Walchand College of Engineering, Sangli

WALCHAND LINUX USERS' GROUP

CELEBRATES

OPEN SOURCE DAY

LEARN & CONTRIBUTE

- Introduction to GIT
- GIT commands
- Branching
- GitLab

FREE FOR ALL

REGISTSER AT

LIMITED SEATS

wcewlug.org

• CONNECT WITH US •

Date:
29th October, 2023

Venue:
Mini CCF

For any query
84210 06401
99236 71592

Mr. D. N. Gangji	Dr. M. A. Shah	Dr. R. R. Rathod	Dr. A. J. Umbarkar	Dr. A. R. Surve	Dr. U. A. Dabade
President Walchand Linux Users' Group	HoD Computer Science and Engineering	HoD Information Technology	Staff Advisor Walchand Linux Users' Group	Assoc. Dean Student Activities and Staff Advisor	I/C Director Walchand College of Engineering

WLUG
COMMUNITY | KNOWLEDGE | SHARE

Table Of Content

OPEN SOURCE

GIT

GITHUB

VERSION CONTORL SYSTEMS

GIT COMMANDS

WLUG
COMMUNITY | KNOWLEDGE | SHARE

Table Of Content

BRANCHING

ADVANCED COMMANDS

GITLAB

GIT INTERNALS

WLUG
COMMUNITY | KNOWLEDGE | SHARE

OPEN SOURCE ?

Open Source

- A software, code and any other intellectual property with publicly accessible source code
- Anyone can inspect, modify, and enhance
- Encourages collaboration and transparency
- Community-driven development
- Ex : Brave, Linux, Git, VLC Media Player

WLUG
COMMUNITY | KNOWLEDGE | SHARE

GIT

WLUG
COMMUNITY | KNOWLEDGE | SHARE

Version Control System

- Version control, also known as source control, is the practice of tracking and managing changes to source code

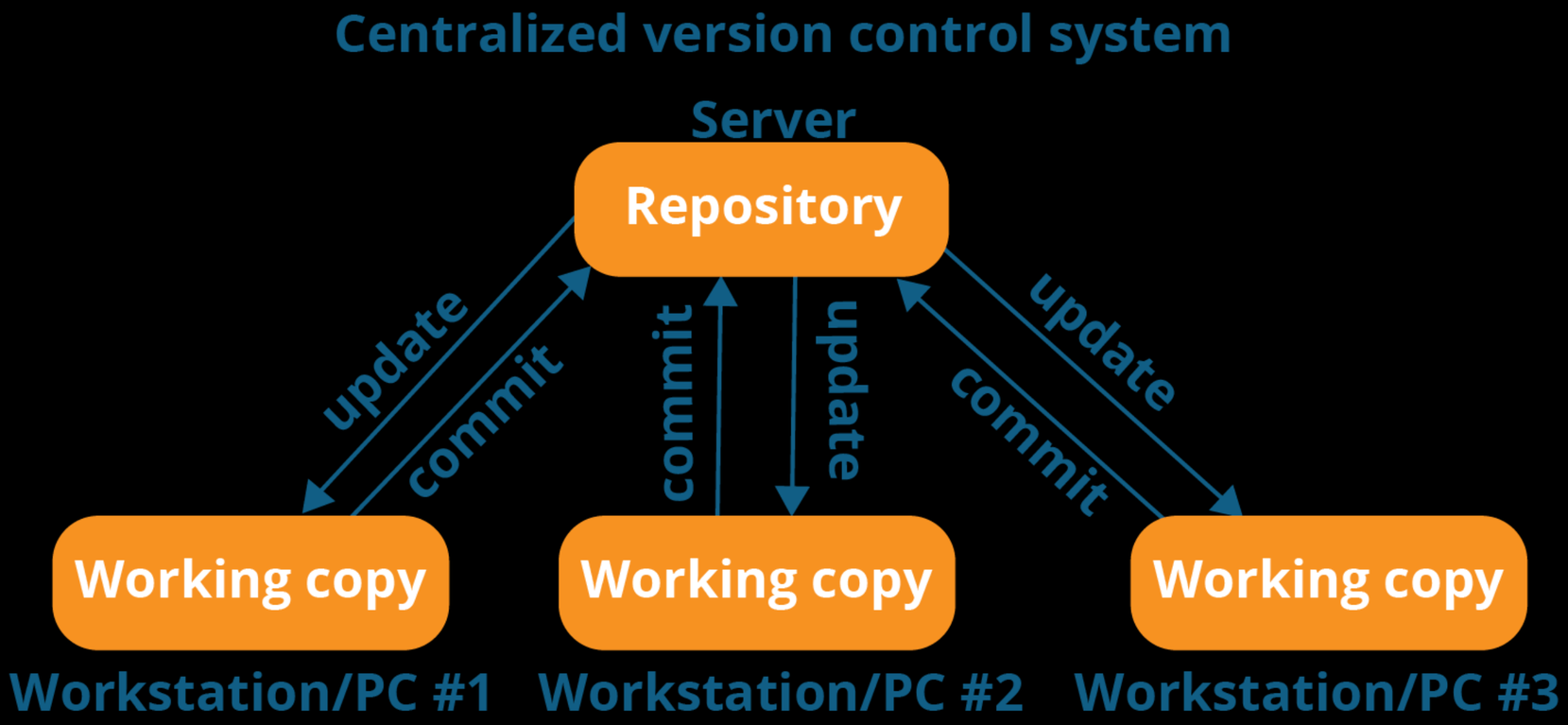
- It is software tool that helps software teams manage changes to source code

WLUG
COMMUNITY | KNOWLEDGE | SHARE

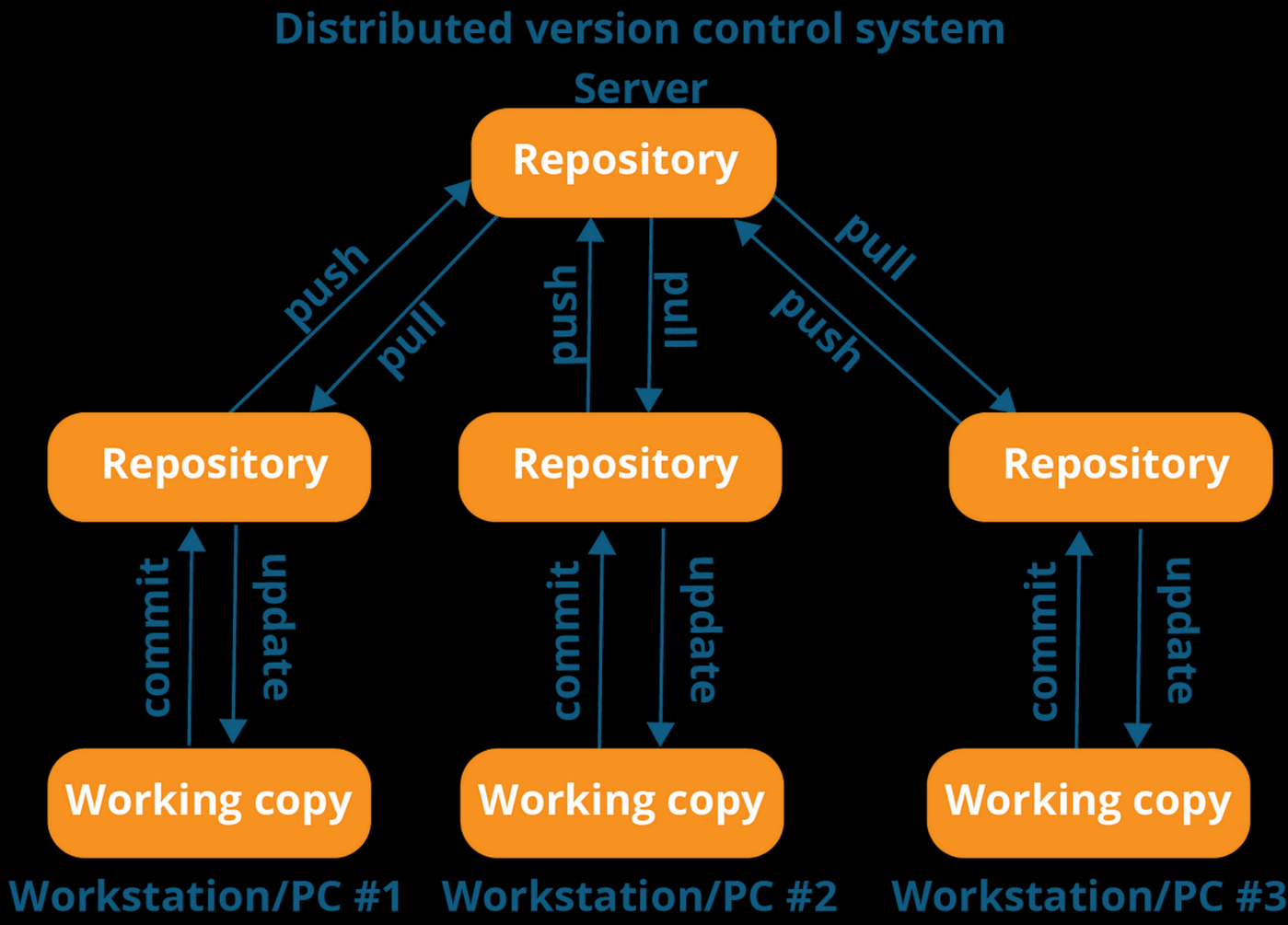
Version Control Systems

- Centralized Version Control System
- Distributed Version Control System

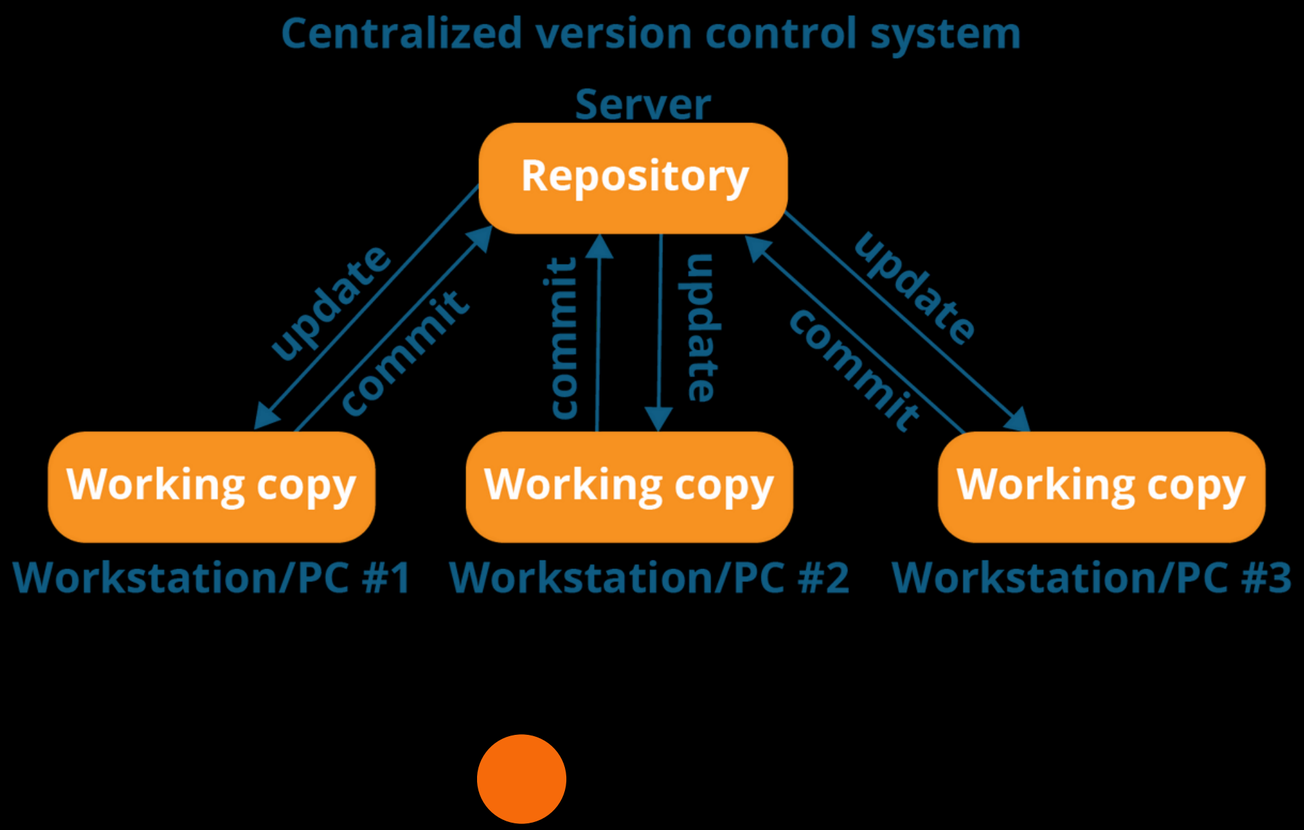
Centralized VCS



Distributed VCS

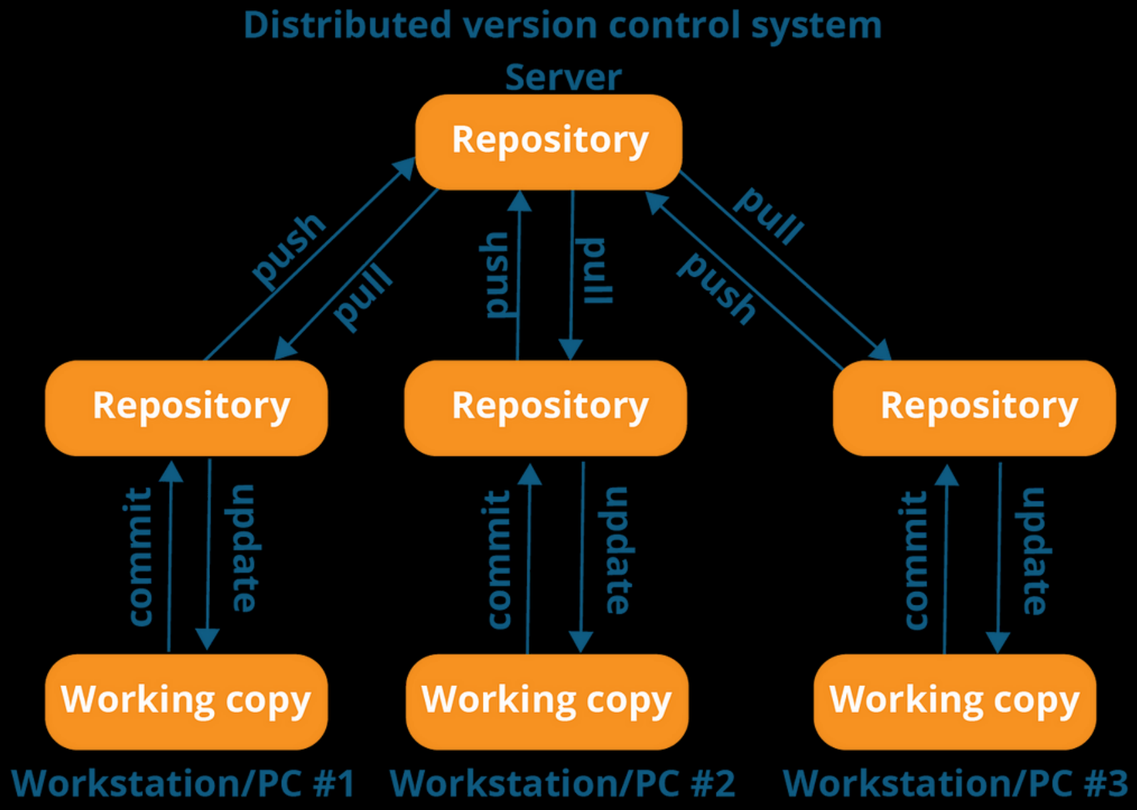


Centralized
Version Control System



- No local repositories
- Always requires internet connectivity
- Simplest form of VCS
- Comparitively slower
- Ex : SVN (Subversion)

Distributed Version Control System



- Local repositories present
- It can work without internet connectivity
- Comparatively complicated form of VCS
- Comparitively faster
- Ex : Git

GIT History

- Developed by Linus Torvalds
- Released on 7 April 2005
- Current core maintainer : Junio C Hamano
- In 2002, the Linux project began using BitKeeper, but since BitKeeper wasn’t free to use, Git was used as its replacement

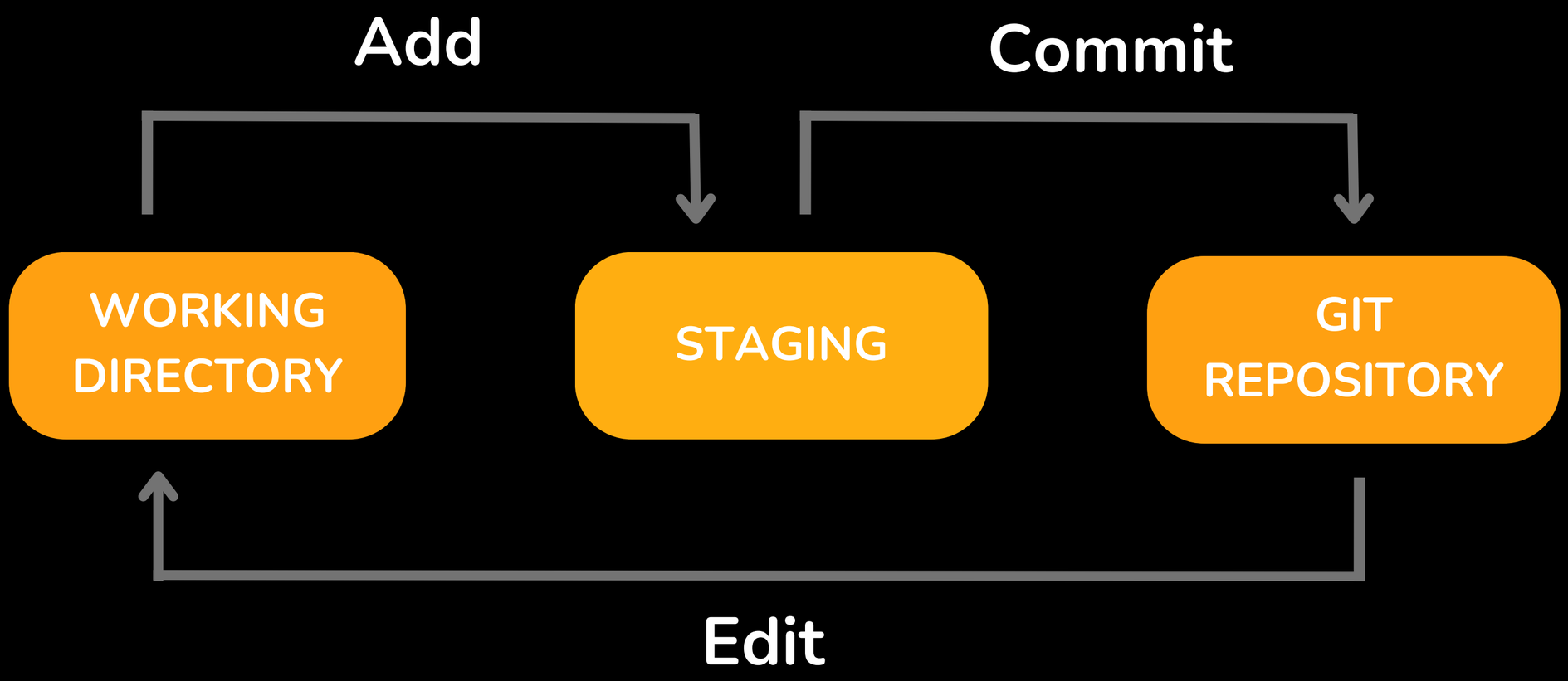
WLUG
COMMUNITY | KNOWLEDGE | SHARE

What is GIT?

- A free and open source tool
- Distributed version control system
- Git is used to track changes in the source code, enabling multiple developers to work together on non-linear development

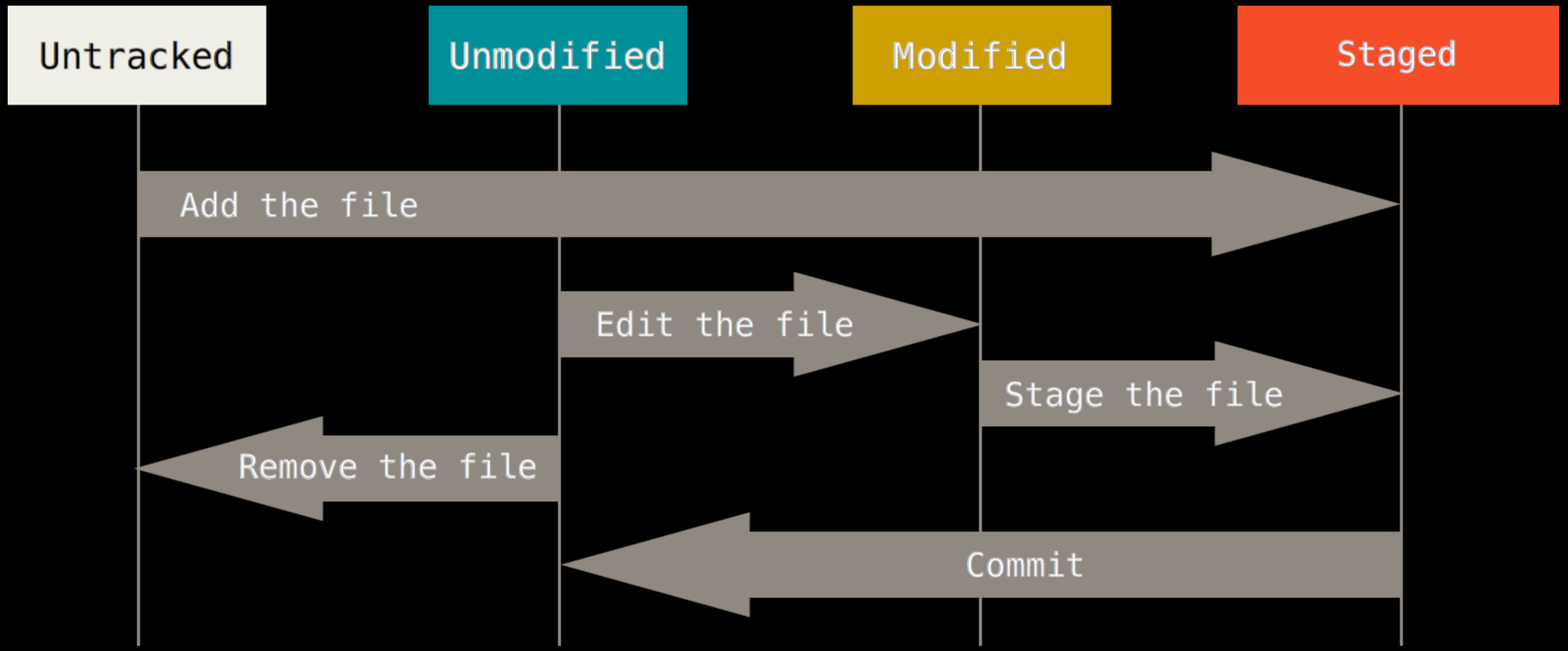
WLUG
COMMUNITY | KNOWLEDGE | SHARE

GIT Architecture



WLUG
COMMUNITY | KNOWLEDGE | SHARE

How Git Works?



WLUG
COMMUNITY | KNOWLEDGE | SHARE

Why Git ?

- An open source and free to use
- Fast and Secure
- Cross-Platform
- Can work without internet connectivity

WLUG
COMMUNITY | KNOWLEDGE | SHARE

BASIC LINUX COMMANDS

WLUG
COMMUNITY | KNOWLEDGE | SHARE

```
$ ls
```

list the files in a directory

```
$ touch <file_name>
```

create a empty file

```
$ cat <file_name>
```

Display contents of a file

```
$ cat >> <file_name>
```

create and edit/write to the file

WLUG
COMMUNITY | KNOWLEDGE | SHARE

```
$ mkdir <directory_name>
```

make a new directory

```
$ rm <file_name>
```

remove a file

```
$ rm -r <directory_name>
```

remove a complete directory

```
$ history
```

see history of commands

WLUG
COMMUNITY | KNOWLEDGE | SHARE

Installing GIT

WLUG
COMMUNITY | KNOWLEDGE | SHARE

For Linux:

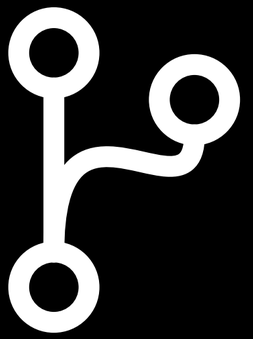
```
$ sudo apt install git-all
```

For Windows:

Visit: https://git-scm.com/downloads

WLUG
COMMUNITY | KNOWLEDGE | SHARE

Configuring GIT



WLUG
COMMUNITY | KNOWLEDGE | SHARE

```
$ git config --global user.name "your-name"
```

```
$ git config --global user.email "xyz@xyz.com"
```

WLUG
COMMUNITY | KNOWLEDGE | SHARE

Starting with your first GIT Repository

Basic Git Commands

WLUG
COMMUNITY | KNOWLEDGE | SHARE

```
$ mkdir newGit
$ cd newGit
```

```
$ git init
```

Initializes an empty Git Repository

you created your
first local repository!

Basic Git Commands

WLUG
COMMUNITY | KNOWLEDGE | SHARE

```
$ git status
```

Display the status of your working directory, showing untracked and modified files

```
$ git add <filename>
```

Stage changes for the next commitor track a untracked file

Basic Git Commands

WLUG
COMMUNITY | KNOWLEDGE | SHARE

```
$ git commit -m "message"
```

Commit staged changes with a descriptive message

```
$ git log
```

Display a history of commits in a Git repository

Basic Git Commands

WLUG
COMMUNITY | KNOWLEDGE | SHARE

```
$ git clone [repository_url]
```

Create a copy of a remote Git repository on your local machine

Url of a remote Repository

https://github.com/User-DK/Hello_World.git

Basic Git Commands

WLUG
COMMUNITY | KNOWLEDGE | SHARE

```
$ git fetch
```

Fetch changes from a remote repository without merging

```
$ git pull
```

Fetch changes from a remote repository and merge them into the current branch

Basic Git Commands

WLUG
COMMUNITY | KNOWLEDGE | SHARE

```
$ git remote -v
```

List all remote repositories associated with your local repository

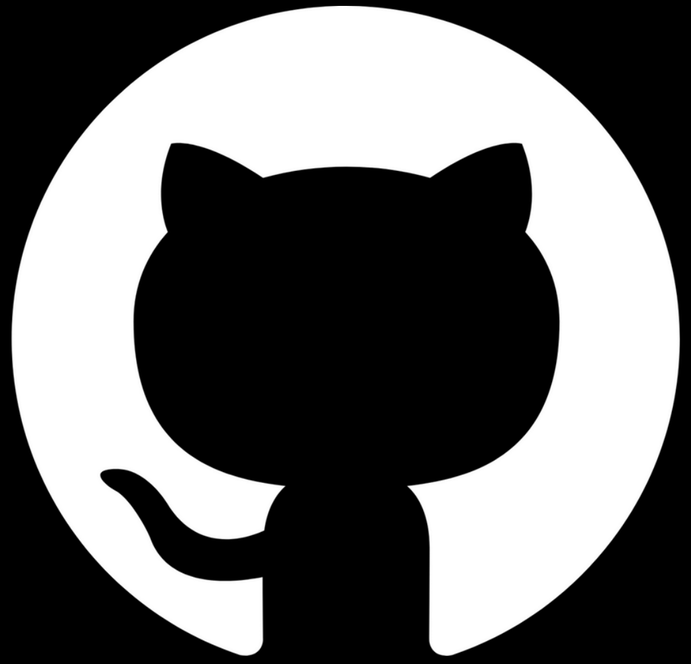
```
$ git push <remote-name> <branch-name>
```

Upload your local commits to a remote repository

WLUG
COMMUNITY | KNOWLEDGE | SHARE

Want to contribute to OPEN SOURCE ?

WLUG
COMMUNITY | KNOWLEDGE | SHARE



GITHUB

What is GITHUB ??

- GitHub is a web-based hosting platform for version control and collaboration
- Developers store, manage, and share code and projects
- Features for tracking changes and collaborating
  Used for open-source and private software development
- Central hub for developers to collaborate and contribute

Steps to contribute

- Sign up / Sign in!!
- Go to the repository you want to contribute to
- Fork it to your own account

  A fork is a copy of a repository. Forking a repository allows you to freely experiment with changes without affecting the original project

Steps to contribute

- Copy url of the forked repository
- Clone it from terminal by:

```
$ git clone [repository_url]
```

- Add or Modify the contents of the repository

Steps to contribute

- After modifying and adding and commiting the changes use this command:

```
$ git push
```

- But as GIT doesnt know about your GITHUB account so it would ask user name and password for which you can generate token on GITHUB page and your changes would be saved after this step

Steps to contribute

Create a Pull Request

Go to the original repository on GitHub and click the "New Pull Request" button. Provide details about your changes

Review and Discussion

The project maintainers will review your pull request and may provide feedback or request further changes

Merge Your Pull Request

Once your changes are approved, a project maintainer will merge your pull request into the main branch of the original repository

Steps to contribute

- Make Changes
- Commit Your Changes

```
$ git add <filename>
```

```
$ git commit -m "message"
```

- Push Your Changes

```
$ git push origin your-branch-name
```

WLUG
COMMUNITY | KNOWLEDGE | SHARE

You cracked it !!

Table Of Content

GIT BRANCHING

ADVANCED COMMANDS

Branching in Git

- A branch in Git is simply a lightweight movable pointer to latest commit on the particular working line

- The default branch name in Git is master. As you start making commits, it keeps pointing to the last commit you made

Branching Commands

```
$ git branch <branch-name>
```

Creates a new-branch

```
$ git checkout <branch_name>
```

Switches from one branch to another also works for commits

```
$ git branch
```

Lists out all the branches

Branching Commands

```
$ git switch <branch_name>
```

Switches to the defined branch

```
$ git checkout -b <branch_name>
```

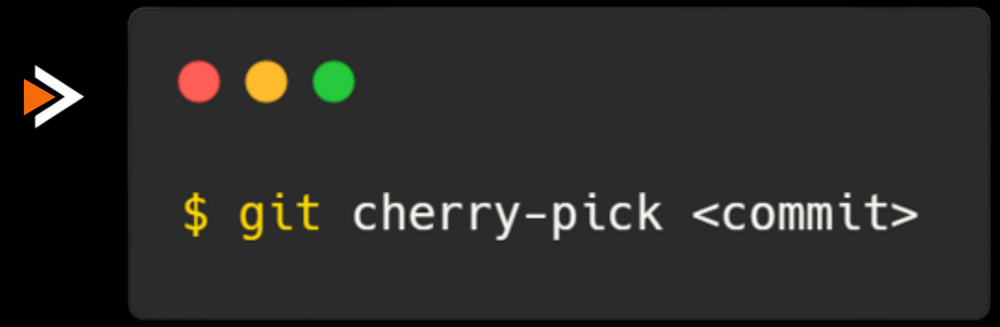
Creates new-branch and switches to it

```
$ git branch -m <old_branch> <new-branch>
```

Rename a branch

Branching Commands

To delete a branch



To apply specific commits from one branch to another

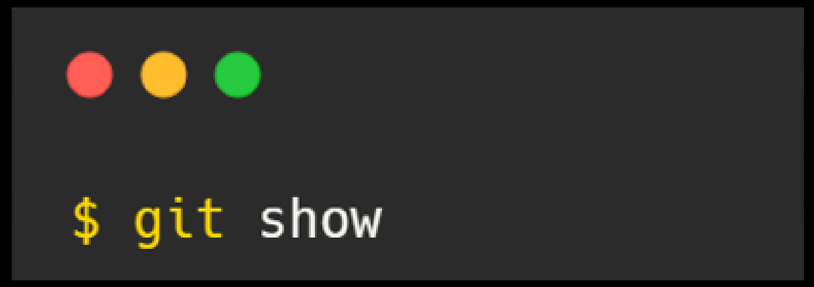
Merging Commands

Merge one-branch to another

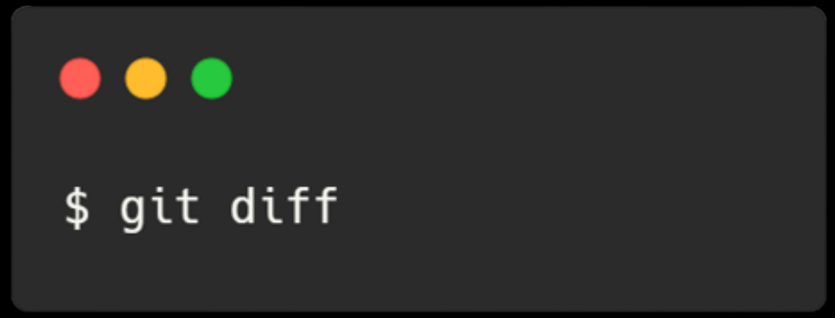
Refer site (Learn Git Branching)

https://learngitbranching.js.org/

Merging Commands



View the changes that cause merge conflicts



Create log with list of commits that cause conflict

WLUG
COMMUNITY | KNOWLEDGE | SHARE

ADVANCED
COMMANDS

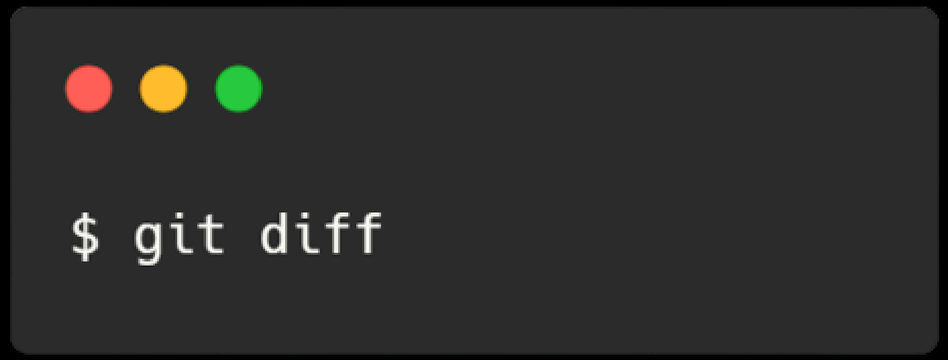
git revert

- Revert some existing commit
- Create new commit and undo the effect of a particular/multiple commit.

```
$ git revert <commitId>
```

git diff

- Show changes between commits, commit and working tree, etc
- Compares the working directory and the staging area



git stash

- When you want to record the current state of the working directory and the index, but want to go back to a clean working directory

```
$ git stash
$ git stash list
$ git stash show
$ git stash apply
$ git stash clear
```

git clean

- Cleans the working tree by recursively removing files that are not under version control, starting from the current directory
- Flags: -i <interactive> , -n <dry-run>, -f <force>

```
$ git clean --flag
```

git rebase

- Integrates one branch changes to another
- With the rebase command, you can take all the changes that were committed on one branch and replay them on a different branch

```
$ git rebase <branch-name>
```

git reset

- Reset current HEAD to the specified state
- Discard any changes made after that commit

```
$ git reset --flag <commitId>
```

Table Of Content

WLUG
COMMUNITY | KNOWLEDGE | SHARE

GITLAB

GIT INTERNALS

WLUG
COMMUNITY | KNOWLEDGE | SHARE

GITLAB

WLUG
COMMUNITY | KNOWLEDGE | SHARE

What is GITLAB?

- It is an open source
- It provides internet hosting services

GITHUB vs GITLAB

- GitHub is not open source
- GitHub provides commit history to view development
- It is less secure

- GitLab is open-source for community edition
- GitLab provides user to see project development charts
- More secure than Github

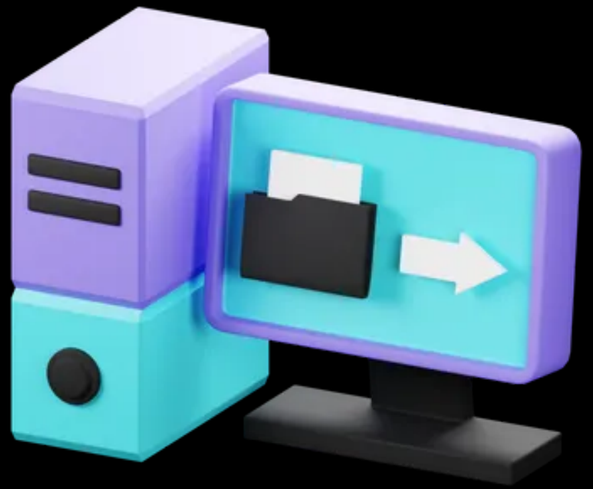
WLUG
COMMUNITY | KNOWLEDGE | SHARE

GITLAB

https://gitlab.com/users/sign_in

WLUG
COMMUNITY | KNOWLEDGE | SHARE

GIT INTERNALS



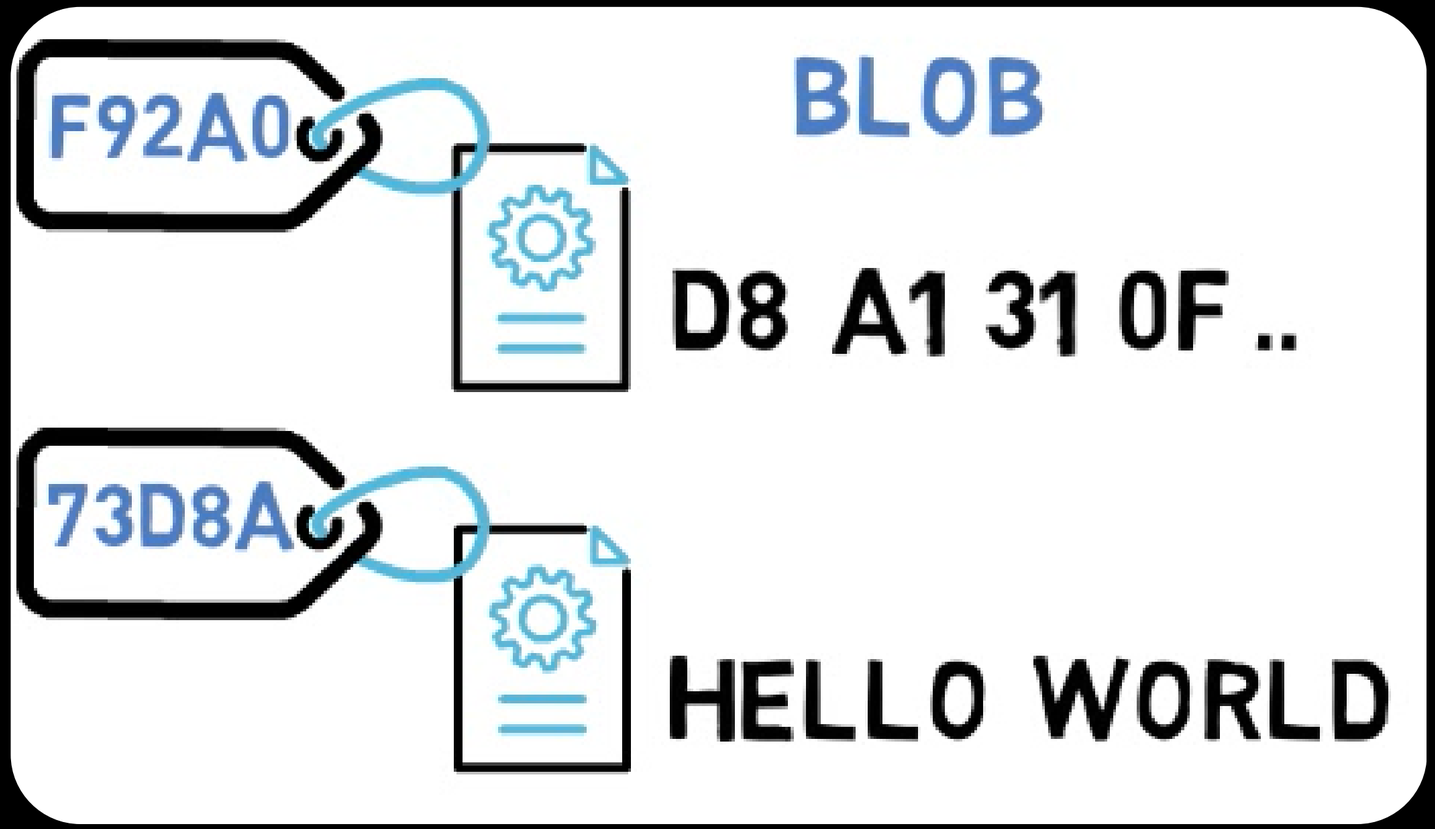
GIT OBJECTS

BLOB

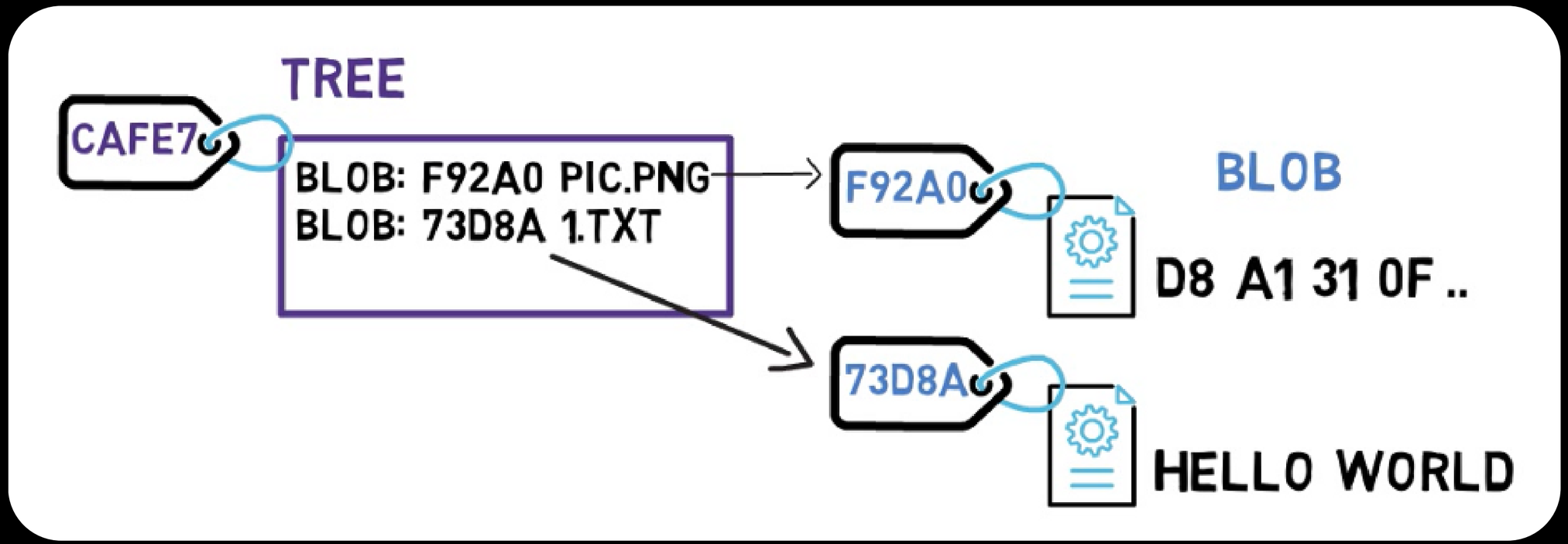
TREE

COMMIT

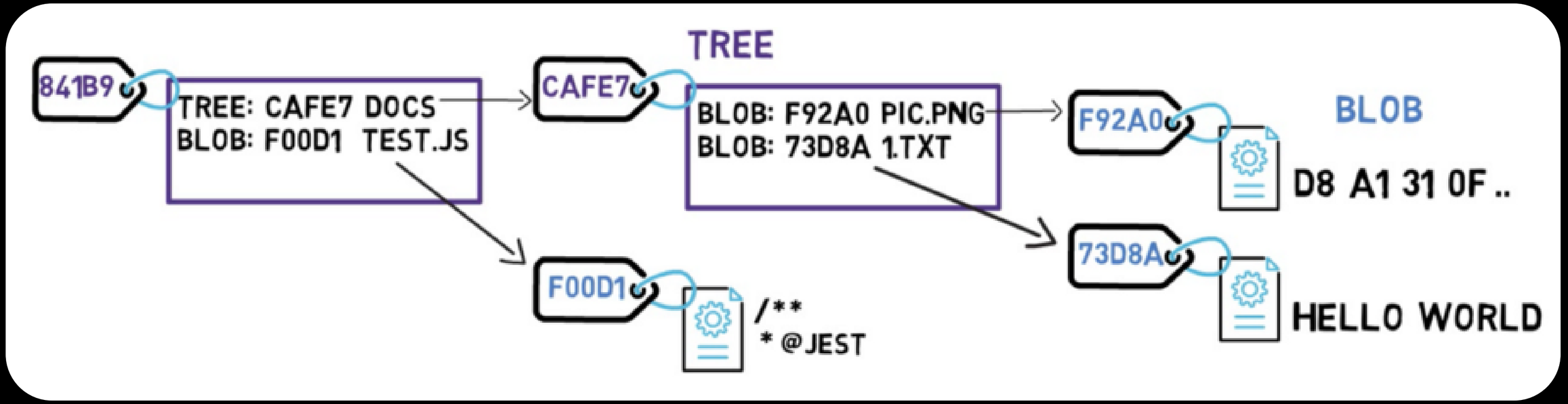
What is a BLOB?



What is a TREE?



What is a COMMIT ?



WLUG
COMMUNITY | KNOWLEDGE | SHARE