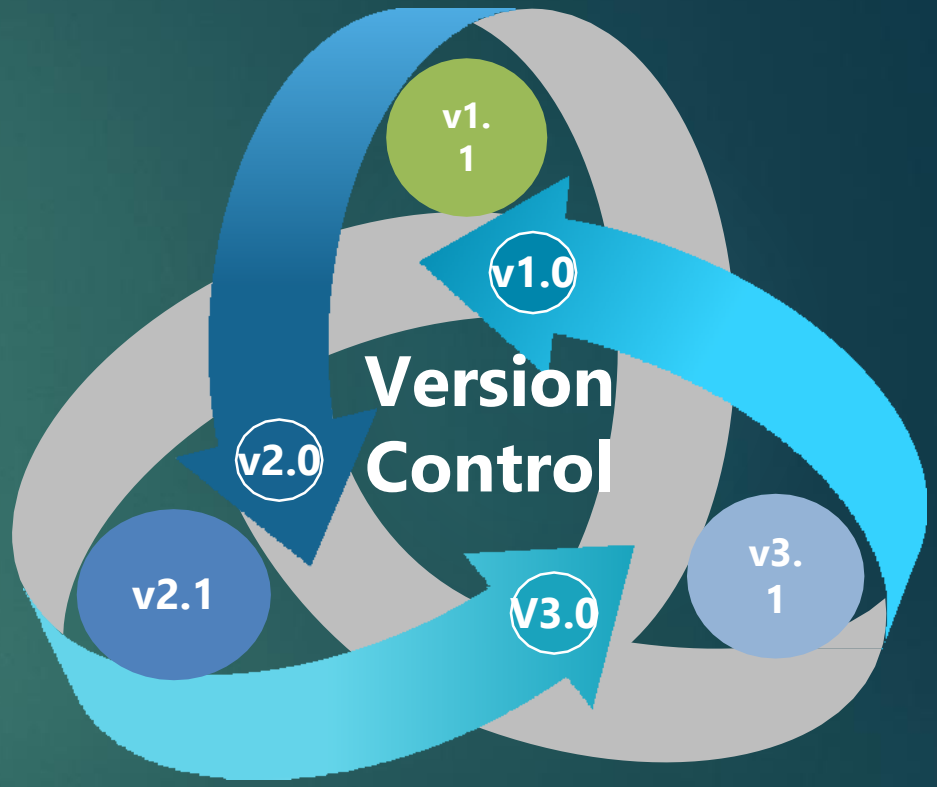
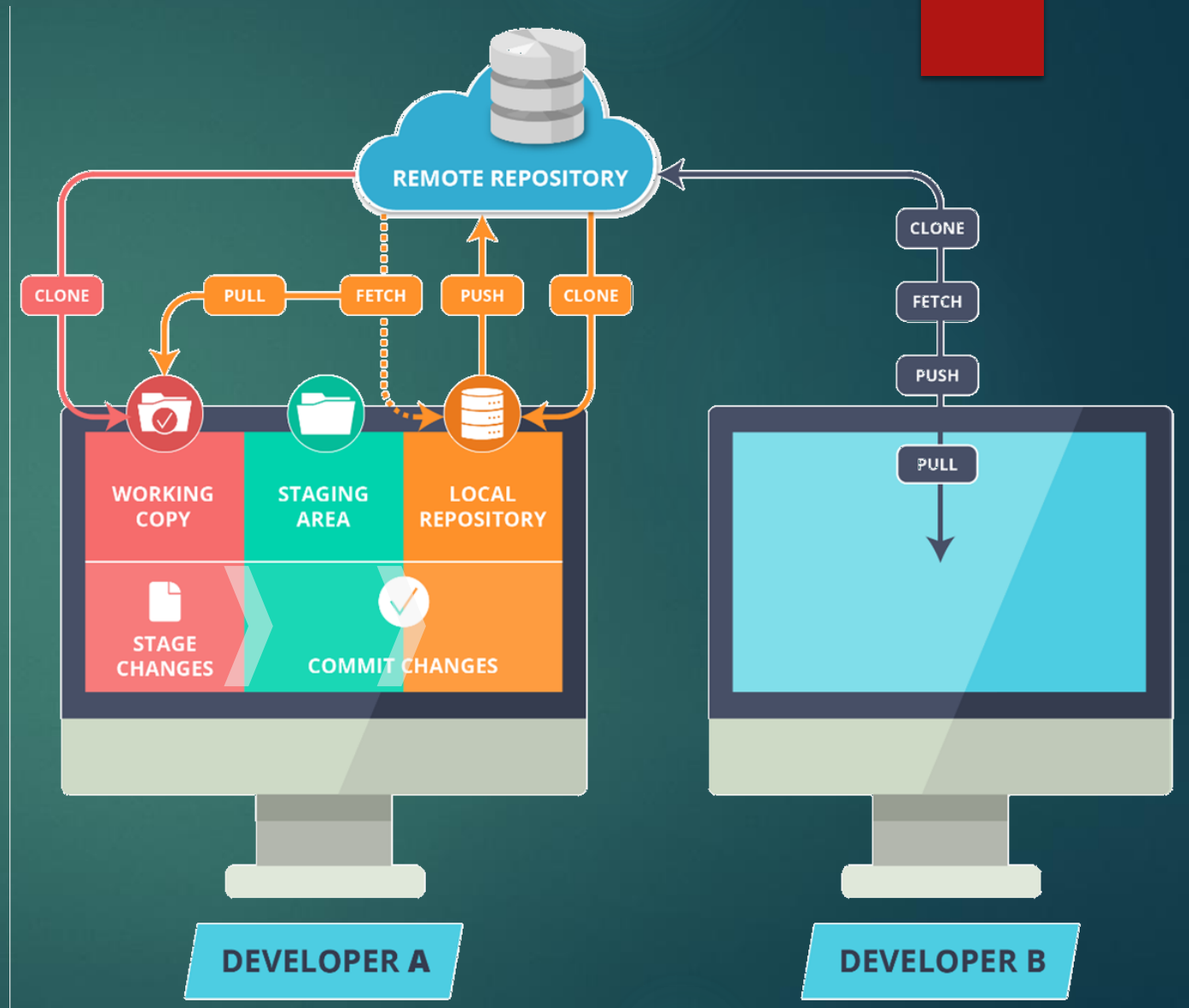


Git

Git is an open source Distributed Version Control System(DVCS) which records changes made to the files laying emphasis on **speed**, **data integrity** and **distributed**, **non-linear workflows**

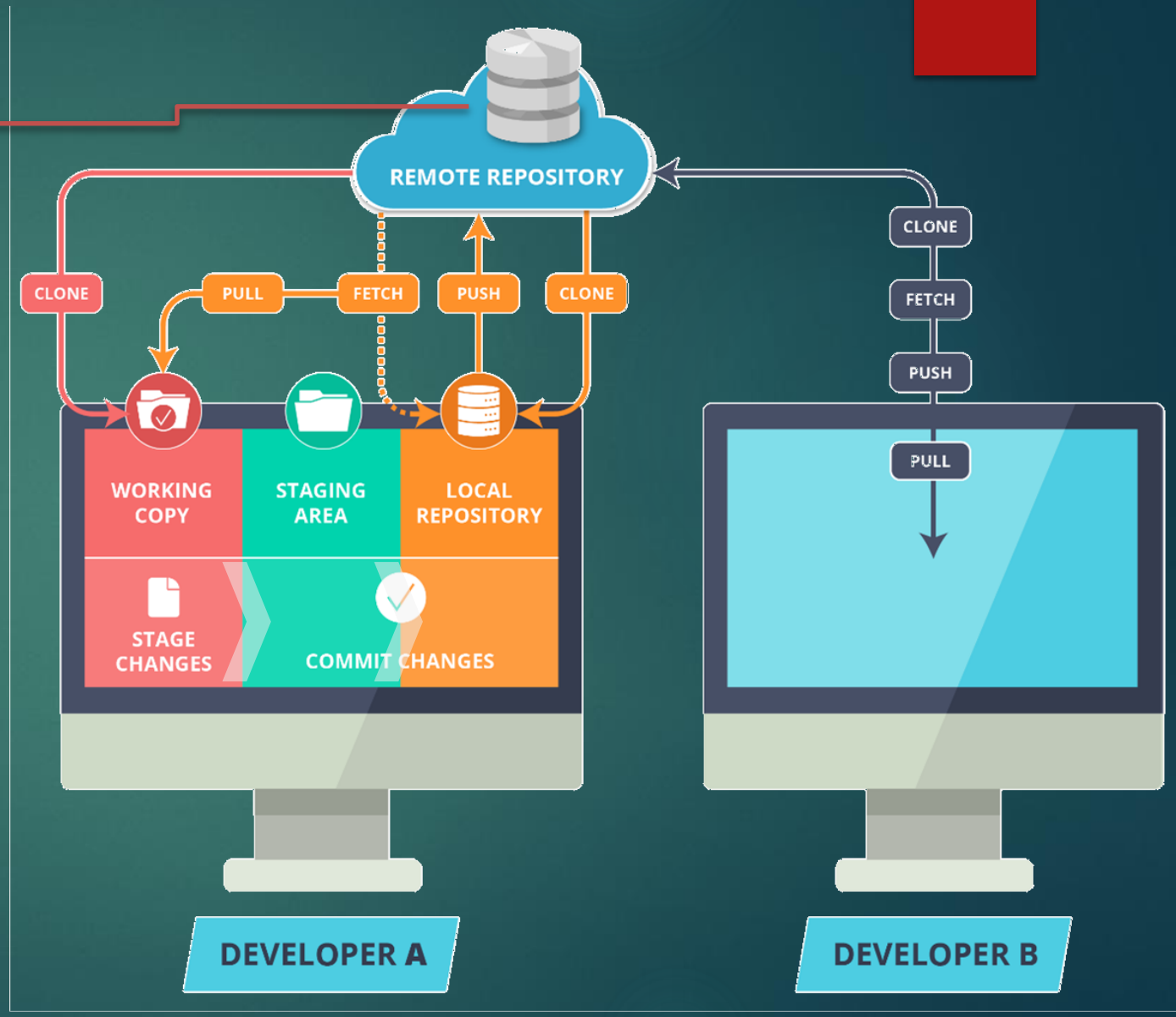
Git Workflow

- Use Git workflow to manage your project effectively
- Working with set of guidelines increases Git's consistency and productivity



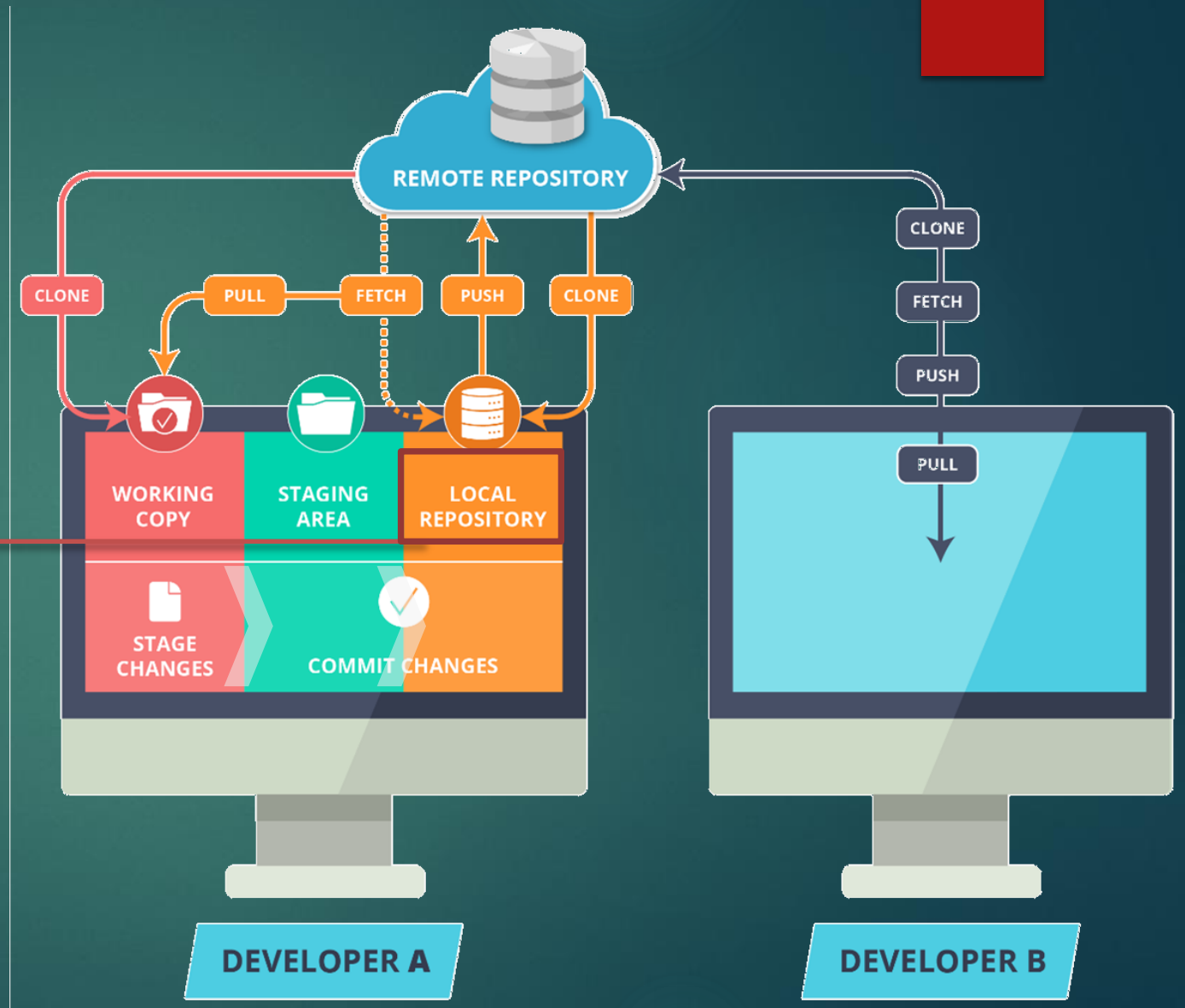
Git Workflow

- The Remote Repository is the server where all the collaborators upload changes made to the files



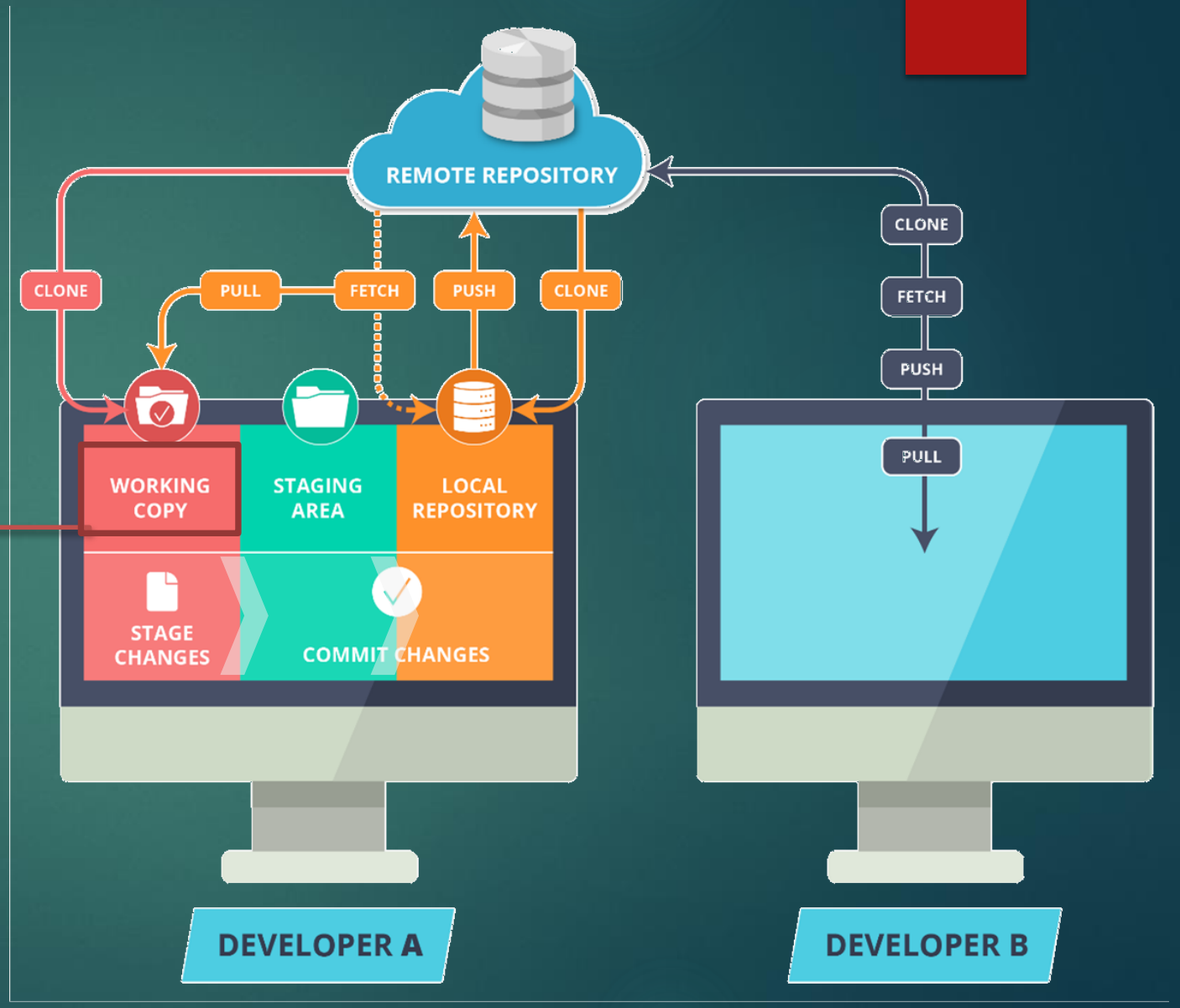
Git Workflow

- "**Local Repository**" is user's copy of the Version Database
- The user accesses all the files through local repository and then push the change made to the "**Remote Repository**"



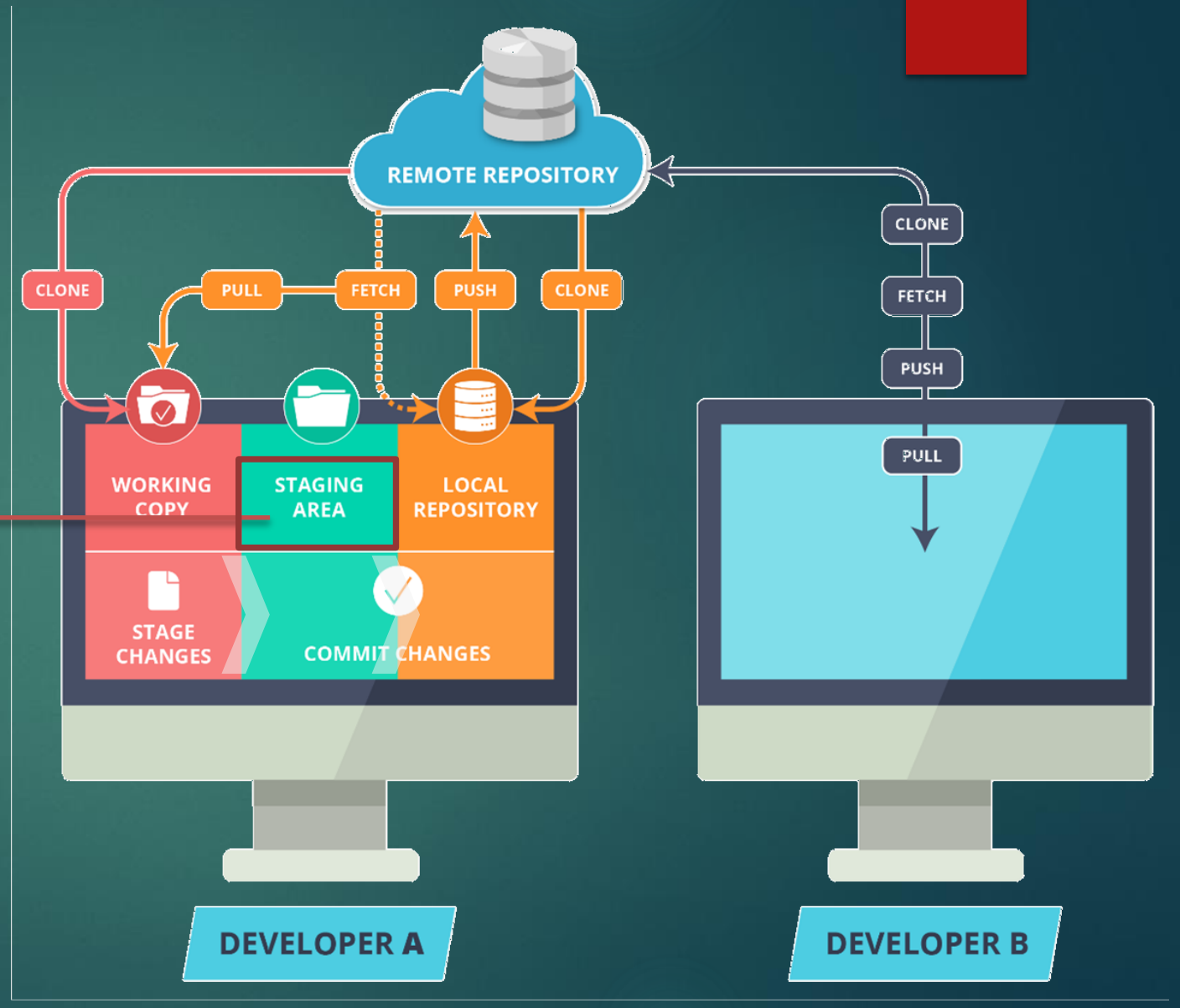
Git Workflow

- **"Workspace"** is user's active directory
- The user modifies existing files and creates new files in this space. Git tracks these changes compared to your Local Repository



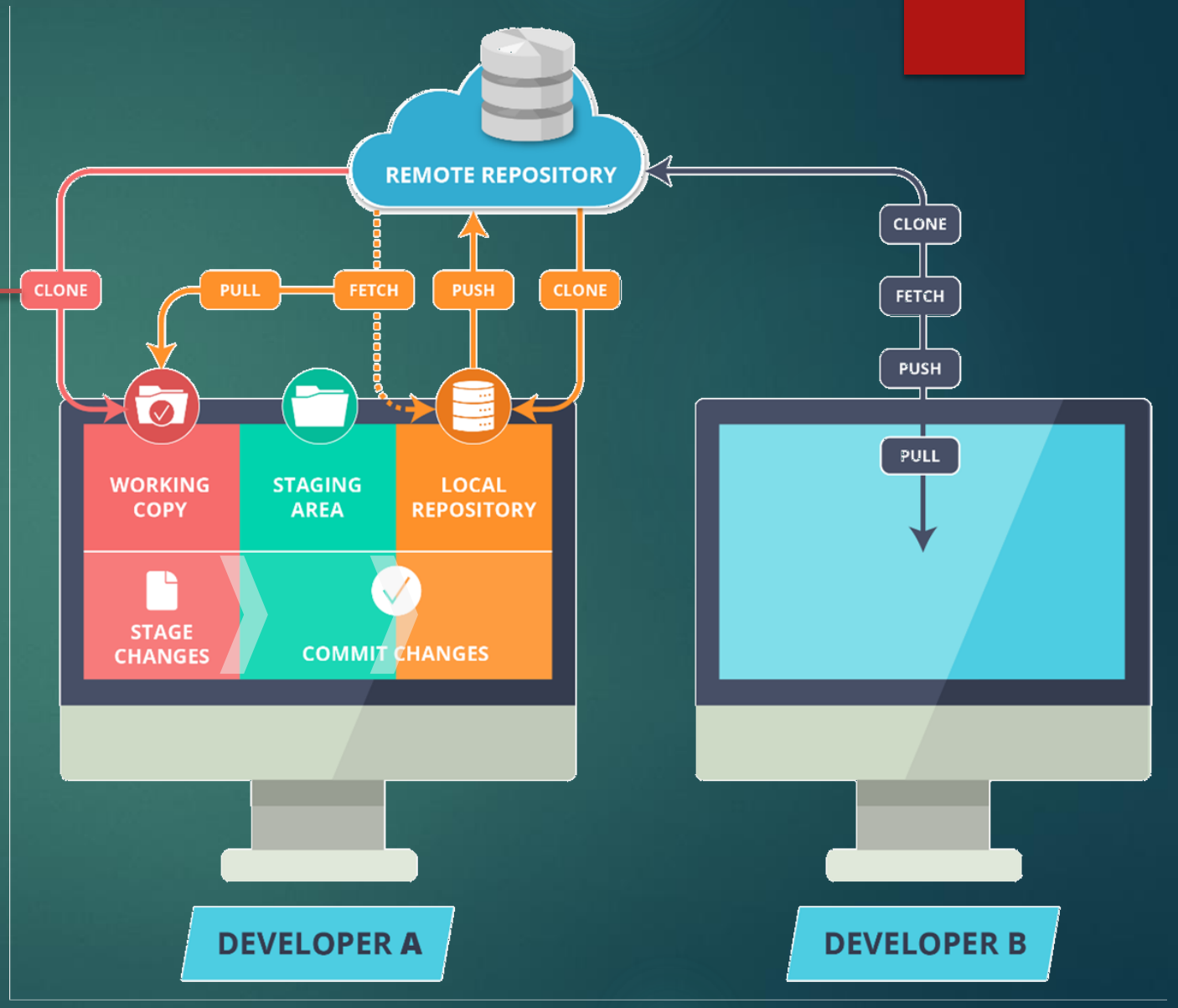
Git Workflow

- Stage is a place where all the modified files marked to be committed are placed.



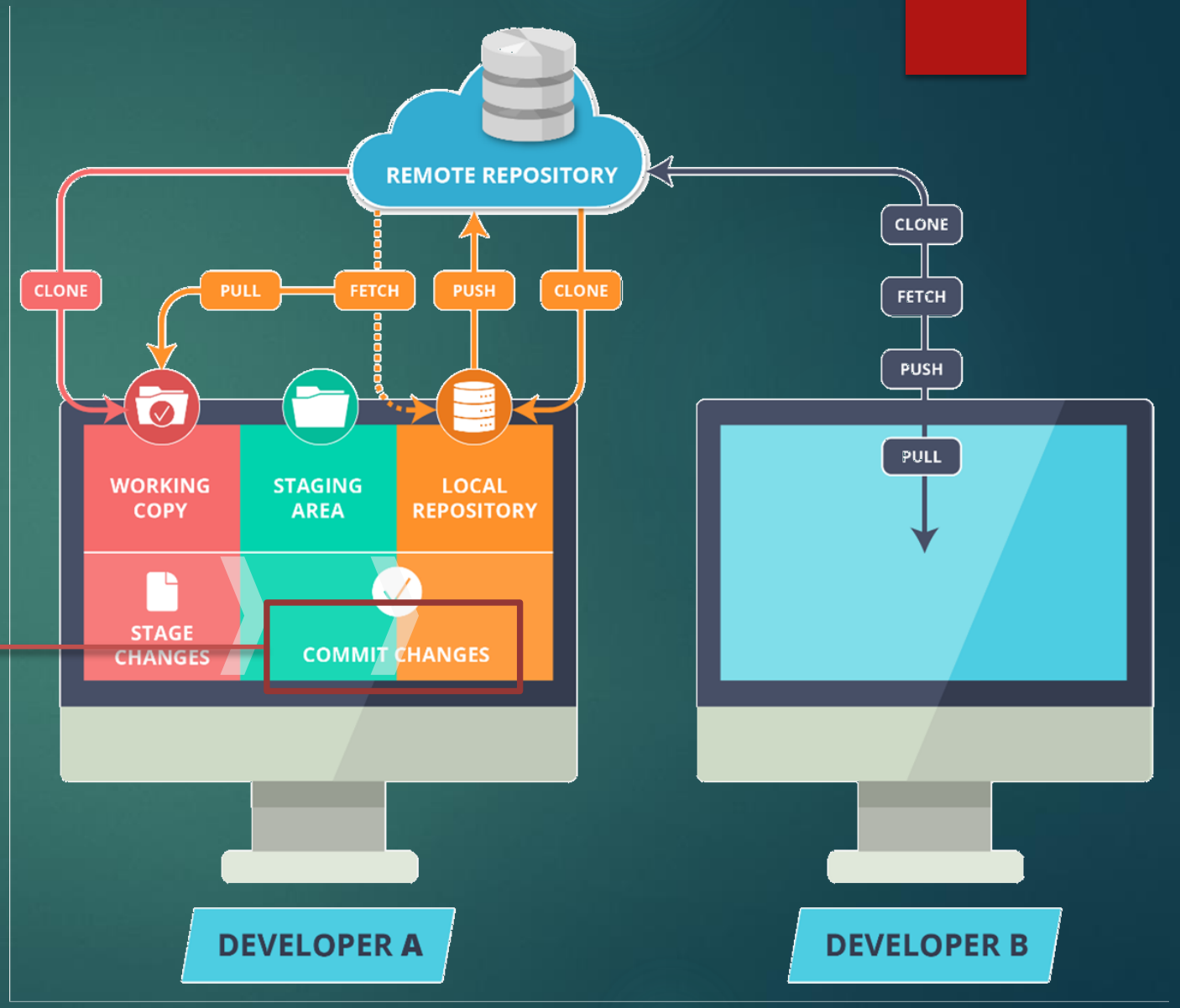
Git Workflow

- Clone command creates a copy of an existing Remote Repository inside the Local Repository.



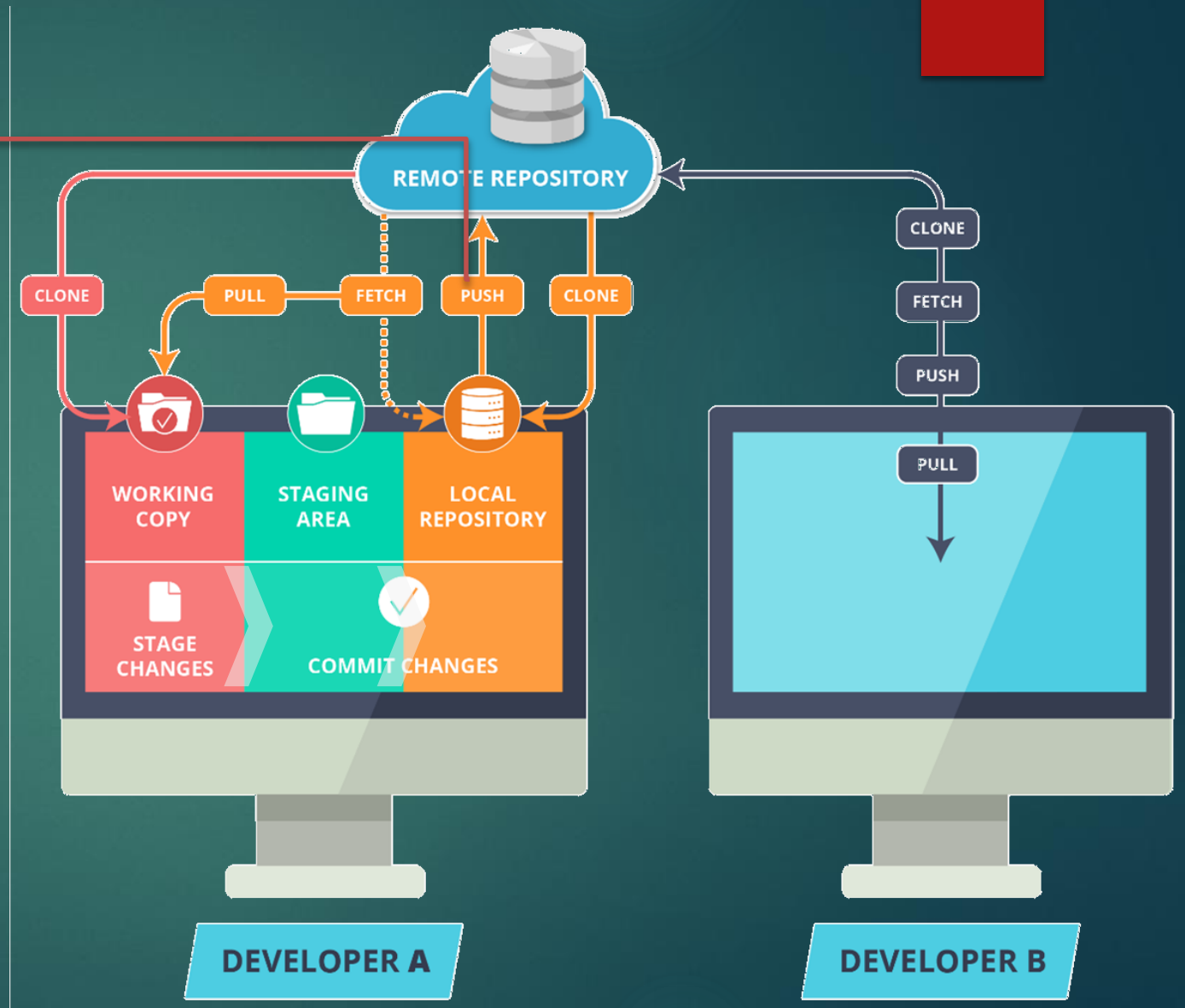
Git Workflow

- Commit command commits all the files in the staging area to the local repository.



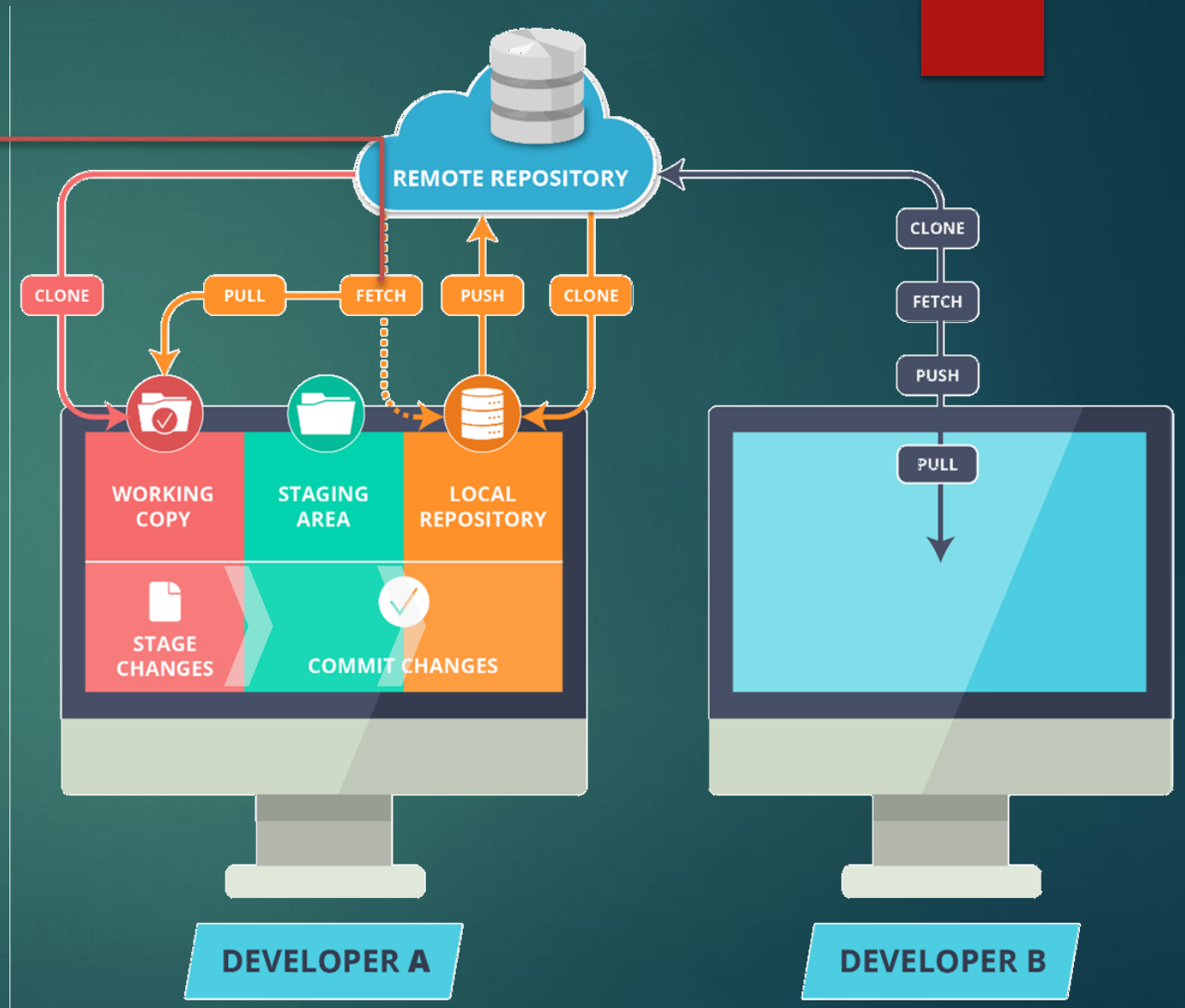
Git Workflow

- Push command pushes all the changes made in the Local Repository to the Remote Repository



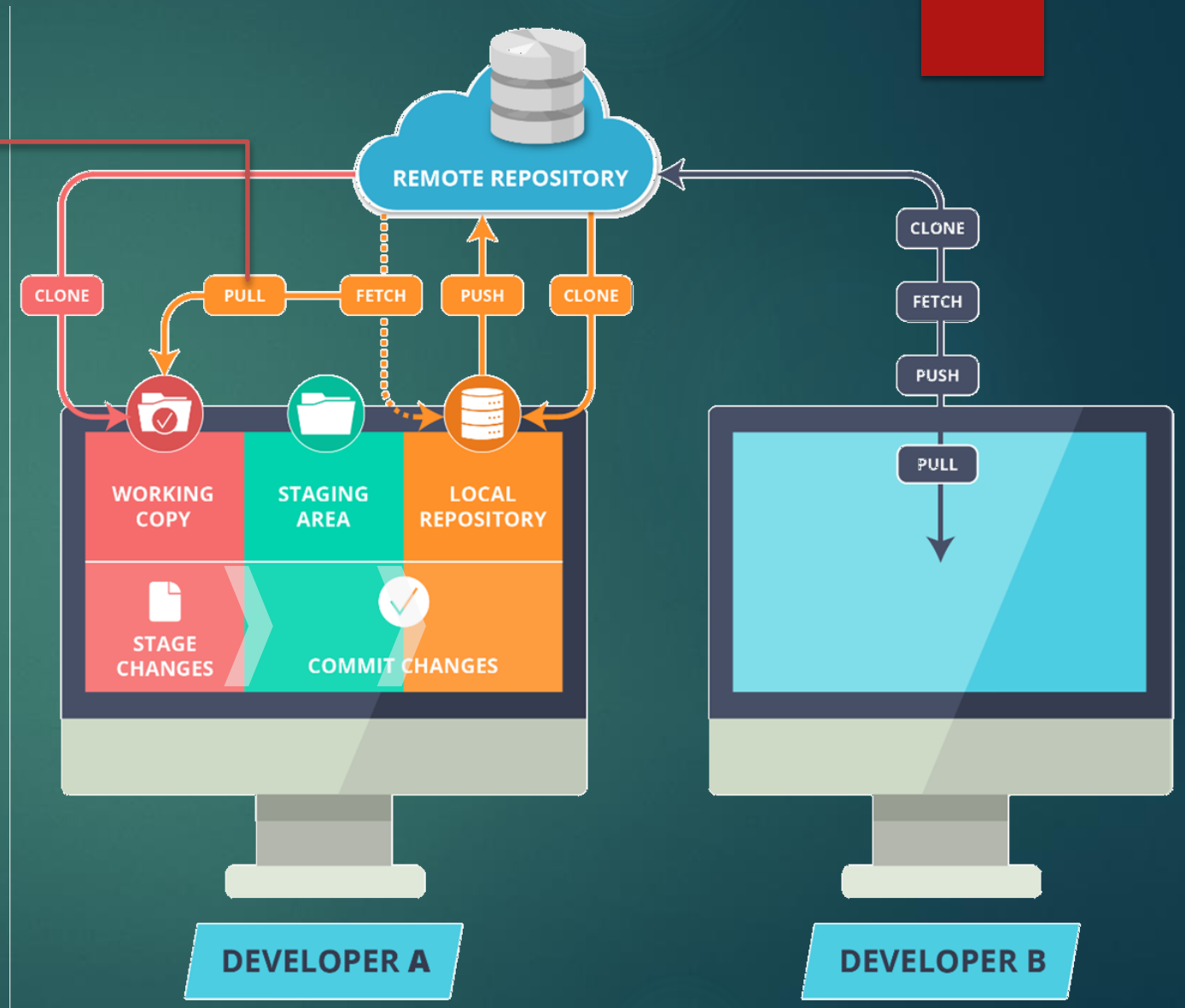
Git Workflow

- Fetch command collects the changes made in the Remote repository and copies them to the Local Repository. This command doesn't affect our Workspace.



Git Workflow

- Pull like Fetch, gets all the changes from the remote repository and copies them to the Local Repository
- Pull merges those changes to the current working directory



Installing Git

- To install Git on your Linux Machine you can type in the following command in Terminal:

```
Syntax: sudo apt-get install git
```

- For Windows download the installer from http://git-scm.com

Setting up Git User

- Set up username for your repository

```
Syntax: git config --global user.name “username”
```

- Set up user-email for your repository

```
Syntax: git config --global user.email “useremail@example.com”
```

Initialize a Git Repository

- Select or create the Directory where you want to initialize Git
- **Initialize Git** in the Directory

```
Syntax: git init
```

Adding Files & Checking Status

- To **add** a file to the **staging area**

```
Syntax: git add <filename>
```

- To check the working tree **status**

```
Syntax: git status
```

Committing Changes

- To **commit** the **staged** files to you **local repository:**

```
Syntax: git commit
```

Tracking Changes

- The git **diff** command displays all the changes made to the **tracked** files

```
Syntax: git diff
```

Staging & Committing Multiple Files

- To **stage and commit** multiple files at once we use -a flag with the commit command
- Commit with -a flag automatically stages all the modified files and commits changes to the local repository

```
Syntax: git commit -a -m ‘message’
```

Staging & Committing Multiple Files

- The **git rm** command deletes the file from git repository as well as users system

```
Syntax: git rm <filename>
```

- To remove the file from git repository but not from the system **--cached** option

```
Syntax: git rm --cached <filename>
```

- An error shows up if you try to delete a staged file
- You can force remove a staged file by using **–f** flag

```
Syntax: git rm -f <filename>
```

Git Log

- The **git log** command shows all the commits so far on the current branch

```
Syntax: git log
```

- The **git log --oneline** command shows only one line for all the commits so far on the current branch

```
Syntax: git log --oneline
```

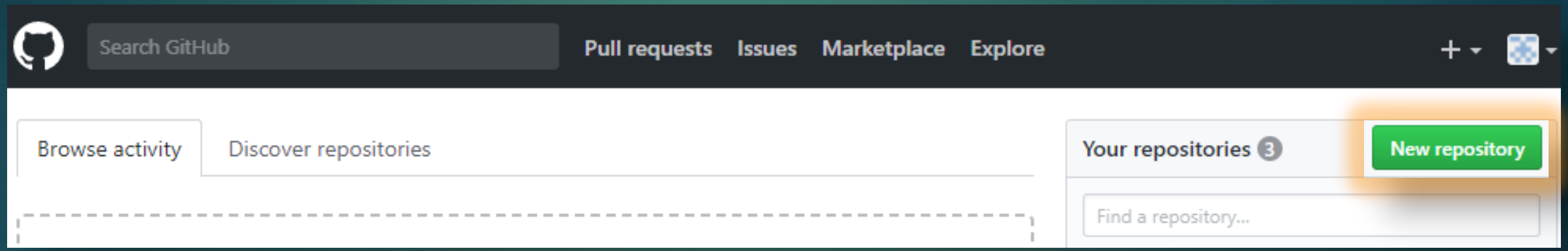
```
Syntax: git log –-oneline --decorate --graph
```

Remote Repository

Mostly the users work on a local repository. But in order to collaborate with other people, we use a remote repository. A remote repository is place where the users upload and share their commits with other collaborators.

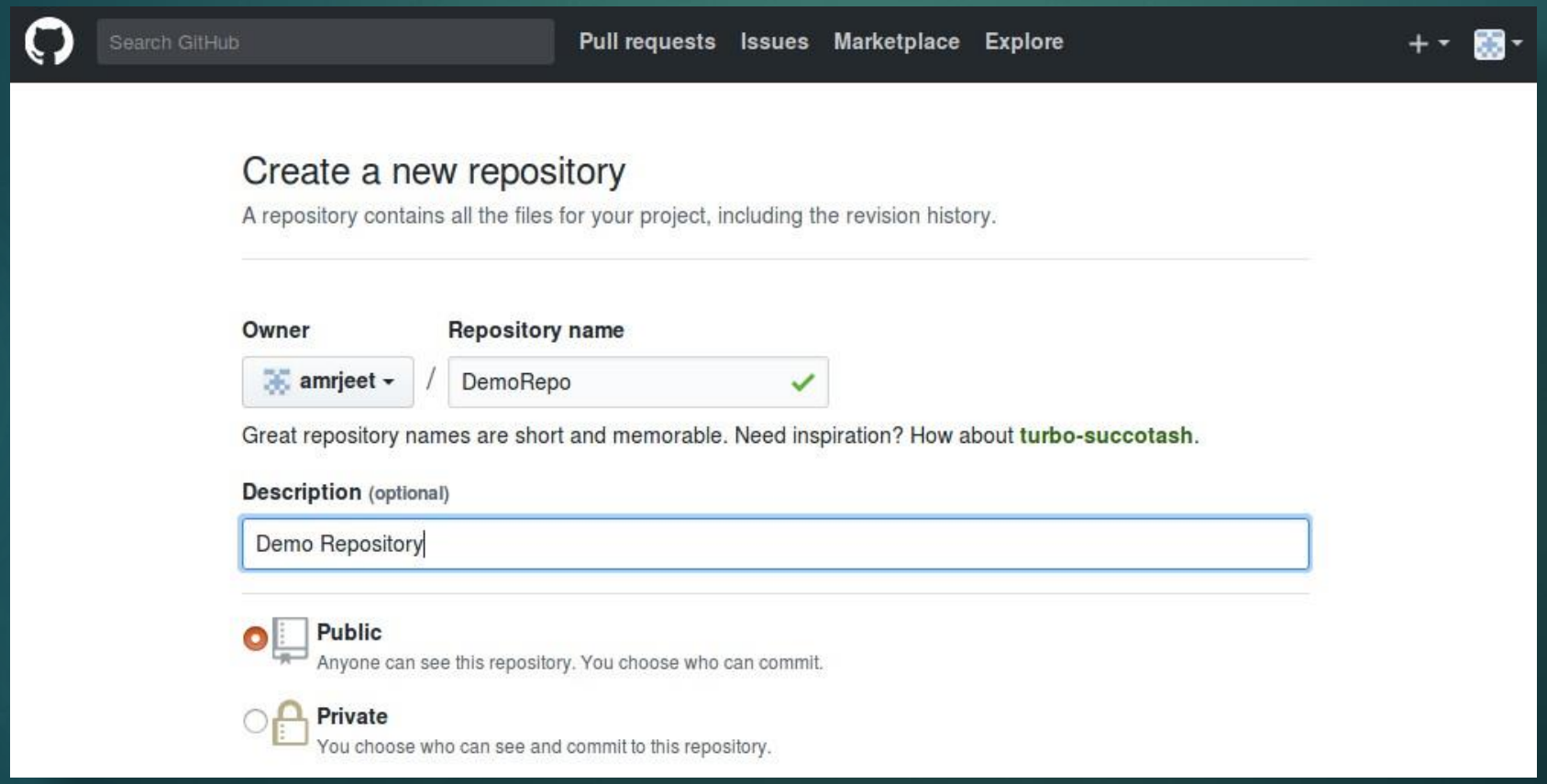
Creating a Remote Repository

- Sign-up at **github.com**
- Click on New repository to create a new repository



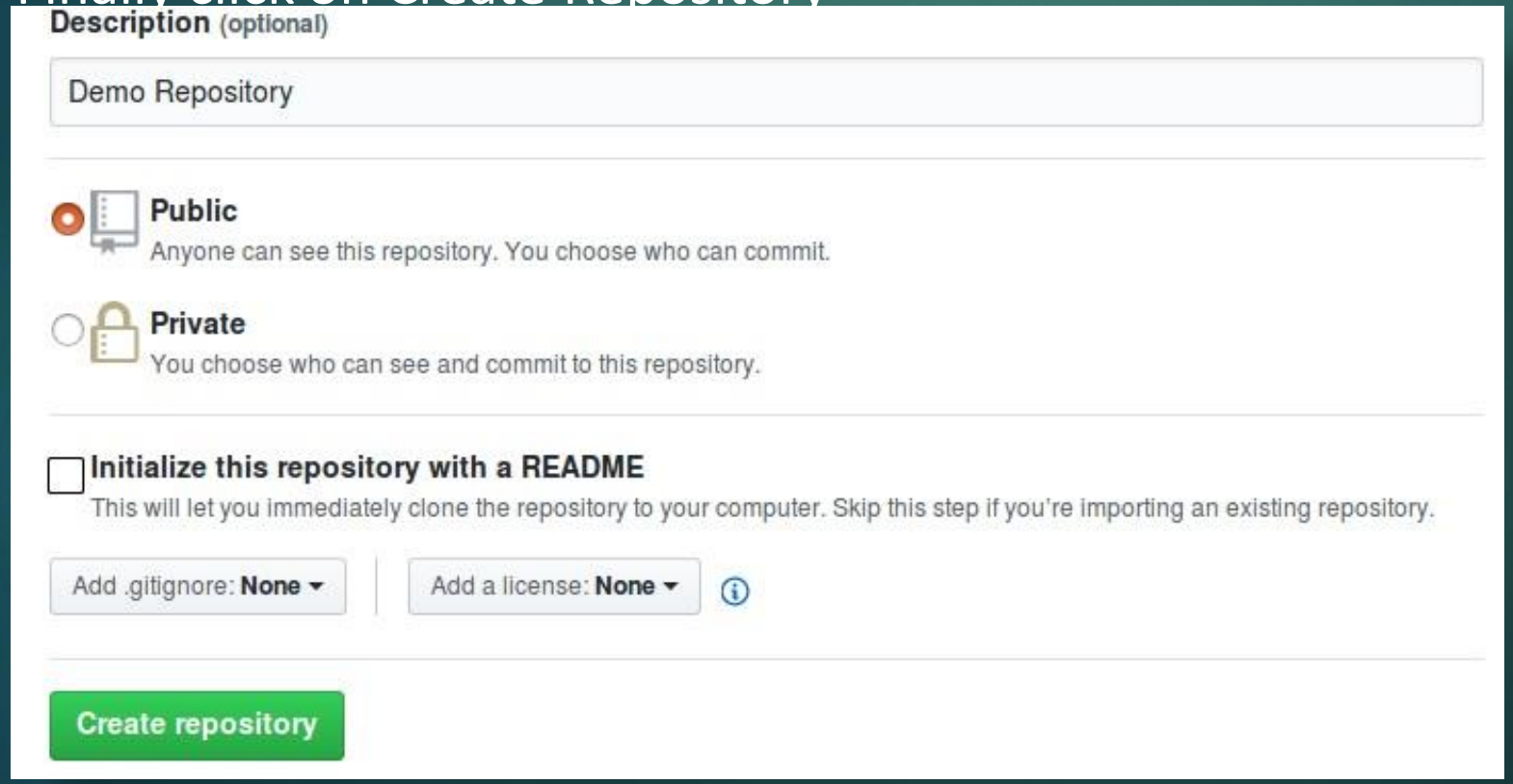
Creating a Remote Repository

- Under **Repository name**, give a name to your repository
- Give some Description about your repository under **Description** section.



Creating a Remote Repository

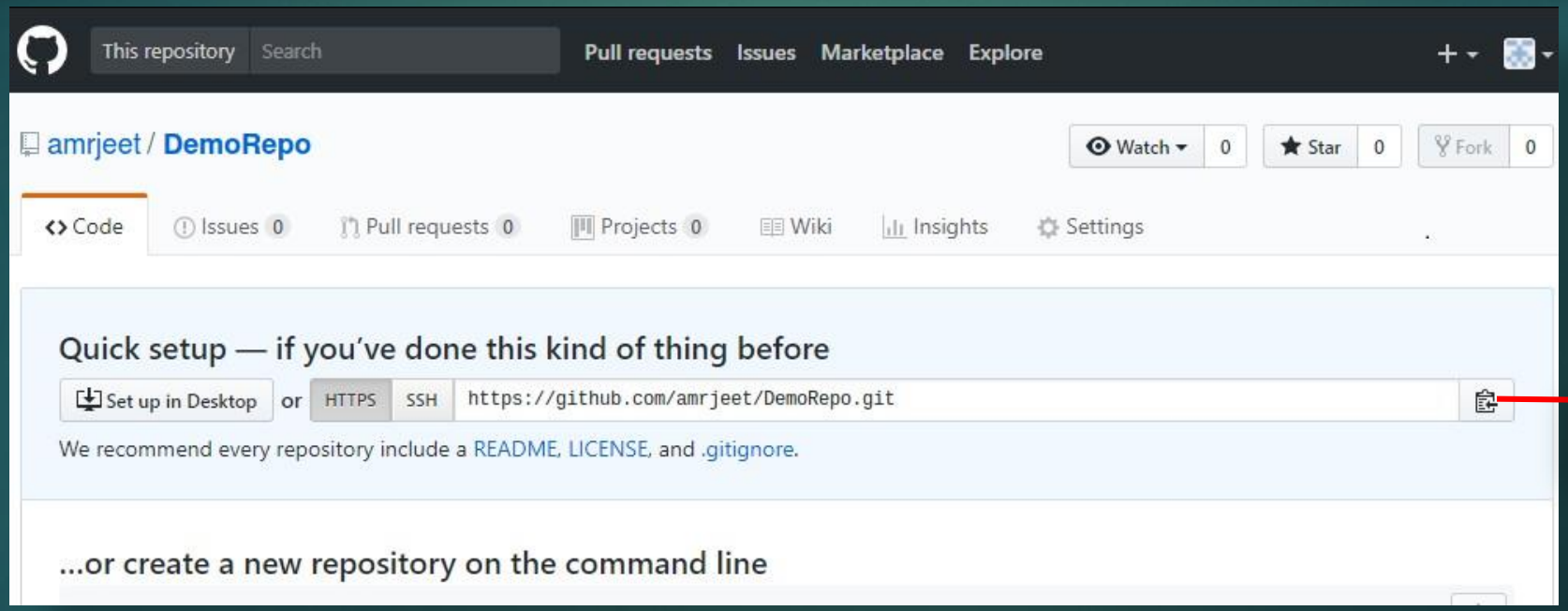
- For a free repository choose public
- For a private repository a monthly premium needs to be paid
- Finally click on Create Repository



Adding Remote Repository To Local Repository

- To add Remote repository to local use **git add remote** followed by remote link

```
Syntax: git add remote origin <remote link>
```



Adding Remote Repository To Local Repository

- To push **Local repository** to remote use **push** command

```
Syntax: git push origin master
```

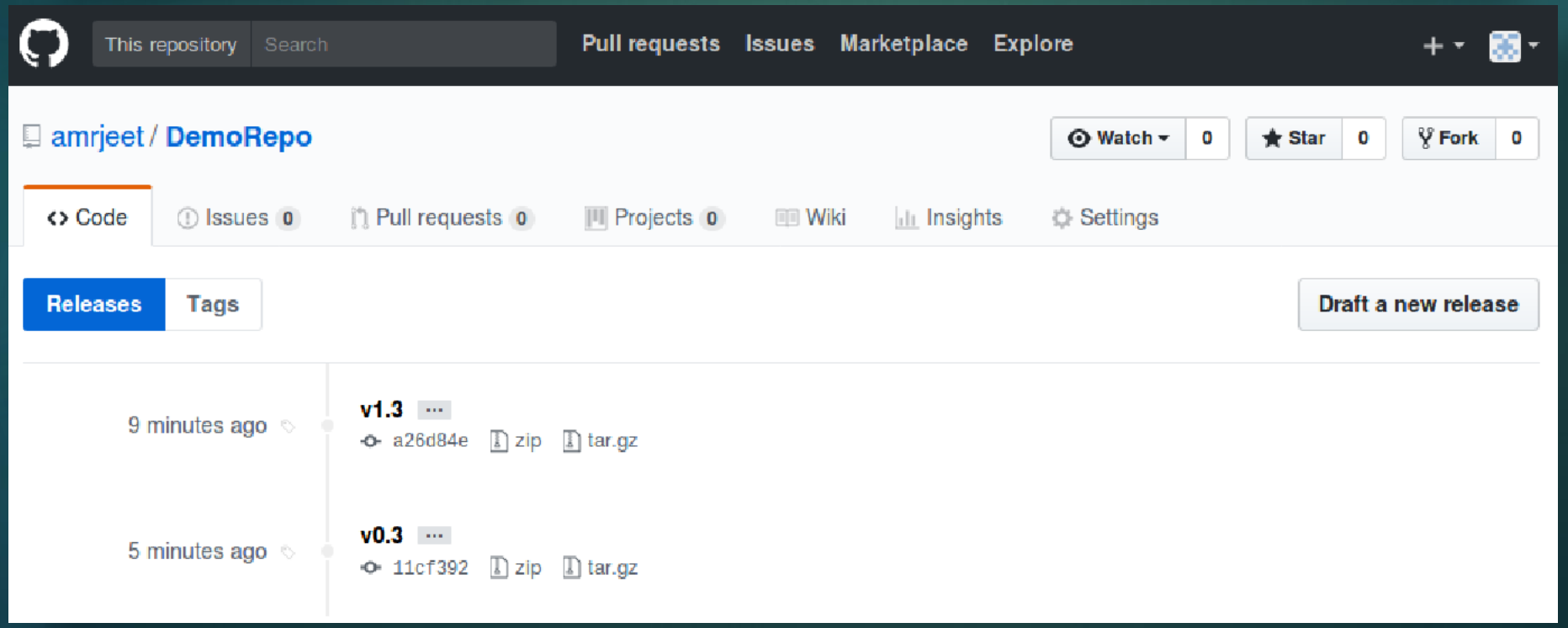
- Origin is an alias for your remote
- Master is the name of the branch you are pushing from local to remote
- To push other branches to remote use the following command

```
Syntax: git push –u origin <branch-name>
```

Pushing Tags to Remote Repository

- Tags can be pushed, viewed and shared on Remote

```
Syntax: git push origin --tags
```



Push Local Repository To Remote

- The changes can be seen in Remote repository

This repository Search Pull requests Issues Marketplace Explore

amrjeet / DemoRepo

Watch 0 Star 0 Fork 0

Code Issues 0 Pull requests 0 Projects 0 Wiki Insights Settings

Demo Repository

Edit

Add topics

3 commits 1 branch 0 releases 1 contributor

Branch: master New pull request Create new file Upload files Find file Clone or download

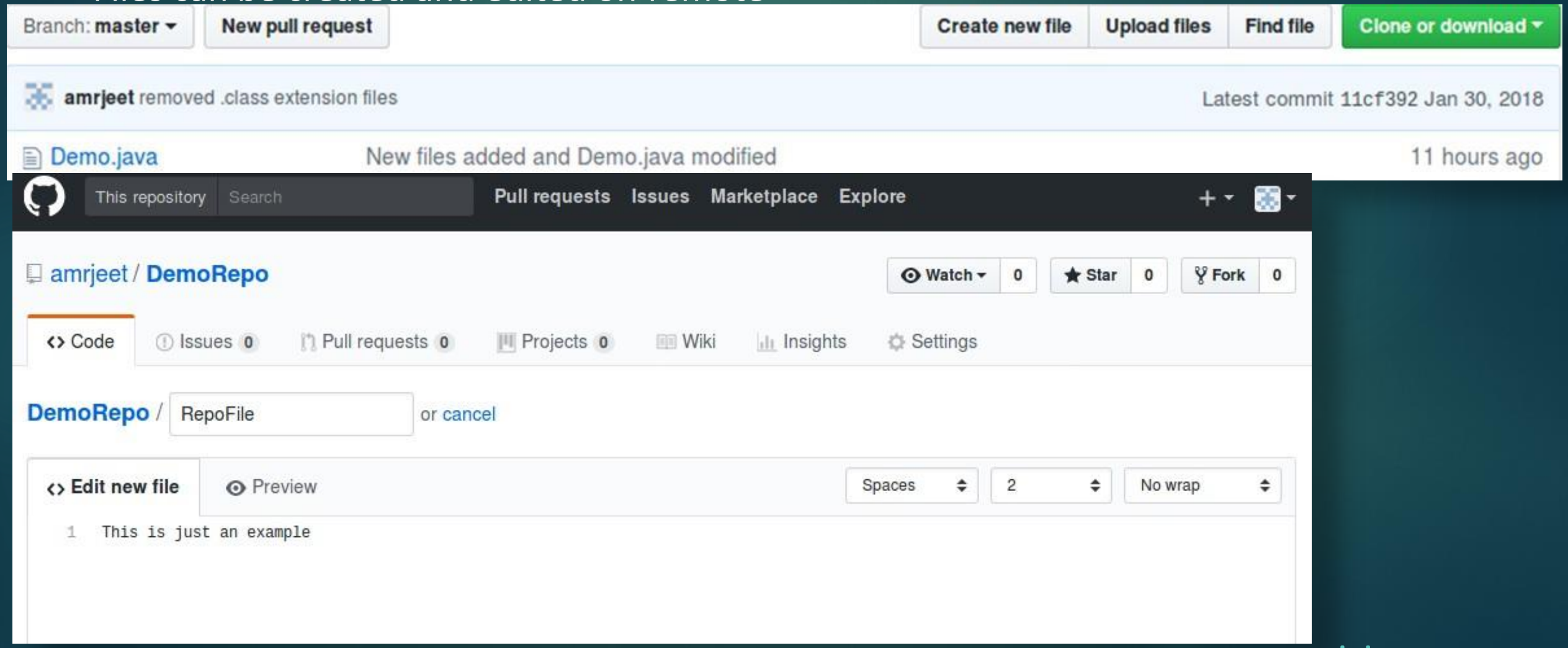
amrjeet removed .class extension files Latest commit 11cf392 Jan 30, 2018

Demo.java	New files added and Demo.java modified	11 hours ago
Demo2.java	New files added and Demo.java modified	11 hours ago

Help people interested in this repository understand your project by adding a README. Add a README

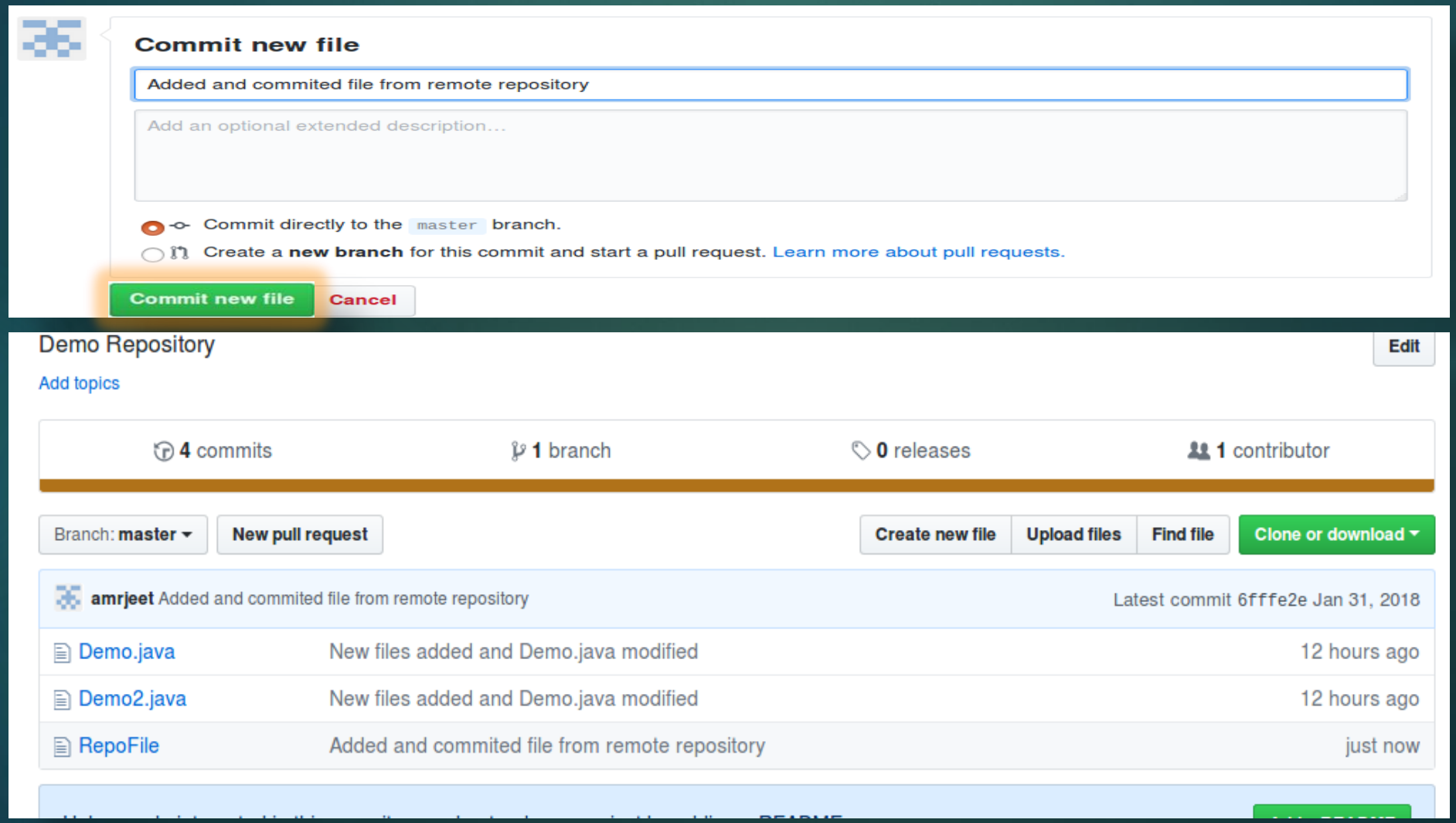
Working on Remote

- Files can be created and edited on remote



Working on Remote

- These files can then be committed on the remote



Remote List

- To list all the remotes attached to your Local repository

```
Syntax: git remote -v
```

Git Fetch

- **Fetch** command copies the changes from remote to local repository

```
Syntax: git fetch origin
```

- Fetch **does not** affect the present working directory

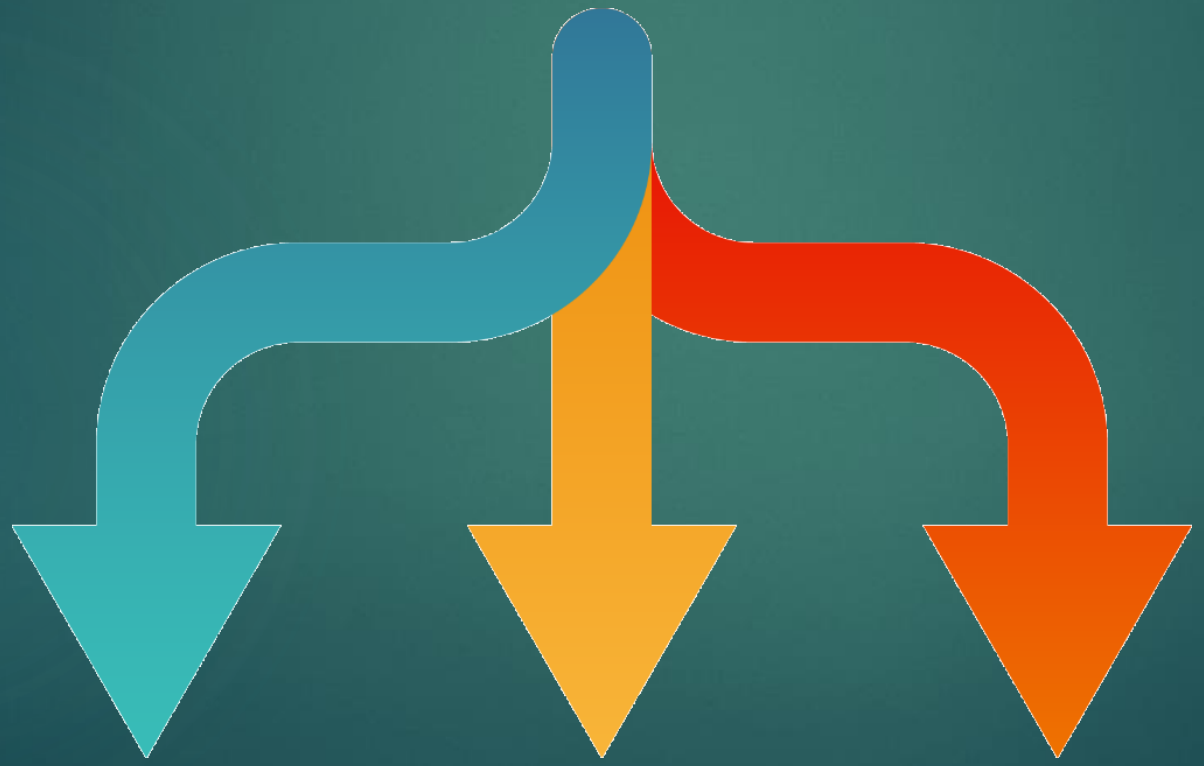
Git Pull

- Pull copies all the changes from remote to local repository
- It then merges the changes with the present working directory

```
Syntax: git pull origin
```

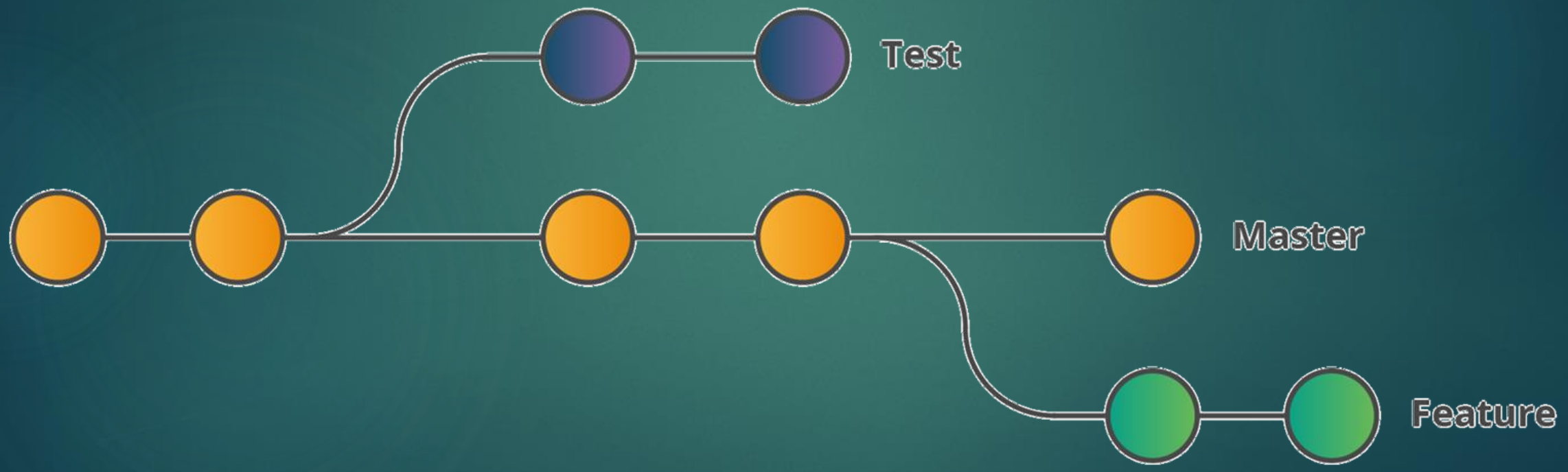
Git Branches

A project in its development could take multiple different paths to achieve its goal. Branching helps us take these different directions, test them out and in the end achieve the required goal.



Branching in Git

- Branching is an integral part of any Version Control(VC) System
- Unlike other VC's Git **does not** create a copy of existing files for new branch
- It **points** to snapshot of the changes you have made in the system



Creating a Branch

- To create a new branch from your current branch

```
Syntax: git branch <branchname>
```

- You can then switch to this newly created branch

```
Syntax: git checkout <branchname>
```

Creating a Branch

- Creating and switching to a new branch can be done with using **-b flag**

```
Syntax: git checkout -b <branchname>
```

- **Branch** command lists all the branches and also points to the current working branch

```
Syntax: git branch
```

Merging in Git

- Merging integrates the changes made in different branches into one single branch

Merging in Git

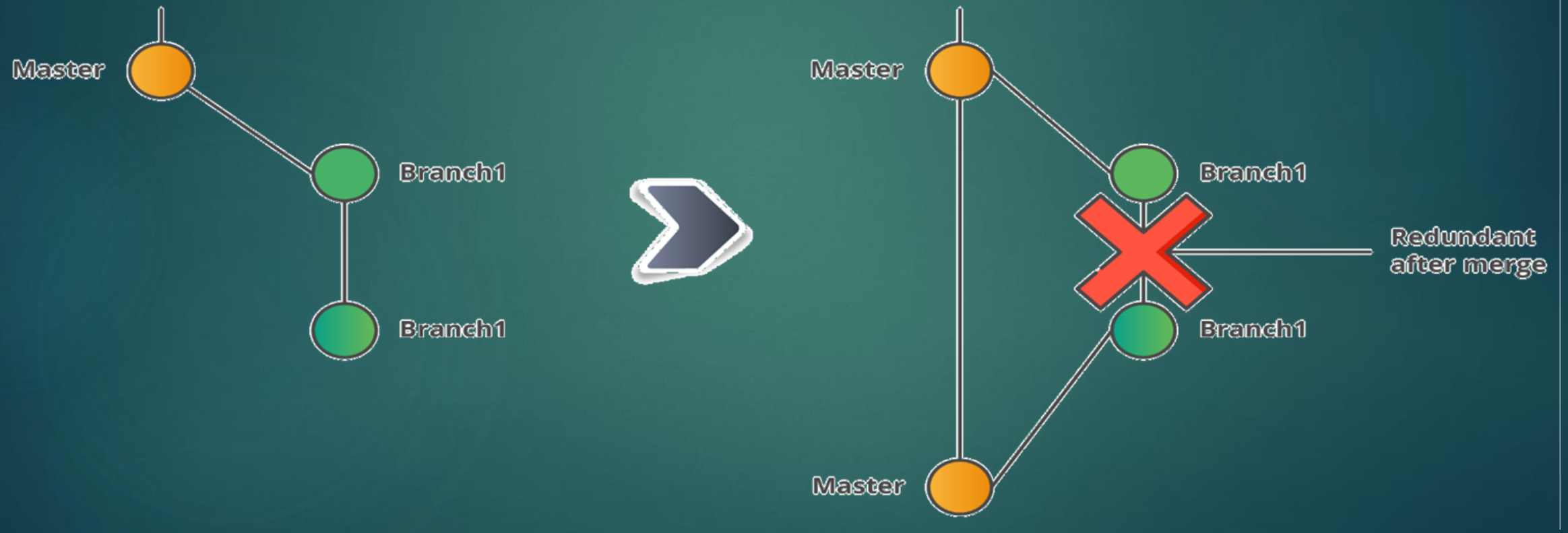
- Different modified branches can be **merged** together using merge

```
Syntax: git merge <branchname>
```

- The branch mentioned is merged into the current branch

Merging in Git

- All the changes made in **Branch1** after merging are available in the Merged branch(Master)
- Branch1 becomes redundant after merging, hence it can be deleted



Deleting a Branch

- **Merged** branches can be deleted using -**d** flag

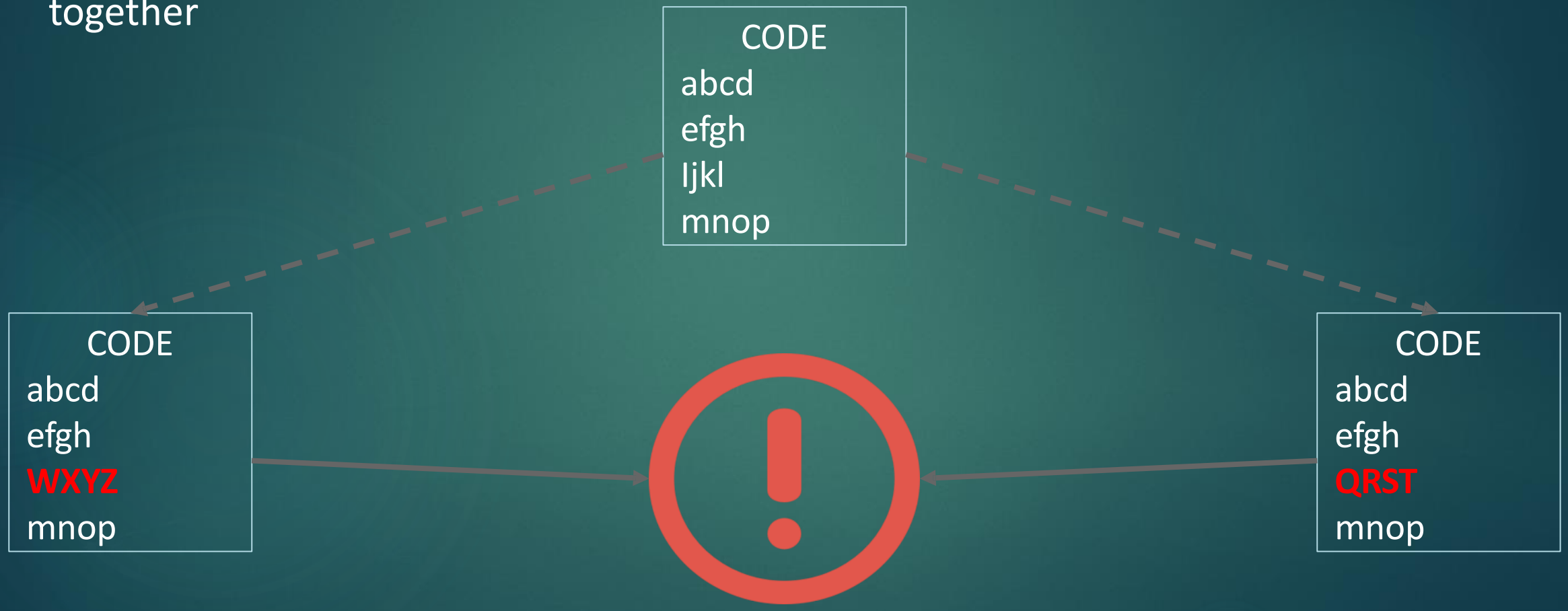
```
Syntax: git branch -d <branchname>
```

- **Unmerged** branches can be deleted using **-D** flag

```
Syntax: git branch -D <branchname>
```

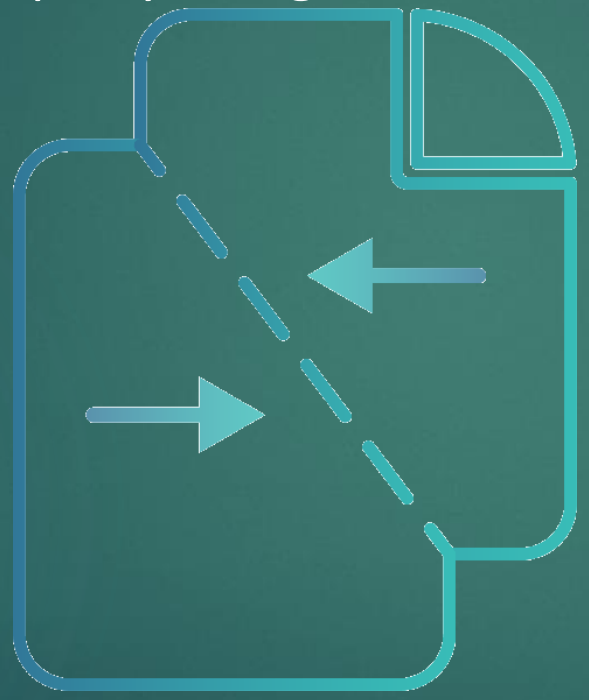
Merge Conflicts

- Merge conflicts arise when two files having same content modified are merged
- Merge conflicts can occur on merging branches or when merging forked history together



Resolving Merge Conflicts

- Merge Conflicts are resolved manually by users
- Git provides different Merge-Tools to compare and choose the required changes
- User can also use third party Merge-Tools with Git



Merge Conflicts

```
This is just an example
Made change
```

Initial RepoFile in Master Branch

```
This is just an example
Made change
inside branch master
```

Modified RepoFile in Master Branch

```
This is just an example
Made change
Inside branch Feature1
```

Modified RepoFile in Feature1 Branch

Resolving Merge Conflicts

- Merge Conflict arises on merging branches
- Set a default merge tool before resolving conflict
- Commit the resolved changes
- Merge the branch again

THANK YOU