

## Version Controlling

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- ➔ This is the process of maintaining multiple versions of the code. All the team members upload their code (check in) into the remote version controlling system. The VCS accepts the code uploads from multiple team members and integrates it so that when the other team members download the code, they will be able to see the entire work done by the team. VCS's also preserve older and later versions of the code so that at any time we can switch between whichever version we want.

### VCS's also keep a track of who is making what kind of changes

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VCS's are categorised into 2 types

- 1 Centralised version controlling
- 2 Distributed version controlling

### Centralised Version controlling

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- ➔ Here we have a remote server (code repository) into which all the team members check in the code and all the features of version controlling are implemented in this remote server.

### Distributed version controlling

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- ➔ Here we have a local repository installed on every team member's machine where version controlling happens at the level of individual team members. From where it is uploaded into a remote server where version controlling happens for the entire team.

### Setting up git on Windows

- 1 Download git from  
<https://git-scm.com/downloads>
- 2 Install it
- 3 Open gitbash and execute the git commands

## Setting up git in ubuntu Linux servers

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1 Update the apt repository

```
sudo apt-get update
```

2 Install git

```
sudo apt-get install -y git
```

**Configuring user and email globally for all users on a system**

```
git config --global user.name "sai krishna"
```

```
git config --global user.email "intelliqittrainings@gmail.com"
```

On the local machine git uses three sections

1 Working directory

2 Staging Area

3 Local repository

Working directory is the location where all the code is created Initially all the files present here are called as untracked files

Staging area is the location where file indexing happens and it is the buffer area of git and the files are called as indexed files

Local repository is where version controlling happens and the files are called as committed files

## Branching in Git

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➔ This is a feature of git using which we can create separate branches for different functionalities and later merge them with the main branch also known as the master branch. This will help in creating the code in an uncluttered way

1 To see the list of local branches

```
git branch
```

2 To see the list all branches local and remote

```
git branch -a
```

3 To create a branch

```
git branch branch_name
```

4 To move into a branch

```
git checkout branch_name
```

5 To create a branch and also move into it

```
git checkout -b branch_name
```

6 To merge a branch

`git merge branch_name`

7 To delete a branch that is merged

`git branch -d branch_name`

This is also called as soft delete

8 To delete a branch that is not merged

`git branch -D branch_name`

This is also known as hard delete

→ **Note:** Whenever a branch is created whatever is the commit history of the parent branch will be copied into the new branch

→ **Note:** Irrespective of, on which branch a file is created or modified git only considers from which branch it is committed and the file belongs to that committed branch only.

## Working on the GitHub

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→ **This is the remote repository into which the code is uploaded and this process is called as check-in**

1 Sign up for a GitHub account

2 Signing into that account

3 Click on + on top right corner

4 Click on New repositories

5 Enter some repository name

6 Select Public or Private

7 Click on Create repository

8 Go to Push an existing repository from command line and copy paste the commands

Enter username and password of GitHub

## Downloading the code from the remote GitHub

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→ **This can be done in three ways**

→ **git clone**

→ **git fetch**

→ **git pull**

## Git clone

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- ➔ This will download all the code from the remote repository into the local repository and it is generally used only once when all the team members want a copy of the same code

Syntax: `git clone remote_git_repo_url`

## Git fetch

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- ➔ This will download only the modified files but it will place them on a separate branch called as "remote branch", we can go into this remote branch check if the modifications are acceptable and then merge it with the main branch

- 1 Open the GitHub
- 2 Go to the repository that we uploaded
- 3 Select a file and edit it--->Click on commit changes
- 4 Open git bash
- 5 `git fetch`
- 6 To see the name of remote branch  
`git branch -a`
- 7 To switch into this branch  
`git checkout branch_name_from_step6`
- 8 View the modified file  
`cat filename`
- 9 If these modifications are ok then merge with main branch  
`git checkout main`  
`git merge branch_name_from_step6`

## Git pull

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This will download only the modified files and merge them with our local branches

- 1 Open the GitHub
- 2 Go to the repository that we uploaded
- 3 Select a file and edit it--->Click on commit changes
- 4 Open git bash
- 5 `git pull`  
We can see the modified files on the main branch

## Git Merge

➔ **Merging always happens bases on the time stamps of the commits**

1 Create few commits on master

```
touch f1
git add .
git commit -m "a"
touch f2
git add .
git commit -m "b"
```

2 Check the git commit history

```
git log --oneline
```

3 Create a test branch and create few commits on it

```
git checkout -b test
touch f3
git add .
git commit -m "c"
touch f4
git add .
git commit -m "d"
```

4 Check the commit history

```
git log --oneline
```

5 Go back to master and create few more commits

```
git checkout master
touch f5
git add .
git commit -m "e"
touch f6
git add .
git commit -m "f"
```

6 Check the commit history

```
git log --oneline
```

9 Merge test with master

```
git merge test
```

10 Check the commit history

```
git log --oneline
```

## Git rebase

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➔ This is called as fast forward merge where the commits coming from a branch are projected as the top most commits on master branch

1 Implement step1-6 from above scenario

2 To rebase test with master

git checkout test

git rebase master

git checkout master

git merge test

3 Check the commit history

git log --oneline

## Git Cherry-picking

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➔ This is used to selectively pick up certain commits and add them to the master branch

1 On master create few commits

a--->b

2 Create a test branch and create few commits

git checkout -b test

a--->b--->c--->d--->e--->f--->g

3 To bring only c and e commits to master

git checkout master

git cherry-pick c\_commitid e\_commitid

## Git reset

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➔ This is a command of git using which we can toggle between multiple versions of git and access whichever version we want

**Reset can be done in 3 ways**

1 Hard reset

2 soft reset

3 Mixed reset

In hard reset HEAD simply points to an older commit and we can see the data as present at the time of that older commit

1 Create few commits on master

a-->b--->c

2 To jump to b commit from c

git reset --hard b\_commit\_id

## Git reset

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➔ This is a command of git using which we can toggle between multiple versions of git and access whichever version we want

**Reset can be done in 3 ways**

**1 Hard reset**

**2 soft reset**

**3 Mixed reset**

**Hard reset** HEAD simply points to an older commit and we can see the data as present at the time of that older commit

1 Create few commits on master

a-->b--->c

2 To jump to b commit from c

git reset --hard b\_commit\_id

**Soft reset** will also move the head to an older commit but we will see the condition of the git repository as just one step prior to the c commit ie the files will be seen in the staging area

git reset --soft b\_commitid

**Mixed reset** also moves the head to an older commit but we will see the condition of git as 2 steps prior to the c commit ie the files will be present in the untracked/modified section

git reset --mixed b\_commitid

## Git stashing

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Stash is a section of git into which once the files are pushed git cannot access them

To stash all the files, present in the staging area

git stash

To stash all files, present in staging area and untracked section

git stash -u

To stash all files, present in staging area, untracked section and .gitignore

git stash -a

To see the list of stases

git stash list

To unstash a latest stash

git stash pop

To unstash an older stash

git stash pop stash@{stashno}

## Git squash

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➔ This is the process of merging multiple commits and making it look like a single commit. This can be done using the git rebase

### Command

1 Create a commit history

a --> b --> c --> d --> e --> f

HEAD is pointing to f commit

**Note: a commit is called as the "initial commit" and it cannot be squashed**

➔ In the above scenario we can squash only a max of 5 commits

2 To squash

git rebase -i HEAD~5

➔ This will open the top 5 commits in vi editor for which ever commits we want to perform a squash operation remove the word "pick" and replace it with "squash"

3 Check the commit history

git log --online

➔ **Git rebase can also rearrange the commit history order**

1 Create a commit history

a --> b --> c --> d --> e --> f

HEAD is pointing it f commit

2 To rearrange the commit history order

git rebase -i HEAD~5

Rearrange the commits in whatever order that we want

3 Check the commit history now

git log --online