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**1.CONCEPT OF GIT:**

Git is a distributed version control system widely used in software development. It allows multiple developers to collaboratively work on a project by tracking changes to the source code. Git provides features such as branching, merging, and remote repositories, enabling efficient code management, version tracking, and seamless collaboration.

**The functions of VCS are:**

* Allows developers to work simultaneously.
* Does not allow overwriting each other’s changes.
* Maintains a history of every version.

**Some of the terms used in git are:**

**BRANCH**-A branch in a Git repository represents a distinct line of development, diverging from the main project. It can embody various purposes, such as introducing new features, experimenting with changes, or serving as a personal fork for users to modify and test alterations. Branches provide a flexible structure, enabling developers to work on different aspects of a project independently while maintaining a clear and organized version control system.

**CLONE**-A clone in Git refers to the duplication of a repository or the process of creating a copy of a repository. When cloning a repository into a different branch, the resulting branch transforms into a remote-tracking branch. This remote-tracking branch facilitates communication with its origin branch for operations such as pushes, pulls, and fetches. This process enables developers to maintain synchronization between the local and remote repositories.

**FORK**-creates a copy of the repository.

**PULL/PUSH REQUEST**-When an individual makes code modifications on a distinct branch of a project and seeks to integrate those changes into the master branch, they initiate a pull request. Pull requests serve as a formal request for repository maintainers to assess the commits. If deemed acceptable, the changes are merged into the master branch. The actual merging of changes into the master branch is referred to as a pull, completing the process of incorporating the modifications.

**2.BASIC COMMANDS OF GIT:**

* **git config command**: This command configures the user. The Git config command is the first and necessary command used on the Git command line. This command sets the author name and email address to be used with your commits. Git config is also used in other scenarios.
* **git init command**:This command is used to create a local repository.
* **git clone command**: This command is used to make a copy of a repository from an existing URL. If I want a local copy of my repository from GitHub, this command allows creating a local copy of that repository on your local directory from the repository URL.
* **git add command**: This command in Git is to stage changes in the working directory for the subsequent commit. This command allows developers to selectively choose and review modifications before committing, promoting the creation of focused and meaningful commits. By organizing changes through staging, the version history is kept clear and facilitates the practice of creating atomic commits.
* **git commit**: Records changes in the repository, creating a snapshot of the staged changes with a commit message.
* **git branch:** It lists existing branches in the repository.
* **git pull:** Fetches changes from a remote repository and merges them into the current branch.
* **git push:** Uploads local changes to a remote repository, keeping them in sync.

**3.CONCEPT of GITHUB,GITLAB,BITBUCKET**

* **Github**- GitHub is a leading web-based platform for version control, widely used for collaborative software development. It hosts Git repositories, enabling developers to manage and share code. Notable features include pull requests for code review, issue tracking, and community engagement, making it a hub for open-source projects and team collaboration.
* **Gitlab**- GitLab is a comprehensive DevOps platform offering integrated CI/CD pipelines, robust issue tracking, and collaborative code review tools. With an emphasis on automation, it supports end-to-end development processes. GitLab provides a centralized environment for managing repositories, enhancing team collaboration, and streamlining the software development lifecycle.
* **BitBucket:** Bitbucket is a Git-based version control platform, emphasizing collaboration and integration with Atlassian's ecosystem. It offers Jira integration, enabling seamless project management. With features like branch permissions, code review, and built-in CI/CD pipelines, Bitbucket facilitates efficient and controlled software development processes for teams of various sizes.

4) **Industrial practices of using Git:**

**Version Control:**

* Branching and Merging: Industries often use feature branching workflows, where each feature or task is developed on a separate branch. After completion, branches are merged back into the main branch.
* Tagging Releases: Git tags are used to mark specific points in history as important, such as release versions.

**Collaboration:**

* Forking and Pull Requests: In larger teams, developers often fork a repository, make changes, and then create pull requests to propose those changes to the original repository. This allows for code review and collaboration.
* Code Review: Git makes it easy to conduct code reviews, either through pull requests or by reviewing commits directly.

**Continuous Integration/Continuous Deployment (CI/CD):**

* Automated Testing: Git is integrated into CI/CD pipelines to trigger automated testing upon each push or merge. This ensures that changes don't break existing functionality.
* Deployment Pipelines: CI/CD tools like Jenkins, GitLab CI, or GitHub Actions use Git to trigger deployment pipelines when changes are pushed to specific branches.

5) **Cloning a repo to local:**

Step 1:Open a Terminal or Command Prompt.

Step 2: Navigate to the Desired Directory.

Step 3: Clone the Repository using ’’git clone’’command.

Step 4: Verify the Clone.

6)**Resources used:** Javatpoint,GitHub Docs,StackOverflow

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