JENKINS

- Jenkins is an opensource project written in Java that runs on windows, macOS and other Unix like operating system. It is free community supported and might be your first choice tool for CI.
- Jenkins automate the entire software development life cycle.
- Jenkins was originally developed by Sun Microsystem in 2004 under the name hudson.
- The project was later named Jenkins when oracle bought Microsystems.
- It can run on any major platform without any compatibility issue.
- Whenever developers write code, we integrate all that code of all developers at that point of time and we build, test and deliver / deploy to the client. This process is called as CI / CD.
- Jenkins helps us to acheive this.
- Because of CI, Now bugs will be reported fast and get rectified fast. So the entire software development happens fast.

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Page No.
Date

"Workflow of Jenkins"

- We can attach git, Maven, selenium and Artifactory plugins to jenkins
- once developers puts code in github, jenkins pull that code and send to maven for build
- once build is done, jenkins pull that code and send to selenium for testing.
- once testing is done, the jenkins will pull that code and send to artifactory as per requirment and so on.
- we can also deploy with jenkins.

"Advantages of Jenkins"

- It has lots of plugins available
- you can write your own plugins
- you can use community plugins
- jenkins is not just a tool. It is a framework i.e you can do whatever you want. All you need is plugins.
- we can attach slaves (nodes) to jenkins master. It instruct other(slaves) to do job. If slaves are not available, jenkins itself does the job.
- Jenkins also behave as crone server Replacement i.e can do scheduled task.
- It can create labels.

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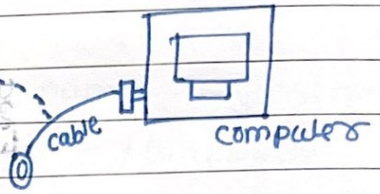
Jenkins

Page No.
Date

CI - CD - Continuous Integration continuous Delivery (Deployment)"

* Plugin : is acting as integration / mediator component point.

ex :



: integration of compuler and mouse is a connected cable or wireless drivers. mouse

: we have to add plugins (attach) to jenkins

: By default all plugins are available in jenkins itself just we have to download and install.

: Jenkins is open source completly free.

- Integrate : Combine all code written by developers till some point of time.
- Build : Compile the code and make a small executable package.
- Test : Test in all enviornment whether application is working properly or not.
- Archived : Store in an artifactory so that in future we may use / deliver again.
- Deliver : Handing the product to client.
- Deploy : Installing product in client's machines.

: Nexus & Jfrog Artifactory - Store .war/.exe/.Jar files

: we can attach slaves(nodes) to Jenkins master. It instructs other (slaves) to do job. If slaves are not available, jenkins it self does the job.

Page No.
Date

: Jenkins also act as cronе server replacement. i.e. condo repeated task automatically

- Running some scripts regularly

Eg: Automatic daily alarm.

Jenkins Installation

step 1) Dependancies we have to install : Java
And for contineous Integration Git, Maven, etc.

step 2) Go To Google - Download Java and Install and set Enviornment variable and set path and verify in cmd. CMD - mvn -version.

step3) GO TO Google - Download Maven (binary zipfile) and create folder in c drive as ex: M2-Home or Maven and set Enviornment variable in system as a new and set path and verify in CMD. echo %JAVA_HOME%

O/P - - - - - - - - -

step4) Go To Google → Download Jenkins Long Term Support for windows.

step5) In service Logon Credentials
Logon Type
✓ ○ Run service as Local system (not recommended)
○ Run service as local or domain user :
Account :
password :

step 5) port selection
port Number (1 - 65535) :
8080
Test port ✓

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Step 7) Set Java Location - Top of Java jenkins is installed

Step 8) Finished Installation

Step 9) Go to browser (Any browser)

localhost : 8080/login

/

my comp ipadd.

Step 10) Getting Started

Unlock Jenkins

path -/-/-/-/-/-/

For Administrator password

Step 11) Go to above path copy password and pal or paste as a Administrator passwd.

Step 12) Customize Jenkins

~~Install~~	Install Suggested plugins	Select plugins to install

✓ Recommended

Step 13) Getting Started

✓ ✓ ✓ ✓

Step 14) Ib error msg is shown and not proceed

next : Java 11 or 18 ~~not~~ compatible ~~to the~~ to jenkins is not available in this system.

- Then install Java 11 and set Enviornment variable and path and then check to installation is forward or not.

Fixed Jenkins Installation problem.

Error Massage: To install Jenkins.

> Faild to find compatible Java version (11 or 17) in C:\Program Files\Java\

OK

Back | next | Cancel

Step 15) Set username, password & Email for login Jenkins.

If Above Step's NOT working in your Machine The follow Below process For Installation & Login Jenkins

Download .war file from Jenkins download (google.com

Create folder in dry drive in our machine

ex: C:/Software/jenkins

ABC

Open CMD on our windows machine.

Run command or go to jenkins folder with the help of Cd -/-/-/

In jenkins directory run command

java -jar jenkins.war

Automatically load all jenkins war file files & folder

o/p

secrete key is available here

for put Administrator password.

put Ap and proceed next step.

Page No.
Date

→ After complete loading step
automatically jenkins localhost:8080
↓
login (username / password)
↓
If you stop server then run command
↓
control+C
↓
localhost:8080 (Stop / Not Running)

———— 0x0 ————

If relogin then go to jenkins director and
RUN command -java -jar jenkins.war
Relogin
Automatically Installed all plugins

———— 0x0 ————

If you restart your jenkins
localhost:8080/restart
If you stop your jenkins
local host:8080/stop or start

———— 0x0 ————

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Page No.
Date

* "Create one sample job in jenkins"

Jenkins Dashboard

New Item

Enter an item name
FirstJob

- Freestyle project ✓
- pipeline
- Multi configuration project
- Folder
- GitHub Organization
- etc

: If you don't know what to select then choose Freestyle project

: For ex

OK ✓

Jenkins configuration page
Dashboard → FirstJob

Description

General | Source code Managment | Build Trigger | Build Environment | Build | Post Build Action

For Ex: Go to Build section

↓

Add one command ex: echo "Hi"

↓

Apply → save

Automatically came back to jenkins server page

↓

Back to Dashboard

↓

Here you can see last build.

S	W	Name ↓	Last Success	Last Failure	Last Duration
⊙		watch 1090			

All +

Page No.
Date

* For start job we have three option in jenkins Dashboard. (execution process)

Project FirstJob

① ↓ Click on
⊛ watch logo

② FirstJob ▽
Build ✓ click on

③ Left hand menu we see option
Build Now ✓ click on

- When build FirstJob then see on Dashboard Status of this job & other information.
- First job successfully execute.

✓ ☼ – sun logo
green colour

* "second JOb"

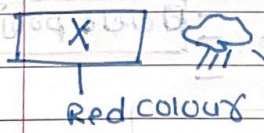
New Item
↓
SecondJob
↓
Build section
In-(Description add wrong command)
↓
Save and Apply
↓
Back to Dashboard

SecondJOB ▽

Build Now ✓

Executing second JOB

Job Failed (wrong command)



* " How TO Troubleshoot "

Failed JOB → Go to Dashboard → SecondJob → edit command In description (Build)

Then run build

Successfully build executed

second job

* " I want to create ThirdJob "

Dashboard ▷ All ▷

Third JOB

If you want to create a New item from other existing, you can use this option:

◎ Copy from | Previous JOB | ex: First or SecondJob

OK → Apply → Save → Dashboard → Build

Page No.
Date

Delete Job

How to Delete ?

↓

Go To Dashboard → Jobs → select Job

dropdown ↓

Delete project

Msg...

localhost:8080 says

Delete project : are you sure?

OK Cancel

* "Manage Plugins"

Dashboard ▷ plugin Manager

↑ Back to Dashboard

Manage Jenkins

Update	Available	Installed	Advanced

Search in Available plugins — Maven inv — for Example

Available

Install : Name

- Maven Integration
- Maven Invoker

Install without Restart ✓

Download Now and install after restart

Check Now

Update information obtained : 1 day 0 hour ago

→ Installing plugins / Upgrades

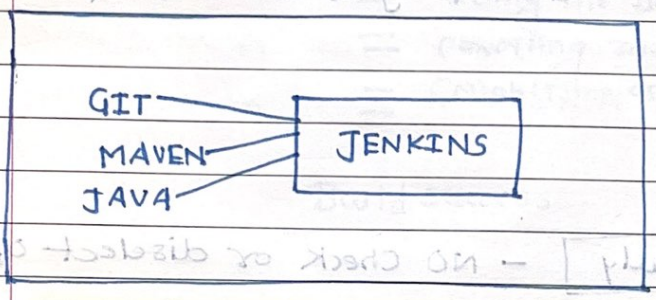
dependancies ✓
software ✓
{ plugins downloads from internet and install itself by jenkins.

→ when installing plugins jenkins restart automatically.

→ After installing plugins we see on dashboard particular this plugins as a project

ex : Maven project — because we installed maven plugins.

*



For Jenkins we have download & installed this s/w as a prerequisites.

Dashboard → Global Tool Configuration

- JDK
  JDK Installations
  Add JDK

  By default (Install automatically) ✓
  ↑ if not install Java in our machine
  ↓ if instal already then disable or uncheck this option

☐ JDK
Name
JAVA

JAVA_HOME

Path :

- Git

Git Installations

☐ Git

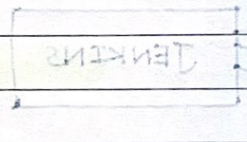
{ Small s/w that why no need to anything

- we have installed Maven plugins so display

maven

Maven Installation

Add Maven



Install Automatically — No Check or diselect option

Name

Maven

Maven_Home

Path –

Add Maven

Apply Save

* Plugins are integration points

" Manual Build / Night Time Build "

- In CMD windows we clone one repo ex: XYZ repo
- Go to this repo director using cd ../../..
- In this repo we will see all files & folders

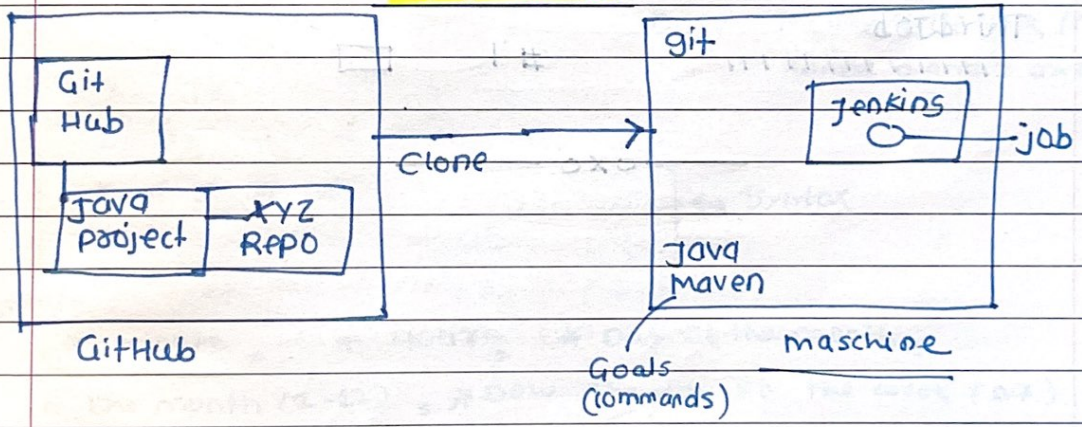
* • C:\(reponame)> mvn clean package

↑ Manual Build using Maven
Used some Maven command.

= Doing the build Activicity
= Converting raw source code into executable Format
= (Night Time or Manual Build)

Build success

* " Same Execution process we will do with the help of Jenkins "



New Item
ThirdJob ▷ configuration page.
⇓
Maven project
↳ Source code Management
Git
Repository
Resositor URL
copy from github as a clone and past here

Page No.
Date

Build :

Root POM

Pom.xml

Goals and Options / command

clean package → automatically we understand maven project

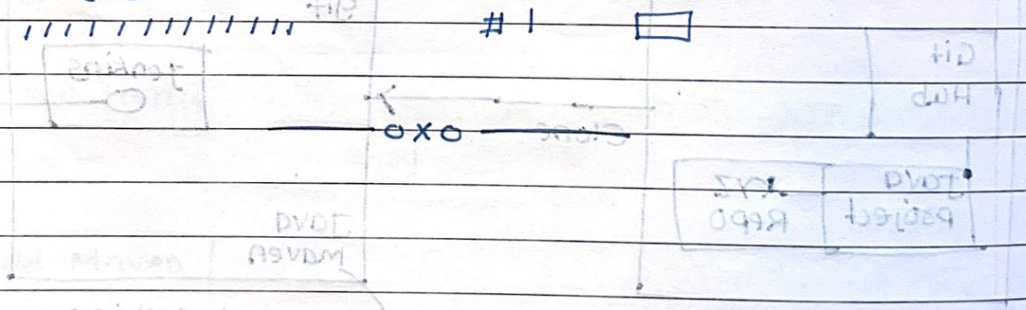
Save ✓ Apply ✓

ThirdJOB - automatically pull code from GitHub repository ~~it~~ will take help from Maven (JAVA)

execute build

Build Executor status

ThirdJOB



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"Scheduled Projects"

Run a job → Repeatedly (continuously)

1) Build Periodically

2) Poll SCM (Source Code Management)
   (Pull)

Concept → crontab / cronjob / crontool (linux concept)

Jenkins Dashboard

↓

Job

↓

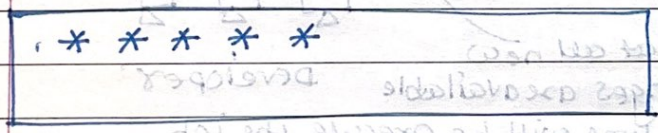
configure → Build periodically

↓ ↑ =

Build Trigger

Minutes Minute (0-59)
Hour Hour (0-23)
DOM Day of the Month
MONTH The month (1-12)
DOW The day of the week (0-7)
where 0 and 7 are sunday.

Schedule



← Syntax

Represent:

* minute, * Hour, * Day of the month,
* The month (1-12), * DOW The day of the week (0-7)

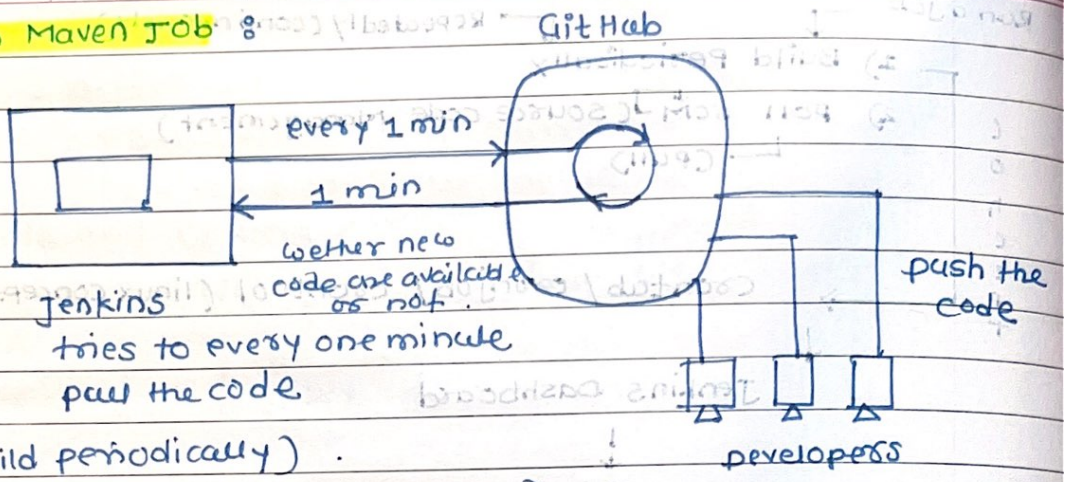
Save ✓ Apply ✓

O/P: Automatically build job's and

- If you want to execute any job frequent interval you just mention the time. (Build periodically).

Page No.
Date

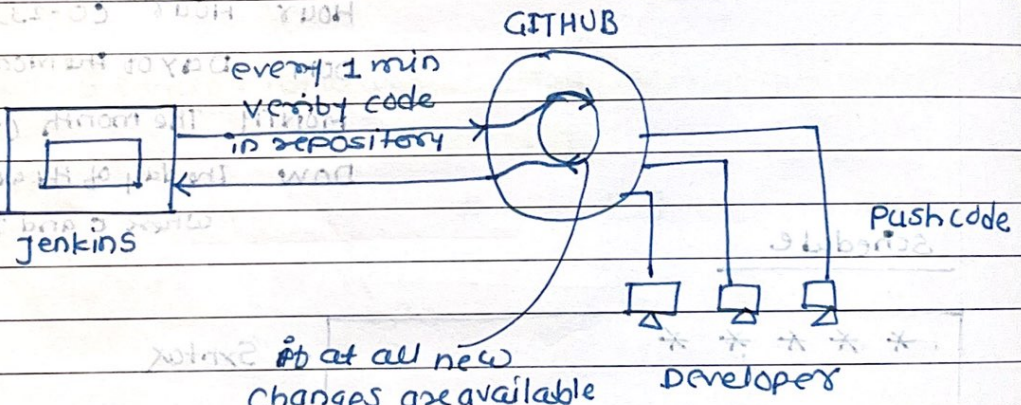
* In Maven Job :



(Build periodically) .
Time mention (schedule box) .

* "Poll SCM"

Build Trigger → Poll SCM



If at all new changes are available that time will be execute the job.
otherwise it will not do anything.

↓
Schedule

* * * * *

Save ✓ Apply ✓

Page No.
Date

"Maven Job, Scheduled Task, Poll SCM"

Go to google chrome → localhost : 8080 → login

Go to Manage Jenkins on left side of jenkins dashboard →
Manage plugins → Available → select Maven Integration & Greens balls
→ Install without Restart

Go to New Item → Maven project
Now go to Manage Jenkins → Global tool configuration go to Add JDK
☐ uncheck this install Automatically option
Name → JAVA
JAVA_HOME → C:\programfiles\Java\Jdk

Now go to Maven
Name – Maven
MAVEN_HOME → C:\DevTools\apache-maven

"MAVEN PROJECT (By Name)maven)"

"go to https://github.com/github account name/Repository_Name
Click on repo (repository code)
"fork" to copy this repo.
sign-in into your github account
click on (repo-name)
clone
go to c drive
git clone <url of repo-name>
cd repo-name
C:\repo_name> mvn clean package

"Maven project (by Jenkins)"

1. Now go to Jenkins → New Item → Enter name → My Maven project
2. Then select Maven project → OK
3. source code management → ~~egit~~ git → Repository URL → github
4. Build option → Root POM → pom.xml → Goals & option → clean package
5. Go to jenkins home page → click on My Maven project → Build now.

"Scheduled project"

1. Click on any project → configure → build → triggers → build → periodically
2. * * * * * → save
3. can see automate Builds after every 1 minutes.
4. You can manually trigger build as well.

"source code polling (poll SCM)"

1. Now go to jenkins Homepage
2. go to My Maven project → configure
3. Now go to Build trigger
4. ☑ pollSCM
5. scheduled | * * * * * | → save
6. Now go to github account → do some changes in README.md → commit changes.
7. You can see, after 1 min, it build automatically.

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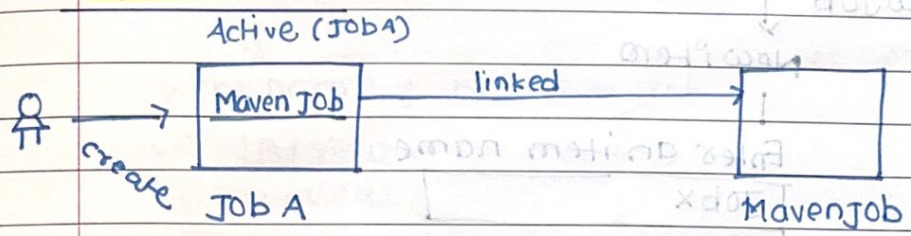
- Code(new) commit in present Repo then automatically POllSCM is working means pull the code from GIT Repo. and build the code.

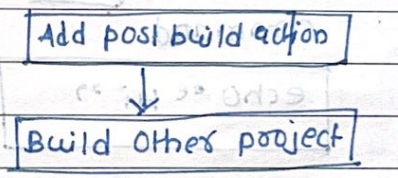
"Linked / Related Jobs"

* **Upstream**



- Assume Job A is already in our project
- Maven Job already exist in our project

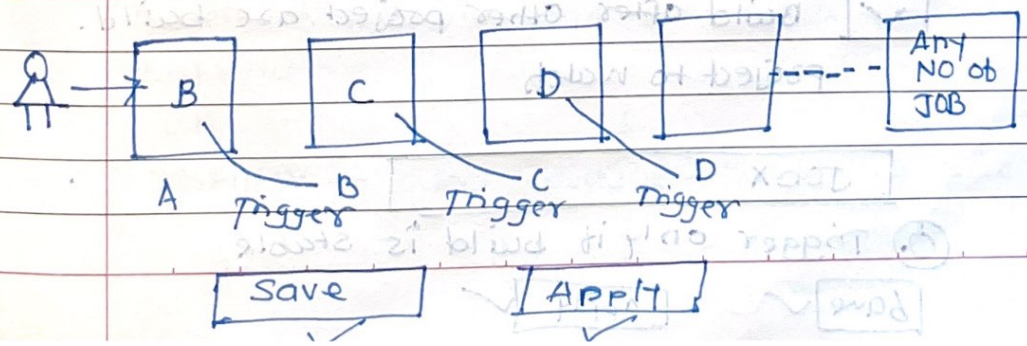
Go to Dashboard → post-build Action



project to Build

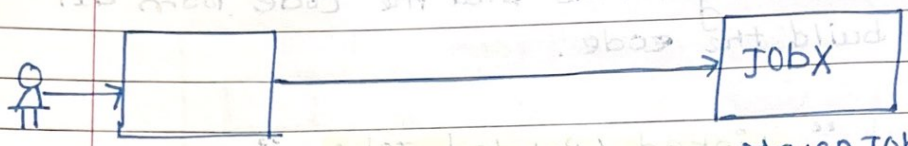
MavenJob

✓ ⊙ Trigger only if build is stable
⊙ Trigger when if the build is unstable (warning msg)
⊙ Trigger even if the build fails



Page No.
Date

* Downstream



Create new job

New item

Enter an item name

JOBX

OK

Build — Execute windows batch command

Command

echo "Hi"

Save ✓ Apply ✓

* Inside of this MavenJob I would like to give JOBX name

* Go to MavenJob

Build Triggers

✓ Build after other project are build.

project to watch

JOBX

Trigger only if build is stable

Save ✓ Apply ✓

Page No.
Date

Jobx execute & Maven Job executes itself.

"Views"

Jenkins Dashboard

New View

↓

view name : Freestyle Job

✓ List view

O My view

OK

↓

Name

Freestyle Job

Description

Job filters

jobs

2 } Select those you want

3

etc

OK

Save | Apply

- we can create another job

MavenJob

List view

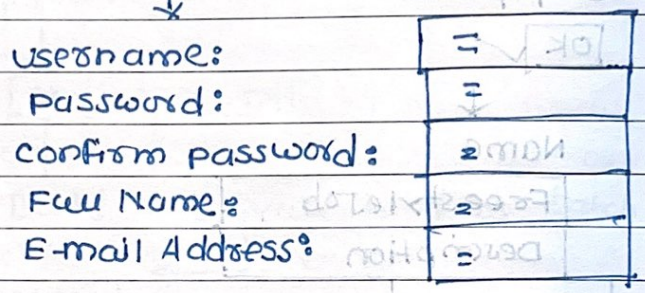
OK

JobFilter → Select MavenJob → OK → Save → Apply

- If you ~~delete~~ want to delete view
  Select view → ~~Right~~ Left Hand → Delete view.
  → yes.

"Jenkins User Administration"

Create user → Go to Manage Users
↓
Create user
↓



- I would like to login as new user in administrator login.
- By default logged in user can seen everything like Admin user.
- Install plugins - Available
  ↓ (install as a administrator.)
  ☑ Role-Based Authorization strategy
  install without restart ✓
  ☑ restart jenkins

- we have install plugins as a administrator
- After install Role-based Authorization strategy we can see in Dashboard
  ↓
  Configure Global security
  ↓
  ⑥ Role-Based strategy ✓ Apply ✓ OK

Page No.
Date

we try to login as a another user or new user
the in Dashboard we will see [Access Denied]
(—) newuser is missing the overall / Read permission.

* o I will give limited permission to user

Global Role
employee
[Role] — Read, view ← I will attach newuser to this employee role.

* project specific Role

Create role [Developer] - Full Access for Developer job
ex: [Tester] - Full access for Test related job

This project

- I will try to attach developer role to developer user's.
- I will try to attach tester role to tester user's.

Go To Manage Jenkins
↓
Security
↓
Manage and Assign Roles
↓
Manage Role's
↓
- Role to add
employee → and give to permission only Read & View.
↓
- Item Role
↓
Role to add
[Developer] → pattern [Dev.*] → Assign full permission.

Page No.
Date

: Item Role

↓

Role to add

[Tester]

Pattern

[Test.*]

↓

Give full permission ✓

[Save] [Apply]

: Now I'am going to attach user's to Developer Role and Tester Role.

↓

Manage and Assign Roles

↓

Assign Roles

↓

User/group to add

[Employee] ABC and XYZ user attach to employee role.

Item Roles

↓

User/group	developer	tester
Anonymous		
ABC	✓	
XYZ		✓

[Apply] [ok]

Page No.
Date

* Create new job as a Devproject → Add build step Execute windows batch command command

```
echo "Hi"
```

Save Apply

* Create new job as a Testproject → Add build step Execute windows batch command command

```
echo "Hello"
```

Save Apply

* As a administrator we can see all function & job in jenkins Dashboard.

* When assign role and attach user then see function and job only devrelated and testrelated projet.

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Page No.
Date

"How To Install Jenkins on Linux"

Install Jenkins on Linux system

Prerequisites
EC2 with port 80:80 open

Install Java on EC2
yum -y install java-1.8.0-openjdk (any version)
Java -version
— Java_HOME (path) copy & paste to terminal
— Setting env^n path.
PATH = $PATH:$JAVA_HOME.
— source ~/.bash_profile
yum install wget
wget -O (jenkins)
yum -y install jenkins

Start Jenkins
Systemctl start jenkins / service jenkins start
Systemctl enable jenkins / chkconfig jenkins on

(http:// your-server-public-IP:8080 in browser.

EC2 - PublicIP copy :8080 ✓ browser

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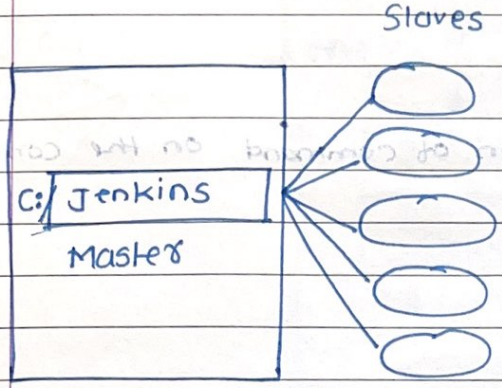
Master And Slave Configuration



* All those job creating only master and executing.

* upstream and downstream disable

Dashboard → Manage Nodes and Clouds

Master → Available

New Node

Node name

Slave1

◉ permanant Agent

Ok ✓

Configuration Details

Description

Number of executor

1 change as per our req^n.

Page No.
Date

Remote root directory

C:\Slave1Dir ← path objob

Launch method
Launch agent via execution of command on the controller

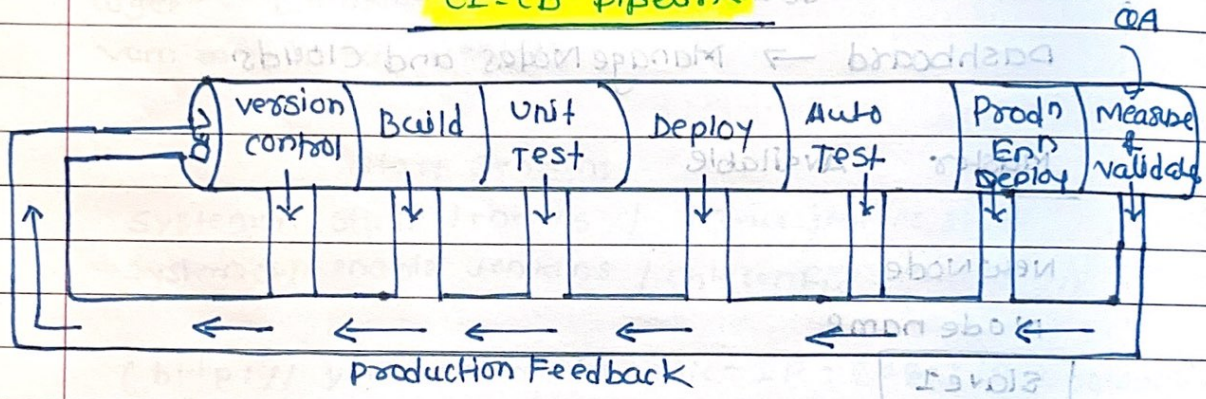
Launch command
Java -jar c:\agent.jar

Save

—oxo—

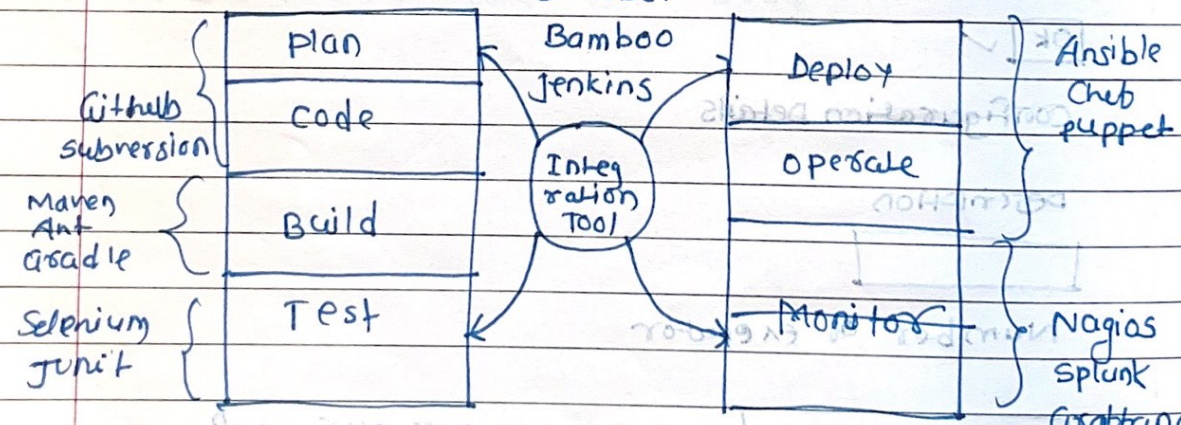
* Jenkins - Opensource

"CI-CD pipeline"



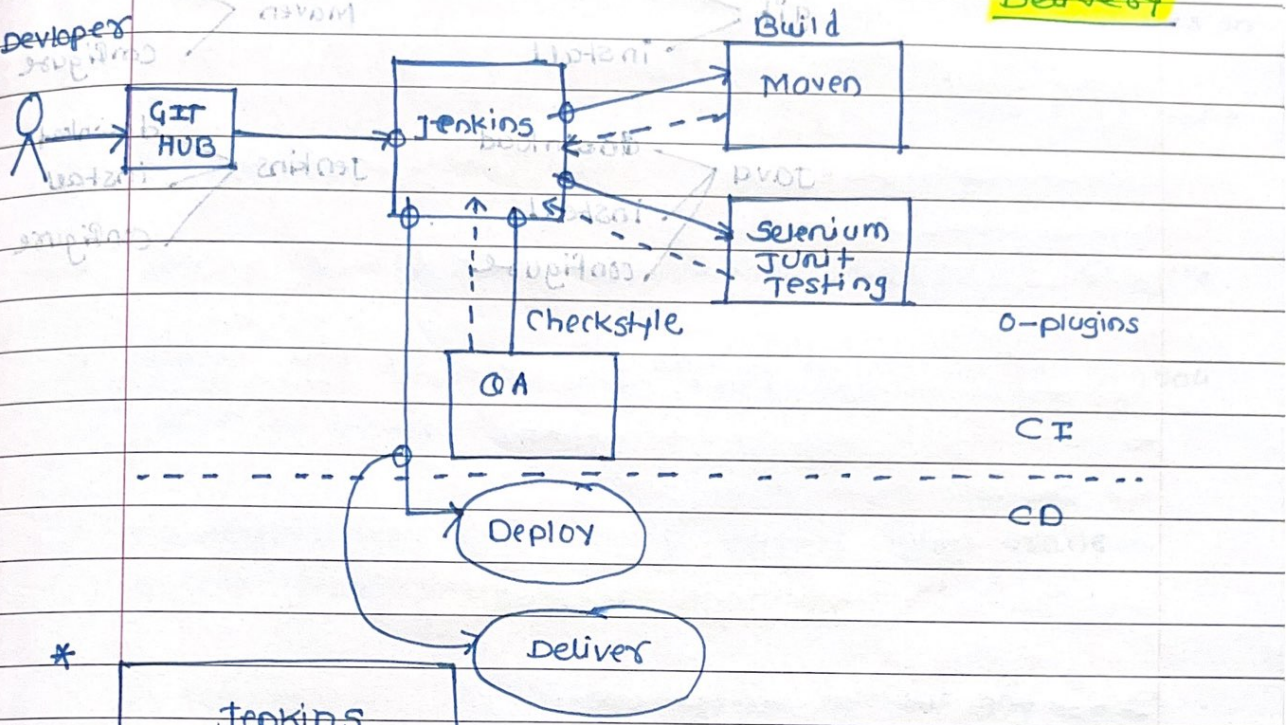
*

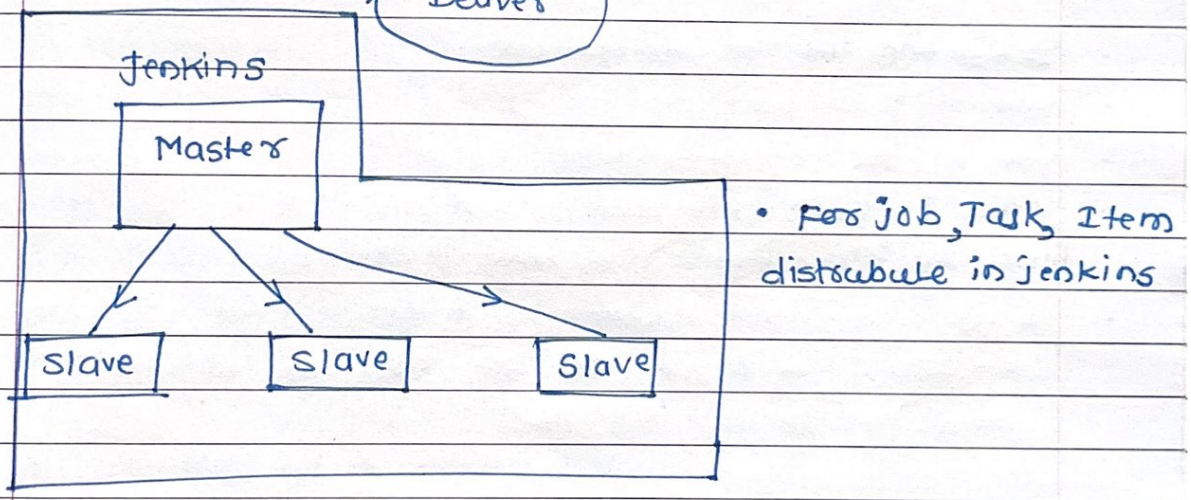
TravisCI
Buildbot
Bamboo
Jenkins



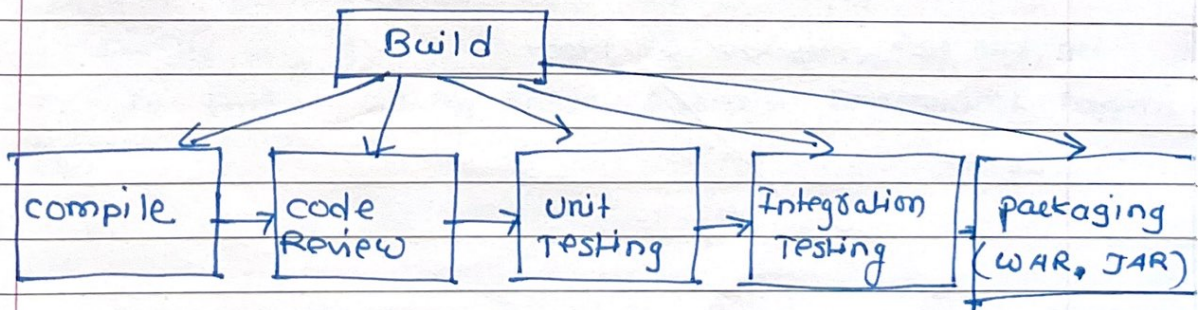
Page No.
Date

"Continuous Integration / Continuous Delivery"





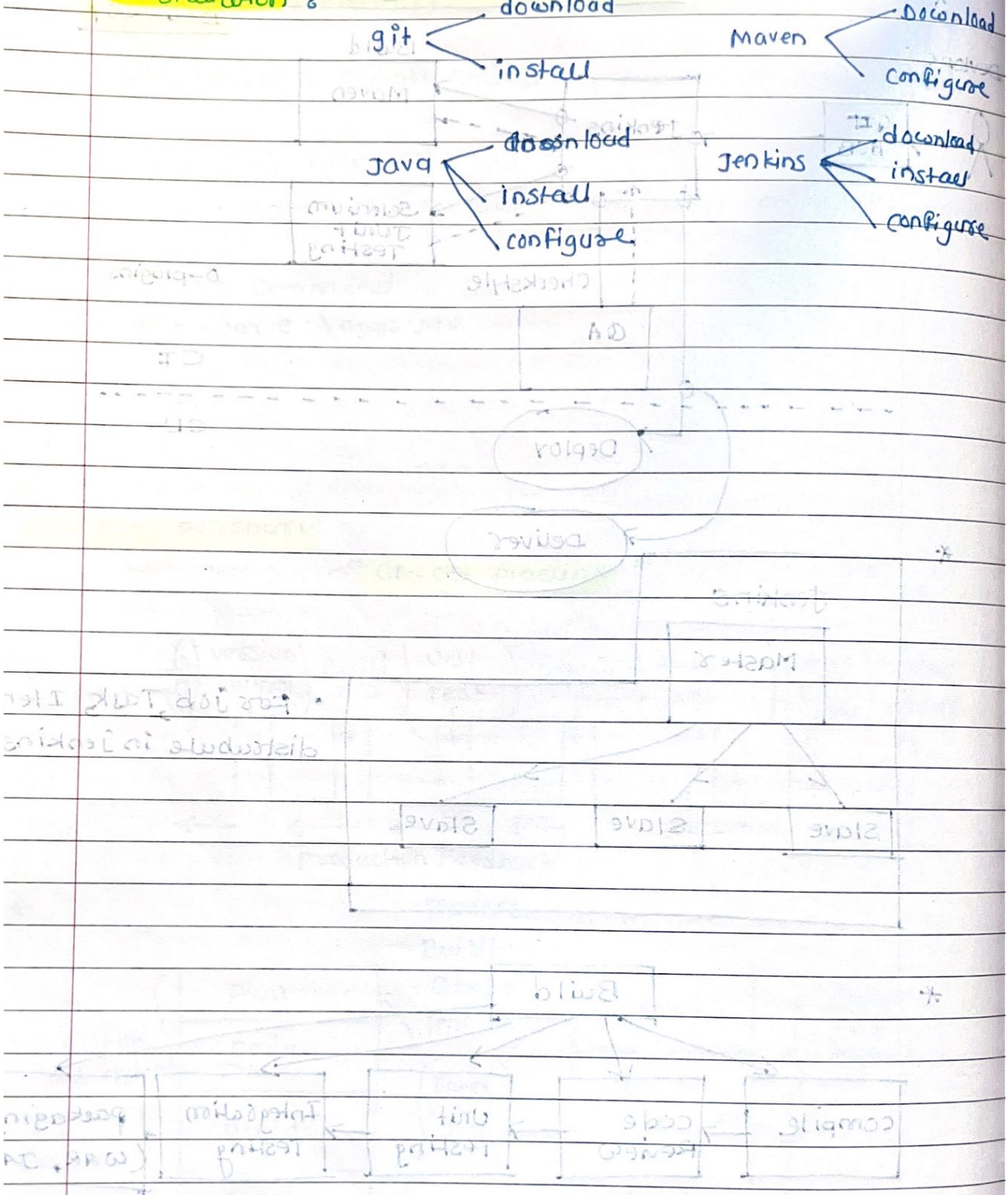
- For job, Task, Item distribute in jenkins



Page No.
Date

Installation :

- git
  - download
  - install
- Java
  - download
  - install
  - configure
- Maven
  - Download
  - configure
- Jenkins
  - download
  - install
  - configure



Akash A. Kale

Thank You ☺