Git Version Control

A logo with a clock and a black background

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1. Explain in detail the git version control system explaining why and when we use it and all the related terms

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| * **Git**   + - **Description:** Git is a distributed version control system that tracks versions of files. It is often used to control source code by programmers who are developing software collaboratively.       * **Why** * Git tracks the changes you make to files, so you have a record of what has been done, and you can revert to specific versions should you ever need to. Git also makes collaboration easier, allowing changes by multiple people to all be merged into one source. * **When we use it** * Git is particularly beneficial in large-scale projects involving multiple team members, where efficient version control and collaboration are essential. |

* Mention all the cloud repositories that uses git version control and compare between them

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| 1. **Google Cloud Source Repositories**    * + **Description:** Google Cloud Source Repositories is Google's newer Git-based tool for code storage and collaboration. It isn’t trying to directly compete with platforms like GitHub or Bitbucket. Instead, it’s meant to replace Google Code, an older non-Git system that became outdated as Git grew popular. Google Cloud waited a long time to launch its own Git service, and this is their answer to that need.  * **Features** * Fully managed Git * Unlimited private repositories * Code review * Fast code search * Issue tracking with Google Cloud Platform * Google App Engine * Automation support for CI/CD (via Kubernetes integration) * **Pricing and packaging options** * Free Plan: Up to 5 users, 50 GB storage, and 50 GB egress * Overages: $1 per project-user over 5, $0.10 per GB per month over 50 GB, $0.10 per GB of network egress per month above 50 GB * **Differentiators** * Google Cloud Source Repositories (GCSR) is Google’s Git platform, designed to integrate smoothly with Google Cloud. Unlike GitHub or Bitbucket, it focuses on syncing repos from other platforms (like GitHub/Bitbucket) into one dashboard and offers more storage. It’s less about competition and more about replacing Google’s older non-Git tools, tailored for users already in the Google Cloud ecosystem.  1. **Bitbucket**    * + **Description:** Bitbucket is Atlassian’s Git tool for code management, tailored for teams using Jira, Confluence, or other Atlassian tools. Its deep integration with these products (like automatic issue tracking in Jira) makes it a top choice for businesses already in the Atlassian ecosystem.  * **Features** * Fully managed Git * Support for centralized version control via Mercurial VCS * Unlimited public/private repositories * Code review * User-friendly Git client via SourceTree * Issue tracking with Jira * Built-in automation support for CI/CD (build, test, deploy, and debug) * **Pricing and packaging options** * Free Plan: Up to 3 users, 500MB storage, 2,000 actions per month * Team: $4 per user, 2 GB storage, 3,000 actions per month * GitHub Enterprise: $21 per user, 50 GB storage, 50,000 actions per month * GitHub One: custom quote, 50 GB storage, 50,000 actions per month * **Differentiators** * Bitbucket offers the best in-class integrations with Atlassian products such as Confluence, Jira, and Trello. Many software companies use Jira as an issue tracker and Trello as a Kanban board to implement agile project management practices within their organization. The advantage of integrating business operations with development teams through your git repository hosting service is not to be understated.  1. **GitHub**    * + **Description:** GitHub is the market leader of Git hosting services and the platform most often credited with the rise of Git version control and code collaboration tools. As of January 2020, GitHub boasts over 40 million users and more than 100 million repositories (28 million public repositories).  * **Features** * Fully managed Git * Support for centralized VCS via SVN clients * Unlimited public/private repositories * Code review * Issue tracking * Powerful code search * Largest open-source community * Built-in automation support for CI/CD (GitHub Actions) support for CI/CD (build, test, deploy, and debug) * **Pricing and packaging options** * Free Plan: Up to 5 users, 1 GB storage, and 50 build minutes per month * Standard: $3 per user, 5 GB storage, and 2,500 build minutes per month * Premium: $6 per user, 10 GB storage, and 3,500 build minutes per month * **Differentiators** * GitHub stars are a badge of honor for developers and their open-source projects. If you’re looking for a place to open-source a project to the public, GitHub is the place to do it. While the pricing may appear steep, those rates only apply to private repos, action minutes and other rates/limits are waived for public repos. It’s also worth noting that GitHub’s popularity means it has the widest offering of third-party integrations—from Jenkins to Slack, automation and integration is relatively easy. * **Google vs Bitbucket vs GitHub** * **You should use Google Cloud Sources Repositories if…** * You want the option that provides the most data storage per cost * Your technology stack is built off Google Cloud Platform and Google apps * You want the ability to seamlessly mirror repositories from multiple sources including GitHub and Bitbucket. * **You should use Bitbucket if…** * You want best-in-class integration with Jira, Trello, and other Atlassian products. * You’re looking for a more affordable place to host your private repositories or collaborate in small teams. * You’re looking for a secure repository ecosystem that caters towards enterprise app development. * **You should use GitHub if…** * You want best-in-class integration with Jira, Trello, and other Atlassian products. * You’re looking for a more affordable place to host your private repositories or collaborate in small teams. * You’re looking for a secure repository ecosystem that caters towards enterprise app development. |

1. **State all the commands that you know with the explanation of each function of them**

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| * **Setup**   + - * **git config --global user.name “Samir”** * set username for git.   + - * **git config --global user.email “Samir@email.com”** * set Email for git. * **Start new project**   + - * **git init** * Make a new repository for folder in the local directory.   + - * **git clone <url>** * Copy or clone a repository from cloud (like GitHub) to local directory * **Work on local**   + - * **git add <file>** * Moving a specific file from working directory to staging area for review.   + - * **git add .** * Moving all files in folder from working directory to staging area for review.   + - * **git commit -m “message/comment/updates”** * Moving all files from staging area to local repo after conforming and adding a message/comment/updates.   + - * **git status** * Get the status of the working directory like if the file was modified or deleted and so on.   + - * **git diff** * It shows the differences between the working directory and the last commit.   + - * **git log --oneline** * Display all commits (ID) with messages.   + - * **git log** * Displays a detailed history of all commits in the current branch. * **Connect to remote**   + - * **git** **remote add <alias> <url>** * Links the local repository to a remote repository (Cloud) and give a alias.   + - * **git** **remote remove <alias>** * Remove a remote repository.   + - * **git** **remote** * List the remote repository you have to other repositories.   + - * **git** **push <alias>** * Uploads local commits to a remote repository.   + - * **git** **pull** * Get all files from remote repository to local repository and merge the latest changes. |

**Reference**

<https://en.wikipedia.org/wiki/Git>

<https://www.nobledesktop.com/learn/git/what-is-git#:~:text=Git%20is%20the%20most%20commonly,be%20merged%20into%20one%20source>.

<https://www.simplilearn.com/tutorials/git-tutorial/what-is-git>

<https://www.upwork.com/resources/best-git-repository-google-github-bitbucket#:~:text=Bitbucket%2C%20Github%2C%20%26%20Cloud%20Source,many%20options%20for%20git%20repositories>.

<https://www.atlassian.com/git/glossary#commands>