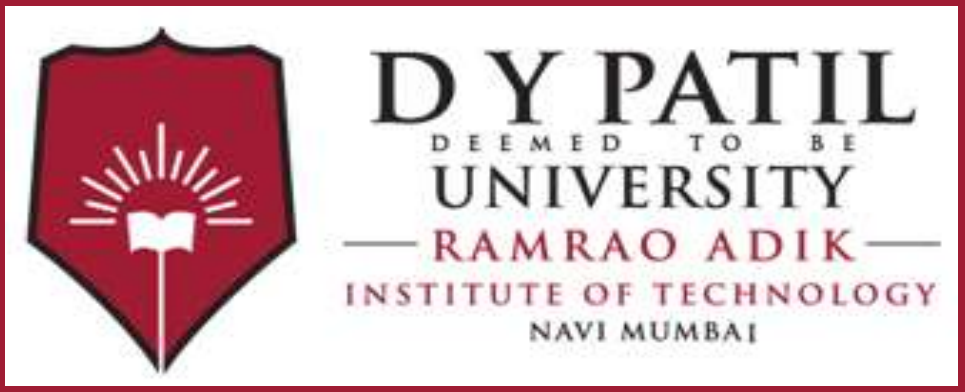

LO2:Version Control System

Mrs. Sujata Oak
Assistant Professor,
Department of Information Technology
RAIT

Version Control System:

Version Control System:

1.GIT Installation, Version Control, Working with remote repository

2.GIT Cheat sheet

3.Create and fork repositories in GitHub

4.Apply branching, merging and rebasing concepts.

5.Implement different Git workflow strategies in real-time scenarios

6.Understand Git operations in IDE

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What is Version Control?

Version Control System is also known as
Software Configuration Management(SCM) or
Source Code Management(SCM)

Need of Version Control System?
How version control system will work?
Benefits of Version Control System?

Types of Version Control Systems
Difference between Centralized and Distributed?
GIT...

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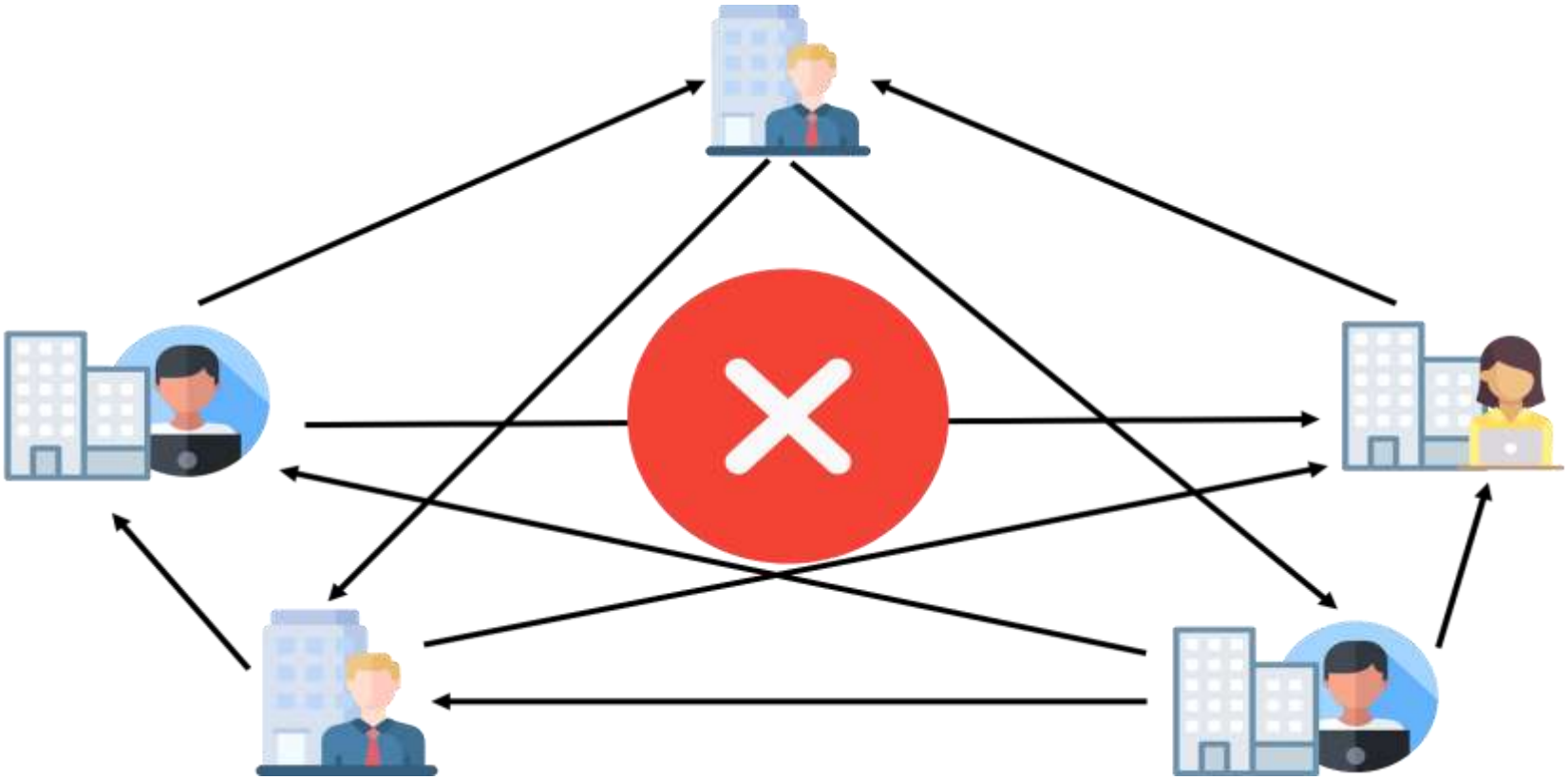
Challenges in Traditional Approach



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Challenges in Traditional Approach

Collaboration

There are so many people located at different places, there may be a need to communicate for a particular reason, or a set of people are working on the same project but from other regions.

Storing Versions

The project is completed into several versions; in that situation, keeping all such commits in a single place is a considerable challenge.

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Challenges in Traditional Approach

Restoring Previous Versions

Sometimes, there is a need to go back to the earlier versions to find the bug's root cause.

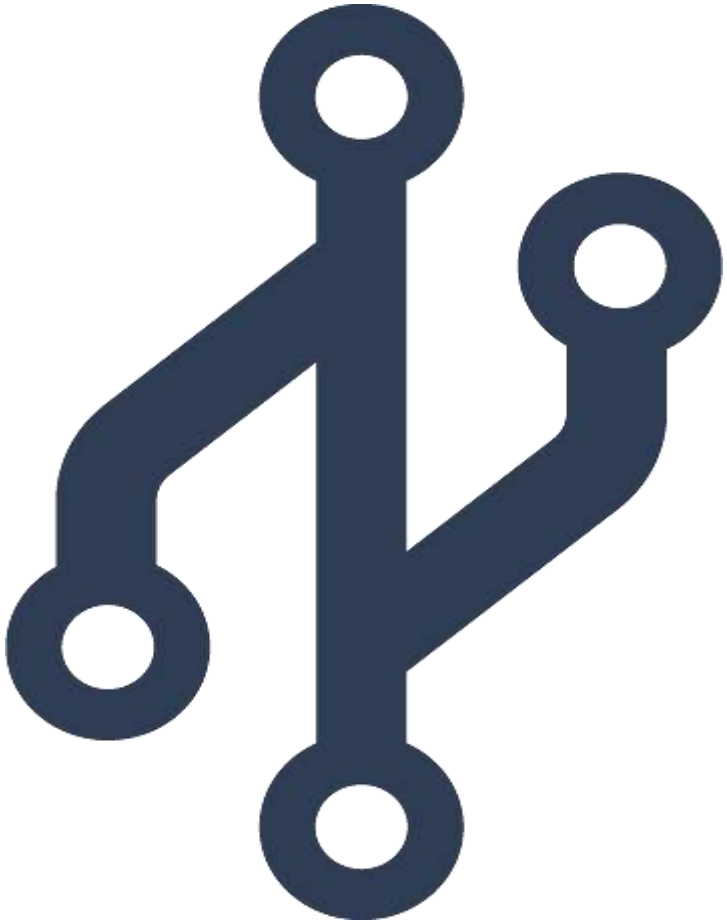
Figure Out What Happened

It is critical to know what changes were made to the previous versions of the source code or where exactly the changes have been made in a file.

Backup

If the system or disk of the user breaks down and there is no backup, then all the efforts go in vain.

Solution Version Control to the rescue!



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What is Version Control?

These days when software is developed, It is not developed with the mind-set that there will only be one piece of code that will be deployed and that's it. These days smaller snippets of code are deployed in regular successions with regular feedbacks. This leads to many different versions of the code.

And that creates a need to organise the code and all of its different version of it. This is where Version Control comes in. It is a practice of managing and storing different version of a source code.

This is especially the case with Larger companies that have multiple projects and multiple teams working within it.

A1, A2, A3

B1, B2, B3

C1,C2,C3

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The responsibility of the Version control system is to keep all the team members on the same page.

It makes sure that everyone on the team is working on the latest version of the file and, most importantly, makes sure that all these people can work simultaneously on the same project.

Why do we need a VCS?

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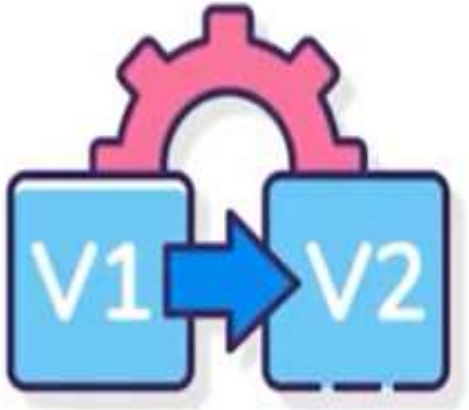
Why do we need a VCS?

Just as we discussed, the purpose of a version control system is as the name suggests, It controls the different versions of the code. The idea of a VCS meshes very well with the DevOps ideology. It allows for quick delivery of code and automatic job triggering. This allows for easy automation of the whole software development pipeline.



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Benefits of VCS

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Benefits of Version Control?

1. Managing and Protecting the Source Code

   The Version Control System helps manage the source code for the software team by keeping track of all the code modifications. It also protects the source code from any unintended human error and consequences.

2. Keeping Track of All the Modifications Made to the Code

   The team working on the project continuously produces new source codes and keeps making amendments to the existing code. These changes are recorded for future references and can be used if ever needed in the future to discover the root cause of any particular problem.

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Benefits of Version Control?

3) Comparing Earlier Versions of the Code:

Since all the versions of the code are saved, this makes it possible for developers to go back at any time and compare the earlier versions of the code to help fix the mistake while reducing disruption to all team members.

4) Supports the Developers' Workflow and Not any Rigid Way of Working

Any suitable Version Control software will not impose any particular way of working. The Version Control Systems are known to provide a smooth and continuous flow of changes made to the code and prevent developers from getting frustrated in this clumsy mechanism.

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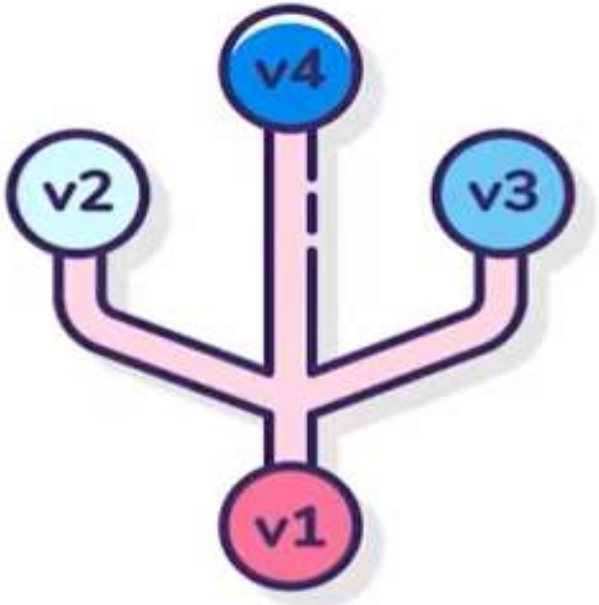

What are the different VCS available?

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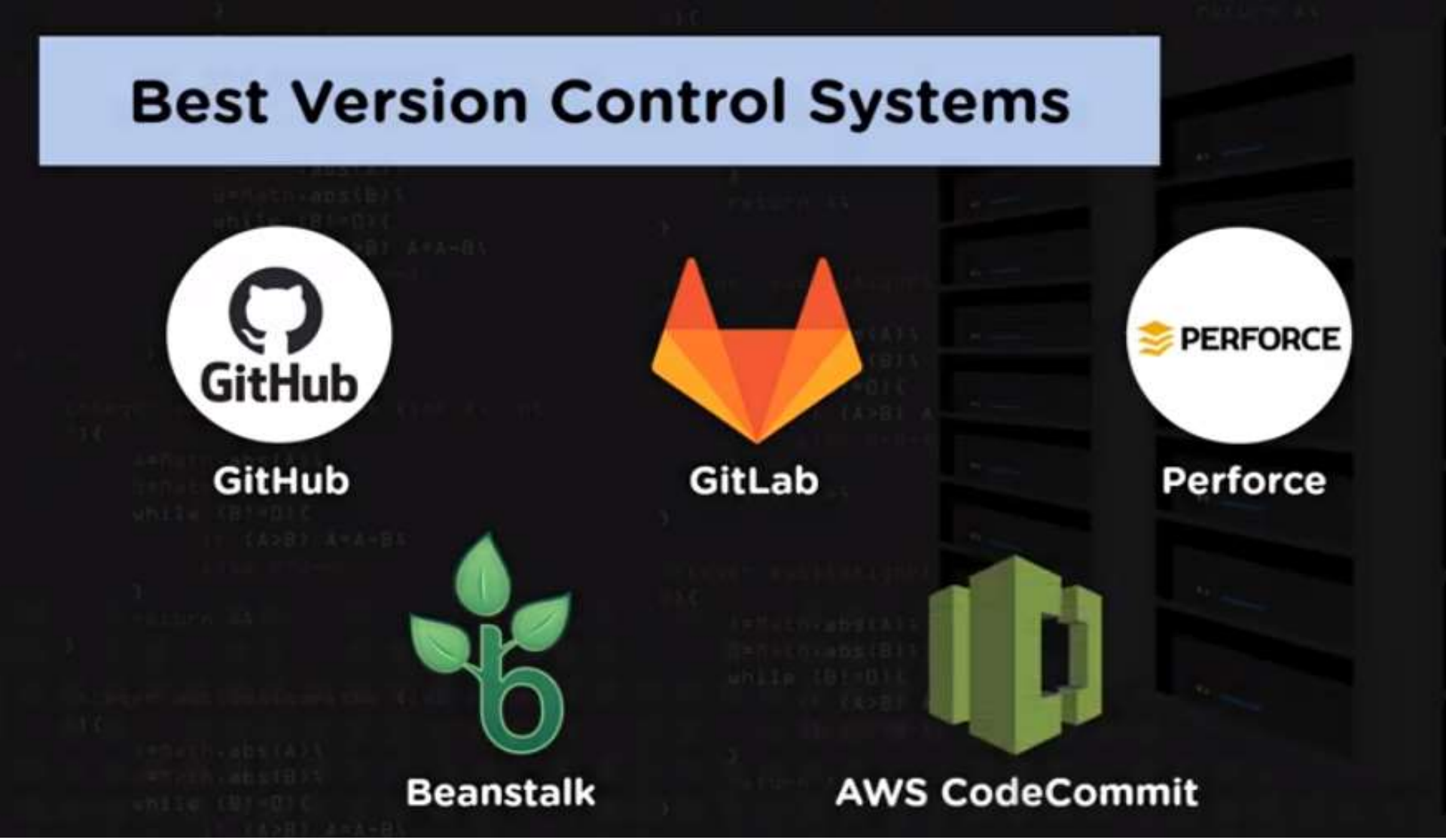

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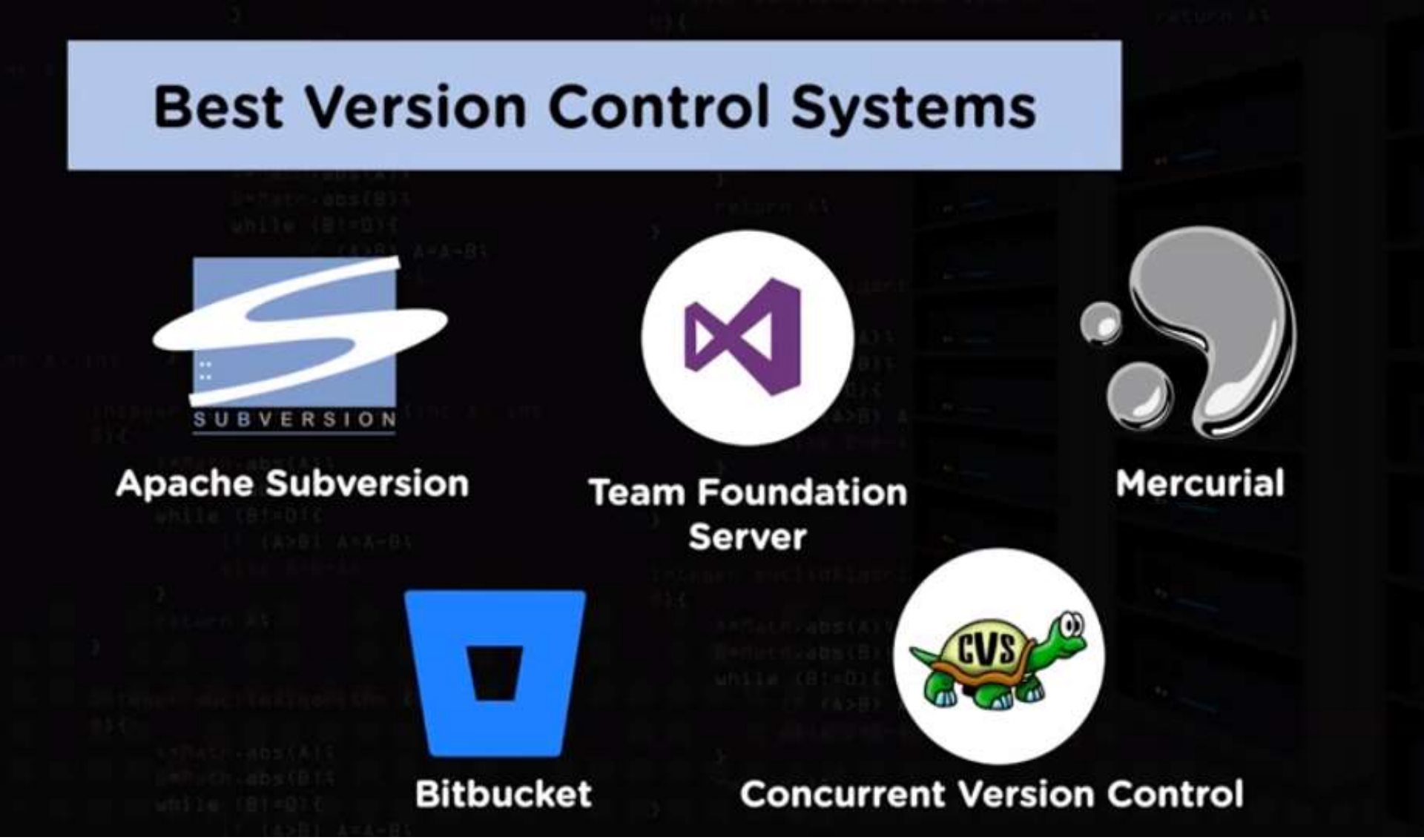

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Version Control Types

3 Types of VCS :

1. Local VCS
2. Centralized VCS
3. Distributed VCS

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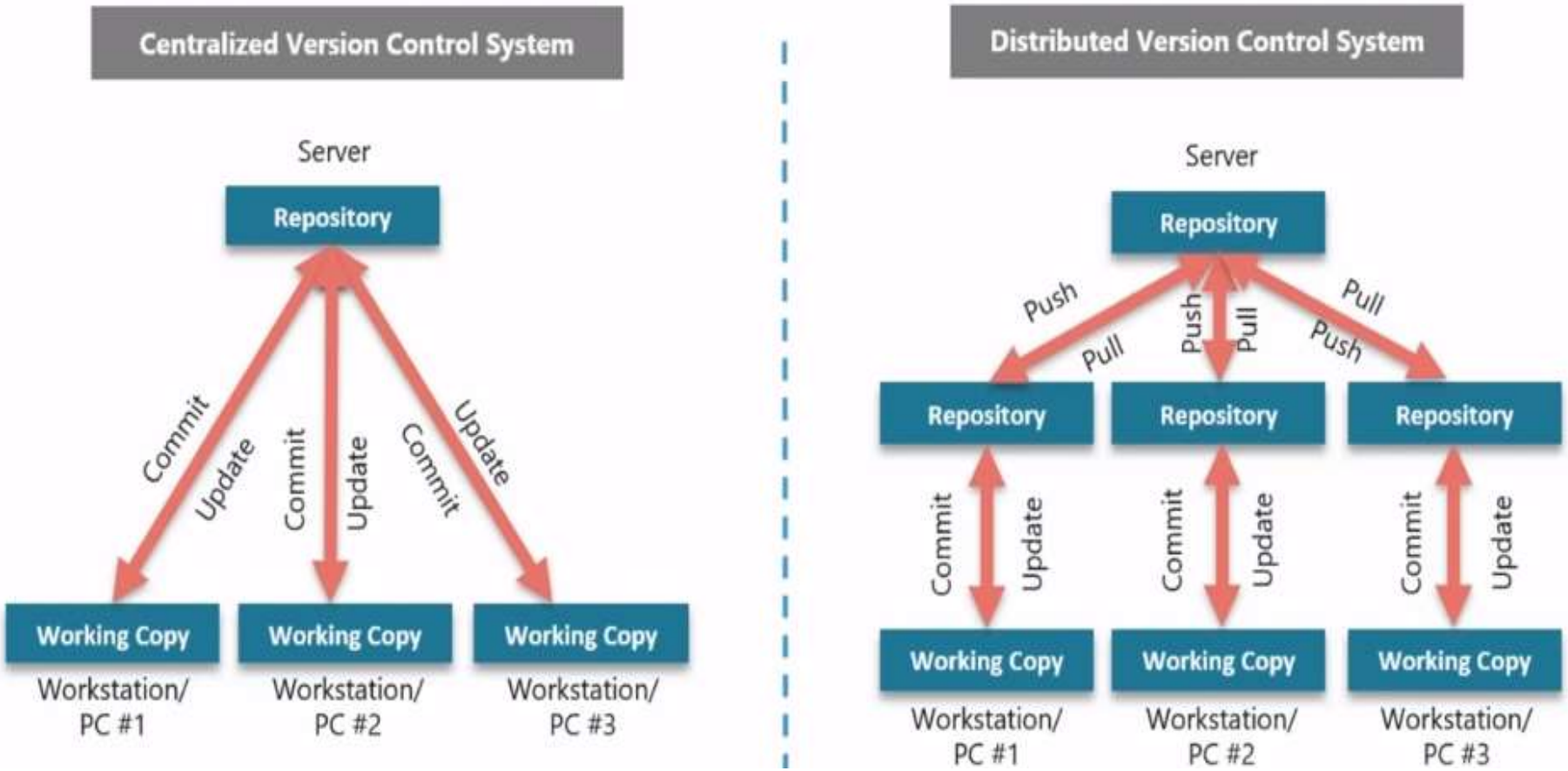
Version Control Types



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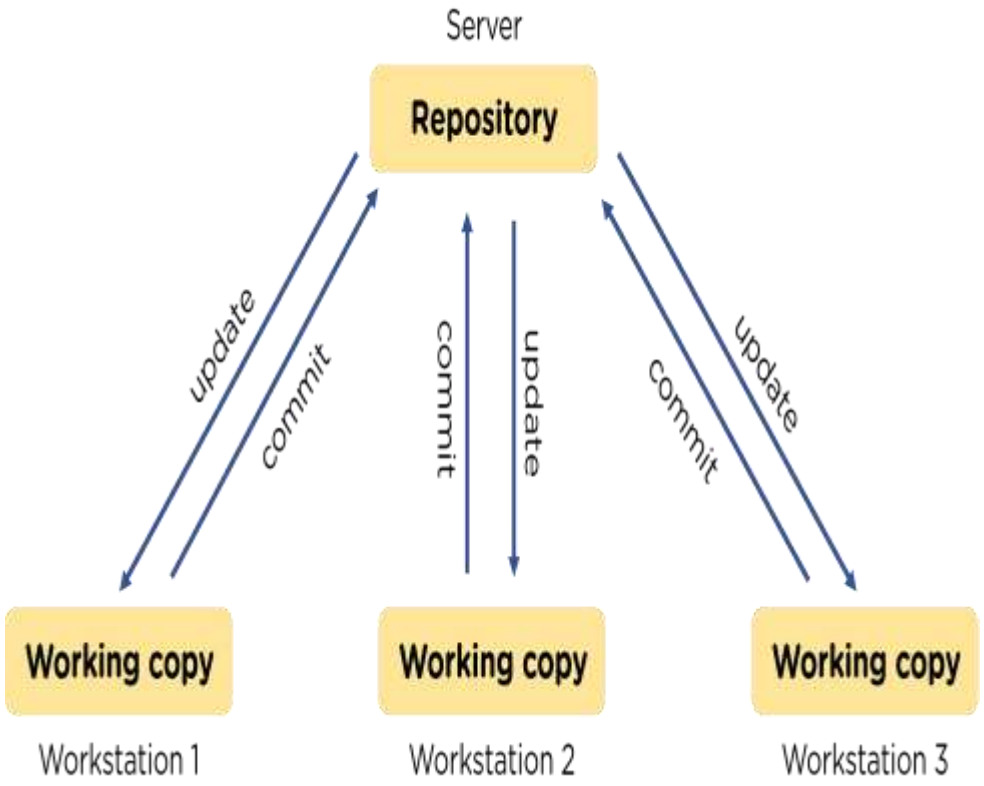
Version Control Types : Centralized



There are 3 workstations or three different developers at three other locations, and there's one repository acting as a server.

The work stations are using that repository either for the process of committing or updating the tasks.

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Version Control Types : Centralized

There may be a large number of workstations using a single server repository.

Each workstation will have its working copy, and all these workstations will be saving their source codes into a particular server repository.

This makes it easy for any developer to access the task being done using the repository.

If any specific developer's system breaks down, then the work won't stop, as there will be a copy of the source code in the central repository.

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A Typical Centralized Version Control Workflow

1. Pull down any changes other people have made from the central server.
2. Make your changes, and make sure they work properly.
3. Commit your changes to the central server, so other programmers can see them.

Subversion (SVN), CVS, and Perforce

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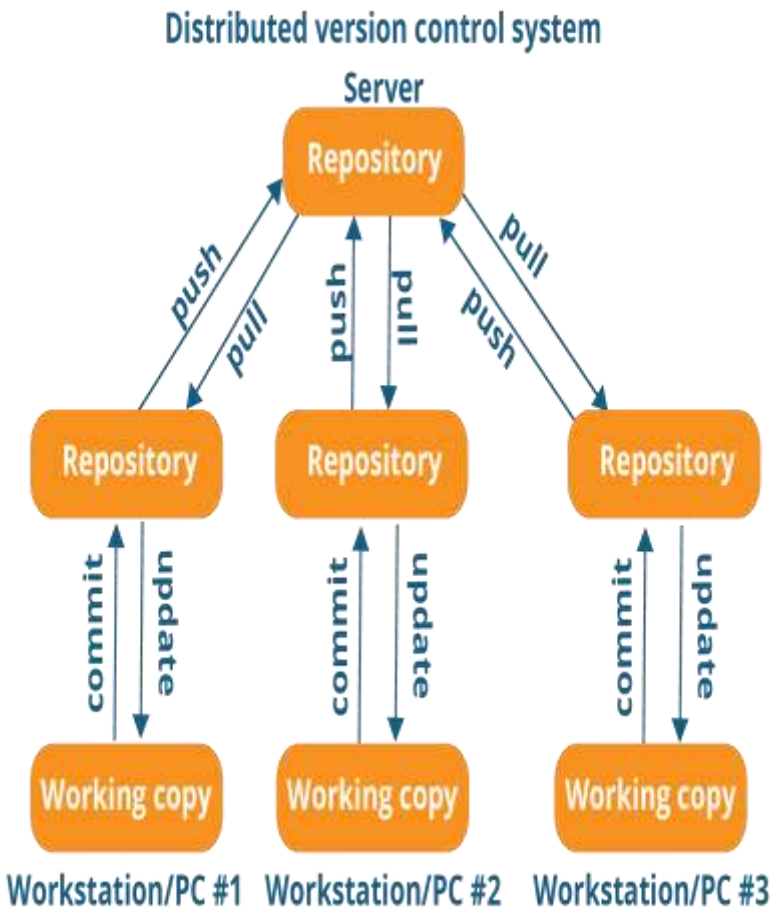
Distributed Version Control



These systems do not necessarily rely on a central server to store all the versions of a project's files. Instead, every developer "clones" a copy of a repository and has the **full** history of the project on their own hard drive.

Mercurial, Git and Bazaar.

Advantages Over Centralized Version Control

1. Performing actions other than pushing and pulling changesets is *extremely* fast because the tool only needs to access the hard drive, not a remote server.
2. Committing new changesets can be done locally without anyone else seeing them. Once you have a group of changesets ready, you can push all of them at once.
3. Everything but pushing and pulling can be done without an internet connection. So you can work on a plane, and you won't be forced to commit several bugfixes as one big changeset.
4. Since each programmer has a full copy of the project repository, they can share changes with one or two other people at a time if they want to get some feedback before showing the changes to everyone.

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Disadvantages Compared to Centralized Version Control

1. If your project contains many large, binary files that cannot be easily compressed, the space needed to store all versions of these files can accumulate quickly.
2. If your project has a very long history (50,000 changesets or more), downloading the entire history can take an impractical amount of time and disk space.

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Conclusion

Version control systems aim to solve a specific problem that programmers face: “storing and sharing multiple versions of code files.” If you’re a programmer of any kind and you don’t use any kind of version control, you should start right now. It will make your life easier.

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Git Overview

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What is Git?

Git is an open source version control system that allows the user to keep track of all the changes that have been made to the source code of the software.

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What Is Git ?

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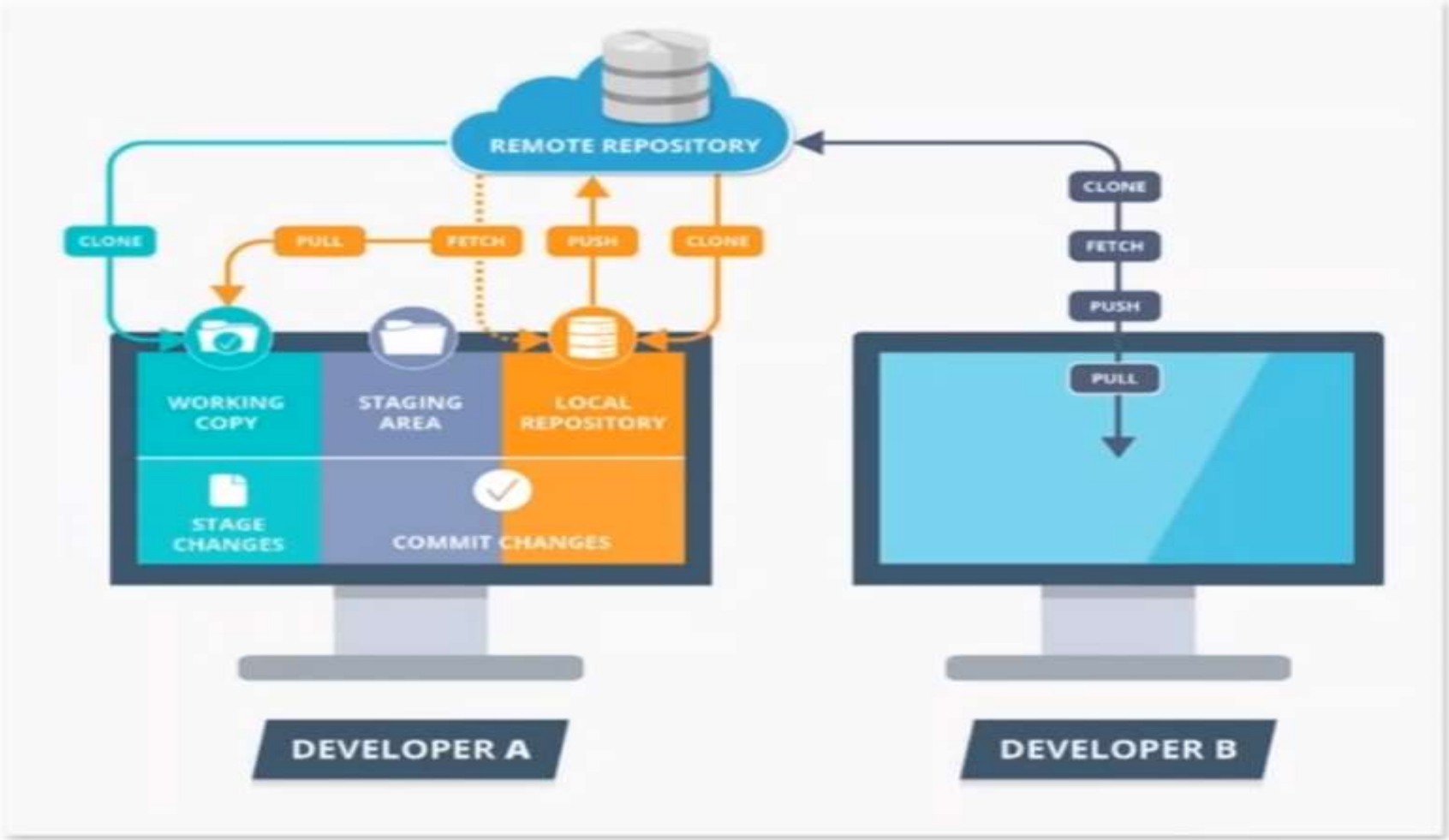
Workflow of Git



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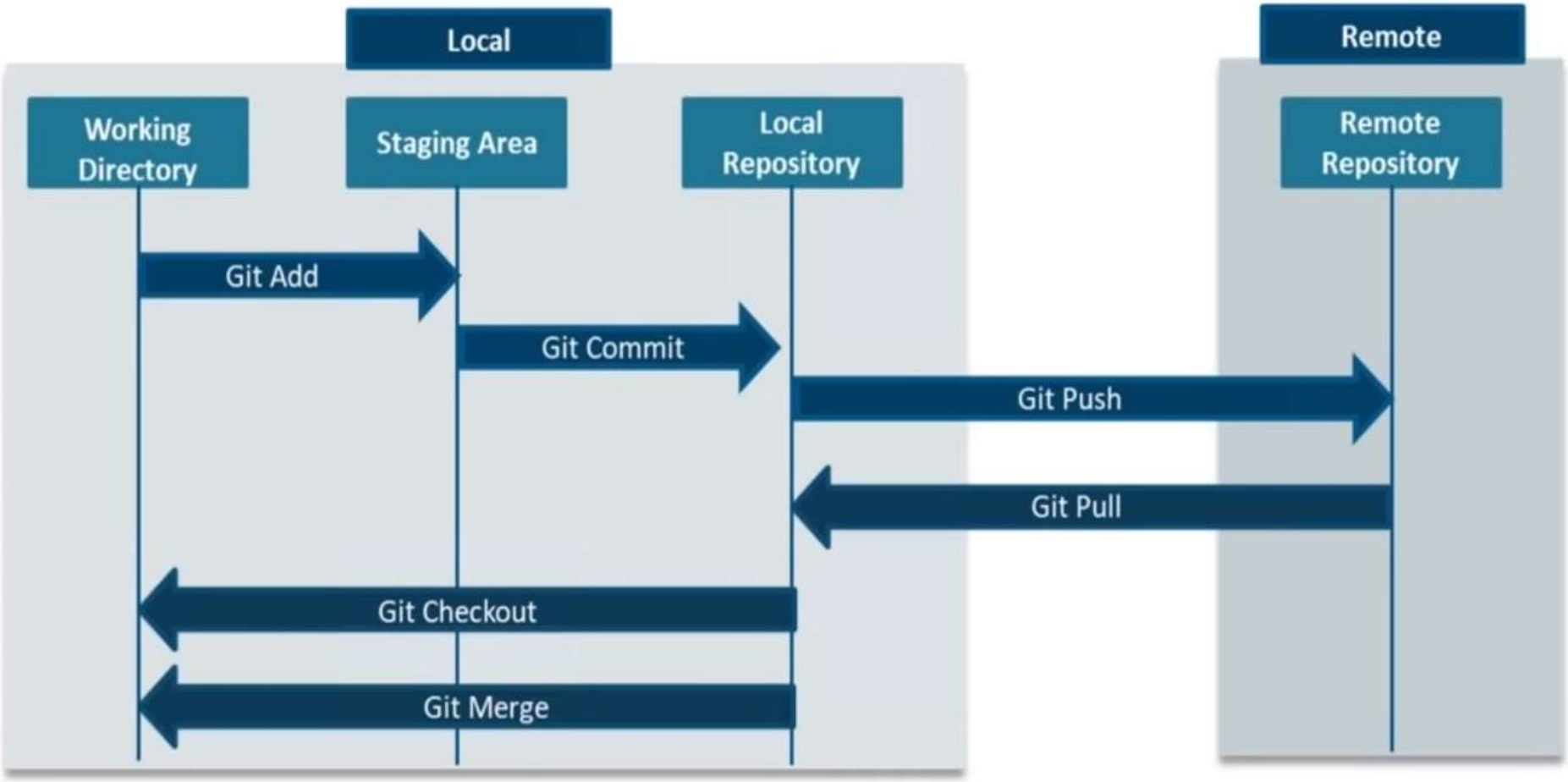
Workflow of Git



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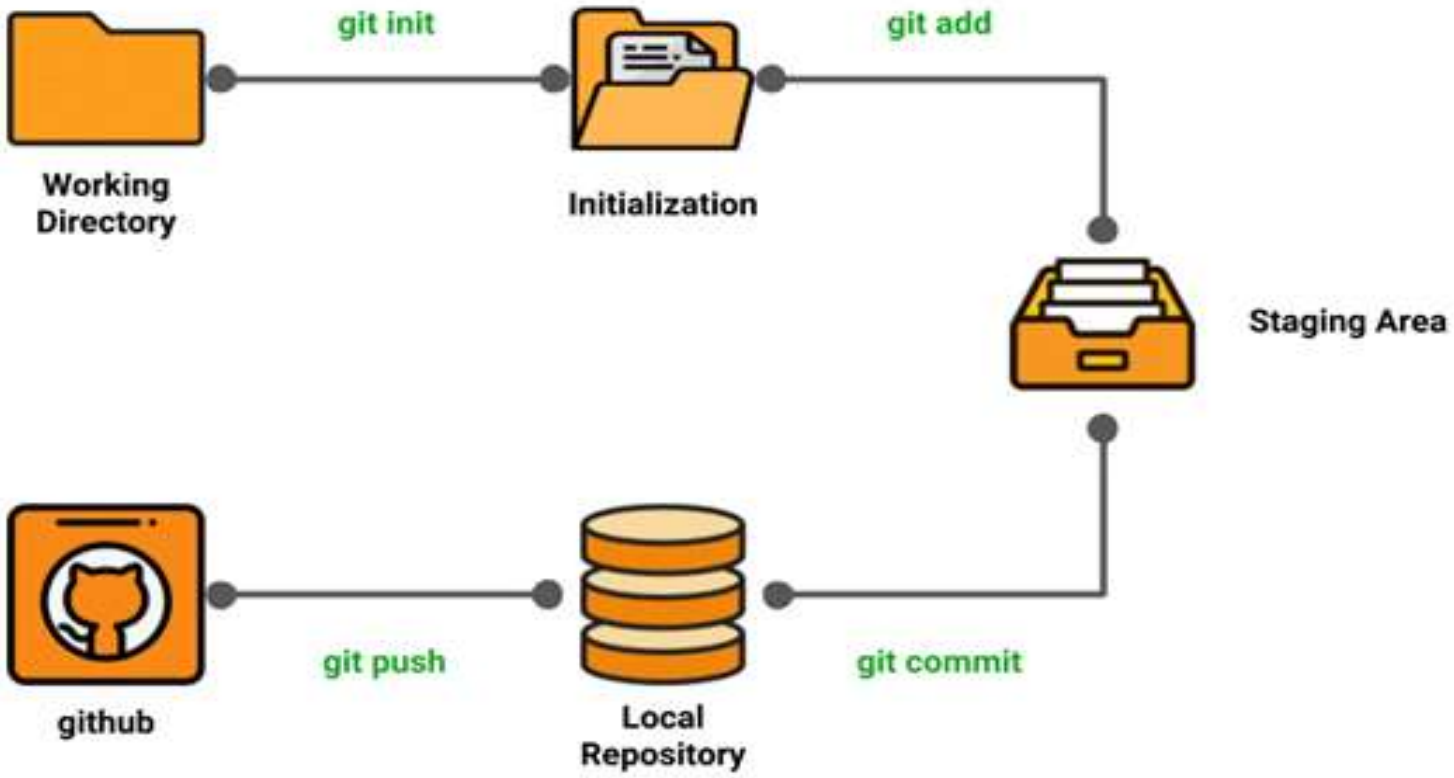
Git Life Cycle



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Git Life Cycle

Local working directory: The first stage of a Git project life cycle is the local working directory where our project resides, which may or may not be tracked.

Initialization: To initialize a repository, we give the command git init. With this command, we will make Git aware of the project file in our repository.

Staging area: Now that our source code files, data files, and configuration files are being tracked by Git, we will add the files that we want to commit to the staging area by the git add command. This process can also be called indexing. The index consists of files added to the staging area.

Commit: Now, we will commit our files using the git commit -m ‘our message’ command.

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Git Cheat Sheet

https://intellipaat.com/mediaFiles/2019/03/Git-Cheat-Sheet.jpg

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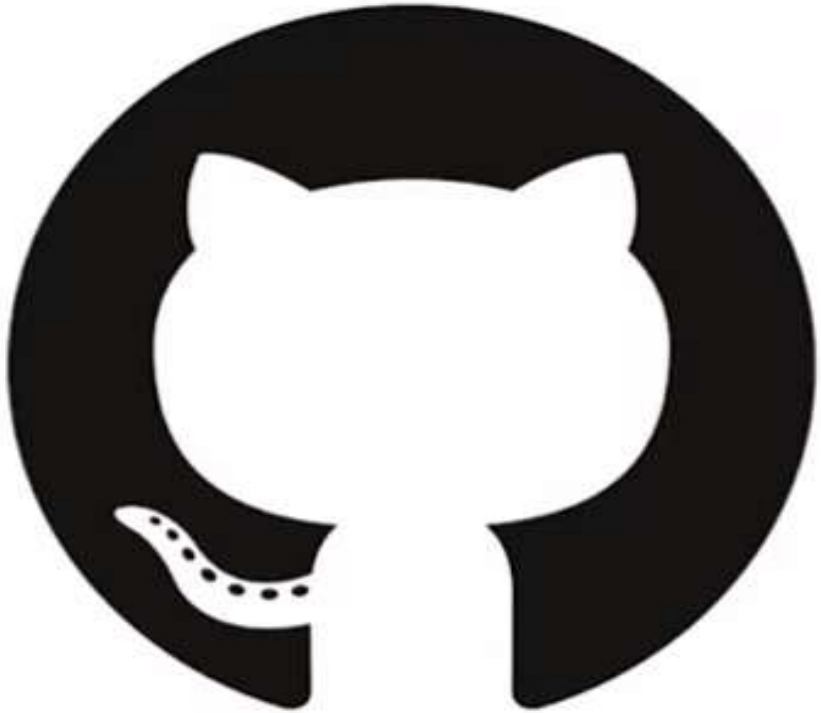
Git Features

1. **Distributed**: A distributed development of code
2. **Compatible**: Works with existing systems and protocols
3. **Non-linear**: Allows the non-linear development of code
4. **Branching**: Easy to create and merge branches
5. **Lightweight**: Lossless compression
6. **Speed**: Faster than the remote repository
7. **Open-source**: A free tool and hence economical
8. **Reliable**: Not viable to any loss of data upon crashes
9. **Secure**: Uses SHA1 and checksum



Getting started with GitHub

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https://www.youtube.com/watch?v=tgmM3_2dZwg

Why Git Wins Over Other Tools?

Released under GPL's license. It is for free and is open source.

Economical

Supports non-linear development of software.

Non -Linear

Records changes made to a file rather than file itself.

Snapshots

Every user has his own copy of the repository data stored locally.

Distributed

Speed offered by Git is lightening fast compared to other VCS's.

Speed

Nearly every task in Git is undo-able.

Robust

No changes can be made without Git recording it.

Integrity

Every collaborator's working directory is in itself a branch.

Branching

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Hands-On

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Hands-On : Solution

Task is to move the company's code base to git and GitHub.

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Hands-On : Objectives

Part 1 : Launch Ubuntu VM

Part2 : Initialize Git

Part3 : Staging and Committing a file in the Git Repository

Part 4 : Managing the file and Tracking Changes

Part 5 : Branches and Merging

Part 6 : Handling Merge Conflicts

Part 7 : Integrating Git with Github

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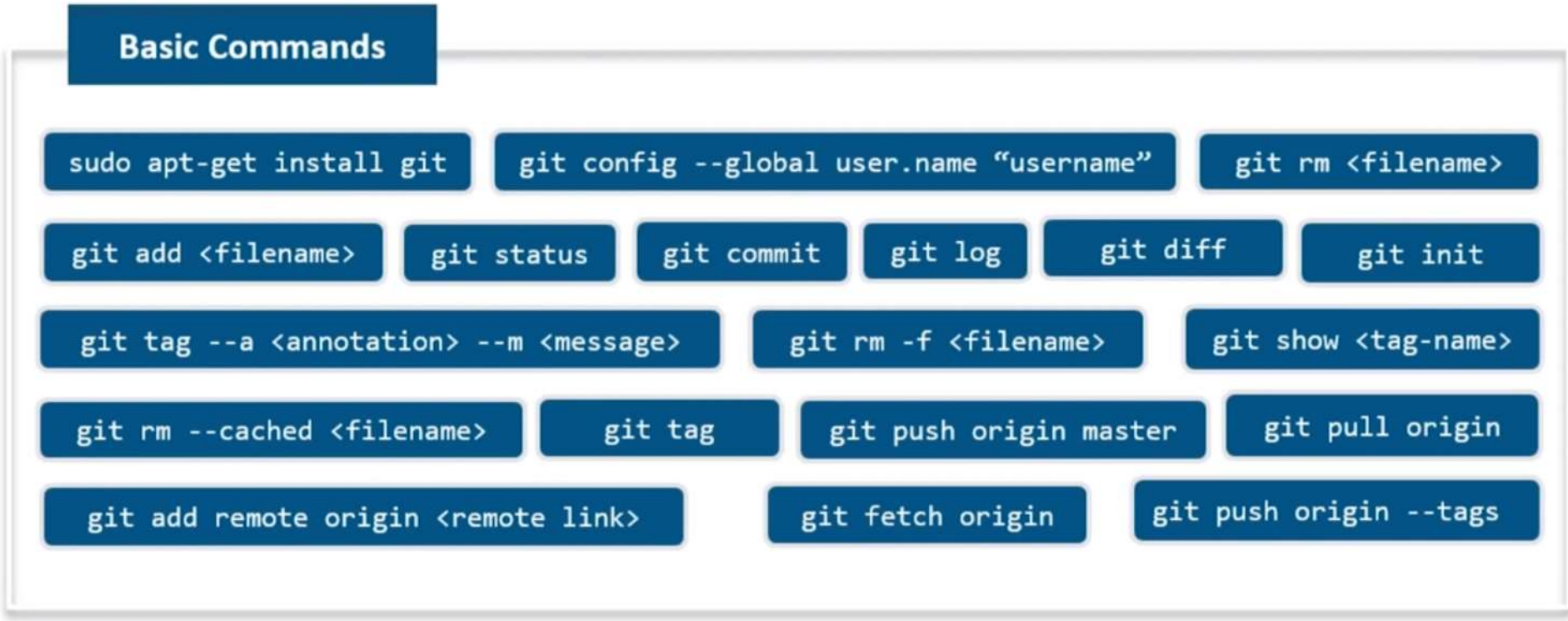
Git Commands



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Git Commands

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Thank you

QUIZ

After you install Git and prior to issuing the first commit, which two configuration properties does the tool expect to be configured?

1. username and email address
2. username and password
3. email address and password
4. username and IP address

QUIZ

Who is attributed with inventing Git?

1. Junio Hamano
2. James Gosling
3. Kohsuke Kawaguchi
4. Linus Torvalds

QUIZ

Which command should you use to initialize a new Git repository?

1. git bash
2. git install
3. git init
4. git start

QUIZ

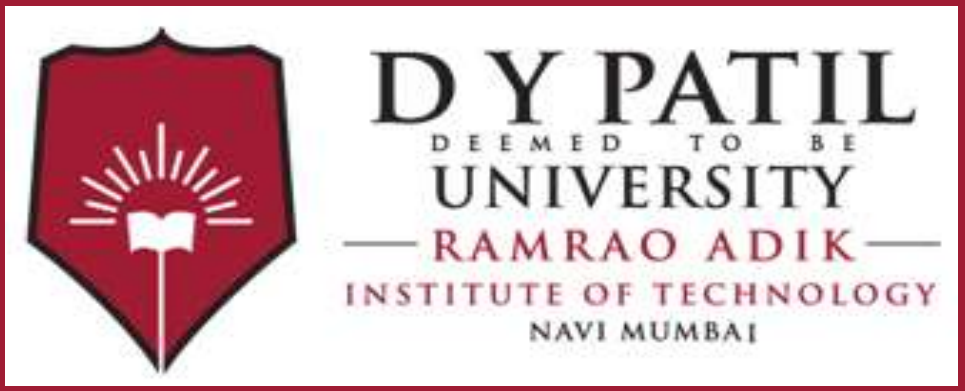
Which file can you configure to ensure that certain file types are never committed to the local Git repository?

1. ignore.git
2. .gitignore
3. gitignore.txt
4. git.ignore

QUIZ

After you initialize a new Git repository and create a file named *git-quiz.html*, which of the following commands will not work if issued?

1. git add git-quiz.html
2. git status
3. git add .
4. git commit -m "git quiz web file added"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Thank You