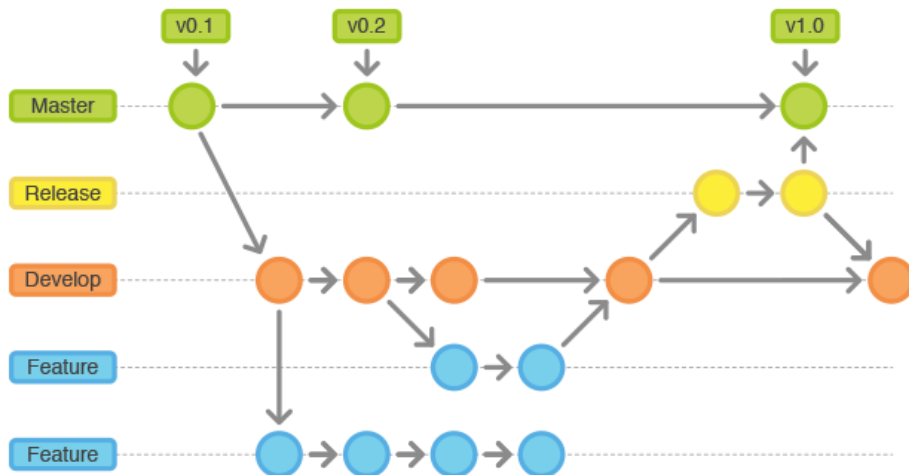# VERSION CONTROL SYSTEM
USING GIT

AYUSH SHRIVASTAV
CS-2B

Contents

- Defining version control system

- Types of version control system

- Introduction to git

- Basic git commands

- Introduction to Github

Before we start..

What is the term

VERSION

signifies?

VERSION

- Version is used to define the state/instance of a program as it is designed and developed

- The version identifier can be a name, or a number, or both.

- In most cases, version 1.0 is commonly used to denote the initial release of a program.

v1.0

Example: Android

Marshmallow
(Android 6.0)

- USB Type-C support added
- Each app permission granted individually during run time

Nougat
(Android 7.0)

- Added launch actions on apps by long pressing app icon
- Keyboard image insertion support

What is version control system?

- Version control is a system that records changes to a file or set of files over time so that you can recall specific versions later.

- It allows you to revert files back to a previous state, revert the entire project back to a previous state.

- Git is currently the most popular implementation of a distributed version control system.

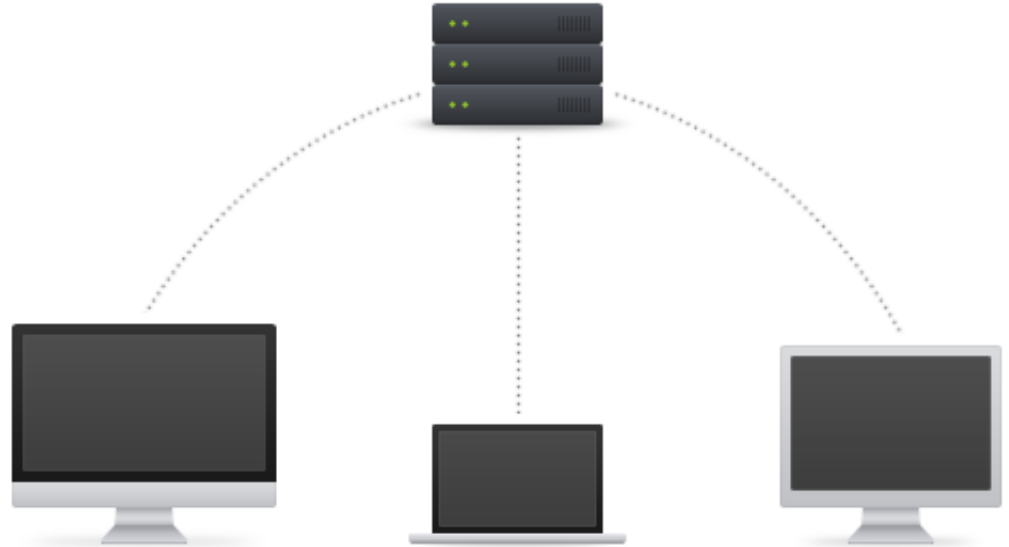# Types of VCS

1. Centralised Version Control System

2. Distributed Version Control System

Centralised Version Control System

Popular software:
SVN (Subversion)

- Works in client-server relationship

- Working repository is located in one place and provides access to many clients

Centralised Version Control System

Advantages

- It is easy to understand.
- You have more control over users and access (since it is served from one place).
- More GUI & IDE clients (Subversion has been around longer).
- Simple to get started.

Drawbacks

- Dependent on access to the server.
- Hard to manage a server and backups (well, not with Beanstalk of course!)
- It can be slower because every command connects to the server.
- Branching and merging tools are difficult to use.

Distributed Version Control System

Popular software:
git and Mercurial

- Each user works on his own copy of the entire repository

- Allows users to work productively when not connected to a network.
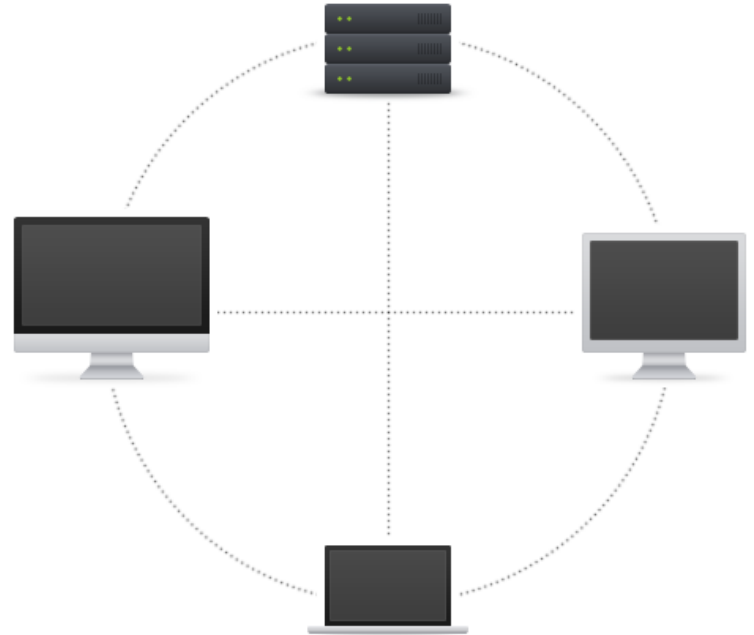
Distributed Version Control System

Advantages

- More powerful and detailed change tracking, which means less conflicts.
- No server necessary – all actions except sharing repositories are local (commit offline).
- Branching and merging is more reliable, and therefore used more often.
- Faster version control system.

Drawbacks

- The distributed model is harder to understand.
- It's new, so not as many GUI clients.
- The revisions are not incremental numbers, which make them harder to reference.
- It can be easier to make mistakes until you are familiar with the model.

Introduction to git

- git was founded in 2005 by Linus Torvalds.

- It is a type of Distributed version control system

- Well defined documentation at scm-git.com

- Free and open source software.

- Widely used as a command line tool

GIT related terminologies

- Repo/Repository

- Commit

- Branch

- HEAD

- Patch

- Clone

Installing git

Ubuntu Linux

$ sudo apt-get install git

Fedora

$ sudo dnf install git

Windows

download and install git bash software

Your identity in git

$ git config --global user.name "sukhbir-singh"

$ git config --global user.email sukhbir@example.com

$ git config --global core.editor gedit

Using git for your next project

$ git init

Initializes current working directory as git repository so that git starts tracking changes incorporated in this directory

$ git add file1 file2 file3 folder/*
  OR
$ git add *

Add files to the staging area before making it into a commit.
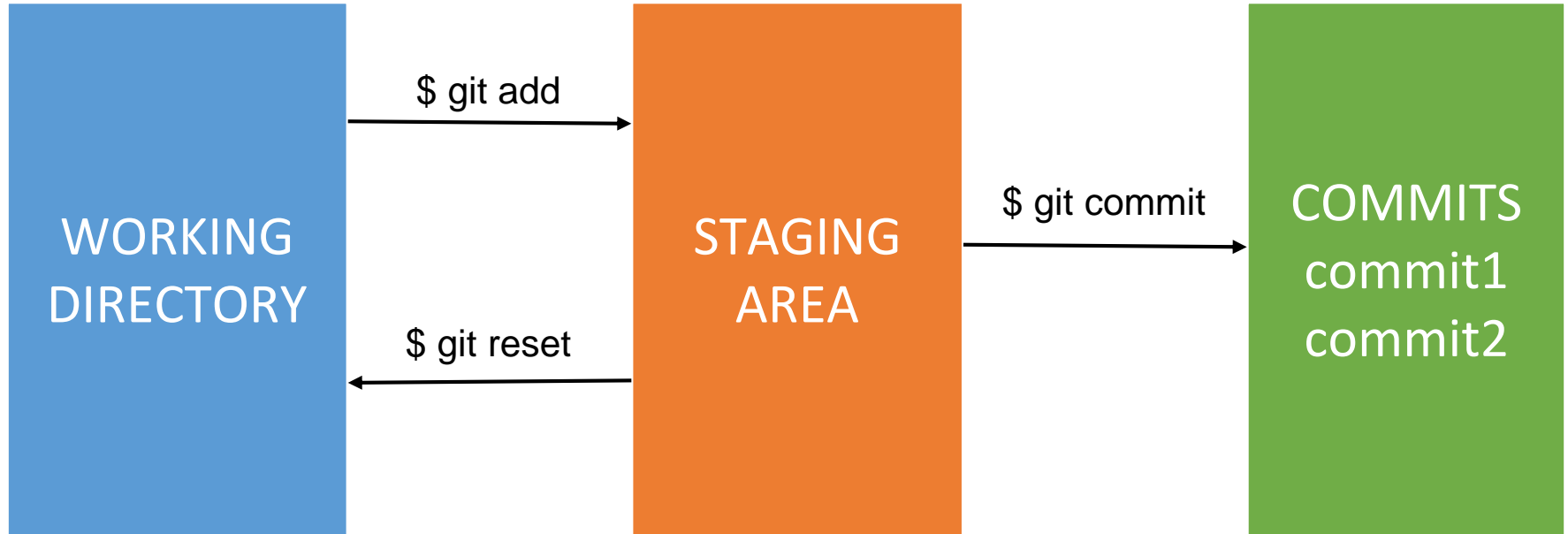
Using git for your next project

$ git commit –m "first commit"

Add a new commit to git with the given message and a generated SHA1 hash. Commit is added to top of commits in current git branch.

$ git log

List all commits of current git branch. It can be used with flags like - -oneline.

Concept of Staging area

Using git for your next project

$ git reset file1 file2

This command is used to move files back from staging area to current working directory.

$ git clone https://github.com/appteam-nith/Nimbus.git

Git clone is used to clone entire git repository along with all commits and branches.

What is remote links

Remote links are used for connecting your current working directory with online remote repository.

git repository can be hosted online on platforms like

Remote links can also be used to update your local repository (git pull) or pushing your changes (commits) to online remote repository (git push).

Using git for your next project

$ git remote add origin LINK

This command is used to add a new remote link of some remote online git repository. This remote link can later be used for fetching commits.

$ git remote –v

To show all remote links attached to current git repository. The command will show each remote's name and URL link.

Using git for your next project

$ git push origin master

This command is used to push new commits to remote repository corresponding to a particular branch.

$ git pull origin master

Pull = Fetch + Merge

This command is used to update current git repository i.e. fetch latest commits made in online git repository to local repository.

Concept of branches in git

Branching is one of the most useful concepts used in
version control system like git, mercurial

Branch is conceptually the sequence of commits in a repository

Branching gives developers the power of testing, working on multiple
features in same repository, and in collaborating with other developers.

Default branch is always named as
    "master"
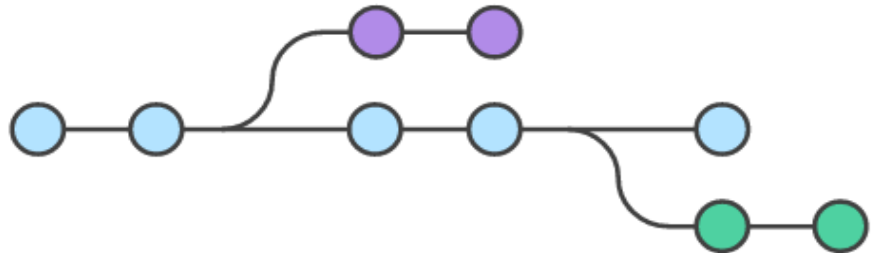
In Git, branches are a part of your everyday development process.

Adding a new feature or fixing a bug—no matter how big or how small, just create a new branch and start implementing the feature.
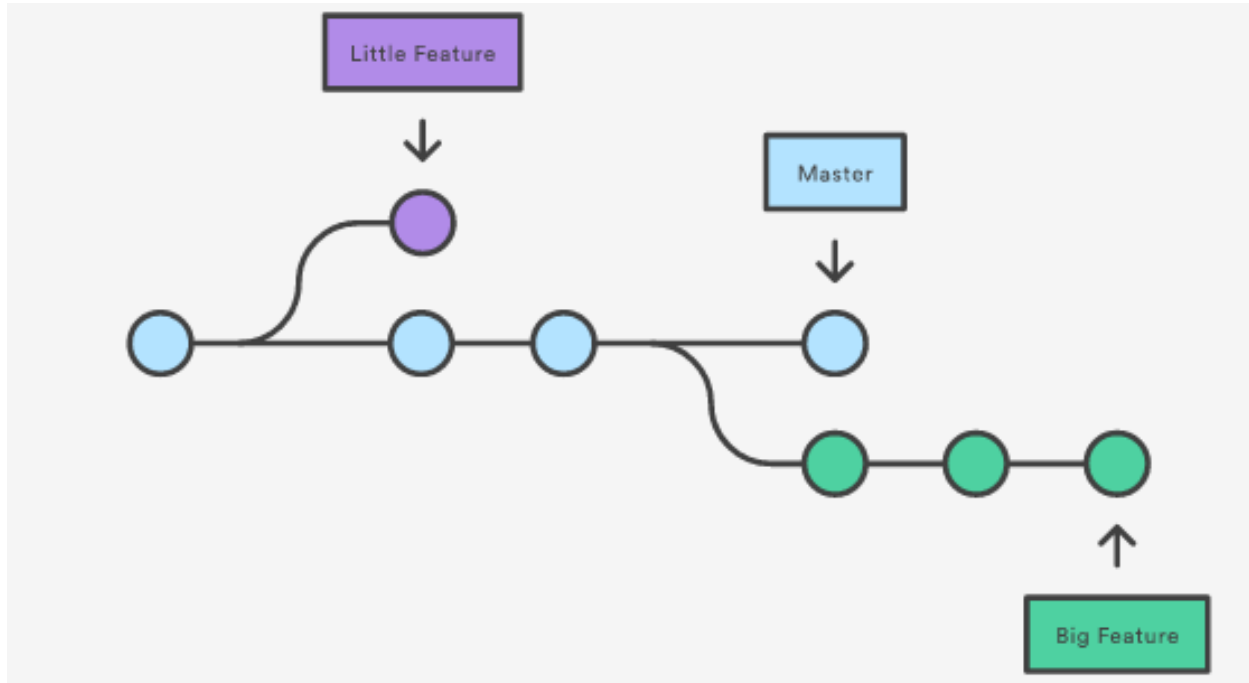
Using git for your next project

$ git branch testing

This command creates a new branch named testing. But remember it does not switch to new branch.

$ git branch –v

This command is used to list all branches made in this git repository. In output of this command an asterisk is shown in front of current branch.

Using git for your next project

$ git checkout testing

git checkout is used to switch between branches.

$ git checkout –b new_feature

This command does two tasks: It creates a new branch named new_feature and switched to it.

Using git for your next project

$ git branch -d <branch>

-d flag in git branch command is used to delete branch.

$ git branch -m <branch>

-m flag in git branch command is used to rename current branch to name mentioned in command

What is .gitignore file

A gitignore file is a text file created in home directory of repository.

This file specifies intentionally untracked files that Git should ignore. Files already tracked by Git are not affected.

To stop tracking a file that is currently tracked, use

$ git rm --cached.

Merging branches

$ git merge testing

This command will merge branch testing with current branch.

Merging will be done automatically if there is no conflicts in any files changed in either branch.

Git is smart enough to merge branches but any ambiguity while merging will signalled as conflicts.

Removing conflicts while merging

One method to resolve conflict is using tools like git mergetool

Another method is to open each file in which conflict happens in a text editor and find below sequence and resolve it appropriately.

```
<<<<<<<

=======

>>>>>>>
```

```ruby
#! /usr/bin/env ruby

def hello
<<<<<<< ours
  puts 'hola world'
||||||| base
  puts 'hello world'
=======
  puts 'hello mundo'
>>>>>>> theirs
end

hello()
```

Github : An Introduction

- Github is the most popular hosting site for git repositories.

- It is written in ruby on rails.

- Features:-
  - Issues tracking
  - online collaboration
  - open source licence
  - wikis
  - Graphs: contributors, commits, code frequency.

Popular Organizations on Github

Popular Organizations on Github

Mozilla
This technology could fall into the right hands.
Mountain View, California   https://wiki.mozilla.org/Github

Repositories   People 268

Microsoft
Open source, from Microsoft with love
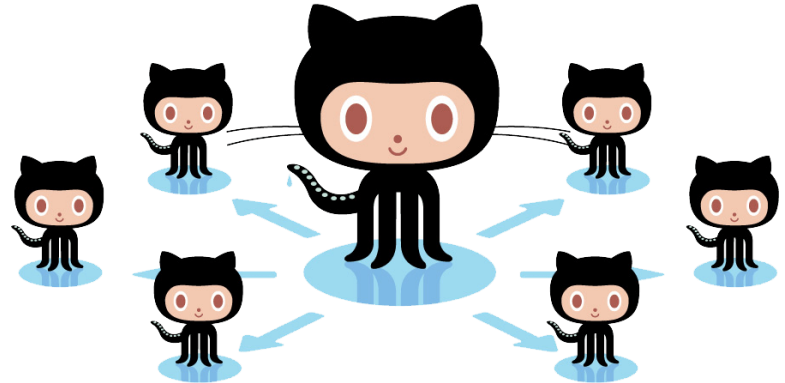Redmond, WA   https://opensource.micro...   opensource@microsoft.co...
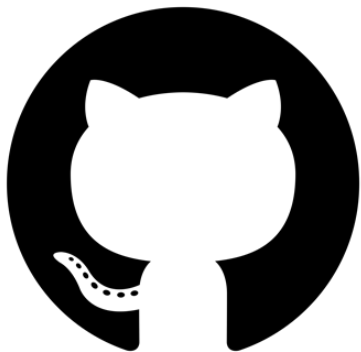
Repositories   People 3,058

Conclusion

Version control system is an important element of software development. It can make the software development process safer and faster.

Any queries?

THANK YOU !