

Certification Project – Insure Me Insurance Domain

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Submitted to Vikul Kumar Sir

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Insure Me is a Global leading Insurance provider based out of USA. The company offers products and services like Home Insurance, Health Insurance, Car Insurance and Life Insurances. Initially the company was using a Monolithic application architecture, As the company grown, It started facing difficulties in managing the application infrastructure and application deployments.

Insure-Me has decided to transform its monolithic application architecture to microservice application architecture and opted to go DevOps by implementing CICD pipeline and necessary automations. Insure me has decided to use AWS as primary cloud services provider to create servers, databases, and application deployments.

The company's goal is to deliver the product updates frequently to production with High quality & Reliability. They also want to accelerate software delivery speed, quality and reduce feedback time between developers and testers.

Following are the problems the company is facing at the moment

- ✓ Building Complex builds is difficult
- ✓ Manual efforts to test various components/modules of the project
- ✓ Incremental builds are difficult to manage, test and deploy
- ✓ Creation of infrastructure and configure it manually is very time consuming
- ✓ Continuous manual monitoring the application is quite challenging.

In order to implement a POC, you are requested to develop a mavenized microservice using spring boot and in memory h2 database.

1. a microservice which exposes below mentioned endpoints as APIs and uses in memory h2 database to store the data.

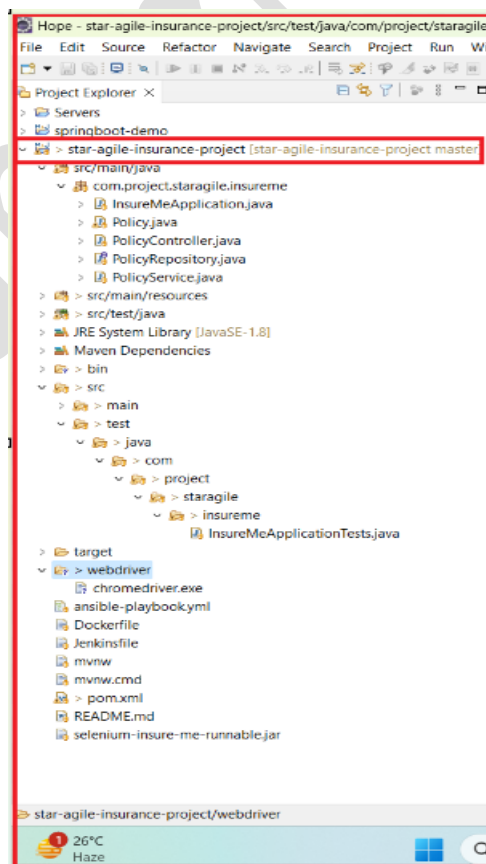
- a. /createPolicy (HTTP Method : POST) (Request Body : JSON)
- b. /updatePolicy/{policy id} (HTTP Method : PUT) (Request Body : JSON)
- c. /viewPolicy/{policy id} (HTTP Method : GET) (No Request Body)
- d. /deletePolicy/{policy id} (HTTP Method : DELETE) (No Request Body)

2. Write necessary Junit testcase.

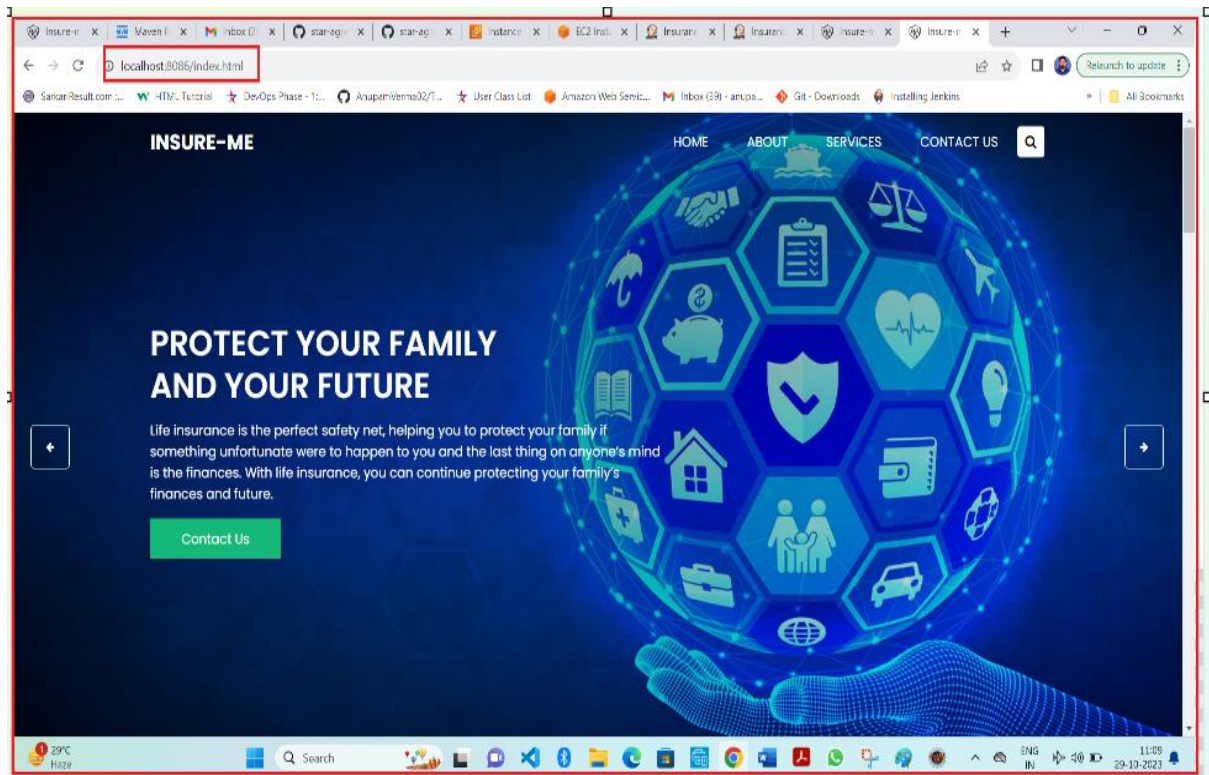
3. Generate HTML report using TestNG.

4. Push your code into your GitHub Repository.

✚ Firstly I imported the git project into Eclipse—You can see my project is imported in Eclipse from Git.



After that I clean package to make the maven build. And then I ran my project as Java Application and you can see it below in screenshot.

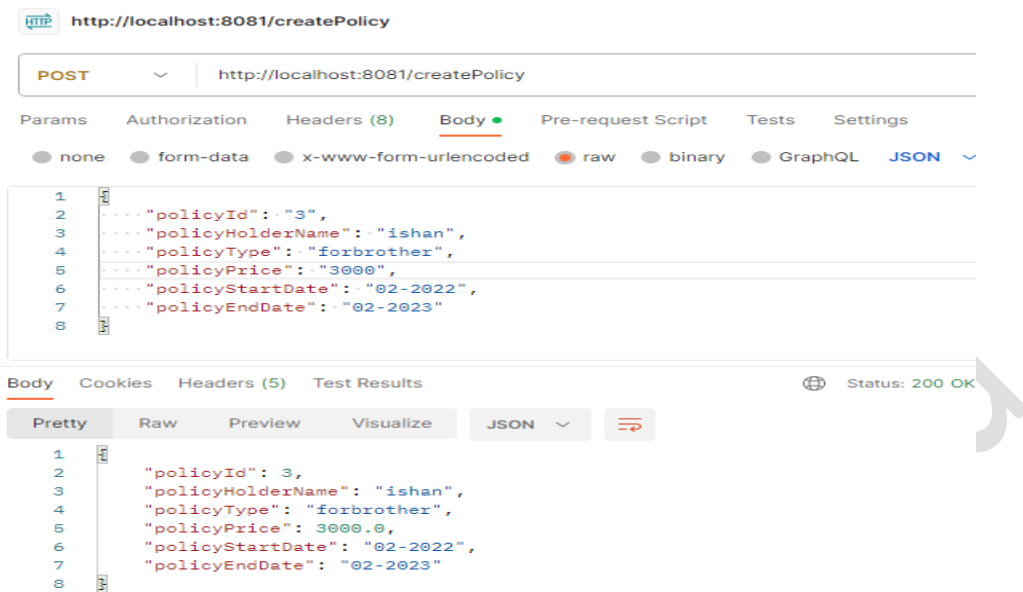


Then I checked the below services on postman.

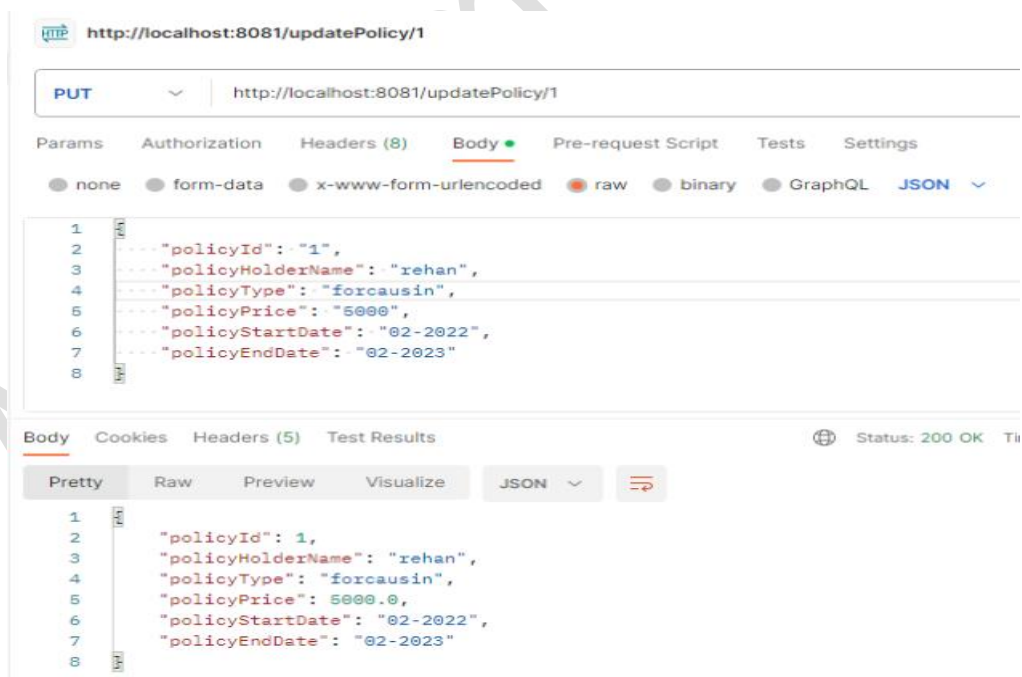
- a. /createPolicy (HTTP Method : POST) (Request Body : JSON)
- b. /updatePolicy/{policy id} (HTTP Method : PUT) (Request Body : JSON)
- c. /viewPolicy/{policy id} (HTTP Method : GET) (No Request Body)
- d. /deletePolicy/{policy id} (HTTP Method : DELETE) (No Request Body)

There are few services which I checked on postman. First of all I downloaded Postman on my system . After configuring it I applied the above 4 services one by one. Here I am showing you that according to the developer's Perspective how things done in the backend and how the API's worked. Here I used the POST,PUT,GET and DELETE methods.

a. /createPolicy (HTTP Method : POST) (Request Body : JSON)



b. /updatePolicy/{policy id} (HTTP Method : PUT) (Request Body : JSON)



c. /viewPolicy/{policy id} (HTTP Method : GET) (No Request Body)

HTTP **GET** http://localhost:8081/viewPolicy/1

Params Authorization Headers (8) **Body** Pre-request Script Tests Settings

● none ● form-data ● x-www-form-urlencoded ● **raw** ● binary ● GraphQL **JSON** ▾

```
1 {
2   "policyId": "3",
3   "policyHolderName": "ishan",
4   "policyType": "forbrother",
5   "policyPrice": "3000",
6   "policyStartDate": "02-2022",
7   "policyEndDate": "02-2023"
8 }
```

Body Cookies Headers (5) Test Results Status: 200 OK Time: 15 r

Pretty Raw Preview Visualize **JSON** ▾

```
1 {
2   "policyId": 1,
3   "policyHolderName": "rehan",
4   "policyType": "forcausin",
5   "policyPrice": 1000.0,
6   "policyStartDate": "02-2022",
7   "policyEndDate": "02-2023"
8 }
```

d. /deletePolicy/{policy id} (HTTP Method : DELETE) (No Request Body)

HTTP **DELETE** http://localhost:8081/deletePolicy/1

Params Authorization Headers (8) **Body** Pre-request Script Tests Settings

● none ● form-data ● x-www-form-urlencoded ● **raw** ● binary ● GraphQL **JSON** ▾

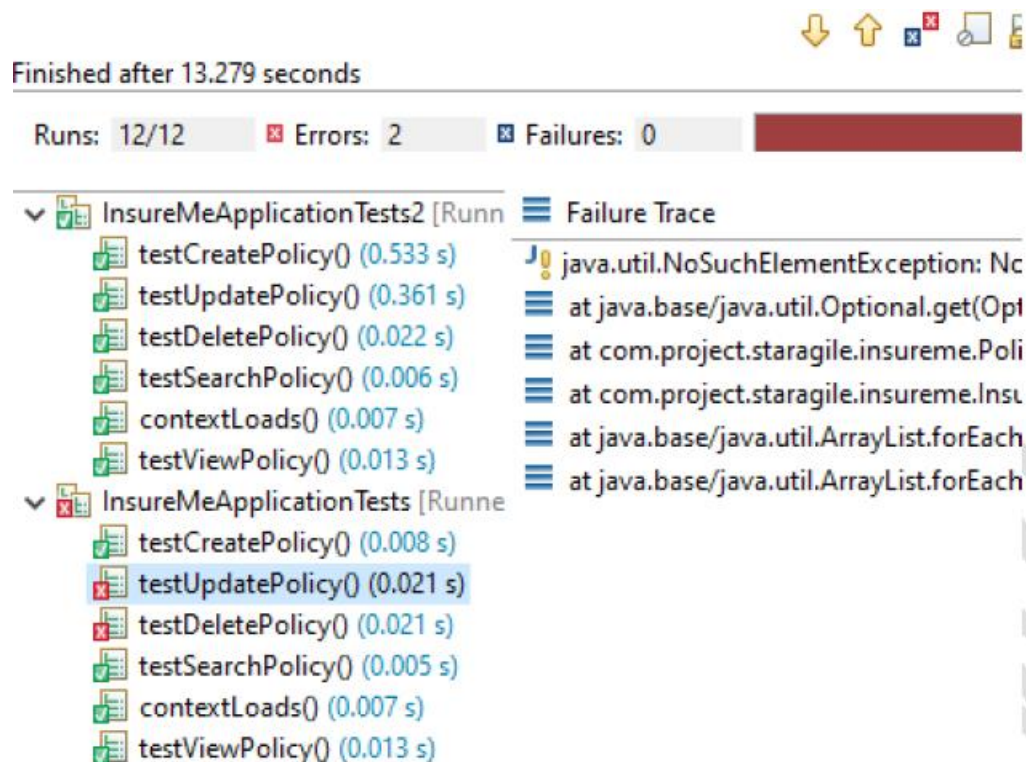
```
1 {
2   "policyId": "1",
3   "policyHolderName": "rehan",
4   "policyType": "forcausin",
5   "policyPrice": "5000",
6   "policyStartDate": "02-2022",
7   "policyEndDate": "02-2023"
8 }
```

Body Cookies Headers (5) Test Results Status: 200 OK Tin

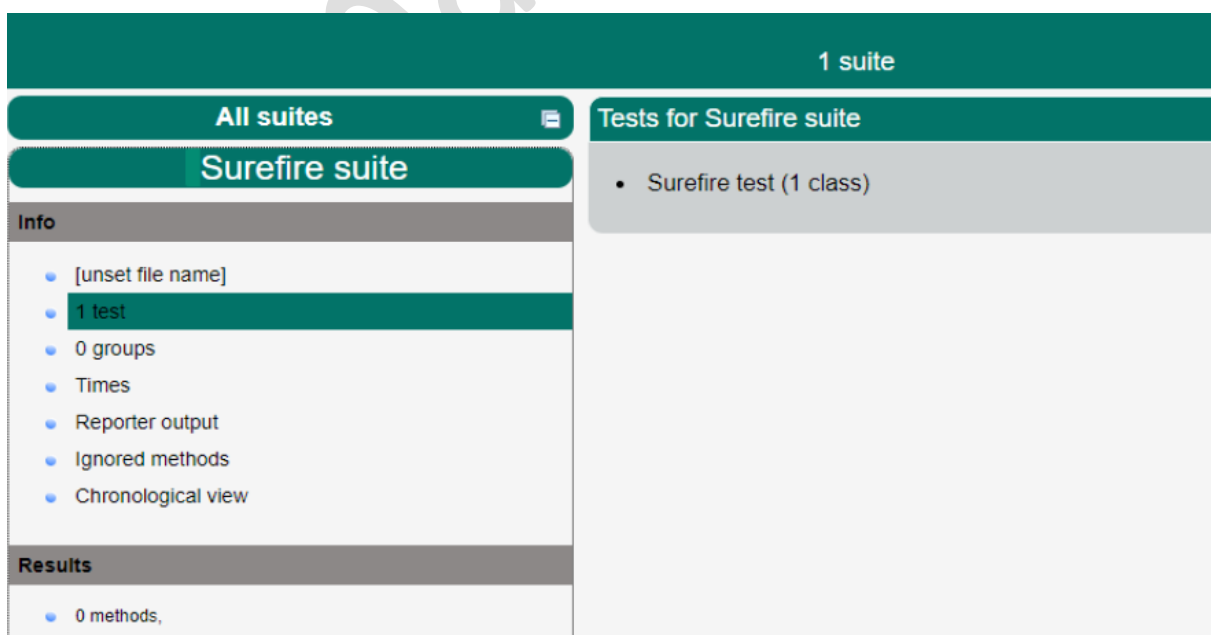
Pretty Raw Preview Visualize **Text** ▾

```
1 Deleted Successfully
```

2. Write necessary Junit testcase. Run the Junit tests:- [Here the necessary Junit testcase are present which I ran there and it gives me the desired result as expected.](#)



3. Generate HTML report using TestNG:- [I generated the HTML Report using TestNG. You can see it below.](#)



Test set: com.project.staragile.insureme.InsureMeApplicationTests

Tests run: 3, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 10.719 s - in com.project.staragile.insureme.InsureMeApplicationTests

4. Push your code into your GitHub Repository:- [Here, I pushed my code to my GitHub Repository.](#)

Push Branch master

Push to branch in remote

Select a remote and the name the branch should have in the remote.

Source:

master d3acd7c Update Jenkinsfile

Destination:

Remote: origin: https://github.com/AnupamVerma02/star-agile-insurance-project.git New Remote...


Branch: master

☒ Configure upstream for push and pull

When pulling: Merge

☐ Force overwrite branch in remote if it exists and has diverged

Show [advanced push](#) dialog

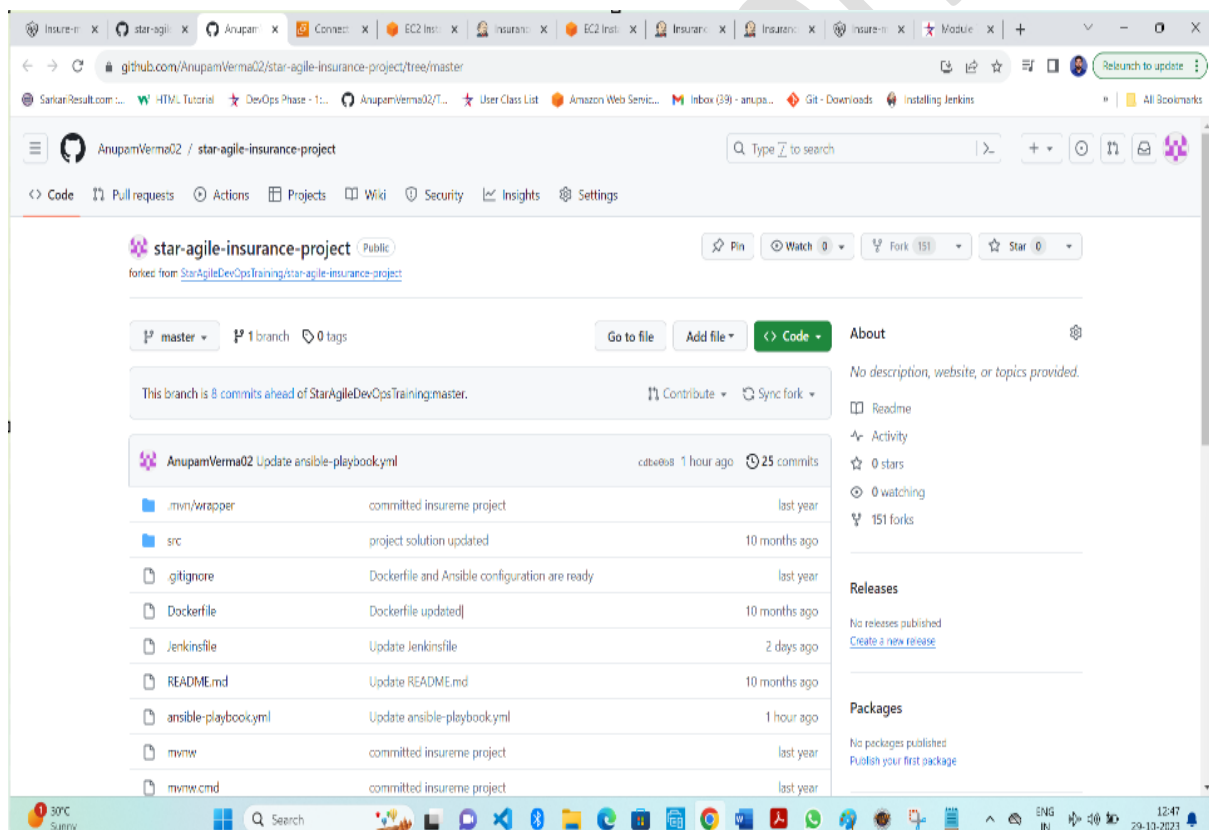
 < Back Preview > Push Cancel

Later, you need to implement Continuous Integration & Continuous Deployment using following tools:

- ✓ Git - For version control for tracking changes in the code files
- ✓ Jenkins - For continuous integration and continuous deployment
- ✓ Docker - For deploying containerized applications
- ✓ Ansible - Configuration management tools
- ✓ Selenium - For automating tests on the deployed web application
- ✓ AWS : For creating ec2 machines as servers and deploy the web application.

Project pushed to GitHub

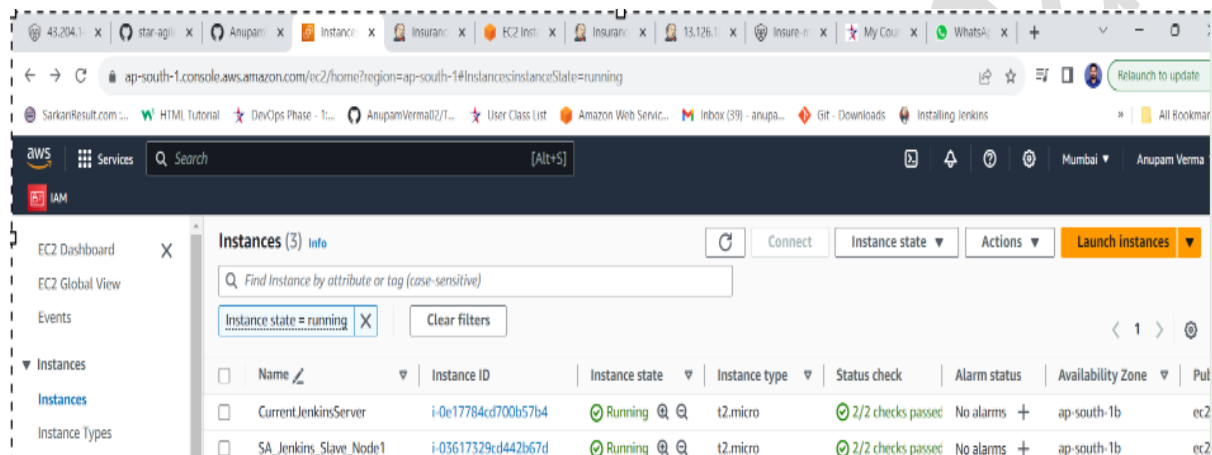
Git -I used here GIT for version control & for tracking changes in the code files



DevOps Steps for Project

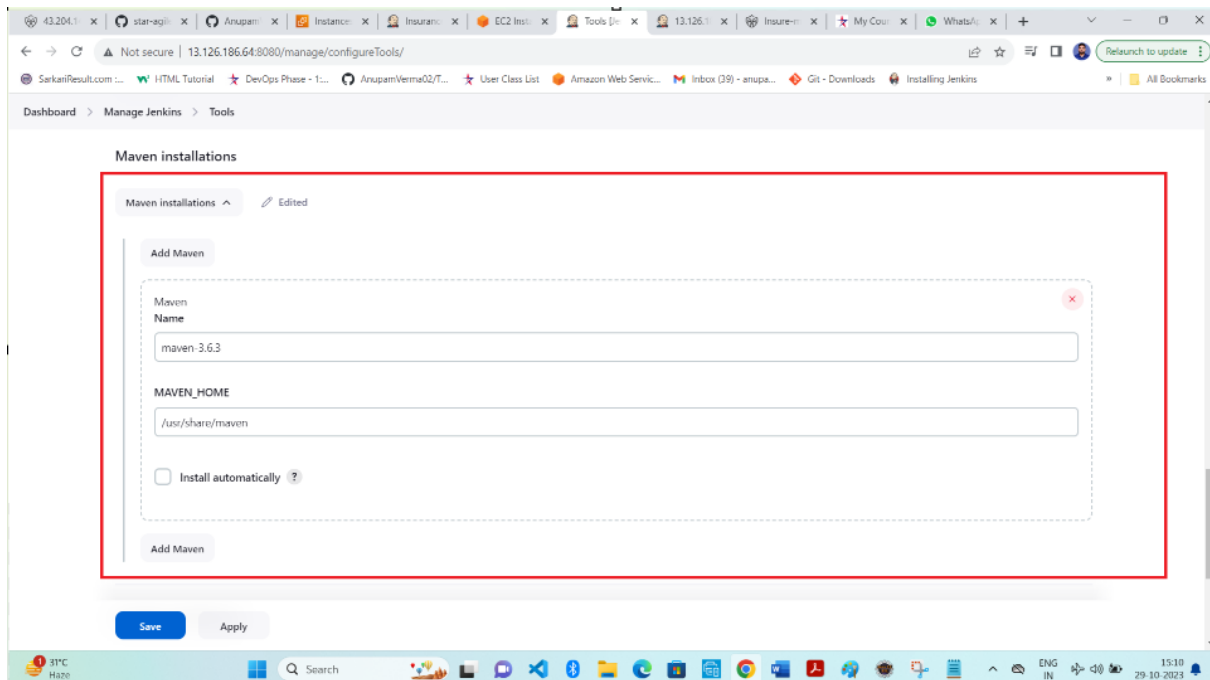
Jenkins -I used Jenkins here for continuous integration and continuous deployment.

1. Configuring Jenkins Master and Jenkins Slave node. Creating 2 EC2 instances. Jenkins Master and Jenkins Slave. Installing required software on Jenkins Master and Slave. Installing Maven in slave as we are going to build the project on Slave node and creating artifacts there.



2. Creating and establishing the connection between Jenkins master and slave node using user devopsadmin and SSH keypair connection. Add the Slave node under nodes in Jenkins Master and enter the server details username and private key.

3. Then I Added the maven plugin in Jenkins Master and configure the maven tool under tools in Jenkins master to point the maven application path in slave node. You can see below in screenshot my configuration of Maven.

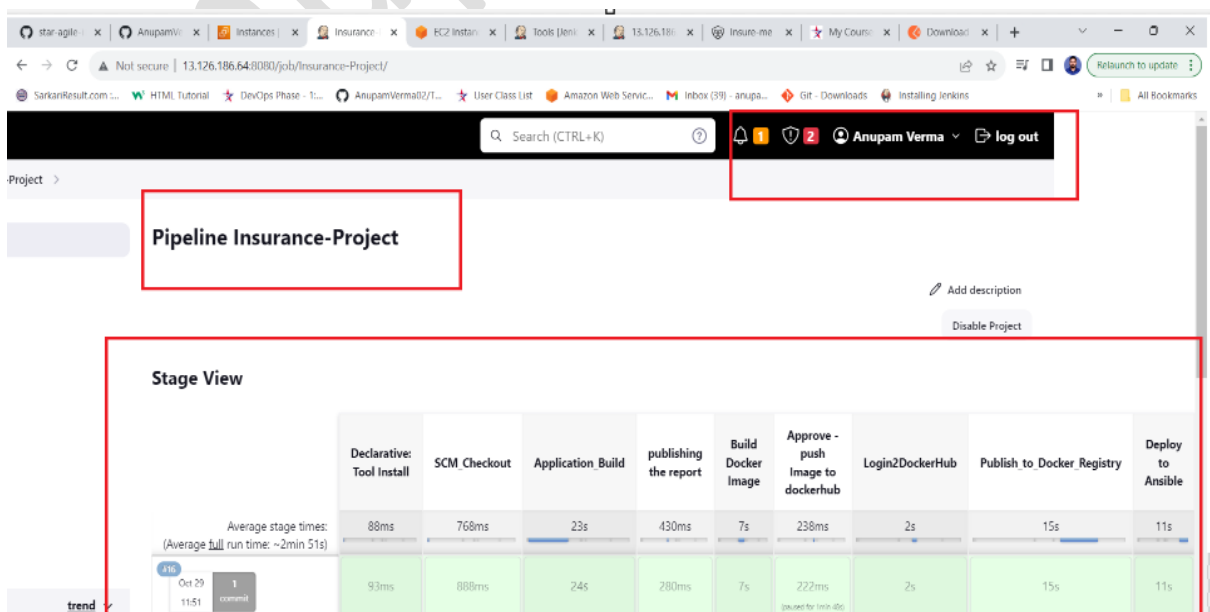


4. Write the Pipeline to build the application:-There are few stages here.

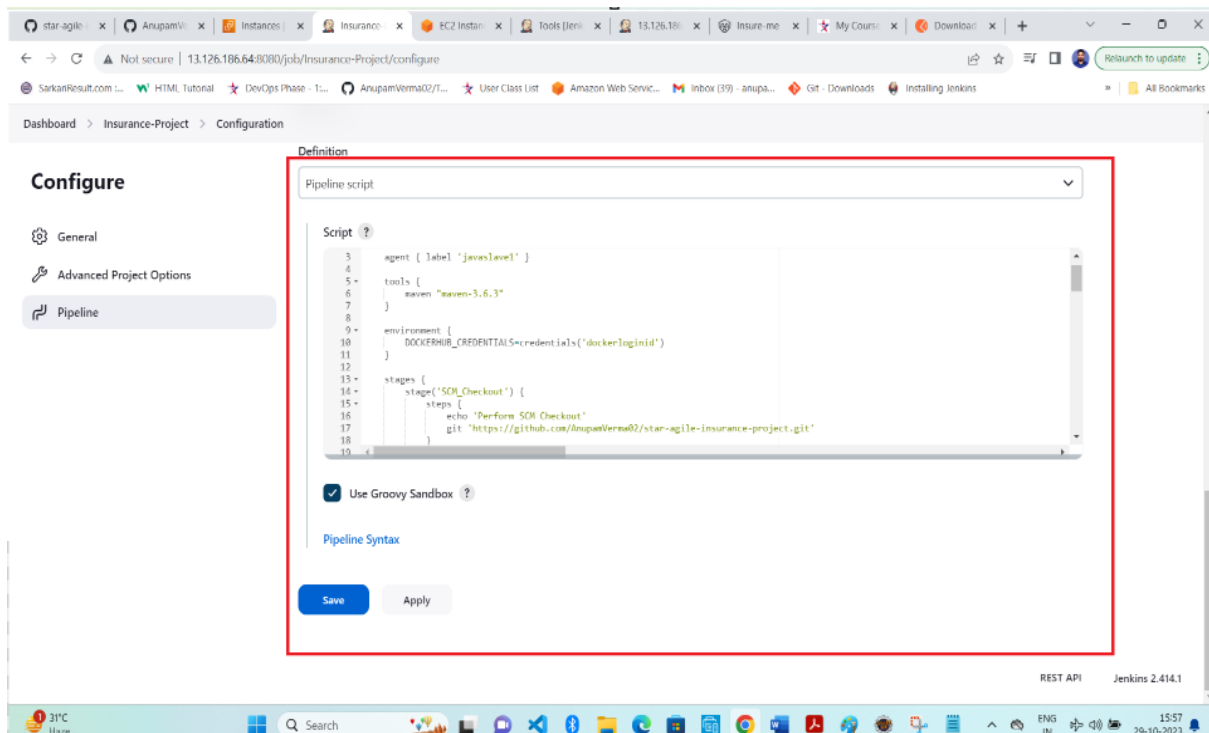
1. Stage 1 : SCM checkout where we get the code from Github repository.
2. Stage 2 : Building package where we use maven clean and package to build the application artifacts.

Check if the application is running correctly and artifacts are generated correctly on slave node.I am showing below all the required Screenshots.

This is my screenshot after completing all the stages.I show you one by one.



Here you can see in the Pipeline code I did the SCM Code Checkout and build.

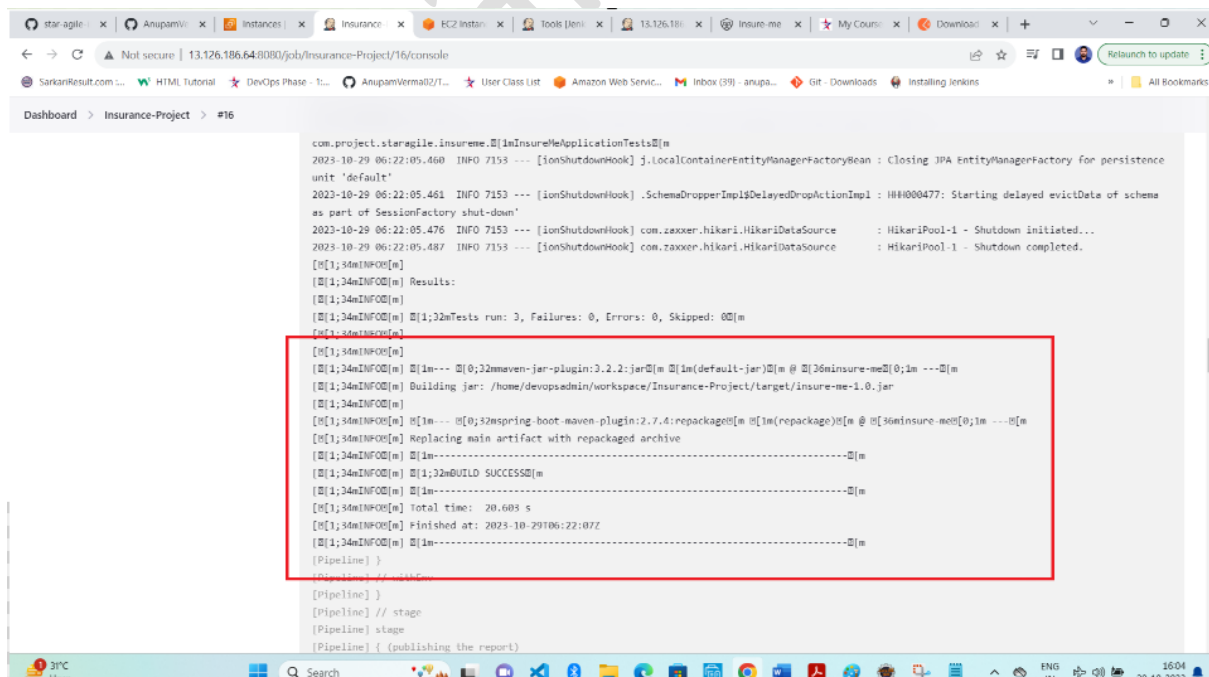


The screenshot shows the Jenkins 'Configure' page for a pipeline named 'Insurance-Project'. The 'Definition' tab is selected, showing a 'Pipeline script' editor. The script is a Groovy pipeline with the following content:

```
3 agent { label 'java:java1' }
4
5 tools {
6   maven "maven-3.6.3"
7 }
8
9 environment {
10   DOCKERHUB_CREDENTIALS('dockerloginid')
11 }
12
13 stages {
14   stage('SCM Checkout') {
15     steps {
16       echo 'Perform SCM Checkout'
17       git 'https://github.com/anupamverma02/star-agile-insurance-project.git'
18     }
19   }
20 }
```

Below the script editor, the 'Use Groovy Sandbox' checkbox is checked. At the bottom of the configuration area are 'Save' and 'Apply' buttons. The left sidebar shows 'General', 'Advanced Project Options', and 'Pipeline' tabs, with 'Pipeline' being the active one. The top of the browser shows multiple tabs and a 'Relaunch to update' button.

After that Jar/Artifacts build successfully in my slave machine.



The screenshot shows the Jenkins console output for the 'Insurance-Project' pipeline. The output is a log of messages from the Jenkins master and slave. A red box highlights the following section of the log:

```
[1,34mINFO[m] [1,32mTests run: 3, Failures: 0, Errors: 0, Skipped: 0[m]
[1,34mINFO[m]
[1,34mINFO[m] [1,32mmaven-jar-plugin:3.2.2:jar[m] [1,34m(default-jar)[m] @ [1,34minsurance-me[0,1m ---[m]
[1,34mINFO[m] Building jar: /home/devopsadmin/workspace/Insurance-Project/target/insurance-me-1.0.jar
[1,34mINFO[m]
[1,34mINFO[m] [1,32mspring-boot-maven-plugin:2.7.4:repackage[m] [1,34m(repackage)[m] @ [1,34minsurance-me[0,1m ---[m]
[1,34mINFO[m] Replacing main artifact with repackaged archive
[1,34mINFO[m] [1,32mBUILD SUCCESS[m]
[1,34mINFO[m] [1,32mTotal time: 20.608 s
[1,34mINFO[m] Finished at: 2023-10-29T06:22:07Z
[1,34mINFO[m] [1,32m-----[m]
[Pipeline] }
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { publishing the report }
```

The console output continues with more messages, including 'INFO 7153 --- [onShutdownHook] j.LocalContainerEntityManagerFactoryBean: Closing JPA EntityManagerFactory for persistence unit 'default'' and 'INFO 7153 --- [onShutdownHook] .SchemaDropperImpl\$DelayedDropActionImpl: HHH000477: Starting delayed evictData of schema as part of SessionFactory shut-down'.

3. Stage 3: Publish HTML reports.

Install HTML publisher. Add a stage publish HTML reports. Use syntax generator.

The screenshot shows the Jenkins Pipeline Syntax generator interface. The 'Sample Step' dropdown is set to 'publishHTML: Publish HTML reports'. The configuration fields are as follows:

- publishHTML**
- HTML directory to archive**: workspace/Insurance-Project/target/surefire-reports
- Index page(s)**: index.html
- Index page title(s) (Optional)**: (empty)
- Report title**: HTML Report
- Publishing options**: (dropdown menu)

A red box highlights the configuration fields. Below the form is a 'Generate Pipeline Script' button.

The screenshot shows the Jenkins Pipeline configuration page. The 'Definition' dropdown is set to 'Pipeline script'. The 'Script' field contains the following Groovy code:

```
23 sh 'mvn -Dmaven.test.failure.ignore=true clean package'
24
25 post {
26     failure {
27         sh "echo 'Send mail on failure'"
28         mail to:'shivapit900@gmail.com', from: 'shivapit900@gmail.com', subject:'FAILURE: ${currentBuild.fullDisplayName}', body
29     }
30 }
31
32 stage('publishing the report') {
33     steps {
34         script {
35             publishHTML([allowMissing: false, alwaysLinkToLastBuild: false, keepAll: false, reportDir: '/home/devopsadmin/works
36         ]
37     }
38 }
39
```

A red box highlights the 'publishHTML' step configuration in the script. Below the script field is a 'Use Groovy Sandbox' checkbox, which is checked. At the bottom are 'Save' and 'Apply' buttons.

Docker - For deploying containerized applications I used Docker. Create DockerHub account. Create dockerHub account token. Add docker hub account details and token to credentials in Jenkins master. Install docker on Jenkins Slave. Add stage 4 building docker image to pipeline script.

Stage 4 : Build docker image and publish image to DockerHub Registry.

Pipeline

Definition

Pipeline script

Script ?

```
39 stage('Build Docker Image') {
40     steps {
41         sh 'docker version'
42         sh "docker build -t anupamverma24/insurance-app:V${BUILD_NUMBER} ."
43         sh 'docker image list'
44         sh "docker tag anupamverma24/insurance-app:V${BUILD_NUMBER} anupamverma24/insurance-app:latest"
45     }
46     post {
47         success {
48             sh "echo 'Send mail docker Build Success'"
49             mail to:"shivarpit9001@gmail.com", from: 'shivarpit9001@gmail.com', subject:"App Image Created Please validate", body:
50         }
51         failure {
52             sh "echo 'Send mail docker Build failure'"
53             mail to:"shivarpit9001@gmail.com", from: 'shivarpit9001@gmail.com', subject:"FAILURE: ${currentBuild.fullDisplayName}"
54         }
55     }
56 }
```

☒ Use Groovy Sandbox ?

[Pipeline Syntax](#)

Pipeline

Definition

Pipeline script

Script ?

```
57 stage('Approve - push Image to dockerhub'){
58     steps{
59         //-----send an approval prompt-----
60         script {
61             env.APPROVED_DEPLOY = input message: 'User input required Choose "Yes" | "Abort"'
62         }
63         //-----end approval prompt-----
64     }
65 }
66 stage('Login2DockerHub') {
67     steps {
68         sh 'echo $DOCKERHUB_CREDENTIALS_PSW | docker login -u $DOCKERHUB_CREDENTIALS_USR --password-stdin'
69     }
70 }
71 }
72 }
73 }
```

☒ Use Groovy Sandbox ?

[Pipeline Syntax](#)

Pipeline

Definition

Pipeline script

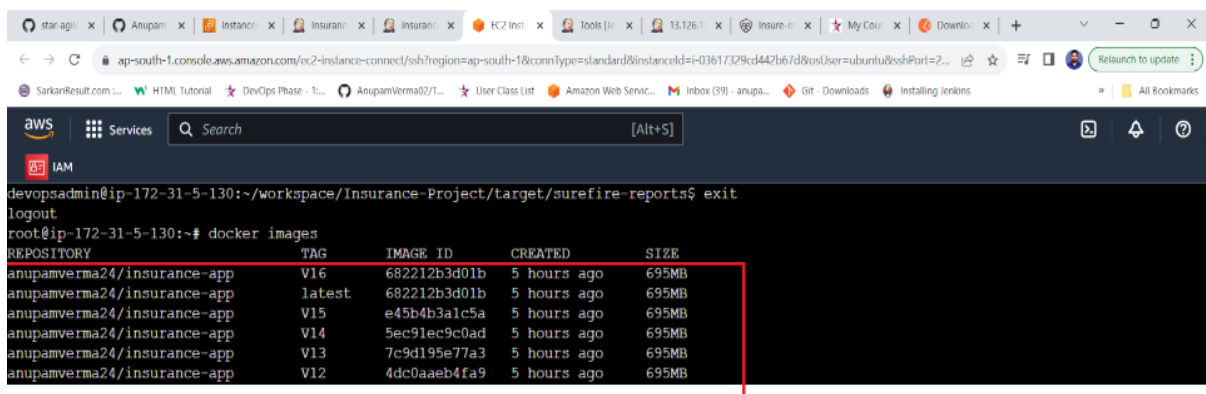
Script ?

```
71     }
72   }
73   stage('Publish_to_Docker_Registry') {
74     steps {
75       sh "docker push anupamverma24/insurance-app:latest"
76     }
77   }
78   //stage('Approve - Deployment'){
79   //steps{
80   //
81   //-----send an approval prompt-----
82   //script {
83   //env.APPROVED_DEPLOY = input message: 'User input required Choose "Yes" | "Abort"'
84   //}
85   //-----end approval prompt-----
86   //}
87 }
```

☒ Use Groovy Sandbox ?

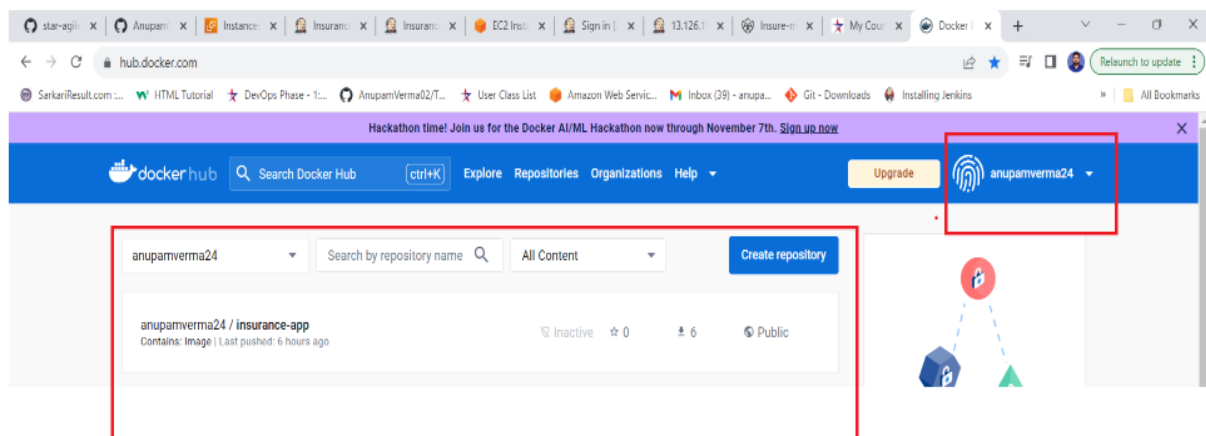
[Pipeline Syntax](#)

Here, you can see my image is present in my Docker Hub Account.



A screenshot of an AWS terminal window. The terminal shows the command `docker images` being executed. The output is a table with columns: REPOSITORY, TAG, IMAGE ID, CREATED, and SIZE. The repository is `anupamverma24/insurance-app`. The tags are `V16`, `latest`, `V15`, `V14`, `V13`, and `V12`. The image IDs are `682212b3d01b`, `682212b3d01b`, `e45b4b3a1c5a`, `5ec91ec9c0ad`, `7c9d195e77a3`, and `4dc0aeb4fa9` respectively. The 'CREATED' column shows '5 hours ago' for all images. The 'SIZE' column shows '695MB' for all images. A red box highlights the entire output table.

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
anupamverma24/insurance-app	V16	682212b3d01b	5 hours ago	695MB
anupamverma24/insurance-app	latest	682212b3d01b	5 hours ago	695MB
anupamverma24/insurance-app	V15	e45b4b3a1c5a	5 hours ago	695MB
anupamverma24/insurance-app	V14	5ec91ec9c0ad	5 hours ago	695MB
anupamverma24/insurance-app	V13	7c9d195e77a3	5 hours ago	695MB
anupamverma24/insurance-app	V12	4dc0aeb4fa9	5 hours ago	695MB



A screenshot of the Docker Hub website. The user's profile is visible at the top right, showing the username `anupamverma24`. Below the profile, there is a search bar with the text `anupamverma24` entered. The search results show a repository named `anupamverma24 / insurance-app`. The repository is listed as 'Inactive' with 0 stars and 6 forks. It is also marked as 'Public'. A red box highlights the repository entry.

anupamverma24

Search by repository name

All Content

Create repository

anupamverma24 / insurance-app

Contains: Image | Last pushed: 6 hours ago

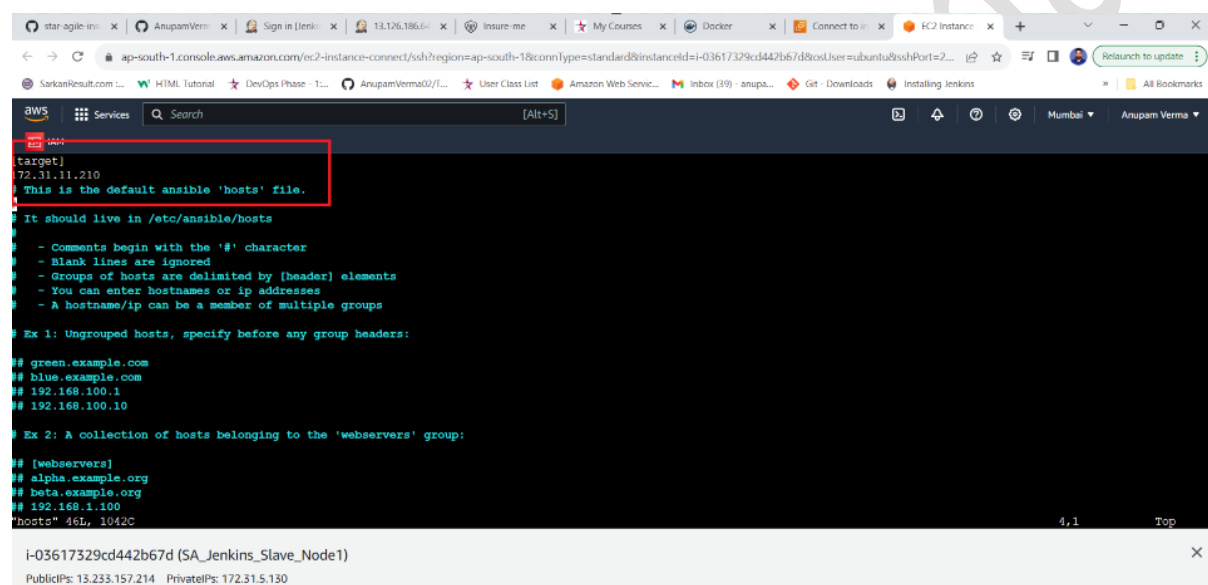
Inactive ☆ 0 ± 6 Public

Ansible – Ansible is a Configuration management tool.

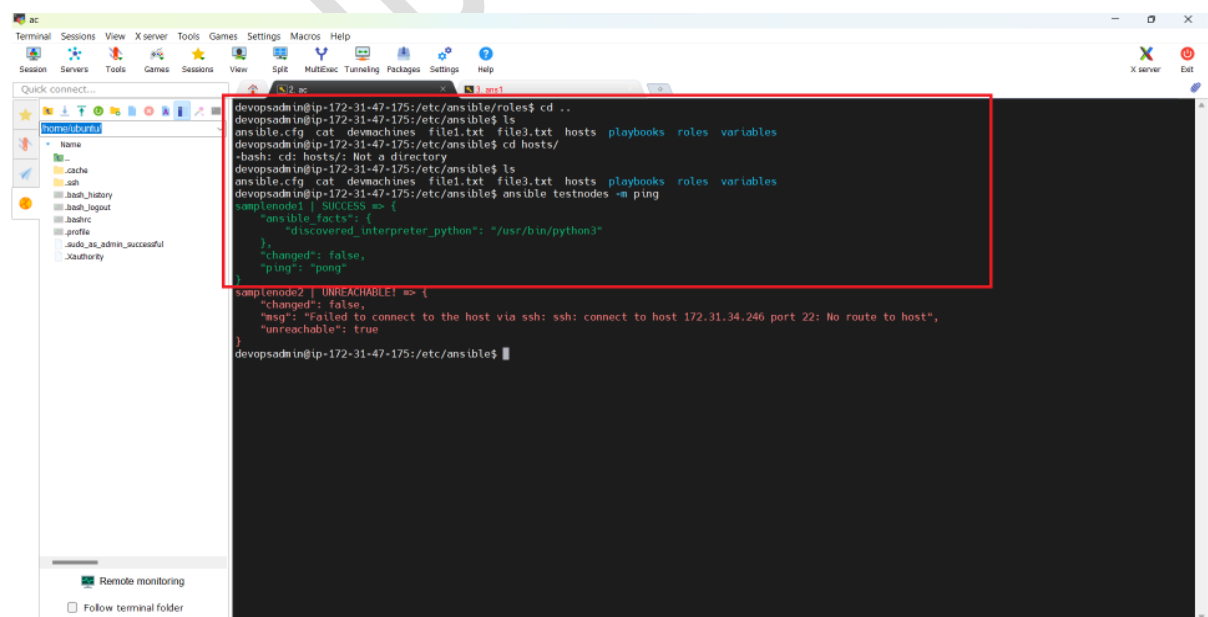
Add one more EC2 instance as Deployment server.

Install Ansible on slave node and make slave node as Ansible controller.

Configure a user on deployment server and connect the user to ansible controller using SSH keys. Add deployment server IP in /etc/Ansible/hosts in Ansible controller as target to Ansible controller. (Deployment server would be target to Slave node) check the connection is working by using the ping command from Ansible controller.

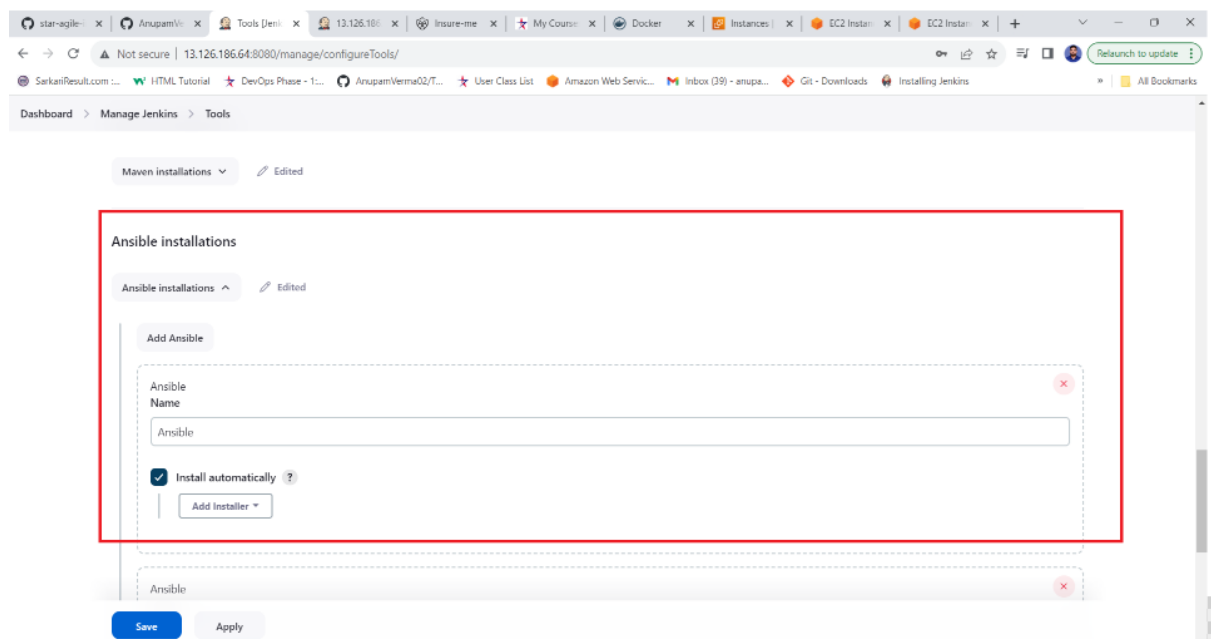


```
target|
72.31.11.210
This is the default ansible 'hosts' file.
It should live in /etc/ansible/hosts
- Comments begin with the '#' character
- Blank lines are ignored
- Groups of hosts are delimited by [header] elements
- You can enter hostnames or ip addresses
- A hostname/ip can be a member of multiple groups
Ex 1: Ungrouped hosts, specify before any group headers:
## green.example.com
## blue.example.com
## 192.168.100.1
## 192.168.100.10
Ex 2: A collection of hosts belonging to the 'webserver' group:
## [webserver]
## alpha.example.org
## beta.example.org
## 192.168.1.100
hosts 46L, 1042C
```

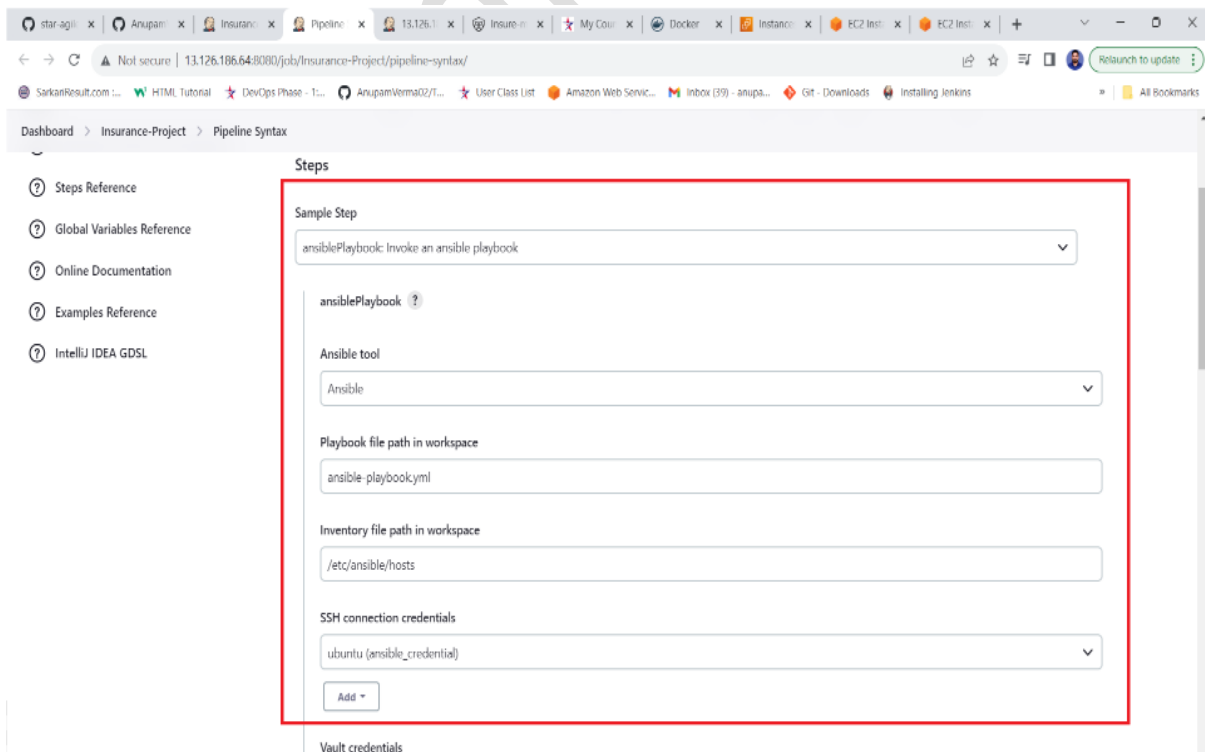


```
devopsadmin@ip-172-31-47-175:/etc/ansible/roles$ cd ..
devopsadmin@ip-172-31-47-175:/etc/ansible$ ls
ansible.cfg  cat  devmachines  file1.txt  file3.txt  hosts  playbooks  roles  variables
devopsadmin@ip-172-31-47-175:/etc/ansible$ cd hosts/
-bash: cd: hosts/: Not a directory
devopsadmin@ip-172-31-47-175:/etc/ansible$ ls
ansible.cfg  cat  devmachines  file1.txt  file3.txt  hosts  playbooks  roles  variables
devopsadmin@ip-172-31-47-175:/etc/ansible$ ansible testnodes -m ping
samplenode1 | SUCCESS => {
  "ansible_facts": {
    "discovered_interpreter_python": "/usr/bin/python3"
  },
  "changed": false,
  "ping": "pong"
}
samplenode2 | UNREACHABLE! => {
  "changed": false,
  "msg": "Failed to connect to the host via ssh: ssh: connect to host 172.31.34.246 port 22: No route to host",
  "unreachable": true
}
devopsadmin@ip-172-31-47-175:/etc/ansible$
```


Once the connection setup is done add the Ansible plugin in Jenkins Master. Go to tools and configure Ansible tool in Jenkins Master.



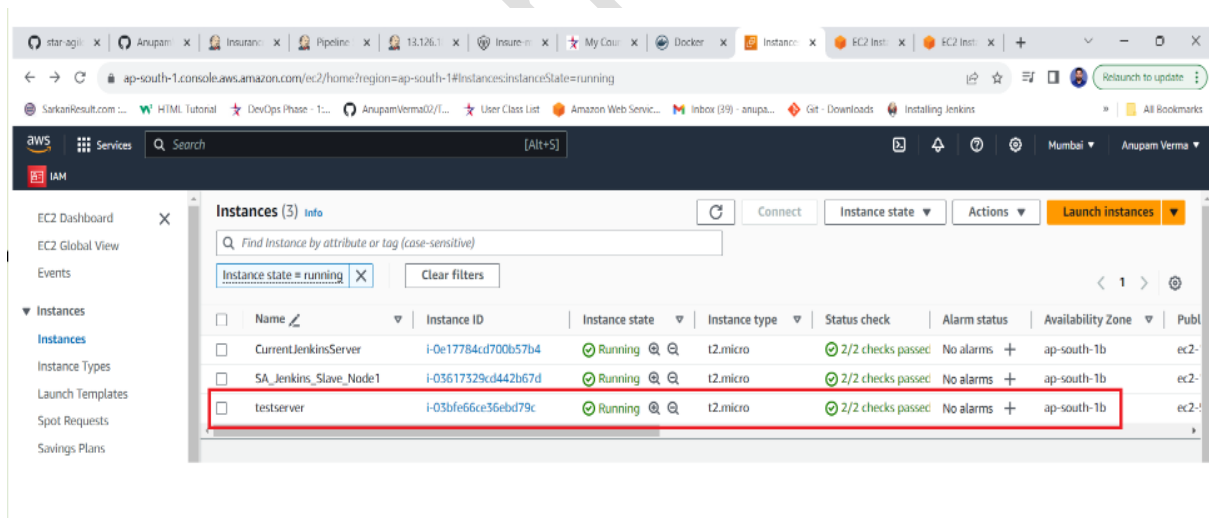
Create the syntax pipeline for Ansible:-Here I invoked the ansible playbook in my snippet generator below. Here I configured it.



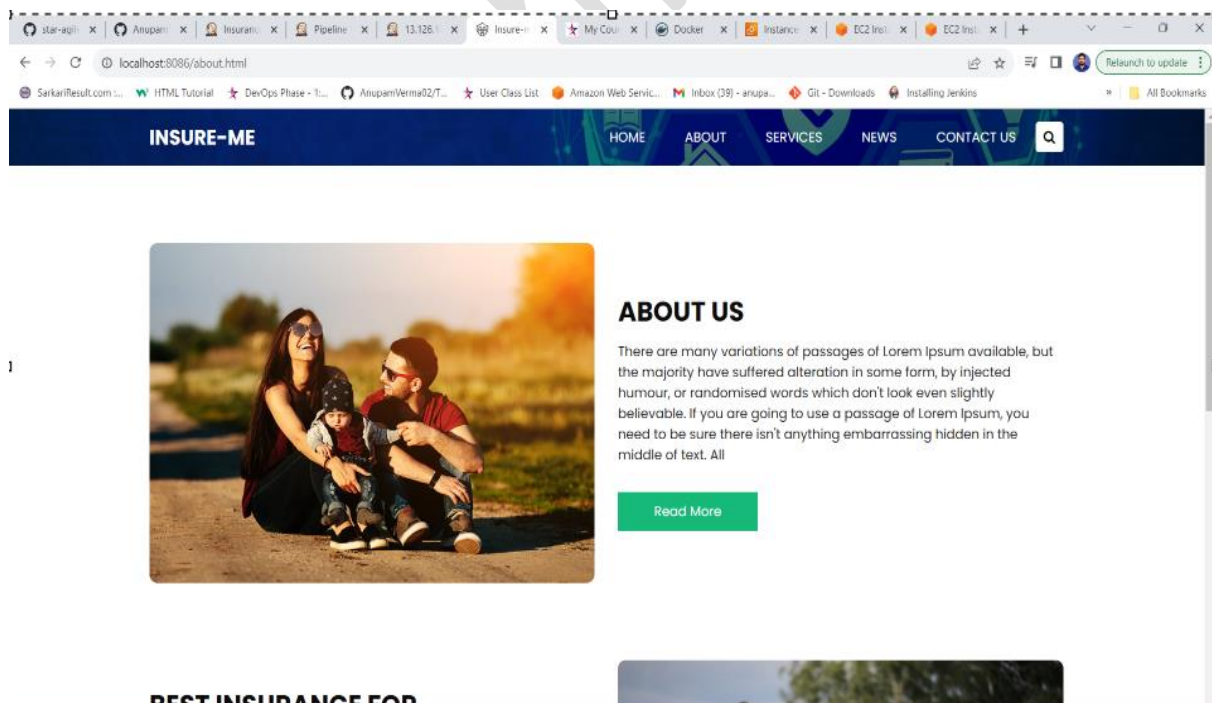
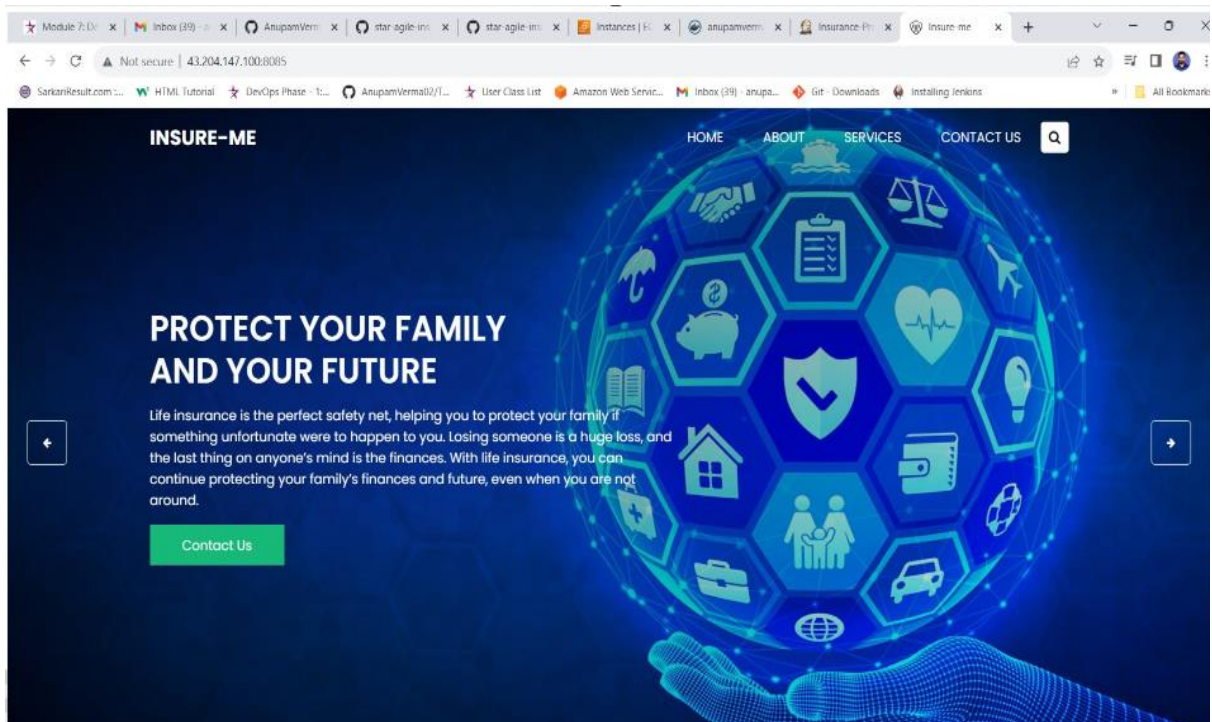


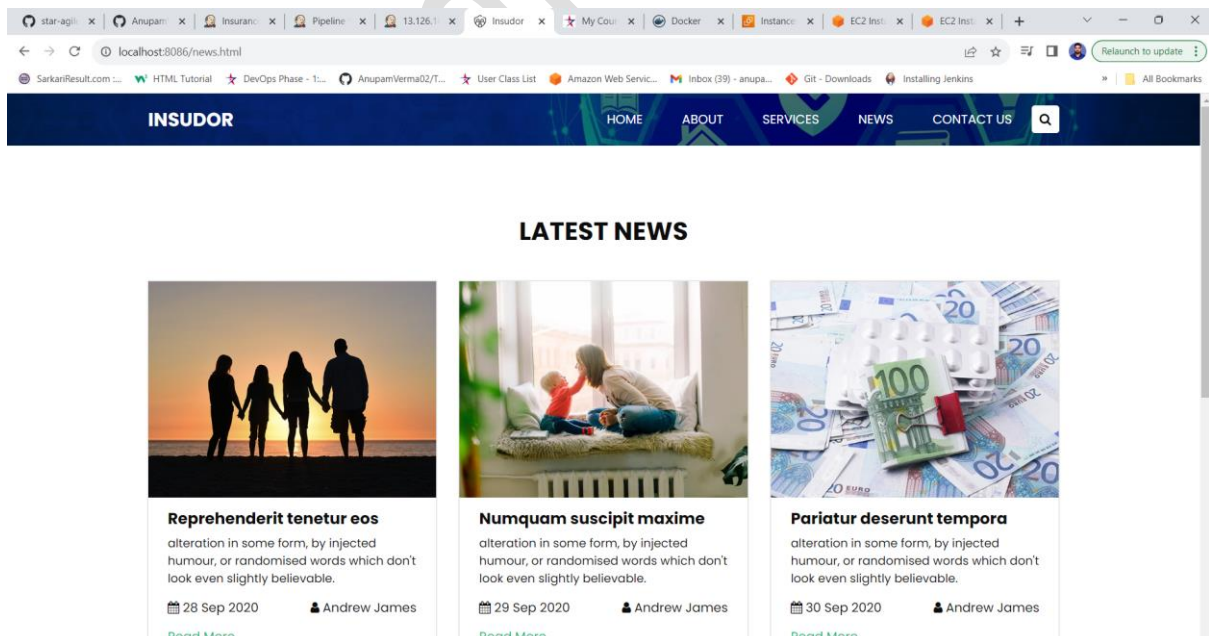
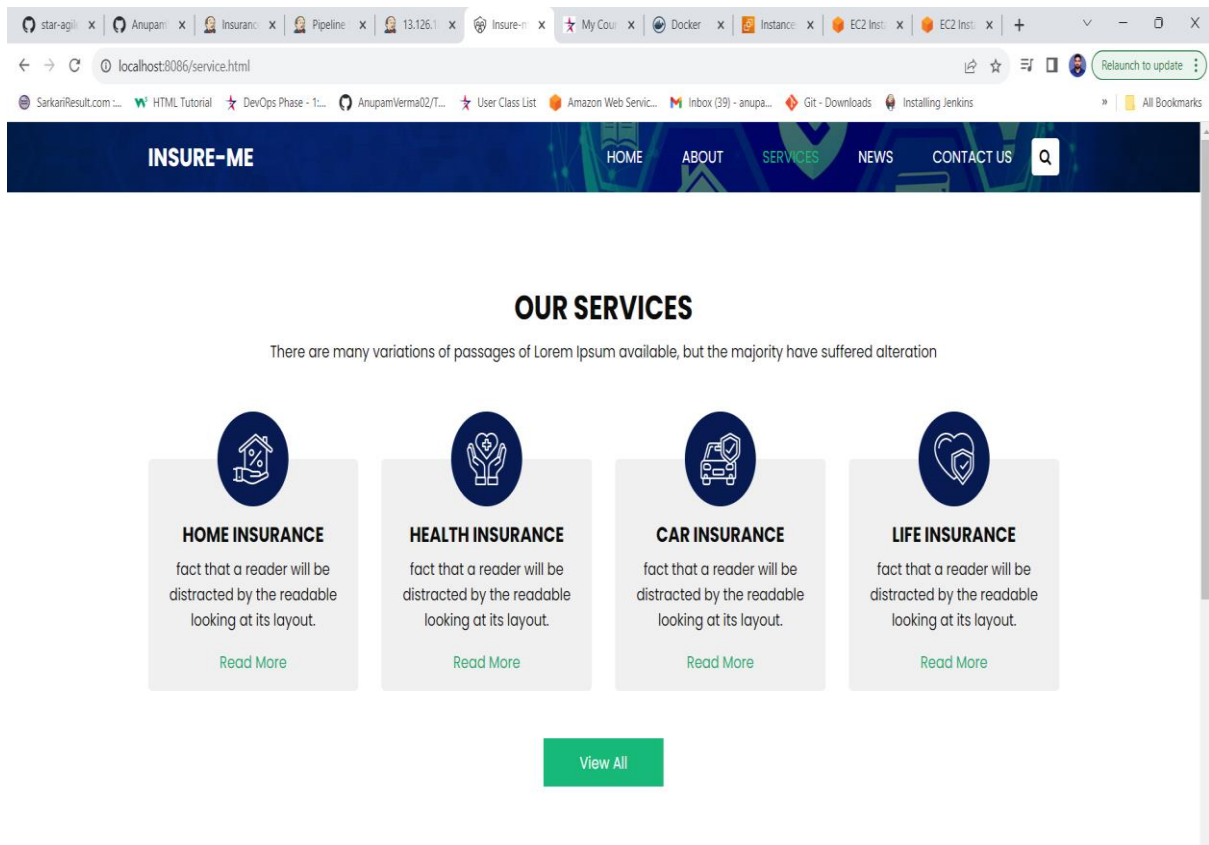
AWS : For creating ec2 machines as servers and deploy the web application.

Created Jenkins Master, Slave and testserver for application build and deployment. I deployed my web application on the testserver.



Here, below you can see my web application of my Insurance_Project is up and running in the browser. Here, I showed you all the pages of my Insurance Application.





Selenium Testing - For automating tests on the deployed web application, I used Selenium. Here you can see below that after performing the selenium testing where I gave my details as to be filled. You can see that it is successfully performing the selenium testing and my details are filled automatically.

