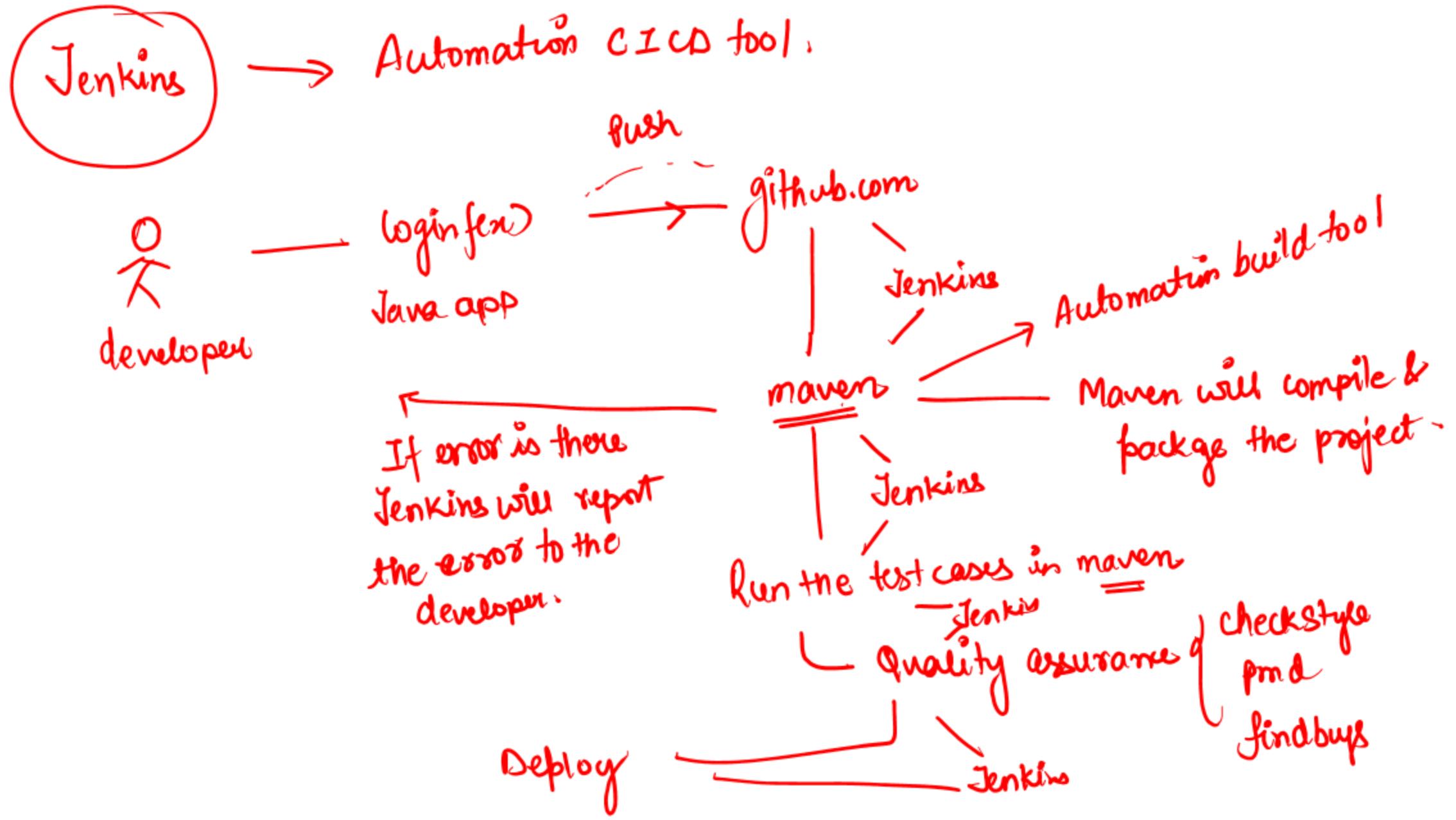


Jenkins



Jenkins → automation tool used for building, testing and deploying app.

→ Open source tool

→ Jenkins software developed in Java.

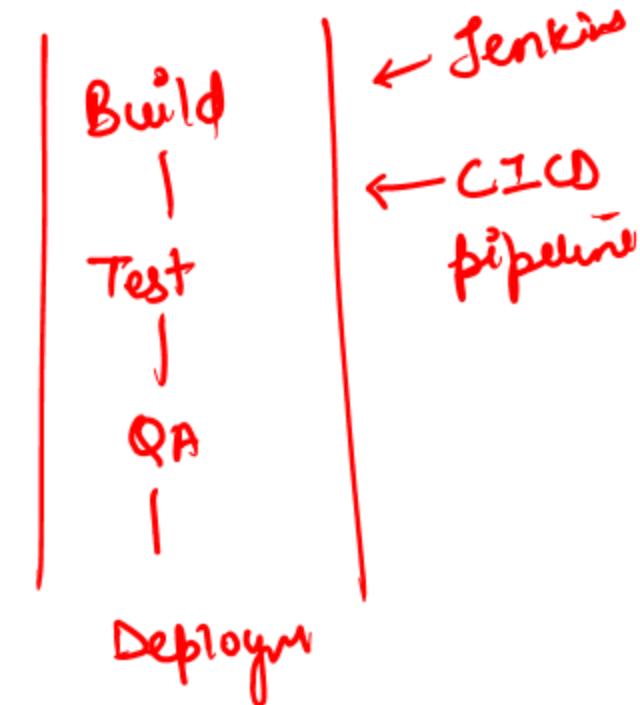
→ Jenkins follow plugin based architecture.

for e.g. → mailer plugin.
maven plugin.

→ To automate the execution of pipeline

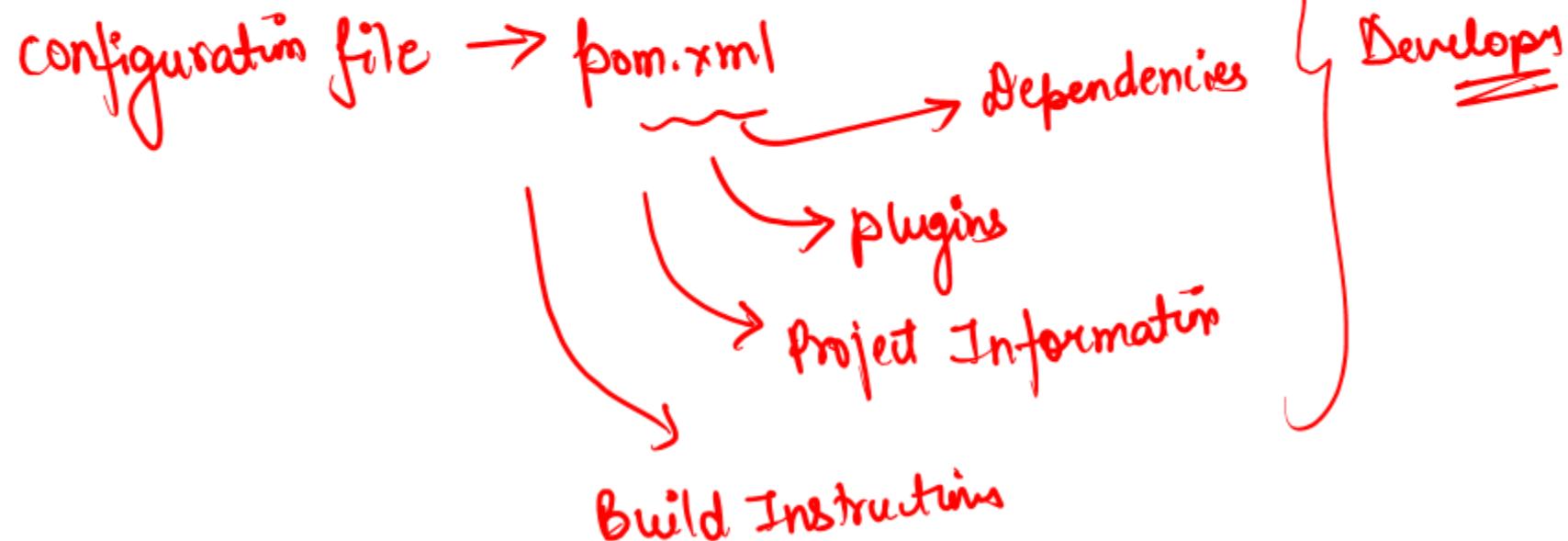
we write the script in groovy language.

→ Jenkins can be installed in windows, mac, Ubuntu, Linux



Maven → Build automation and project management tool

→ It helps building (compiling, packaging), testing Java app automatically
→ (jar|war)



- <https://maven.apache.org/guides/introduction/introduction-to-the-lifecycle.html>

lifecycle handles the creation of your project's web site.

A Build Lifecycle is Made Up of Phases

Each of these build lifecycles is defined by a different list of build phases, wherein a build phase represents a stage in the lifecycle.

For example, the default lifecycle comprises of the following phases (for a complete list of the lifecycle phases, refer to the [Lifecycle Reference](#)):

- `validate` - validate the project is correct and all necessary information is available
- `compile` - compile the source code of the project
- `test` - test the compiled source code using a suitable unit testing framework. These tests should not require the code be packaged or deployed
- `package` - take the compiled code and package it in its distributable format, such as a JAR.
- `verify` - run any checks on results of integration tests to ensure quality criteria are met
- `install` - install the package into the local repository, for use as a dependency in other projects locally
- `deploy` - done in the build environment, copies the final package to the remote repository for sharing with other developers and projects.

These lifecycle phases (plus the other lifecycle phases not shown here) are executed sequentially to complete the `default` lifecycle. Given the lifecycle phases above, th

Gradle → competitor of maven

→ build automation tool used to build, test and deploy the applications

You can use gradle for Java, Kotlin ./ Android apps, Groovy --

Gradle uses scripts

build.gradle (Groovy)

build.gradle.kts (Kotlin)

Lab 1 : Install Jenkins in the ubuntu machine

Use the script to download Jenkins

<https://raw.githubusercontent.com/akshu20791/Deployment-script/refs/heads/main/jenkins.sh>

Jenkins works on port 8080 so you need to allow traffic coming from port 8080 on ur machine

Not Secure — 44.213.80.62:8080/login?from=%2F

EC2 Instance Connect | us-east-1 Sign in - Jenkins

Started

Unlock Jenkins

To ensure Jenkins is securely set up by the administrator, a password has been written to the log ([not sure where to find it?](#)) and this file on the server:

`/var/lib/jenkins/secrets/initialAdminPassword`

Please copy the password from either location and paste it below.

Administrator password

http:// publicip:8080

cat /var/lib ... give you password

- Install suggested plugins
- Put user , pass and other details and login to jenkins

The screenshot shows the Jenkins dashboard. At the top left is the Jenkins logo and the word "Jenkins". Below it are three buttons: "+ New Item" (circled in red), "Build History", and "Build Queue". The "Build Queue" section says "No builds in the queue." Below that is a "Build Executor Status" section showing "0/2". Handwritten red text on the right side of the dashboard reads: "you want to create a new Job|Item|Project" with an arrow pointing to the "+ New Item" button, and "e.g. you want to create a pipeline which will compile - package - Test - QA - deploy" with an arrow pointing to the "Build Queue" section. Another handwritten note "whenever you execute the Item we call it as build." is written vertically next to the "Build Queue" section.

Welcome to Jenkins!

This page is where your Jenkins jobs will be displayed. To get started, you can set up distributed builds or start building a software project.

Start building your software project

Create a job



Set up a distributed build

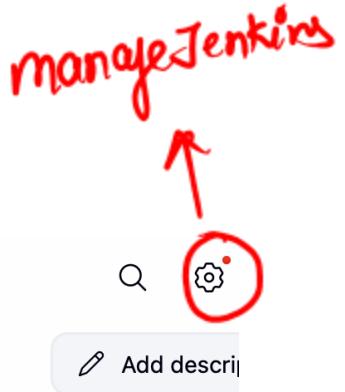
Set up an agent



Configure a cloud



Learn more about distributed builds



Lab 2: User management in jenkins

Lets suppose you are working in a team and you have developer , testers ,interns , admin etc in the team to which u don't want to give your main Jenkins account. So we can create the users in Jenkins and give them the restricted permissions

There are multiple ways of doing it ...

- 1) Role based access control
- 2) Matrix based method

Doc link:

https://docs.google.com/document/d/1kFln0dF1zX3MHTTz96JLefwzk0gi3KNPB_NLxs9x1jA/edit?usp=sharing

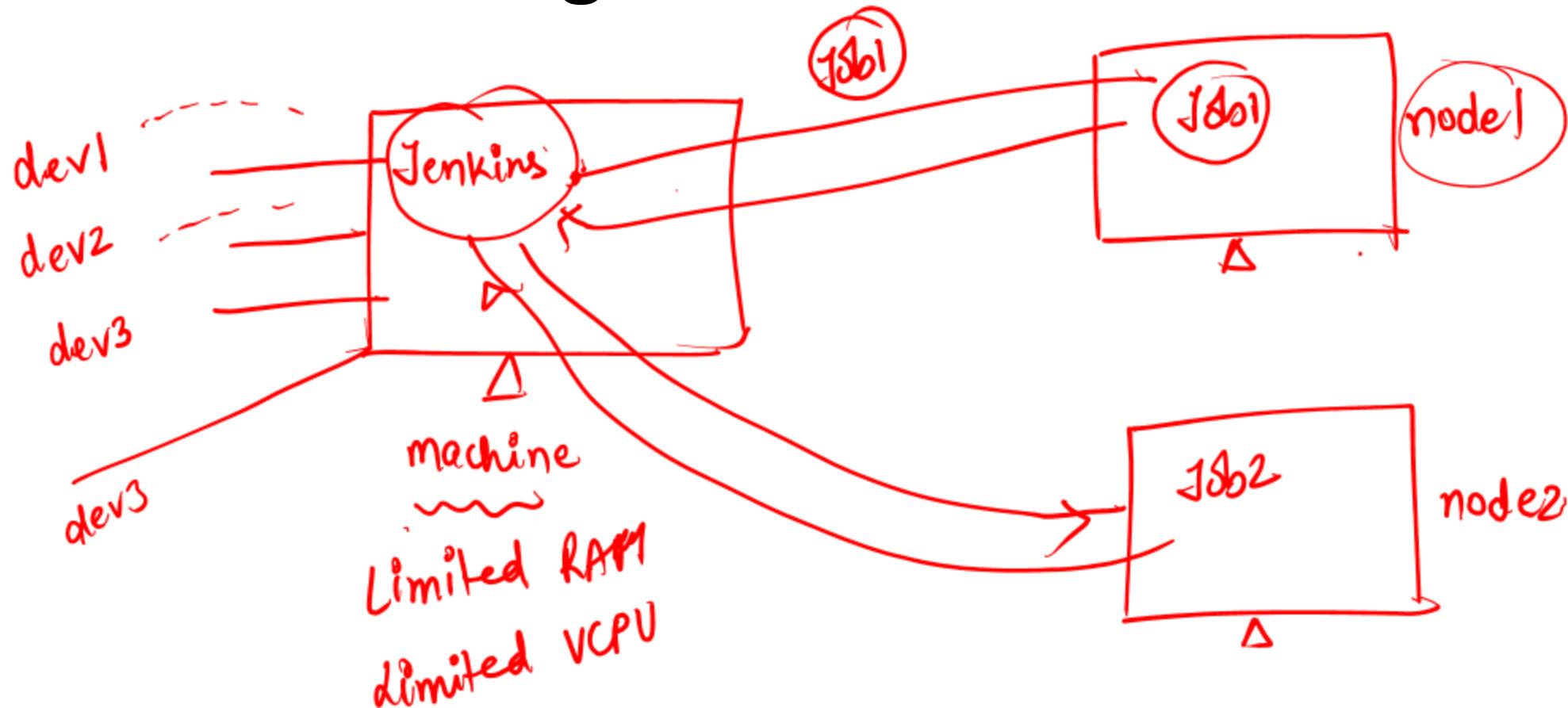
Lab 3: Create a simple hello world job

- We need to create a job in Jenkins which will print hello world message in the machine and we will see the logs from Jenkins

Solution:

<https://drive.google.com/file/d/178Ql7wdMHlcGA3abSHhOwWumFE7HgiUu/view?usp=sharing>

Lab 4: Working in master node architecture



Jenkins delegates the tasks to the nodes (machines) so as to reduce the load on Jenkins machine (master)

- Go to aws account -> ec2 -> Instances -> Launch a new instance with all traffic enabled and name that machine as node machine
- Connect to the node machine

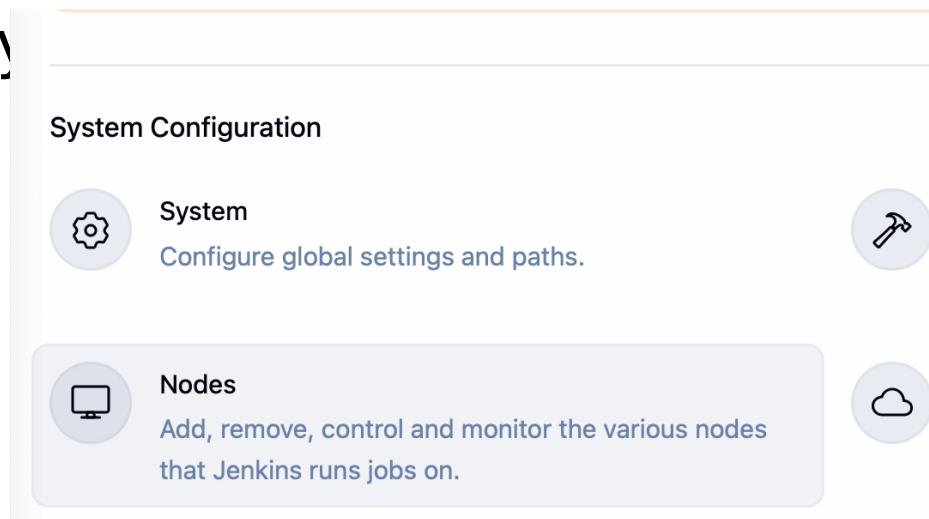
In the terminal write :

sudo su

apt update

apt install openjdk-17-jdk -y

- Go back to your Jenkins master machine -> manage Jenkins -> In System Configuration : nodes -> + NEW NODES





New node

Node name
akshat-node

Type

 Permanent Agent

Adds a plain, permanent agent to Jenkins. This is called "permanent" because Jenkins doesn't provide higher level of integration with these agents, such as dynamic provisioning. Select this type if no other agent types apply — for example such as when you are adding a physical computer, virtual machines managed outside Jenkins, etc.

any name



Name ?

akshat-node

Description ?

How many jobs this node can execute concurrently

Plain text Preview

Number of executors ?

1

any location
(Here your connection files are present)

Remote root directory ?

/opt/akshat

Labels ?

node1

Identifier



Nodes

This node is
not connected

[+ New Node](#)[Configure Monitors](#)

S	Name ↓	Architecture	Clock Difference	Free Disk Space	Free Swap Space	Free Temp Space	Response Time	
	akshat-node	← click	N/A	N/A	N/A	N/A	N/A	
	Built-In Node	Linux (amd64)	In sync	3.44 GiB	0 B	3.44 GiB	0ms	

[Status](#)[Delete Agent](#)[Configure](#)[Build History](#)[Load Statistics](#)[Log](#)

Agent akshat-node

[Add description](#)[Mark this node temporarily offline](#)

Run from agent command line: (Unix)

```
curl -s0 http://44.213.80.62:8080/jnlpJars/agent.jar
java -jar agent.jar -url http://44.213.80.62:8080/ -secret
335036eec46ef461336cd8a16a1086959fd53d5a2ffdfc90bc341ea7e9c9a263 -name "akshat-node" -webSocket -workDir
"/opt/akshat"
```

copy this complete code
& paste it
in node

Build Executor Status

0/1

```
No VM guests are running outdated hypervisor (qemu) binaries on this host.  
root@ip-172-31-66-234:/home/ubuntu# curl -s0 http://44.213.80.62:8080/jnlpJars/agent.jar  
java -jar agent.jar -url http://44.213.80.62:8080/ -secret 335036eec46ef461336cd8a16a1086959fd53d5a2ffdfc90bc341ea7e9c9a263 -name "akshat-node" -webS  
rkDir "/opt/akshat"  
Nov 18, 2025 11:12:58 AM org.jenkinsci.remoting.engine.WorkDirManager initializeWorkDir  
INFO: Using /opt/akshat/remoting as a remoting work directory  
Nov 18, 2025 11:12:58 AM org.jenkinsci.remoting.engine.WorkDirManager setupLogging  
INFO: Both error and output logs will be printed to /opt/akshat/remoting  
Nov 18, 2025 11:12:58 AM hudson.remoting.Launcher createEngine  
INFO: Setting up agent: akshat-node  
Nov 18, 2025 11:12:58 AM hudson.remoting.Engine startEngine  
INFO: Using Remoting version: 3327.v868139a_d00e0  
Nov 18, 2025 11:12:58 AM org.jenkinsci.remoting.engine.WorkDirManager initializeWorkDir  
INFO: Using /opt/akshat/remoting as a remoting work directory  
Nov 18, 2025 11:12:58 AM hudson.remoting.Launcher$CuiListener status  
INFO: WebSocket connection open  
Nov 18, 2025 11:12:58 AM hudson.remoting.Launcher$CuiListener status  
INFO: Connected
```

i-069660b9f5bf64f88 (node-akshat-jenkins)
PublicIPs: 18.206.16.190 PrivateIPs: 172.31.66.234

(node machine)



Jenkins / Manage Jenkins / Nodes

Nodes

X mark is removed

S	Name ↓	Architecture	Clock Difference	Free Disk Space	Free Swap Space
	akshat-node	Linux (amd64)	In sync	4.09 GiB	
	Built-In Node	Linux (amd64)	In sync	3.44 GiB	
	Data obtained	35 sec	35 sec	35 sec	3!

- Lets run the job in the node

Go to ur Jenkins machine

+new item

New Item

Enter an item name

mysecondjob ✓

Select an item type



Freestyle project

Classic, general-purpose job type that checks out post-build steps like archiving artifacts and sending emails.

Ok →

Jenkins / mysecondjob / Configuration

Configure

General

Source Code Management

Triggers

Environment

Build Steps

Post-build Actions

Plain text Preview

Discard old builds ?

GitHub project

This project is parameterized ?

Throttle builds ?

Execute concurrent builds if necessary ?

Restrict where this project can be run ?

Label Expression ?

node1 |

Label node1 matches 1 node. Permissions or other restrictions provided by

label of the node



Configure

[General](#)[Source Code Management](#)[Triggers](#)[Environment](#)[Build Steps](#)[Post-build Actions](#)

- Use secret text(s) or file(s) ?
- Add timestamps to the Console Output
- Inspect build log for published build scans
- Terminate a build if it's stuck
- With Ant ?

Build Steps

Automate your build process with ordered tasks like code compilation, testing,

Execute shell ?

Command

See [the list of available environment variables](#)

```
echo hello world
```

Save and Build

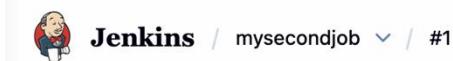
[Status](#)[Changes](#)[Workspace](#)[Build Now](#)[Configure](#)[Delete Project](#)[Rename](#)[Credentials](#)

Builds

Today

#1 11:17 am

click (After build)



Status

</> Changes

Console Output

Edit Build Information

Delete build '#1'

Timings

✓ #1 (18-Nov-2025, 11:17:39 am)

⌚ Started by user admin

⌚ This run spent:

- 3 ms waiting;
- 0.41 sec build duration;
- 0.42 sec total from scheduled to completion.

to see the logs

Add description Keep this build forever

Started 50 sec ago
Took 0.41 sec on akshat-node



Hence proved that
our job is executed
in akshatnode .

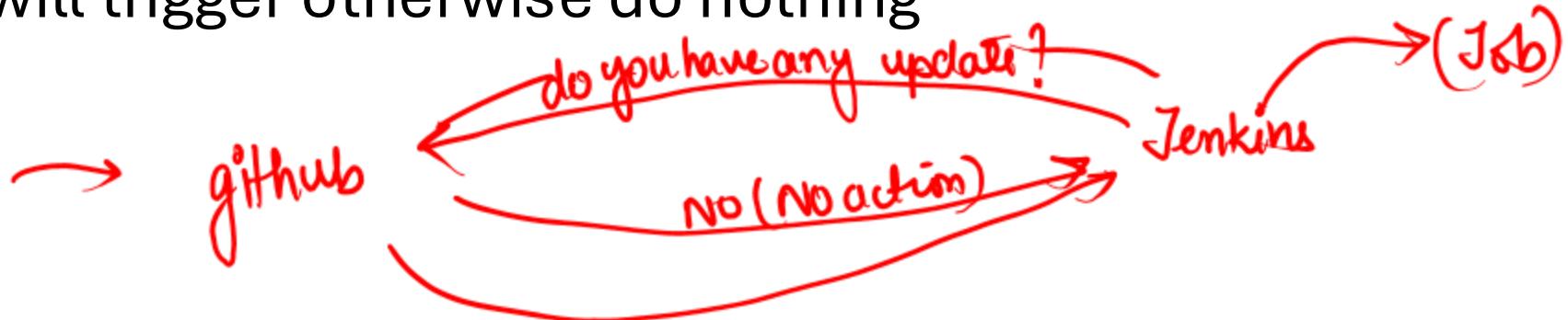
Lab 5: Automate the Jenkins job whenever the developer push the code to github

- As of now if the developer push the code to github it does not automatically build the project ...we need to manually build the project by clicking on build now button



- This could be done via multiple ways like :

> POLL SCM : Jenkins will keep checking the github for updates after a particular duration (CRON JOB) and if there is any update in github it will trigger otherwise do nothing



> GITHUB WEBHOOK : Whenever there is any update in github ...its github who will go to Jenkins and trigger the job....



LAB 5.1 : POLL SCM LAB

- Go to Jenkins -> +NEW ITEM -> Give any name and freestyle job

Enter an item name

pollscmlab

Select an item type



Freestyle project

Classic, general-purpose job type that checks out from up to one SCM, executes post-build steps like archiving artifacts and sending email notifications.

FORK THE GITHUB REPO :

<https://github.com/akshu20791/apachewebsite>

(Google if you don't know how to fork)

Jenkins / pollscmlab / Configuration

Configure

Source Code Management

Connect and manage your code repository to automatically pull the latest code for your builds.

None

Git ?

Repositories ?

Repository URL ?

https://github.com/akshu20791/apachewebsite

Please enter Git repository.

Credentials ?

- none -

Advanced

+ Add Repository

here put the link
of your forked githubs
repo.

Jenkins / pollscmlab / Configuration

Configure

Triggers

Set up automated actions that start your build based on specific events

General

Source Code Management

Triggers

Environment

Build Steps

Post-build Actions

Trigger builds remotely (e.g., from scripts) ?

Build after other projects are built ?

Build periodically ?

GitHub hook trigger for GITScm polling ?

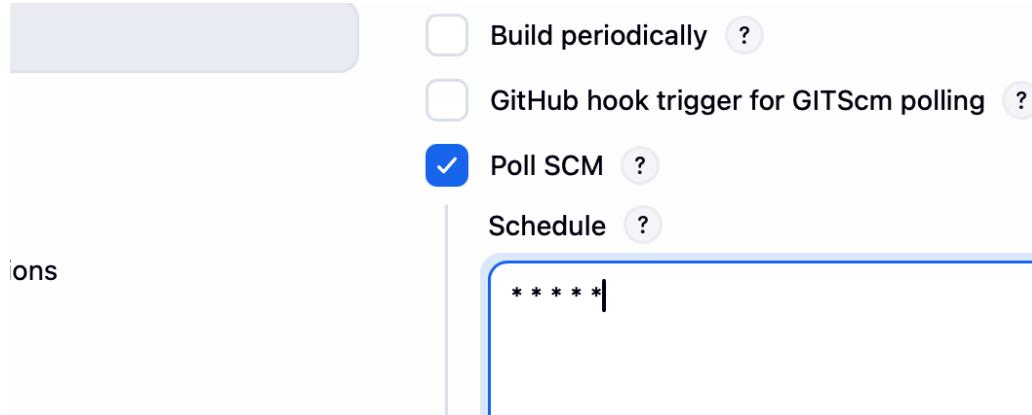
Poll SCM ?

Schedule ?

here Cron job will up

- <https://crontab.guru>

- * * * * *



crontab guru

The quick and simple editor for cron schedule expressions by Cronitor.

"At every minute."

next at 2025-11-18 17:05:00

random Copy

minute hour day month weekday

* any value

A screenshot of the crontab.guru website. It shows the cron expression '* * * * *' highlighted with a yellow box. Above the box, it says 'next at 2025-11-18 17:05:00'. Below the box are labels for 'minute', 'hour', 'day', 'month', and 'weekday'. A small note at the bottom says '* any value'. There is also a 'random' button and a 'Copy' button.

In build steps -> add build steps

execute shell

echo hello world

Save → Build now

- Go to the github account -> go to the repo which u have forked -> edit the index.html file and add any content

akshu20791 / apachewebsite

Type / to search

<> Code Issues Pull requests 11 Actions Projects Wiki Security Insights Settings

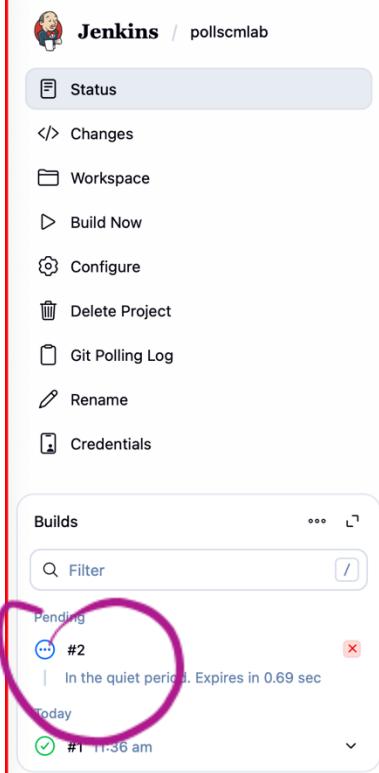
apachewebsite / index.html in master

Edit Preview

```
34     <!-- loader -->
35     <div class="loader_bg">
36         <div class="loader"></div>
37     </div>
38     <!-- end loader -->
39     <!-- header -->
40     <header>
41         <!-- header inner -->
42         <div class="head">
43             <div class="container">
44                 <div class="row ">
45                     <div class="col-md-6">
46                         <ul class="email_call">
47                             <li><a href="#">(+71)1213332222</a></li>
48                             <li><a href="#">akshu20791@gmail.com</a></li>
49                         </ul>
50                     </div>
51                     <div class="col-md-6">
52                         <ul class="list-style">
```

Commit

- Keep checking the Jenkins ...u will see automatically the Jenkins job will be trigger after 1 min because u have made some changes in github which is automatically identified by Jenkins.

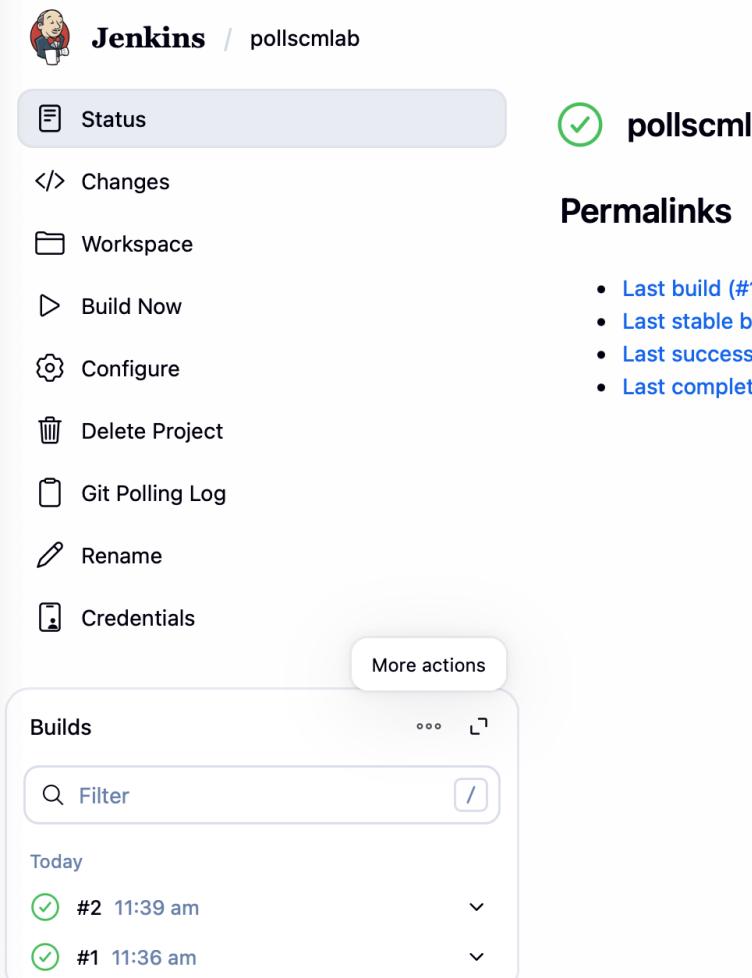


Jenkins / pollscmlab

- Status
- </> Changes
- Workspace
- ▷ Build Now
- ⚙ Configure
- Delete Project
- Git Polling Log
- Rename
- Credentials

Builds

Build	Timestamp
Pending	#2
In the quiet period. Expires in 0.69 sec	
Today	#1 11:36 am

Jenkins / pollscmlab

Status

</> Changes

Workspace

▷ Build Now

⚙ Configure

Delete Project

Git Polling Log

Rename

Credentials

Permalinks

- Last build (#1), 1 min 45 sec ago
- Last stable build (#1), 1 min 45 sec ago
- Last successful build (#1), 1 min 45 sec ago
- Last completed build (#1), 1 min 45 sec ago

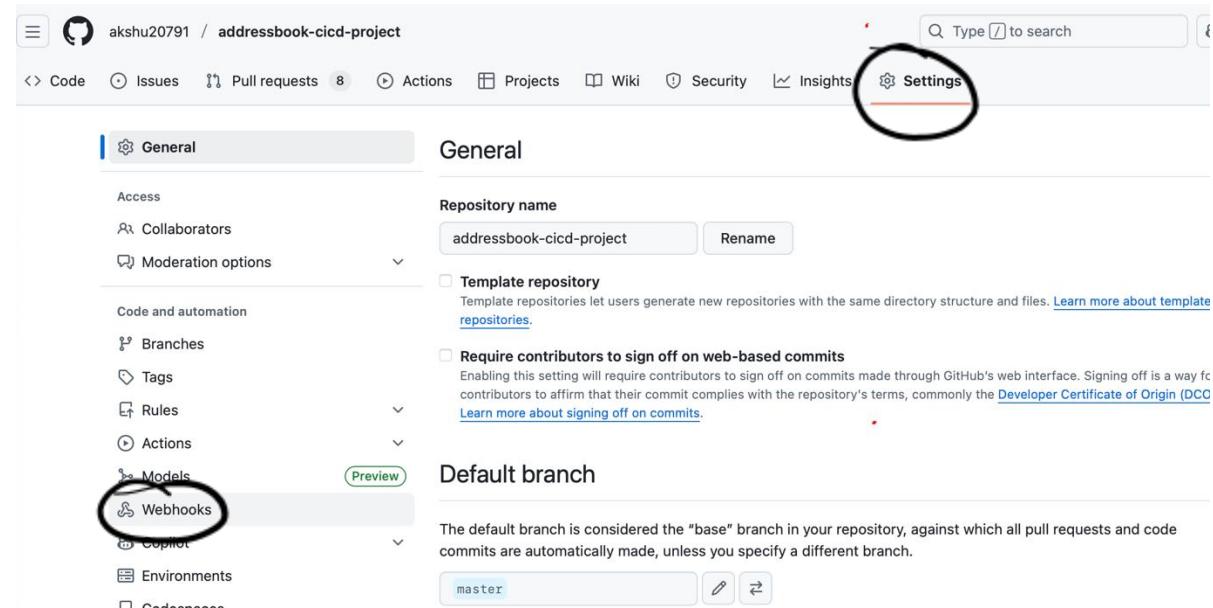
Builds

Build	Timestamp
Today	#2 11:39 am
Today	#1 11:36 am

Lab 5.2: Github webhooks

- Fork <https://github.com/akshu20791/addressbook-cicd-project>
(you will be using ur forked github repo everywhere)

Go to github -> go to ur githubrepo -> settings → **webhooks**



Click on Add webhook -> in payload url : put your Jenkins url
http://publicip:8080/github-webhook/

my Jenkins url
(you have to use yours)

Webhooks / Add webhook

We'll send a POST request to the URL below with details of any subscribed events. You can also specify which data format you'd like to receive (JSON, x-www-form-urlencoded, etc). More information can be found in [our developer documentation](#).

Payload URL *
http://44.213.80.62:8080/github-webhook/

Content type *
application/json

Secret

SSL verification
By default, we verify SSL certificates when delivering payloads.

Enable SSL verification Disable (not recommended)

Which events would you like to trigger this webhook?

Just the push event.
 Send me everything.
 Let me select individual events.

Active
We will deliver event details when this hook is triggered.

Add webhook !

do not forget to put / in the end .

- Go to Jenkins -> + new item -> free style item

Jenkins / mynewsite / Configuration

Configure

Source Code Management

Connect and manage your code repository to automatically pull the latest code for your builds.

General

- Source Code Management** (highlighted)
- Triggers
- Environment
- Build Steps
- Post-build Actions

Source Code Management

None

Git (highlighted)

Repositories

Repository URL

https://github.com/akshu20791/addressbook-cicd-project

Please enter Git repository.

Credentials

Here your forked git hub repos will come

Jenkins / mynewsite / Configuration

Configure

Triggers

Set up automated actions that start your build based on specific events.

- Trigger builds remotely (e.g., from scripts) ?
- Build after other projects are built ?
- Build periodically ?
- GitHub hook trigger for GITScm polling ?
- Poll SCM ?

In trigger -> select GitHub hook trigger for GITScm polling

In build step -> add build step -> Execute shell -> echo hello world

save

- Now build the job once
- Now go to github and edit readme file and add any content in it

