

# **DevOps Project: Milestone 2**

## **Problem Statement:**

Create an end-to-end CI/CD pipeline in AWS platform using Jenkins as the orchestration tool, Github as the SCM, Maven as the Build tool, deploy in a docker instance and create a Docker image, Store the docker image in ECR, Achieve Kubernetes deployment using the ECR image. Build a sample java web app using maven.

## **Requirements:**

- CI/CD Pipeline System
- Git: Source Code Management
- Github: Distributed Version Control System
- Jenkins: Automation tool for Continuous Integration and Continuous Deployment
- Maven: Build Automation tool for Java
- Tomcat: Java based Web Server for JavaServer Pages (JSP)
- Docker: Containerisation tool used for creating Docker Image
- Kubernetes: Deployment Automation and Management of Containerized Application

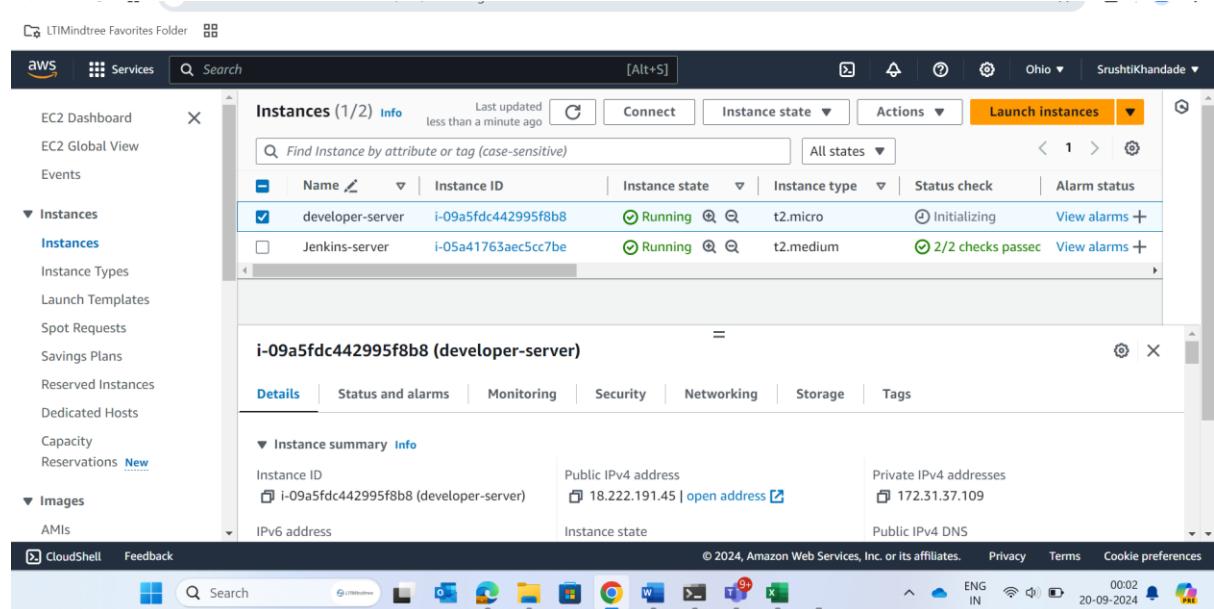
## **Servers Created:**

- Developer Server
- Jenkins Server
- Tomcat Server
- Docker Server
- Kubernetes Server

## Steps:

### 1. Created Developer Server

1.1. Initiated Amazon Linux EC2 instance for Developer Server and connected to local device via ssh



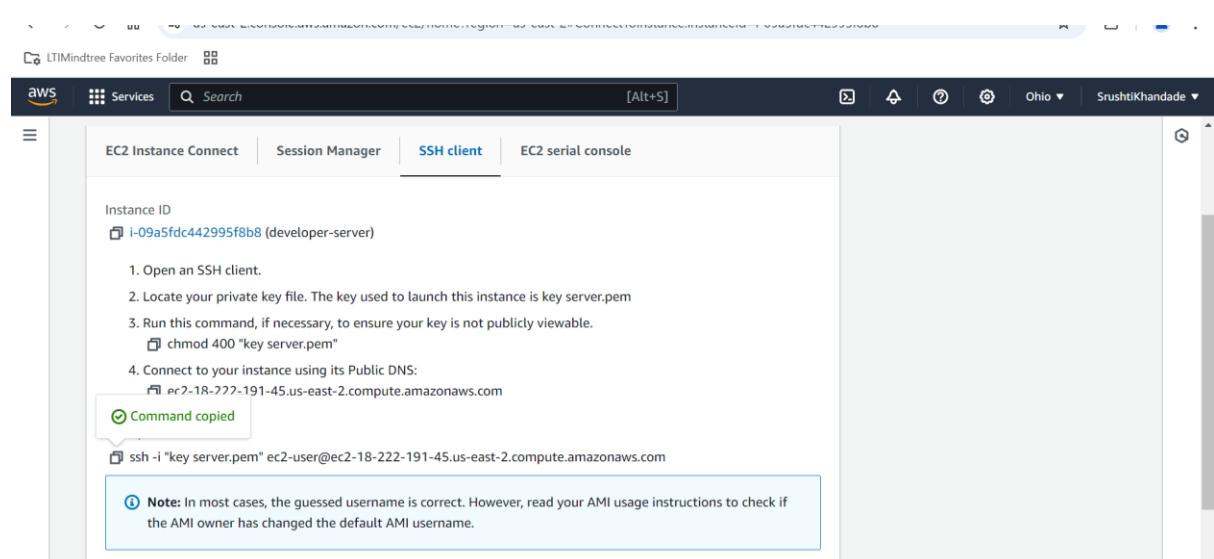
The screenshot shows the AWS EC2 Instances page. The left sidebar lists various EC2-related options like Dashboard, Global View, Events, Instances, Instance Types, Launch Templates, etc. The main pane displays two instances:

Name	Instance ID	Instance state	Instance type	Status check
developer-server	i-09a5fdc442995f8b8	Running	t2.micro	Initializing
Jenkins-server	i-05a41763aec5cc7be	Running	t2.medium	2/2 checks passed

Below the instances, the details for the developer-server instance are shown:

Details	Status and alarms	Monitoring	Security	Networking	Storage	Tags
<b>Instance summary</b>						
Instance ID i-09a5fdc442995f8b8 (developer-server)	Public IPv4 address 18.222.191.45   <a href="#">open address</a>	Private IPv4 addresses 172.31.37.109				
IPv6 address	Instance state	Public IPv4 DNS				

Developer-server instance created successfully!

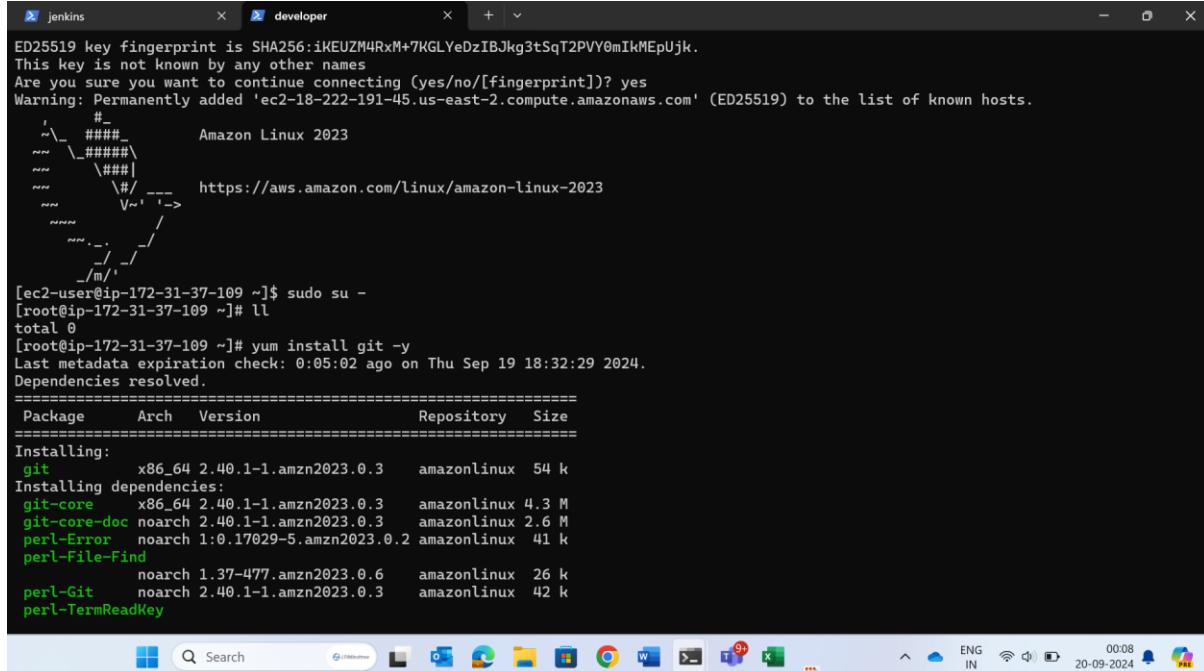


The screenshot shows the AWS EC2 Instance Connect interface, specifically the SSH client tab. It displays instructions for connecting via SSH:

- Open an SSH client.
- Locate your private key file. The key used to launch this instance is key server.pem.
- Run this command, if necessary, to ensure your key is not publicly viewable.  
`chmod 400 "key server.pem"`
- Connect to your instance using its Public DNS:  
`ssh -i "key server.pem" ec2-user@ec2-18-222-191-45.us-east-2.compute.amazonaws.com`

A message box indicates: **Command copied**. Below the instructions, a note states: **Note:** In most cases, the guessed username is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI username.

## 1.2. Installed git on developer server.

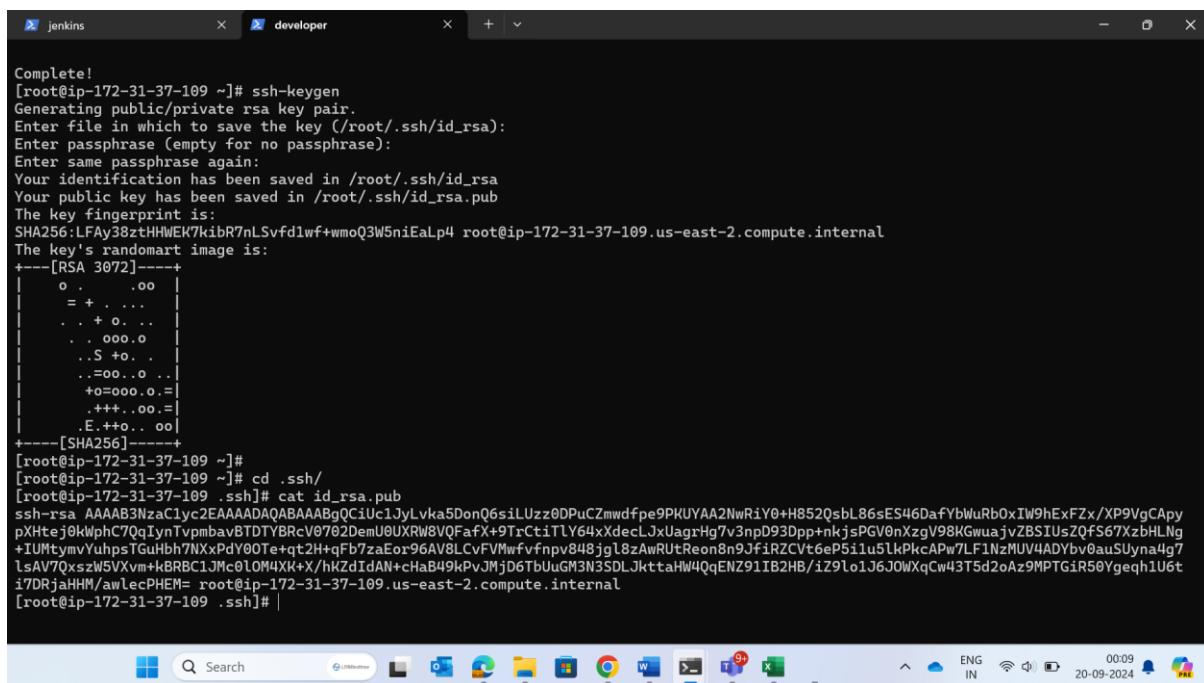


```
ED25519 key fingerprint is SHA256:iKEUZM4RxM+7KGLYeDzIBJkg3tSqT2PVY0mIkMEpUjk.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-18-222-191-45.us-east-2.compute.amazonaws.com' (ED25519) to the list of known hosts.

# 
~\_ #####          Amazon Linux 2023
~~ \#####|
~~\###| 
~~ \#/ ___ https://aws.amazon.com/linux/amazon-linux-2023
~~ \~' '-->
~~\_ /_
~~\_ /_
~/m'/

[ec2-user@ip-172-31-37-109 ~]$ sudo su -
[root@ip-172-31-37-109 ~]# ll
total 0
[root@ip-172-31-37-109 ~]# yum install git -y
Last metadata expiration check: 0:05:02 ago on Thu Sep 19 18:32:29 2024.
Dependencies resolved.
=====
Package      Arch Version       Repository Size
=====
Installing:
git           x86_64 2.40.1-1.amzn2023.0.3    amazonlinux 54 k
Installing dependencies:
git-core      x86_64 2.40.1-1.amzn2023.0.3    amazonlinux 4.3 M
git-core-doc  noarch 2.40.1-1.amzn2023.0.3   amazonlinux 2.6 M
perl-Error    noarch 1:0.17029-5.amzn2023.0.2  amazonlinux 41 k
perl-File-Find
noarch 1.37-477.amzn2023.0.6    amazonlinux 26 k
perl-Git      noarch 2.40.1-1.amzn2023.0.3   amazonlinux 42 k
perl-TermReadKey
```

## 1.3. Generated ssh-key for connection between EC2 and Github Account



```
Complete!
[root@ip-172-31-37-109 ~]# ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /root/.ssh/id_rsa
Your public key has been saved in /root/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:LFAY38zTHHWEK7kibR7nLSvfd1wf+wmoQ3W5niEaLp4 root@ip-172-31-37-109.us-east-2.compute.internal
The key's randomart image is:
+---[RSA 3072]---+
| o . . oo |
| = + . . . |
| . . + o. . . |
| . . ooo.o |
| ..S +o. . |
| ..=oo..oo .. |
| +o=ooo.o.= |
| .+++..oo.= |
| .E.+oo..oo |
+---[SHA256]---+
[root@ip-172-31-37-109 ~]#
[root@ip-172-31-37-109 ~]# cd .ssh/
[root@ip-172-31-37-109 .ssh]# cat id_rsa.pub
ssh-rsa AAAAB3NzaC1yc2EAAAQABAAABgQCiUc1JyLvka5DonQ6siLUzz0DPuCZmwdfpe9PKUYAA2NwRiY0+H852QsL86sES46DaFybWuRb0xIW9hExFZx/XP9VgCApy
pXHtej0KwphC70qIyNvpmbavBTDTYBRcv0702DemU0XRW8/QFafX+9TrCtiLY4xxdecLJxUagrHg7v3npDpp+nkjspGv0nXzgV98KGwuajvZBSIUsZQfS67zbHLNg
+IUHtmvYUhpsTGuhbh7NXxPdY00Te+qt2H+qfb7zaEor96AV8LCvFVmfvfnpv848jglBzAwRtReon8n9JfirZCVt6eP5ilu5lkPkAPw7Lf1NzHUV4ADYbv0auSuyna4g7
lsAV70xszw5VXvm+kBRBC1JM0LOM4XXkX/hKZdIdAN+cHaB49kPvJMjD6TbUuGM3N35DLJkttaHW4QqENZ91IB2HB/iZ9lo1J6J0WxqCw43T5d2oA29MPTGiR50Ygeqh1U6t
i7DRjaHHM=awlecPHEM= root@ip-172-31-37-109.us-east-2.compute.internal
[root@ip-172-31-37-109 .ssh]#
```

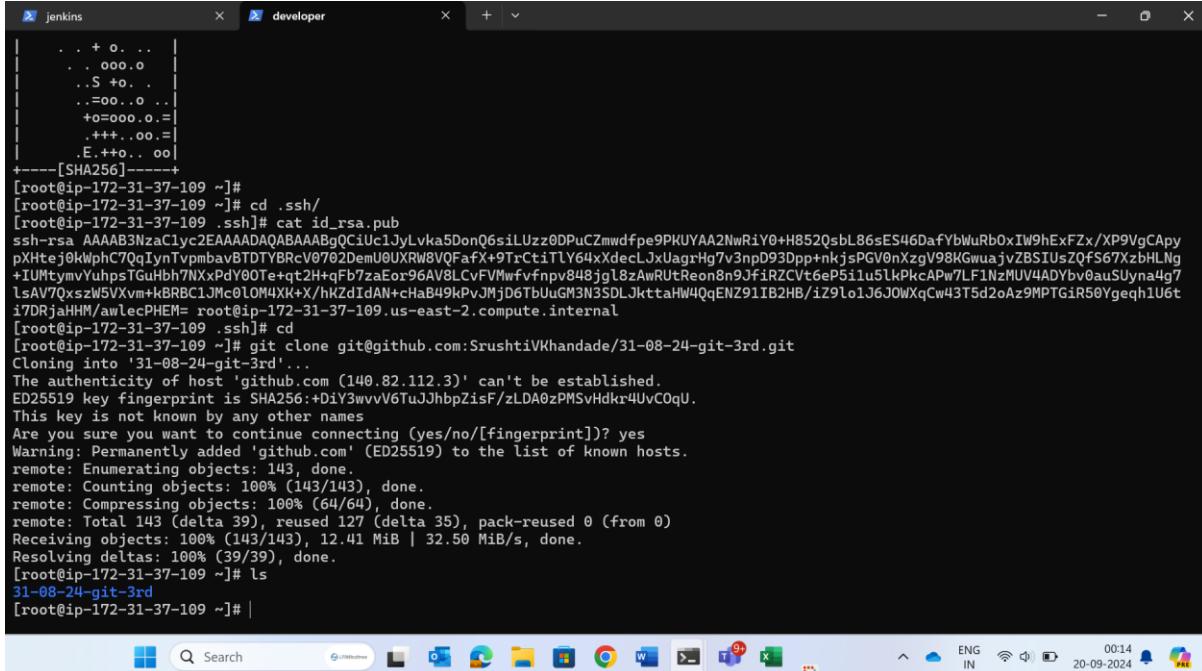
## 1.4. Added ssh-key of Developer Server to Github Account

The screenshot shows a Microsoft Edge browser window with the URL [github.com/settings/ssh/new](https://github.com/settings/ssh/new). The left sidebar shows navigation options like Public profile, Account, Appearance, Accessibility, Notifications, Access, Billing and plans, Emails, Password and authentication, Sessions, SSH and GPG keys (which is selected), Organizations, Enterprises, and Moderation. The main content area is titled "Add new SSH Key". It has fields for "Title" (set to "test") and "Key type" (set to "Authentication Key"). A large text area contains the SSH key text:  
ssh-rsa  
AAAAAB3NzaC1y2EAAAQABAAQgQCiUc1jyLvk5DonQ6siiUzz0DPuCZmwdfpe9PKUYAA2NwRiY0+H852QsbL86sES46DaFybWuRbOxIW9hExFzX/XP9vgCapppXHtej0kWphC7QqlnTvpmavaBTDTYRcv0702DemUUUXRW8VQfAx+9TcITIY64xXdecJxUlagrHg7v3npD93Dpp+nkjspGV0nXzgV98KGwajjZBSlUsZQs67XzbHLNg+IMtymvYuhpsTGuhbh7NxPdYO0Te+q12h+qFb7zaEo96AV8LCvFVmwfvrnpv848jgl8zAwRUltReon8n9JfirZCVt6eP5i1u5lkPkcaPw7LF1NzMUv4ADYbv0auaSUyna4g7lsAV7QxszW5VXvm+kBRBC1JMcoIOM4XK+X/hKZldIAN+chaB49kPvJMjD6TbUuGM3N3SDLUkttAHW4QqENZ91IB2HB/Z9lo1J6/OWXqcw43T5d2oAz9MPTGir50Ygeqh1U6ti7DRjaHHM/awlecPHEM= root@ip-172-31-37-109.us-east-2.compute.internal  
The "Add SSH key" button is visible at the bottom.

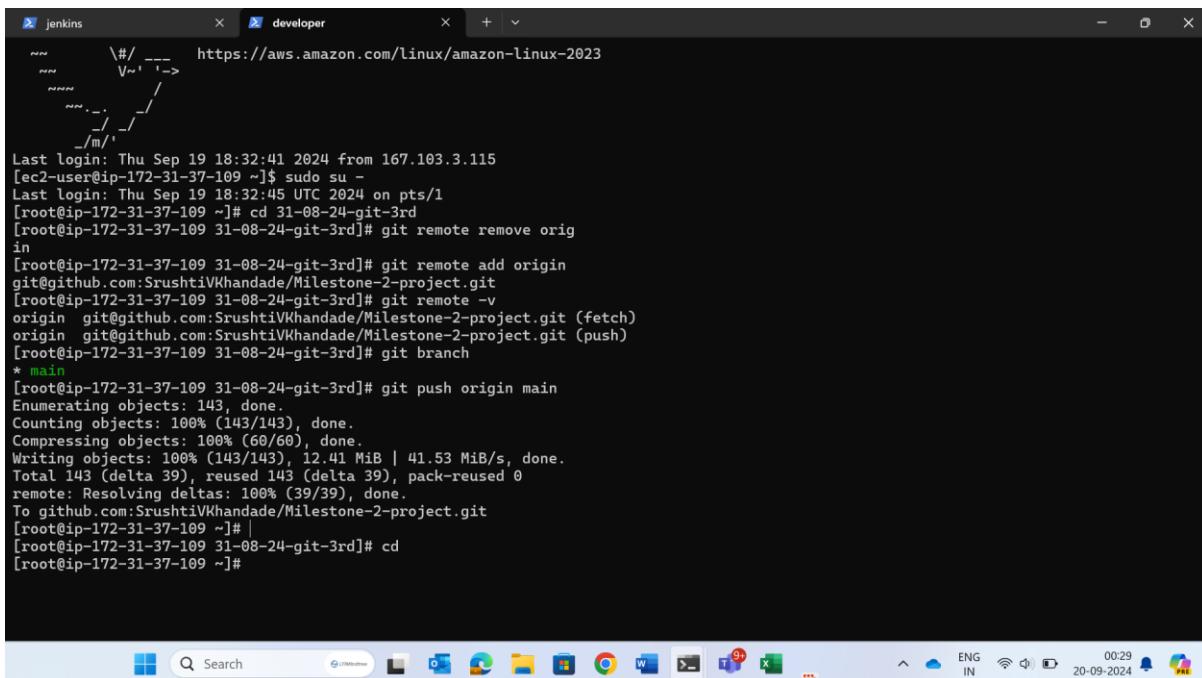
## 1.5. Created new repository on Github Account

The screenshot shows a Microsoft Edge browser window with the URL [github.com/new](https://github.com/new). The left sidebar shows navigation options like New repository (which is selected), LTIMindtree Favorites Folder, and a search bar. The main content area is titled "Create a new repository". It has fields for "Owner" (set to "SrushtiVKhandade") and "Repository name" (set to "Milestone 2-project"). A note says "Your new repository will be created as Milestone-2-project." Below it, there's a note about repository names and a suggestion for a short, memorable name. The "Description (optional)" field is empty. At the bottom, there are radio buttons for "Public" (selected) and "Private", with descriptions for each. The "Description (optional)" field is empty. The "Add repository" button is visible at the bottom.

## 1.6 Cloning git repository



```
jenkins developer
[SHA256]-----+
[root@ip-172-31-37-109 ~]# cd .ssh/
[root@ip-172-31-37-109 ~]# cat id_rsa.pub
ssh-rsa AAAAB3NzaC1yc2EAAAQABAAQCiUc1JyLvka5DnQ6siLUzz0DPuCZmwdfpe9PKUYAA2NwRiY0+H852QsbL86sES46DaFybWuRbOxIw9hExFzX/XP9VgCApy
pXHtej0kWphC7QqfynTvpmbaBTDTYBRcV0702DemU0XRW8VQFafX+9TrCtiTLY64xXdecLJxUagrHg7v3npD93Dpp+nkjPGV0nXzgV98KGwuajvZBSIUsZQfS67XzbHLNg
+iUMtymvYuhpsTGUhbh7NxPdY0Te+qt2H+qfb7zaEor96AV8LCvFVmfvfpv848jglbzAwRUtReon8n9JfIRZCVt6eP5i1u5lkPkcaPw7LF1NzMUV4ADYbv0auSuyna4g7
lsAV/70xszw5Vxm+KBRBC1JM+0LOM4XX+kX/hKZdIdAN+chAB49kPVJMjD6TbUuGM3N3SDLJkttahW4QqENZ91IB2HB/iZ9l01J6JOwXqCw43T5d2oAzmPMTGiR50Ygeqh1U6t
i7DRjaHHM/awlecPHEM= root@ip-172-31-37-109.us-east-2.compute.internal
[root@ip-172-31-37-109 ~]# git clone git@github.com:SrushtiVKhanda/31-08-24-git-3rd.git
Cloning into '31-08-24-git-3rd'...
The authenticity of host 'github.com (140.82.112.3)' can't be established.
ED25519 key fingerprint is SHA256:+0iY3vvv6TuJhbZisF/ZLDA0zPMsvHdkr4UvC0qU.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'github.com' (ED25519) to the list of known hosts.
remote: Enumerating objects: 143, done.
remote: Counting objects: 100% (143/143), done.
remote: Compressing objects: 100% (64/64), done.
remote: Total 143 (delta 39), reused 127 (delta 35), pack-reused 0 (from 0)
Receiving objects: 100% (143/143), 12.41 MiB | 32.50 MiB/s, done.
Resolving deltas: 100% (39/39), done.
[root@ip-172-31-37-109 ~]# ls
31-08-24-git-3rd
[root@ip-172-31-37-109 ~]# |
```



```
jenkins developer
~~      \#/ __  https://aws.amazon.com/linux/amazon-linux-2023
~~      V~' '-->
~~      /
~~      /-
~~      /_/
~/m'/

Last login: Thu Sep 19 18:32:41 2024 from 167.103.3.115
[ec2-user@ip-172-31-37-109 ~]$ sudo su -
Last login: Thu Sep 19 18:32:45 UTC 2024 on pts/1
[root@ip-172-31-37-109 ~]# cd 31-08-24-git-3rd
[root@ip-172-31-37-109 31-08-24-git-3rd]# git remote remove orig
in
[root@ip-172-31-37-109 31-08-24-git-3rd]# git remote add origin
git@github.com:SrushtiVKhanda/Milestone-2-project.git
[root@ip-172-31-37-109 31-08-24-git-3rd]# git remote -v
origin git@github.com:SrushtiVKhanda/Milestone-2-project.git (fetch)
origin git@github.com:SrushtiVKhanda/Milestone-2-project.git (push)
[root@ip-172-31-37-109 31-08-24-git-3rd]# git branch
* main
[root@ip-172-31-37-109 31-08-24-git-3rd]# git push origin main
Enumerating objects: 143, done.
Counting objects: 100% (143/143), done.
Compressing objects: 100% (60/60), done.
Writing objects: 100% (143/143), 12.41 MiB | 41.53 MiB/s, done.
Total 143 (delta 39), reused 143 (delta 39), pack-reused 0
remote: Resolving deltas: 100% (39/39), done.
To github.com:SrushtiVKhanda/Milestone-2-project.git
[root@ip-172-31-37-109 ~]#
[root@ip-172-31-37-109 31-08-24-git-3rd]# cd
[root@ip-172-31-37-109 ~]# |
```

The screenshot shows a GitHub repository page for 'Milestone-2-project' owned by SrushtiVKhandade. The repository is public and contains 28 commits. The commit history includes updates to index.jsp, Dockerfile, README.md, and pom.xml. The repository has 0 forks and 0 stars. The 'About' section indicates no description, website, or topics provided. The 'Releases' section shows no releases published, with a link to 'Create a new release'. The bottom of the screen shows a Windows taskbar with various pinned icons.

Milestone-2-project Public

SrushtiVKhandade / Milestone-2-project

Type to search

Code Issues Pull requests Actions Projects Wiki Security Insights Settings

Milestone-2-project

main 1 Branch 0 Tags

Go to file Add file Code

SrushtiVKhandade Update index.jsp a36ab4d - 2 weeks ago 28 Commits

File	Commit Message	Date
server	first commit	last year
webapp	Update index.jsp	2 weeks ago
Dockerfile	first commit	last year
README.md	Changed README File	last year
Snjay_Devops_project.pdf	Add files via upload	2 months ago
pom.xml	first commit	last year

About

No description, website, or topics provided.

Readme Activity 0 stars 1 watching 0 forks

Releases

No releases published Create a new release

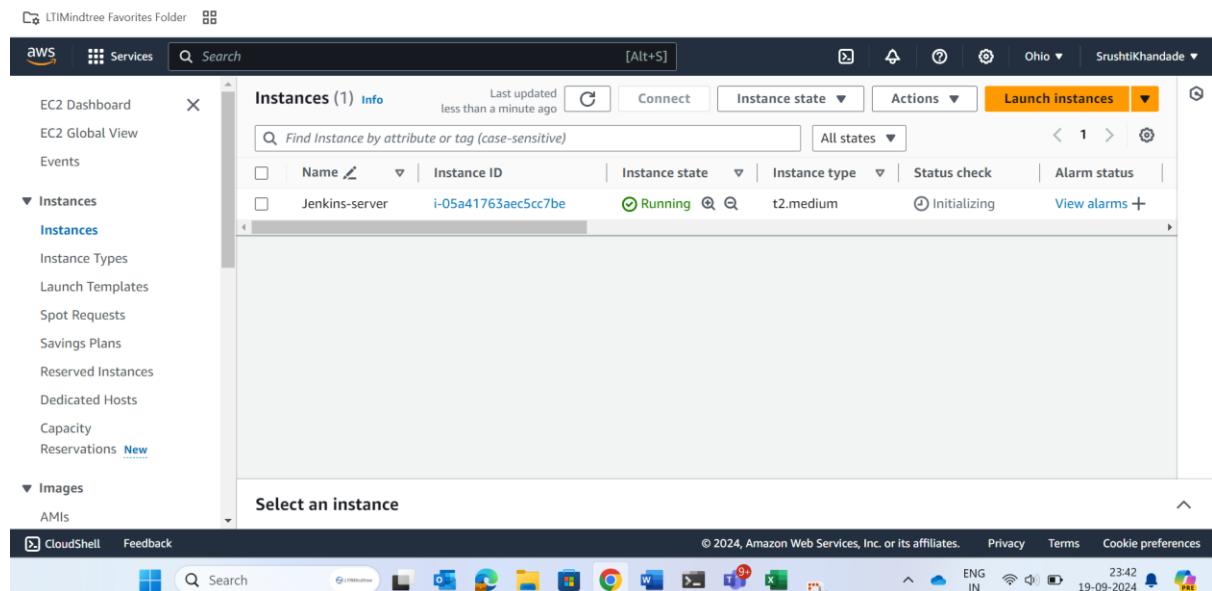
Search

ENG IN 00:30 20-09-2024

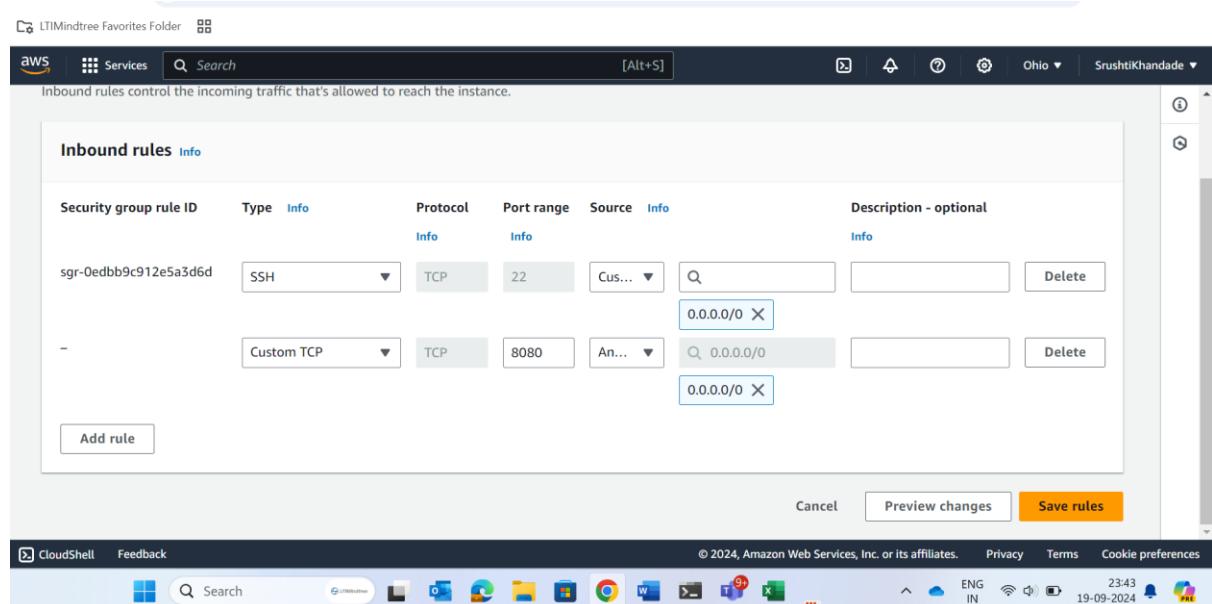
Developer added project to Github Repository Successfully!

## 2. Created Jenkins Server

2.1. Initiated Amazon Linux EC2 instance for Jenkins-server. Added 8080 TCP port in Security Group. Selected t2.medium as instance type. Added 15 GB as storage



### Edit the inbound rules



## 2.2. Connected Jenkins-server EC2 to local machine via ssh.

```
PS jenkins x + - <input type="checkbox" checked=""> Jenkins

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\10748164\Downloads> ssh -i "key_server.pem" ec2-user@ec2-18-218-209-89.us-east-2.compute.amazonaws.com
The authenticity of host 'ec2-18-218-209-89.us-east-2.compute.amazonaws.com (18.218.209.89)' can't be established.
ED25519 key fingerprint is SHA256:Z9m/+mF+UBzoJFNi5ZrzmhPQLRZ4tQzDyJbm86k6vU.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-18-218-209-89.us-east-2.compute.amazonaws.com' (ED25519) to the list of known hosts.

#_
~_\ #####
~~ \####\ Amazon Linux 2023
~~ \|##|
~~ \##| https://aws.amazon.com/linux/amazon-linux-2023
~~ \|_-->
~~ \|_/
~~ \|_/
~~ \|_/
~~ \|_/
[m/,
[ec2-user@ip-172-31-43-6 ~]$ sudo su -
[root@ip-172-31-43-6 ~]# yum install git -y
Last metadata expiration check: 0:03:17 ago on Thu Sep 19 18:13:12 2024.
Dependencies resolved.
=====
Package           Architecture      Version       Repository      Size
=====
Installing:
git              x86_64          2.40.1-1.amzn2023.0.3   amazonlinux    54 k
Installing dependencies:
git-core          x86_64          2.40.1-1.amzn2023.0.3   amazonlinux    4.3 M
git-core-doc     noarch          2.40.1-1.amzn2023.0.3   amazonlinux    2.6 M
perl-Error        noarch          1:0.17029-5.amzn2023.0.2   amazonlinux    41 k
perl-File-Find    noarch          1.37-477.amzn2023.0.6    amazonlinux    26 k

```

Installed git on Jenkins Server.

## 2.3. Installed java-17-amazon-corretto on Jenkins Server

The terminal window shows the output of the command `yum install java-17-amazon-corretto -y`. It lists the packages being installed, their architectures (x86\_64), versions, repositories (amazonlinux), and sizes. The output includes dependency resolution and the final package list.

Package	Architecture	Version	Repository	Size
java-17-amazon-corretto	x86_64	1:17.0.12+7-1.amzn2023.1	amazonlinux	187 k
Installing dependencies:				
alsa-lib	x86_64	1.2.7.2-1.amzn2023.0.2	amazonlinux	504 k
cairo	x86_64	1.17.6-2.amzn2023.0.1	amazonlinux	684 k
dejavu-sans-fonts	noarch	2.37-16.amzn2023.0.2	amazonlinux	1.3 M
dejavu-sans-mono-fonts	noarch	2.37-16.amzn2023.0.2	amazonlinux	467 k
dejavu-serif-fonts	noarch	2.37-16.amzn2023.0.2	amazonlinux	1.0 M
fontconfig	x86_64	2.13.94-2.amzn2023.0.2	amazonlinux	273 k
fonts-filesystem	noarch	1:2.0.5-12.amzn2023.0.2	amazonlinux	9.5 k
freetype	x86_64	2.13.2-5.amzn2023.0.1	amazonlinux	423 k
glib	x86_64	5.2.1-9.amzn2023.0.1	amazonlinux	49 k
google-noto-fonts-common	noarch	20201206-2.amzn2023.0.2	amazonlinux	15 k
google-noto-sans-vf-fonts	noarch	20201206-2.amzn2023.0.2	amazonlinux	492 k
graphite2	x86_64	1.3.14-7.amzn2023.0.2	amazonlinux	97 k
harfbuzz	x86_64	7.0.0-2.amzn2023.0.1	amazonlinux	868 k
java-17-amazon-corretto-headless	x86_64	1:17.0.12+7-1.amzn2023.1	amazonlinux	91 M
javapackages-filesystem	noarch	6.0.0-7.amzn2023.0.6	amazonlinux	12 k
langpacks-core-font-en	noarch	3.0-21.amzn2023.0.4	amazonlinux	10 k
libICE	x86_64	1.0.10-6.amzn2023.0.2	amazonlinux	71 k
libSM	x86_64	1.2.3-8.amzn2023.0.2	amazonlinux	42 k
libX11	x86_64	1.7.2-3.amzn2023.0.4	amazonlinux	657 k
libX11-common	noarch	1.7.2-3.amzn2023.0.4	amazonlinux	152 k
libXau	x86_64	1.0.9-6.amzn2023.0.2	amazonlinux	31 k
libXext	x86_64	1.3.4-6.amzn2023.0.2	amazonlinux	41 k
libXi	x86_64	1.7.10-6.amzn2023.0.2	amazonlinux	40 k

Git and java has been installed.

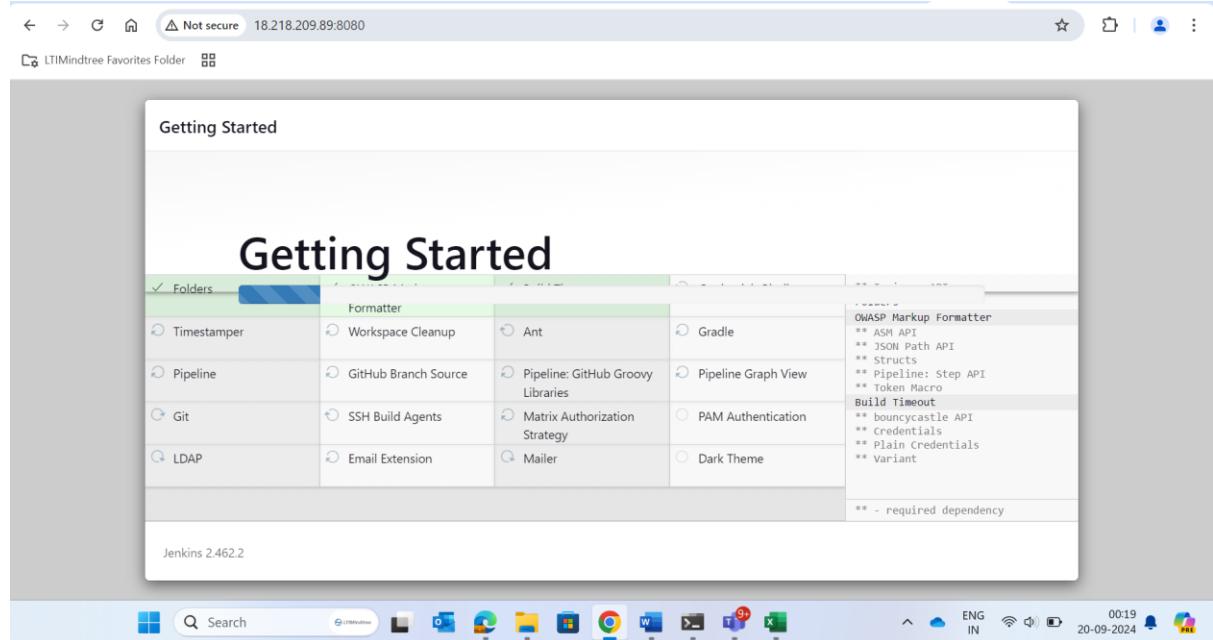
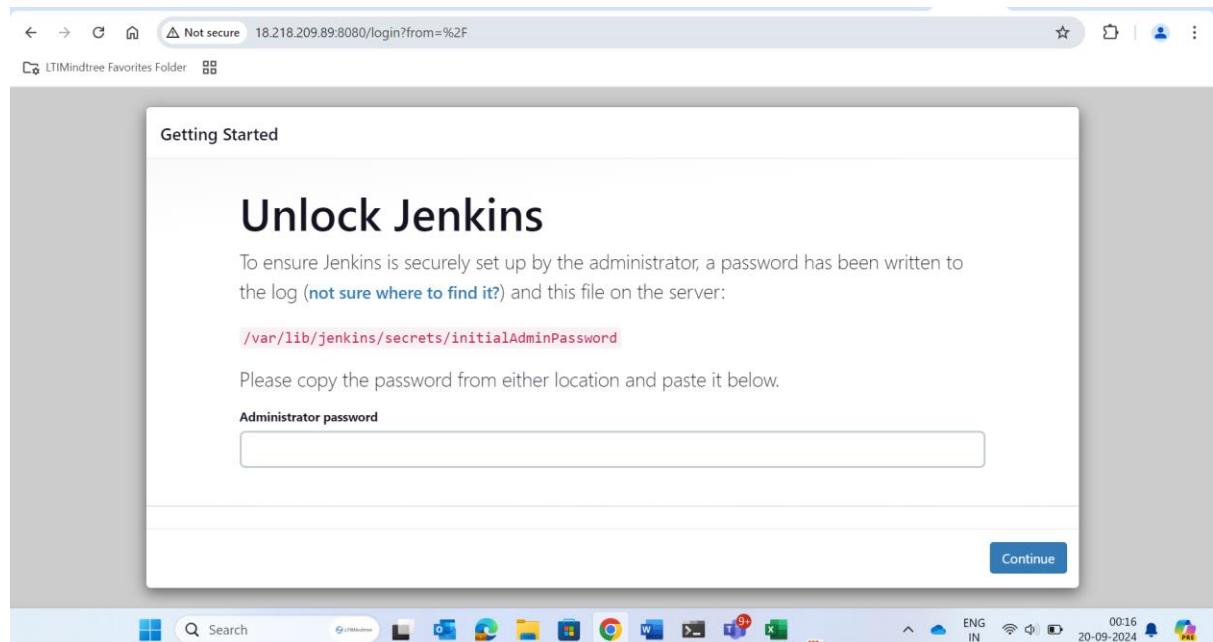
## 2.4. Installed Jenkins on Jenkins Server.

The terminal window shows the output of the command `yum install jenkins -y`. It displays the transaction summary, package details, and the progress of the download and installation process. The output shows Jenkins version 2.462.2-1.1 being installed from the jenkins repository.

Package	Architecture	Version	Repository	Size
jenkins	noarch	2.462.2-1.1	jenkins	89 M

Enabled Jenkins and Started Jenkins and checked status whether it is running correctly.

## 2.5. Copied secret password for initiating admin access in Jenkins Dashboard and Unlocked Jenkins on port 8080 as admin



The screenshot shows the Jenkins dashboard. At the top, there's a header with a logo, a search bar, and user information for 'Srushti Vijay Khandade'. Below the header, the main content area has a title 'Welcome to Jenkins!' and a message: '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.' On the left, there are several navigation links: '+ New Item', 'Build History', 'Manage Jenkins', and 'My Views'. A 'Build Queue' section shows 'No builds in the queue.' Below it is a 'Build Executor Status' section with 1 Idle and 2 Idle entries. In the center, there are three main buttons: 'Create a job', 'Set up a distributed build', and 'Set up an agent'. To the right, there's a 'Configure a cloud' button. The bottom of the screen shows a Windows taskbar with various icons and system status.

Jenkins has been connected in the Web Browser.

## 2.6. Installed Maven on Jenkins Server as build tool for Java Application

The terminal window shows the following command and its output:

```
Last login: Thu Sep 19 18:15:48 2024 from 167.103.3.115
[ec2-user@ip-172-31-43-6 ~]$ sudo su -
Last login: Thu Sep 19 18:15:54 UTC 2024 on pts/1
[root@ip-172-31-43-6 ~]# yum install maven
Last metadata expiration check: 0:36:20 ago on Thu Sep 19 18:25:20 2024.
Dependencies resolved.
=====
Package           Architecture Version      Repository   Size
=====
Installing:
maven             noarch      1:3.8.4-3.amzn2023.0.5    amazonlinux 18 k
Installing dependencies:
apache-commons-cli noarch      1.5.0-3.amzn2023.0.3    amazonlinux 76 k
apache-commons-codec noarch     1.15-6.amzn2023.0.3    amazonlinux 303 k
apache-commons-io  noarch     1:2.8.0-7.amzn2023.0.4   amazonlinux 284 k
apache-commons-lang3 noarch     3.12.0-7.amzn2023.0.3   amazonlinux 559 k
atinject          noarch     1.0.5-3.amzn2023.0.3    amazonlinux 23 k
cdi-api           noarch     2.0.2-6.amzn2023.0.3    amazonlinux 54 k
google-guice       noarch     4.2.3-8.amzn2023.0.6   amazonlinux 473 k
guava              noarch     31.0.1-3.amzn2023.0.6   amazonlinux 2.4 M
httpcomponents-client noarch   4.5.13-4.amzn2023.0.4   amazonlinux 657 k
httpcomponents-core noarch   4.4.13-6.amzn2023.0.3   amazonlinux 632 k
jakarta-annotations noarch   1.3.5-13.amzn2023.0.3   amazonlinux 46 k
jansi              x86_64    2.4.0-3.amzn2023.0.3   amazonlinux 113 k
java-17-amazon-corretto-devel x86_64   1:17.0.12+7-1.amzn2023.1  amazonlinux 142 k
jcl-over-slf4j      noarch     1.7.32-3.amzn2023.0.4   amazonlinux 25 k
jsoup              noarch     1.13.1-9.amzn2023.0.5   amazonlinux 377 k
jsr-305            noarch     3.0.2-5.amzn2023.0.4   amazonlinux 32 k
maven-amazon-corretto17 noarch   1:3.8.4-3.amzn2023.0.5   amazonlinux 9.4 k
maven-lib           noarch     1:3.8.4-3.amzn2023.0.5   amazonlinux 1.5 M
maven-resolver      noarch     1:1.7.3-3.amzn2023.0.4   amazonlinux 557 k
maven-shared-utils  noarch     3.3.4-4.amzn2023.0.3   amazonlinux 152 k
maven-wagon          noarch   3.4.2-6.amzn2023.0.4   amazonlinux 113 k
```

```

jenkins      developer
Verifying    : plexus-interpolation-1.26-10.amzn2023.0.4.noarch          26/31
Verifying    : plexus-sec-dispatcher-2.0-3.amzn2023.0.3.noarch          27/31
Verifying    : plexus-utils-3.3.0-9.amzn2023.0.4.noarch          28/31
Verifying    : publicsuffix-list-20240212-61.amzn2023.noarch          29/31
Verifying    : sisu-1.0.3.4-9.amzn2023.0.4.noarch          30/31
Verifying    : slf4j-1.7.32-3.amzn2023.0.4.noarch          31/31

Installed:
apache-commons-cli-1.5.0-3.amzn2023.0.3.noarch
apache-commons-io-1.2.8.0-7.amzn2023.0.4.noarch
atinject-1.0.5-3.amzn2023.0.3.noarch
google-guice-4.2.3-8.amzn2023.0.6.noarch
httpcomponents-client-4.5.13-4.amzn2023.0.4.noarch
jakarta-annotations-1.3.5-13.amzn2023.0.3.noarch
java-17-amazon-corretto-devel-1:17.0.12+7-1.amzn2023.1.x86_64
jsoup-1.13.1-9.amzn2023.0.5.noarch
maven-1:3.8.4-3.amzn2023.0.5.noarch
maven-lib-1:3.8.4-3.amzn2023.0.5.noarch
maven-shared-utils-3.3.4-4.amzn2023.0.3.noarch
plexus-cipher-1.8-3.amzn2023.0.3.noarch
plexus-containers-component-annotations-2.1.0-9.amzn2023.0.4.noarch
plexus-sec-dispatcher-2.0-3.amzn2023.0.3.noarch
publicsuffix-list-20240212-61.amzn2023.noarch
slf4j-1.7.32-3.amzn2023.0.4.noarch

Complete!
[root@ip-172-31-43-6 ~]# mvn --version
Apache Maven 3.8.4 (Red Hat 3.8.4-3.amzn2023.0.5)
Maven home: /usr/share/maven
Java version: 17.0.12, vendor: Amazon.com Inc., runtime: /usr/lib/jvm/java-17-amazon-corretto.x86_64
Default locale: en, platform encoding: UTF-8
OS name: "Linux", version: "6.1.109-118.189.amzn2023.x86_64", arch: "amd64", family: "unix"
[root@ip-172-31-43-6 ~]#

```

The terminal window shows the Maven dependency tree and version information. It lists various dependencies and their versions, such as plexus-interpolation-1.26-10.amzn2023.0.4.noarch, apache-commons-lang-3.12.0-7.amzn2023.0.3.noarch, and java-17-amazon-corretto-devel-1:17.0.12+7-1.amzn2023.1.x86\_64. The output concludes with the Maven version command, confirming the setup.

Maven has been installed successfully.

## 2.7. Installed Maven Integration Plugin on Jenkins Dashboard.

The screenshot shows the Jenkins dashboard under the 'Manage Jenkins' section, specifically the 'Plugins' page. The left sidebar shows navigation options like 'Updates', 'Available plugins' (which is selected), 'Installed plugins', 'Advanced settings', and 'Download progress'. The main area displays a search bar with 'mav' entered. A table lists available plugins:

Install	Name	Released
<input checked="" type="checkbox"/>	Maven Integration 3.23	1 yr 1 mo ago
<input type="checkbox"/>	Config File Provider 978.v8e85886ffdc	10 days ago
<input type="checkbox"/>	Jira 3.13	

The 'Maven Integration' plugin is highlighted with a checked checkbox in the 'Install' column. The description for this plugin states: 'This plugin provides a deep integration between Jenkins and Maven. It adds support for automatic triggers between projects depending on SNAPSHOTs as well as the automated configuration of various Jenkins publishers such as Junit.'

## 2.8. Added java installation path in Tools section of Jenkins Dashboard

The screenshot shows the Jenkins 'Manage Jenkins' interface under the 'Tools' section. A new JDK entry is being added, named 'java'. The 'JAVA\_HOME' field is set to '/usr/lib/jvm/java-17-amazon-corretto.x86\_64'. An 'Install automatically' checkbox is unchecked. At the bottom, there are 'Save' and 'Apply' buttons.

## 2.9. Added Maven installation path in Tools section of Jenkins Dashboard.

The screenshot shows the Jenkins 'Manage Jenkins' interface under the 'Tools' section. A new Maven entry is being added, named 'maven'. The 'MAVEN\_HOME' field is set to '/usr/share/maven'. An 'Install automatically' checkbox is unchecked. At the bottom, there are 'Save' and 'Apply' buttons.

## 2.10. Generated token from Jenkins Account Configure Section and Copied it for creating connection between Github Repository and Jenkins Server.

The screenshot shows the Jenkins 'Configure' screen for a user account. The 'API Token' section displays a current token labeled 'test' with the value '11a80c0ca6b25b516dfd8f59bc8fc0e777'. A warning message says '⚠️ Copy this token now, because it cannot be recovered in the future.' Below the token is a button to 'Add new Token'. The browser's address bar shows the URL '18.218.209.89:8080/user/srushtivkhanda/configure'.

## 2.11. Created one Github Webhook from settings of project repository. Added http path for Jenkins Server in payload URL. Added generated token copied from Jenkins as Secret.

The screenshot shows the GitHub 'Add webhook' configuration page. The 'Payload URL' field contains 'http://18.218.209.89:8080/github-webhook/'. The 'Secret' field contains the copied Jenkins API token '11a80c0ca6b25b516dfd8f59bc8fc0e777'. The 'SSL verification' section has 'Enable SSL verification' selected. The 'Which events would you like to trigger this webhook?' section has 'Just the push event' selected. The browser's address bar shows the URL 'github.com/SrushtiVKhanda/Milestone-2-project/settings/hooks/new'.

The screenshot shows a browser window with the URL [github.com/SrushtiVKhandade/Milestone-2-project/settings/hooks](https://github.com/SrushtiVKhandade/Milestone-2-project/settings/hooks). The page displays the 'Webhooks' section under the 'Settings' tab. A message at the top states, "Okay, that hook was successfully created. We sent a ping payload to test it out! Read more about it at <https://docs.github.com/webhooks/#ping-event>". On the left, a sidebar lists project settings: General, Access, Collaborators, Moderation options, Code and automation (Branches, Tags, Rules, Actions), and Webhooks (which is currently selected). A right-hand panel titled "Webhooks" contains a list with one item: "http://18.218.209.89:8080/github-... (push)". Below this, a note says "Last delivery was successful." with "Edit" and "Delete" buttons. The status bar at the bottom shows system information like battery level, signal strength, and the date/time.

## 2.12. Created maven project Milestone 2-Project.

The screenshot shows a browser window with the URL [18.218.209.89:8080/view/all/newJob](http://18.218.209.89:8080/view/all/newJob). The page is titled "New Item" and shows the Jenkins interface for creating a new job. It starts with "Enter an item name" and a field containing "Milestone 2-project". Below this, "Select an item type" is shown with three options: "Freestyle project" (selected), "Maven project" (disabled), and "Pipeline". Each option has a brief description. At the bottom is an "OK" button. The status bar at the bottom shows system information like battery level, signal strength, and the date/time.

## 2.13. Added Github repo link as Source Code Management and select branch main

The screenshot shows the Jenkins configuration interface for a project named 'Milestone 2-project'. In the 'Source Code Management' section, the 'Git' option is selected. Under 'Repositories', there is a single entry pointing to a GitHub repository. The 'Save' button is visible at the bottom of the form.

## 2.14. Build Java Application using Maven

The screenshot shows the Jenkins console output for a build job. The log output details the Maven build process, starting with cloning the repository from GitHub and then performing a clean install. The output ends with a success message: 'Build successful.'

```
Started by user Srushti Vijay Khandade
Running as SYSTEM
Building in workspace /var/lib/jenkins/workspace/Milestone 2-project
The recommended git tool is: NONE
No credentials specified
Cloning the remote Git repository
  > git init /var/lib/jenkins/workspace/Milestone 2-project # timeout=10
Fetching upstream changes from https://github.com/SrushtiVKhandade/Milestone-2-project.git
  > git --version # timeout=10
  > git --version # 'git version 2.40.1'
  > git fetch --tags --force --progress -- https://github.com/SrushtiVKhandade/Milestone-2-project.git
+refs/heads/*:refs/remotes/origin/*
  > git config remote.origin.url https://github.com/SrushtiVKhandade/Milestone-2-project.git # timeout=10
  > git config -add remote.origin.fetch +refs/heads/*:refs/remotes/origin/* # timeout=10
Avoid second fetch
```

Java Application Build Successful!

### 3. Created Tomcat Server

3.1. Initiated amazon linux EC2 instance tomcat-server and connected it with local machine via ssh.

The screenshot shows the AWS EC2 Instances page. On the left, there's a sidebar with options like EC2 Dashboard, EC2 Global View, Events, Instances (selected), Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Capacity, Reservations (New), and Images. The main area displays 'Instances (1/3) Info' with a table. The table has columns for Name, Instance ID, Instance state, Instance type, Status check, and Alarm status. It lists three instances: 'tomcat-server' (Pending, t2.micro), 'Jenkins-server' (Running, t2.medium), and 'developer-server' (Running, t2.micro). Below the table, a detailed view for the 'tomcat-server' instance is shown, including its instance ID, public and private IP addresses, and instance state.

### 3.2. . Install Java on Tomcat Server

```
[root@ip-172-31-45-13 ~]# yum install java* -y
Last metadata expiration check: 0:10:58 ago on Thu Sep 19 19:21:26 2024.
Dependencies resolved.
=====
 Package           Architecture Version       Repository   Size
=====
 Installing:
 java-1.8.0-amazon-corretto      x86_64        1:1.8.0_422.b05-1.amzn2023      amazonlinux  38 M
 java-1.8.0-amazon-corretto-devel x86_64        1:1.8.0_422.b05-1.amzn2023      amazonlinux  63 M
 java-11-amazon-corretto         x86_64        1:11.0_24+8-1.amzn2023      amazonlinux  197 k
 java-11-amazon-corretto-devel   x86_64        1:11.0_24+8-1.amzn2023      amazonlinux  211 k
 java-11-amazon-corretto-javadoc x86_64        1:11.0_24+8-1.amzn2023      amazonlinux  13 M
 java-11-amazon-corretto-jmods   x86_64        1:11.0_24+8-1.amzn2023      amazonlinux  71 M
 java-17-amazon-corretto         x86_64        1:17.0_12+7-1.amzn2023.1    amazonlinux  187 k
 java-17-amazon-corretto-javadoc x86_64        1:17.0_12+7-1.amzn2023.1    amazonlinux  12 M
 java-17-amazon-corretto-jmods   x86_64        1:17.0_12+7-1.amzn2023.1    amazonlinux  69 M
 java-21-amazon-corretto         x86_64        1:21.0_4+7-1.amzn2023.1    amazonlinux  213 k
 java-21-amazon-corretto-devel   x86_64        1:21.0_4+7-1.amzn2023.1    amazonlinux  150 k
 java-21-amazon-corretto-javadoc x86_64        1:21.0_4+7-1.amzn2023.1    amazonlinux  13 M
 java-21-amazon-corretto-jmods   x86_64        1:21.0_4+7-1.amzn2023.1    amazonlinux  75 M
 java_cup                      noarch      1:0.11b-21.amzn2023.0.3    amazonlinux  213 k
 java_cup-javadoc                noarch      1:0.11b-21.amzn2023.0.3    amazonlinux  150 k
 java_cup-manual                 noarch      1:0.11b-21.amzn2023.0.3    amazonlinux  13 M
 javacc                         noarch      7.0.4-11.amzn2023.0.1     amazonlinux  606 k
 javacc-demo                     noarch      7.0.4-11.amzn2023.0.1     amazonlinux  95 k
 javacc-javadoc                  noarch      7.0.4-11.amzn2023.0.1     amazonlinux  229 k
 javacc-manual                   noarch      7.0.4-11.amzn2023.0.1     amazonlinux  84 k
 javacc-maven-plugin              noarch      2.6-35.amzn2023.0.1      amazonlinux  77 k
```

### 3.3. downloading tar.gz file from tomcat 9.

Downloaded file in Tomcat Server using wget command and unzipped it using tar.

```
PS C:\Users\10748164\Downloads> ssh -i "key server.pem" ec2-user@ec2-3-137-205-209.us-east-2.compute.amazonaws.com
The authenticity of host 'ec2-3-137-205-209.us-east-2.compute.amazonaws.com (3.137.205.209)' can't be established.
ED25519 key fingerprint is SHA256:RpgmThebwVoaEoLO/TxxBVmQCHw2gudoB3xDUks2pc8.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-3-137-205-209.us-east-2.compute.amazonaws.com' (ED25519) to the list of known hosts.

#_ _###_ Amazon Linux 2023
~~ \_\#\#\#\_
~~ \#\#\#
~~ \#\_ https://aws.amazon.com/linux/amazon-linux-2023
~~ V~' '-->
~~ / /
~~ .-/-
~/ /m/
[ec2-user@ip-172-31-45-13 ~]$ sudo su -
[root@ip-172-31-45-13 ~]# wget https://downloads.apache.org/tomcat/tomcat-9/v9.0.95/bin/apache-tomcat-9.0.95.tar.gz.asc
--2024-09-19 19:22:44-- https://downloads.apache.org/tomcat/tomcat-9/v9.0.95/bin/apache-tomcat-9.0.95.tar.gz.asc
Resolving downloads.apache.org (downloads.apache.org)... 88.99.208.237, 135.181.214.104, 2a01:4f9:3a:2c57::2, ...
Connecting to downloads.apache.org (downloads.apache.org)|88.99.208.237|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 833 [text/plain]
Saving to: 'apache-tomcat-9.0.95.tar.gz.asc'

apache-tomcat-9.0.95.tar.gz.asc 100%[=====] 833 --.-KB/s in 0s

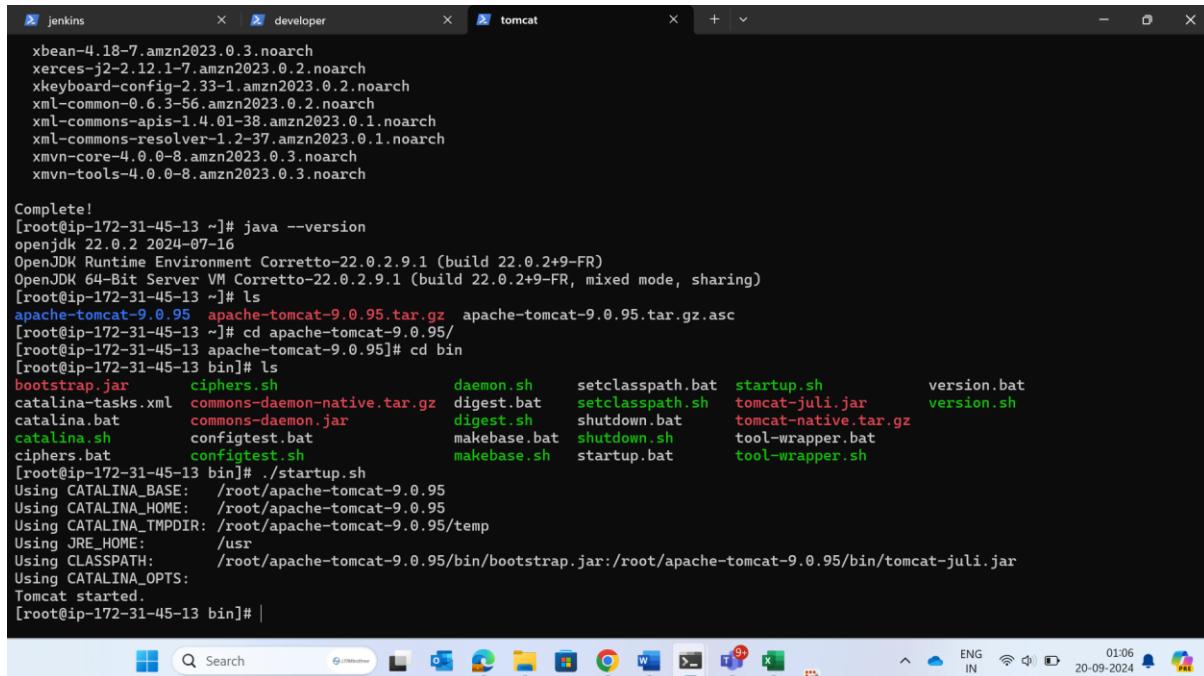
2024-09-19 19:22:44 (20.3 MB/s) - 'apache-tomcat-9.0.95.tar.gz.asc' saved [833/833]

[root@ip-172-31-45-13 ~]# ls
apache-tomcat-9.0.95.tar.gz.asc
[root@ip-172-31-45-13 ~]# |
```

```
apache-tomcat-9.0.95.tar.gz      100%[=====] 12.13M --.-KB/s in 0.1s
2024-09-19 19:25:50 (127 MB/s) - 'apache-tomcat-9.0.95.tar.gz' saved [12715996/12715996]

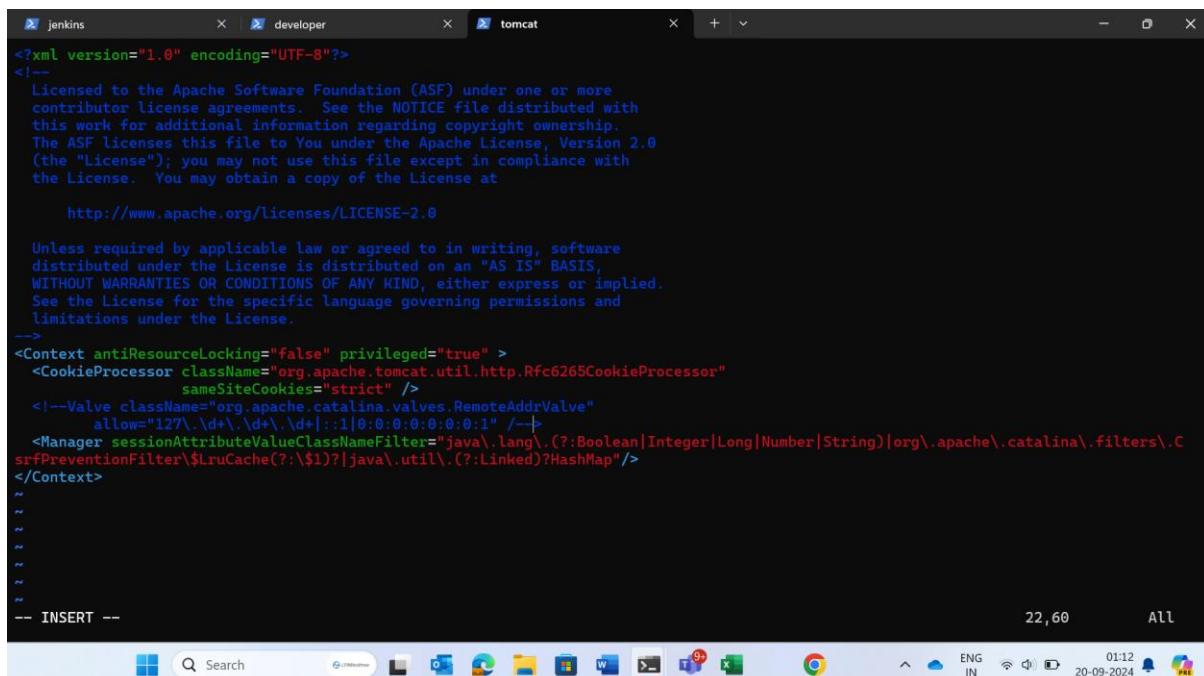
[root@ip-172-31-45-13 ~]# ls
apache-tomcat-9.0.95.tar.gz      apache-tomcat-9.0.95.tar.gz.asc
[root@ip-172-31-45-13 ~]# tar apache-tomcat-9.0.95.tar.gz
tar: Old option 'g' requires an argument.
Try 'tar --help' or 'tar --usage' for more information.
[root@ip-172-31-45-13 ~]# tar -xvf apache-tomcat-9.0.95.tar.gz
apache-tomcat-9.0.95/conf/
apache-tomcat-9.0.95/conf/catalina.policy
apache-tomcat-9.0.95/conf/catalina.properties
apache-tomcat-9.0.95/conf/context.xml
apache-tomcat-9.0.95/conf/jaspic-providers.xml
apache-tomcat-9.0.95/conf/jaspic-providers.xsd
apache-tomcat-9.0.95/conf/logging.properties
apache-tomcat-9.0.95/conf/server.xml
apache-tomcat-9.0.95/conf/tomcat-users.xml
apache-tomcat-9.0.95/conf/tomcat-users.xsd
apache-tomcat-9.0.95/conf/web.xml
apache-tomcat-9.0.95/bin/
apache-tomcat-9.0.95/lib/
apache-tomcat-9.0.95/logs/
apache-tomcat-9.0.95/temp/
apache-tomcat-9.0.95/webapps/
apache-tomcat-9.0.95/webapps/ROOT/
apache-tomcat-9.0.95/webapps/ROOT/WEB-INF/
apache-tomcat-9.0.95/webapps/docs/
apache-tomcat-9.0.95/webapps/docs/META-INF/
apache-tomcat-9.0.95/webapps/docs/WEB-INF/
apache-tomcat-9.0.95/webapps/docs/WEB-INF/jsp/
```

### 3.4. Started Tomcat Server and configured some pre-requisite settings



```
xbean-4.18-7.amzn2023.0.3.noarch
xerces-j2-2.12.1-7.amzn2023.0.2.noarch
xkeyboard-config-2.33-1.amzn2023.0.2.noarch
xml-common-0.6.3-56.amzn2023.0.2.noarch
xml-commons-apis-1.4.01-38.amzn2023.0.1.noarch
xml-commons-resolver-1.2-37.amzn2023.0.1.noarch
xmvn-core-4.0.0-8.amzn2023.0.3.noarch
xmvn-tools-4.0.0-8.amzn2023.0.3.noarch

Complete!
[root@ip-172-31-45-13 ~]# java --version
openjdk 22.0.2 2024-07-16
OpenJDK Runtime Environment Corretto-22.0.2.9.1 (build 22.0.2+9-FR)
OpenJDK 64-Bit Server VM Corretto-22.0.2.9.1 (build 22.0.2+9-FR, mixed mode, sharing)
[root@ip-172-31-45-13 ~]# ls
apache-tomcat-9.0.95 apache-tomcat-9.0.95.tar.gz apache-tomcat-9.0.95.tar.gz.asc
[root@ip-172-31-45-13 ~]# cd apache-tomcat-9.0.95/
[root@ip-172-31-45-13 apache-tomcat-9.0.95]# cd bin
[root@ip-172-31-45-13 bin]# ls
bootstrap.jar      ciphers.sh          daemon.sh      setclasspath.bat  startup.sh        version.bat
catalina-tasks.xml commons-daemon-native.tar.gz digest.bat    setclasspath.sh  tomcat-juli.jar   version.sh
catalina.bat        commons-daemon.jar  digest.sh     shutdown.bat    tomcat-native.tar.gz
catalina.sh         configtest.bat    makebase.bat shutdown.sh    tool-wrapper.bat
ciphers.bat        configtest.sh    makebase.sh   startup.bat    tool-wrapper.sh
[root@ip-172-31-45-13 bin]# ./startup.sh
Using CATALINA_BASE:  /root/apache-tomcat-9.0.95
Using CATALINA_HOME:   /root/apache-tomcat-9.0.95
Using CATALINA_TMPDIR: /root/apache-tomcat-9.0.95/temp
Using JRE_HOME:       /usr
Using CLASSPATH:      /root/apache-tomcat-9.0.95/bin/bootstrap.jar:/root/apache-tomcat-9.0.95/bin/tomcat-juli.jar
Using CATALINA_OPTS:
Tomcat started.
[root@ip-172-31-45-13 bin]# |
```



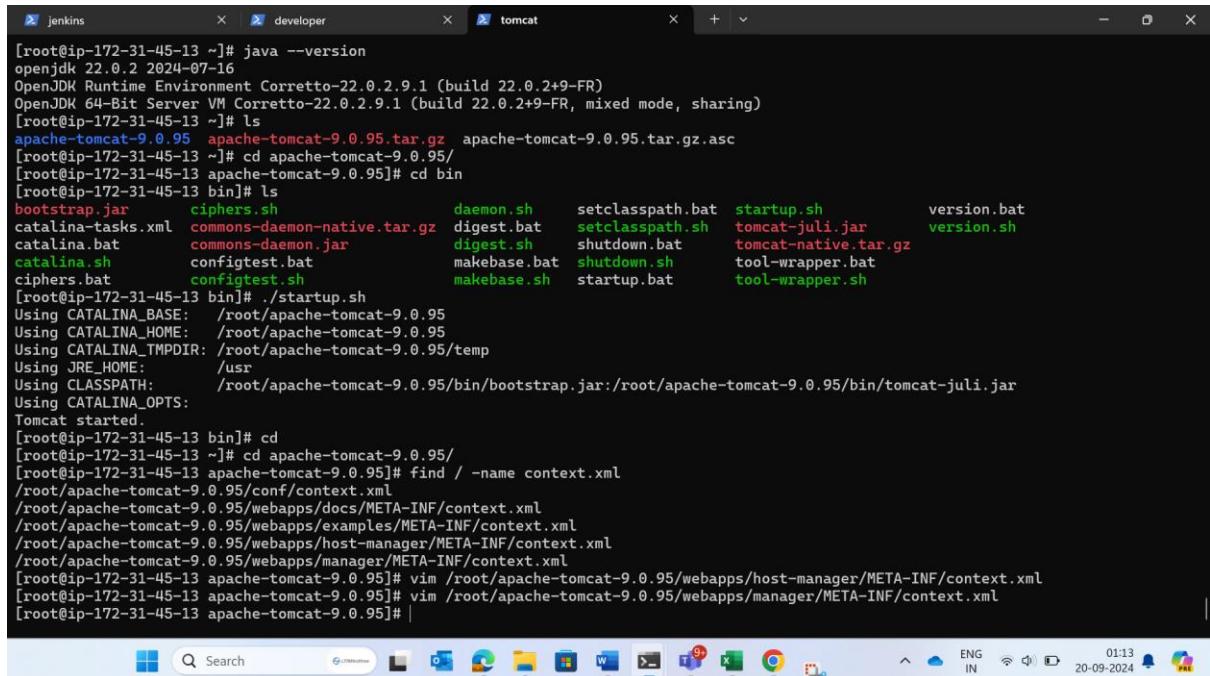
```
<?xml version="1.0" encoding="UTF-8"?>
<!--
Licensed to the Apache Software Foundation (ASF) under one or more
contributor license agreements. See the NOTICE file distributed with
this work for additional information regarding copyright ownership.
The ASF licenses this file to You under the Apache License, Version 2.0
(the "License"); you may not use this file except in compliance with
the License. You may obtain a copy of the License at

    http://www.apache.org/licenses/LICENSE-2.0

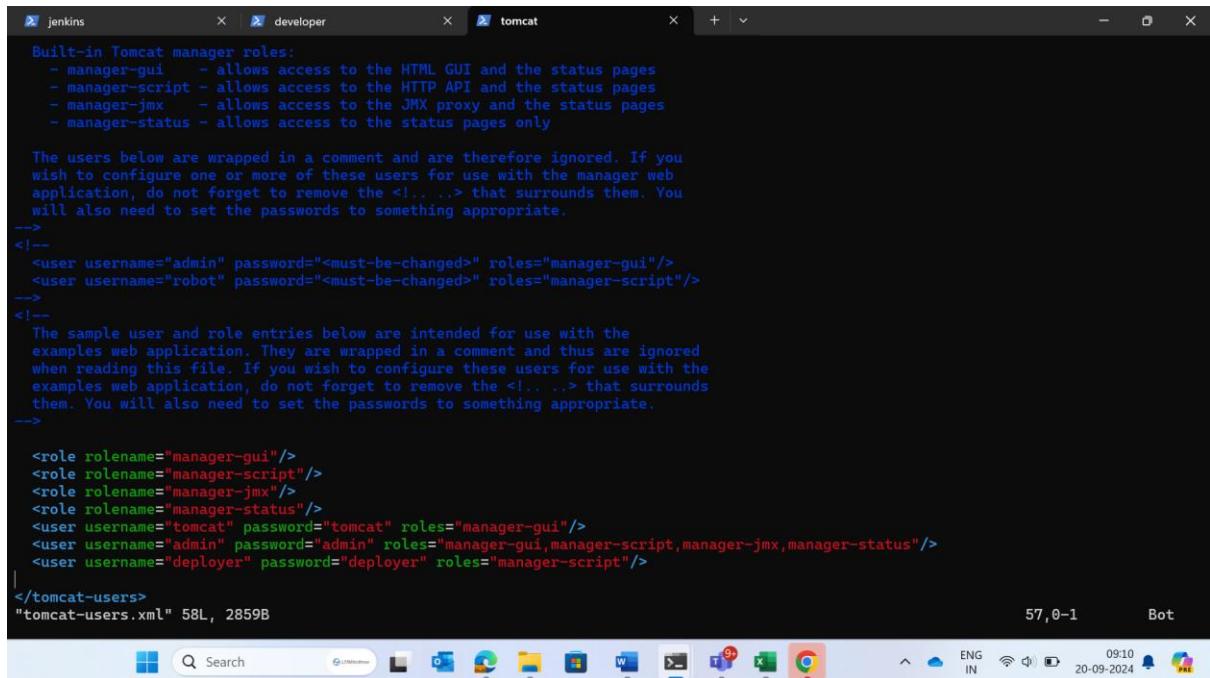
Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.
-->
<Context antiResourceLocking="false" privileged="true" >
    <CookieProcessor className="org.apache.tomcat.util.http.Rfc6265CookieProcessor"
        sameSiteCookies="strict" />
    <!--Valve className="org.apache.catalina.valves.RemoteAddrValve"
        allow="127\.\d+\.\d+\:\d{1,5};" /-->
    <Manager sessionAttributeValueClassNameFilter="java\lang\.(?:Boolean|Integer|Long|Number|String)|org\apache\catalina\filters\CSRfPreventionFilter\$LruCache(?:\$1)?|java\util\.(?:Linked)?HashMap"/>
</Context>
~
~
~
~
~
~
-- INSERT --
22,60          All

```

### 3.5. Added roles and users in tomcat-users.xml and .



```
[root@ip-172-31-45-13 ~]# java --version
openjdk 22.0.2 2024-07-16
OpenJDK Runtime Environment Corretto-22.0.2.9.1 (build 22.0.2+9-FR)
OpenJDK 64-Bit Server VM Corretto-22.0.2.9.1 (build 22.0.2+9-FR, mixed mode, sharing)
[root@ip-172-31-45-13 ~]# ls
apache-tomcat-9.0.95 apache-tomcat-9.0.95.tar.gz apache-tomcat-9.0.95.tar.gz.asc
[root@ip-172-31-45-13 ~]# cd apache-tomcat-9.0.95/
[root@ip-172-31-45-13 apache-tomcat-9.0.95]# cd bin
[root@ip-172-31-45-13 bin]# ls
bootstrap.jar ciphers.sh daemon.sh setclasspath.bat startup.sh version.bat
catalina-tasks.xml commons-daemon-native.tar.gz digest.bat setclasspath.sh tomcat-juli.jar version.sh
catalina.bat commons-daemon.jar digest.sh shutdown.bat tomcat-native.tar.gz
catalina.sh configtest.bat makebase.bat shutdown.sh tool-wrapper.bat
ciphers.bat configtest.sh makebase.sh startup.bat tool-wrapper.sh
[root@ip-172-31-45-13 bin]# ./startup.sh
Using CATALINA_BASE: /root/apache-tomcat-9.0.95
Using CATALINA_HOME: /root/apache-tomcat-9.0.95
Using CATALINA_TMPDIR: /root/apache-tomcat-9.0.95/temp
Using JRE_HOME: /usr
Using CLASSPATH: /root/apache-tomcat-9.0.95/bin/bootstrap.jar:/root/apache-tomcat-9.0.95/bin/tomcat-juli.jar
Using CATALINA_OPTS:
Tomcat started.
[root@ip-172-31-45-13 bin]# cd
[root@ip-172-31-45-13 ~]# cd apache-tomcat-9.0.95/
[root@ip-172-31-45-13 apache-tomcat-9.0.95]# find / -name context.xml
/root/apache-tomcat-9.0.95/conf/context.xml
/root/apache-tomcat-9.0.95/webapps/docs/META-INF/context.xml
/root/apache-tomcat-9.0.95/webapps/examples/META-INF/context.xml
/root/apache-tomcat-9.0.95/webapps/host-manager/META-INF/context.xml
/root/apache-tomcat-9.0.95/webapps/manager/META-INF/context.xml
[root@ip-172-31-45-13 apache-tomcat-9.0.95]# vim /root/apache-tomcat-9.0.95/webapps/host-manager/META-INF/context.xml
[root@ip-172-31-45-13 apache-tomcat-9.0.95]# vim /root/apache-tomcat-9.0.95/webapps/manager/META-INF/context.xml
[root@ip-172-31-45-13 apache-tomcat-9.0.95]# |
```



```
Built-in Tomcat manager roles:
- manager-gui - allows access to the HTML GUI and the status pages
- manager-script - allows access to the HTTP API and the status pages
- manager-jmx - allows access to the JMX proxy and the status pages
- manager-status - allows access to the status pages only

The users below are wrapped in a comment and are therefore ignored. If you
wish to configure one or more of these users for use with the manager web
application, do not forget to remove the <!...> that surrounds them. You
will also need to set the passwords to something appropriate.
-->
<!--
<user username="admin" password="" roles="manager-gui"/>
<user username="robot" password="" roles="manager-script"/>
-->
<!--
The sample user and role entries below are intended for use with the
examples web application. They are wrapped in a comment and thus are ignored
when reading this file. If you wish to configure these users for use with the
examples web application, do not forget to remove the <!...> that surrounds
them. You will also need to set the passwords to something appropriate.
-->

<role rolename="manager-gui"/>
<role rolename="manager-script"/>
<role rolename="manager-jmx"/>
<role rolename="manager-status"/>
<user username="tomcat" password="tomcat" roles="manager-gui"/>
<user username="admin" password="admin" roles="manager-gui,manager-script,manager-jmx,manager-status"/>
<user username="deployer" password="deployer" roles="manager-script"/>

</tomcat-users>
"tomcat-users.xml" 58L, 2859B
```

### 3.6. Hosted tomcat dashboard on 8080 port

The screenshot shows the Apache Tomcat 9.0.95 dashboard running on port 8080. The URL in the browser bar is 3.137.205.209:8080. The page has a green header with the Apache logo and a message: "If you're seeing this, you've successfully installed Tomcat. Congratulations!". Below the header, there's a section for "Developer Quick Start" with links to Tomcat Setup, First Web Application, Realms & AAA, JDBC DataSources, Examples, Servlet Specifications, and Tomcat Versions. There are also sections for "Managing Tomcat", "Documentation" (with links to Tomcat 9.0 Documentation, Tomcat 9.0 Configuration, and Tomcat Wiki), and "Getting Help" (with links to FAQ and Mailing Lists). On the right side, there are buttons for "Server Status", "Manager App", and "Host Manager". The bottom of the screen shows a Windows taskbar with various icons and system status.

The screenshot shows the Tomcat Web Application Manager at 3.137.205.209:8080/manager/html. The page title is "Tomcat Web Application Manager". It displays a table of applications:

Path	Version	Display Name	Running	Sessions	Commands
/	None specified	Welcome to Tomcat	true	0	<a href="#">Start</a> <a href="#">Stop</a> <a href="#">Reload</a> <a href="#">Undeploy</a> <a href="#">Expire sessions with idle ≥ 30 minutes</a>
/docs	None specified	Tomcat Documentation	true	0	<a href="#">Start</a> <a href="#">Stop</a> <a href="#">Reload</a> <a href="#">Undeploy</a> <a href="#">Expire sessions with idle ≥ 30 minutes</a>
/examples	None specified	Servlet and JSP Examples	true	0	<a href="#">Start</a> <a href="#">Stop</a> <a href="#">Reload</a> <a href="#">Undeploy</a> <a href="#">Expire sessions with idle ≥ 30 minutes</a>

The interface includes tabs for Manager, List Applications, HTML Manager Help, Manager Help, and Server Status. The bottom of the screen shows a Windows taskbar with various icons and system status.

### 3.7. Added deployer credentials in Jenkins Dashboard.

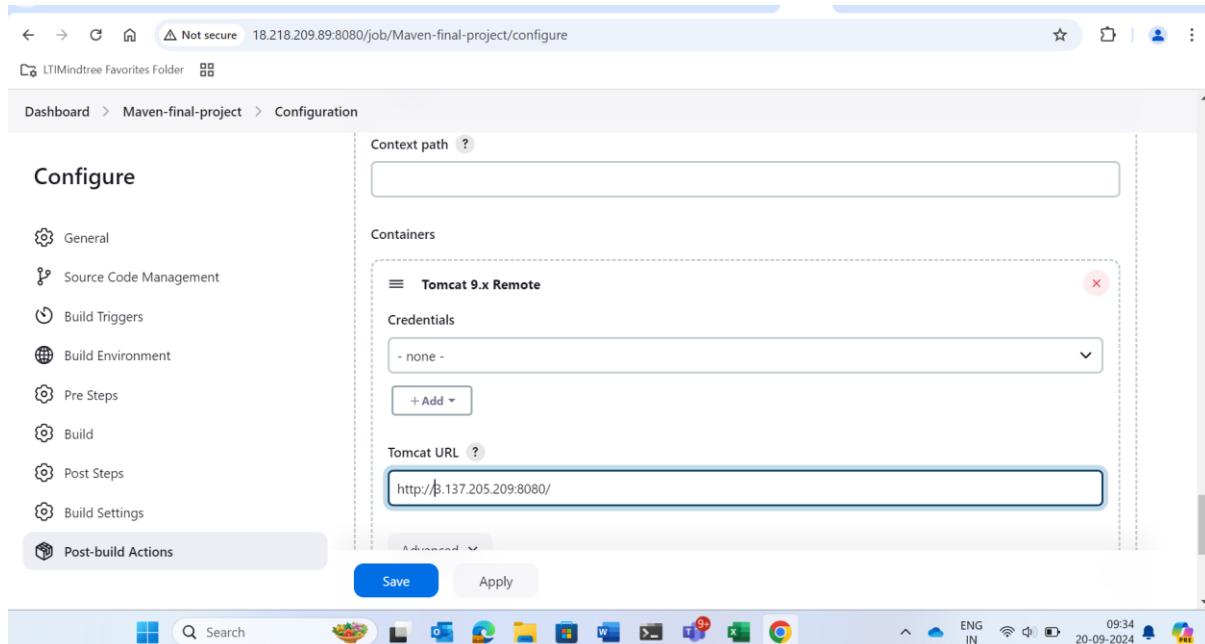
The screenshot shows the Jenkins 'Global credentials (unrestricted)' creation form. The 'Kind' dropdown is set to 'Username with password'. The 'Scope' field is empty. The 'Username' field contains 'deployer'. The 'Treat username as secret' checkbox is unchecked. The 'Password' field contains '\*\*\*\*\*'. A blue 'Create' button is at the bottom.

The screenshot shows the Jenkins 'Global credentials (unrestricted)' list page. It displays a single credential entry:

ID	Name	Kind	Description
3a1fae73-737b-4559-a646-24fb8afacda1	deployer/*****	Username with password	

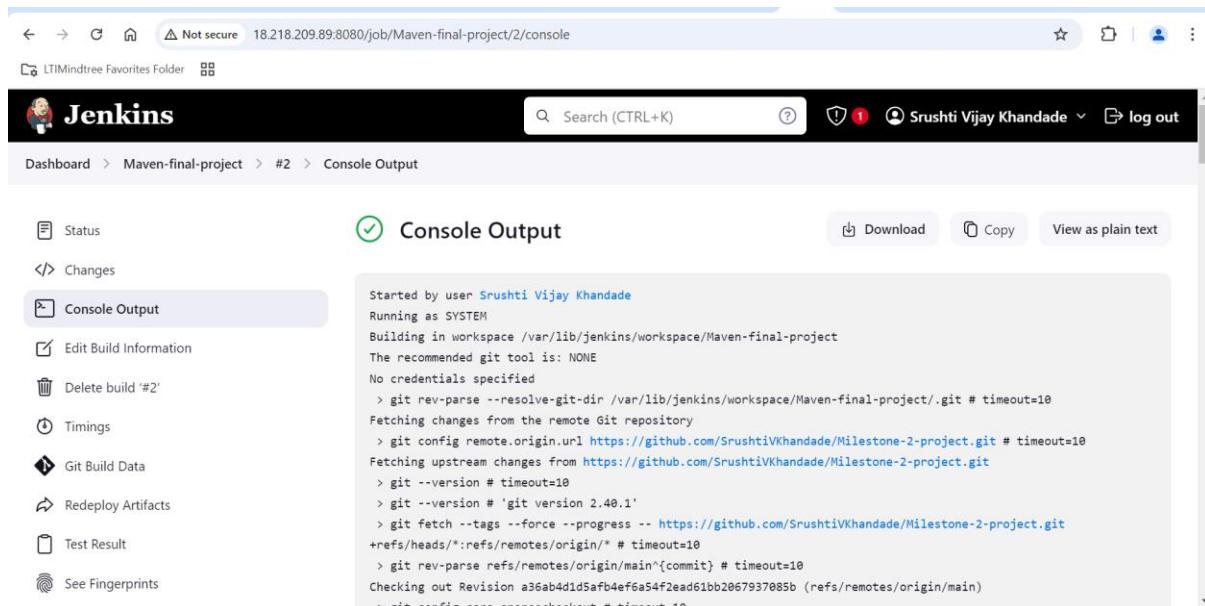
At the top right, there is a '+ Add Credentials' button. At the bottom left, there are icon size options: S, M, L. At the bottom right, it shows 'REST API' and 'Jenkins 2.46.2'.

### 3.8. Added deployer credentials and Tomcat URL



The screenshot shows the Jenkins configuration interface for a job named "Maven-final-project". The left sidebar lists various configuration sections: General, Source Code Management, Build Triggers, Build Environment, Pre Steps, Build, Post Steps, Build Settings, and Post-build Actions. The "Post-build Actions" section is currently selected. In the main panel, under the "Containers" section, there is a "Tomcat 9.x Remote" entry. The "Credentials" dropdown is set to "none". The "Tomcat URL" field contains the value "http://137.205.209.8080/". At the bottom of the panel are "Save" and "Apply" buttons.

### 3.9. Build the Java application using tomcat deployment.



The screenshot shows the Jenkins console output for a build step. The left sidebar shows navigation links: Status, Changes, Console Output (which is selected), Edit Build Information, Delete build '#2', Timings, Git Build Data, Redeploy Artifacts, Test Result, and See Fingerprints. The main area is titled "Console Output" and displays the following log entries:

```
Started by user Srushti Vijay Khandade
Running as SYSTEM
Building in workspace /var/lib/jenkins/workspace/Maven-final-project
The recommended git tool is: NONE
No credentials specified
> git rev-parse --resolve-git-dir /var/lib/jenkins/workspace/Maven-final-project/.git # timeout=10
Fetching changes from the remote Git repository
> git config remote.origin.url https://github.com/SrushtiVKhandaDe/Milestone-2-project.git # timeout=10
Fetching upstream changes from https://github.com/SrushtiVKhandaDe/Milestone-2-project.git
> git --version # timeout=10
> git --version # 'git version 2.40.1'
> git fetch --tags --force --progress -- https://github.com/SrushtiVKhandaDe/Milestone-2-project.git
+refs/heads/*:refs/remotes/origin/* # timeout=10
> git rev-parse refs/remotes/origin/main^{commit} # timeout=10
Checking out Revision a36ab4d1d5afb4ef6a54f2eadd61bb2067937085b (refs/remotes/origin/main)
> git config core.sparsecheckout # timeout=10
```

					<input type="button" value="Expire sessions"/>
/examples	<i>None specified</i>	Servlet and JSP Examples	true	0	<input type="button" value="Start"/> <input type="button" value="Stop"/> <input type="button" value="Relo"/>
/host-manager	<i>None specified</i>	Tomcat Host Manager Application	true	0	<input type="button" value="Start"/> <input type="button" value="Stop"/> <input type="button" value="Relo"/>
/manager	<i>None specified</i>	Tomcat Manager Application	true	1	<input type="button" value="Start"/> <input type="button" value="Stop"/> <input type="button" value="Relo"/>
/webapp	<i>None specified</i>	Webapp	true	0	<input type="button" value="Start"/> <input type="button" value="Stop"/> <input type="button" value="Relo"/>

### Deploy

Deploy directory or WAR file located on server

Context Path:

### 3.10. Java based web Application is visible on Tomcat webapp URL

The screenshot shows a web browser window with the following details:

- Address Bar:** 3.137.205.209:8080/webapp/
- Page Content:**
  - A registration form with fields for Enter Name, Enter mobile, Enter Email, Password, and Repeat Password.
  - A note: "By creating an account you agree to our [Terms & Privacy](#)".
  - A "Register" button.
  - A link: "Already have an account? [Sign in](#)".

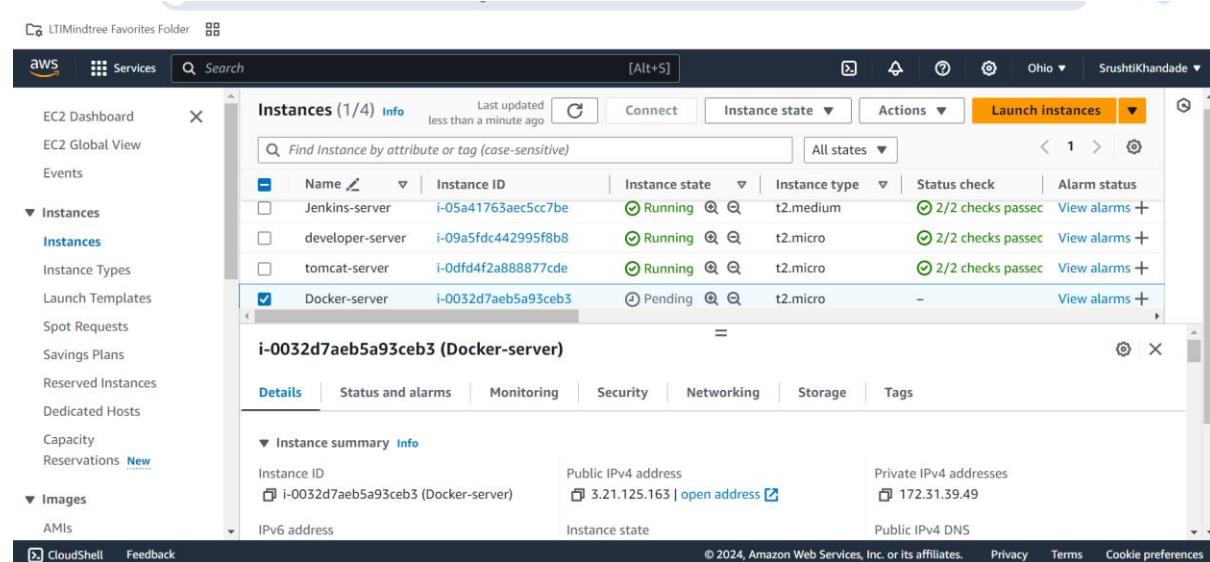
**Thank You, Happy Learning**

**See You Again**

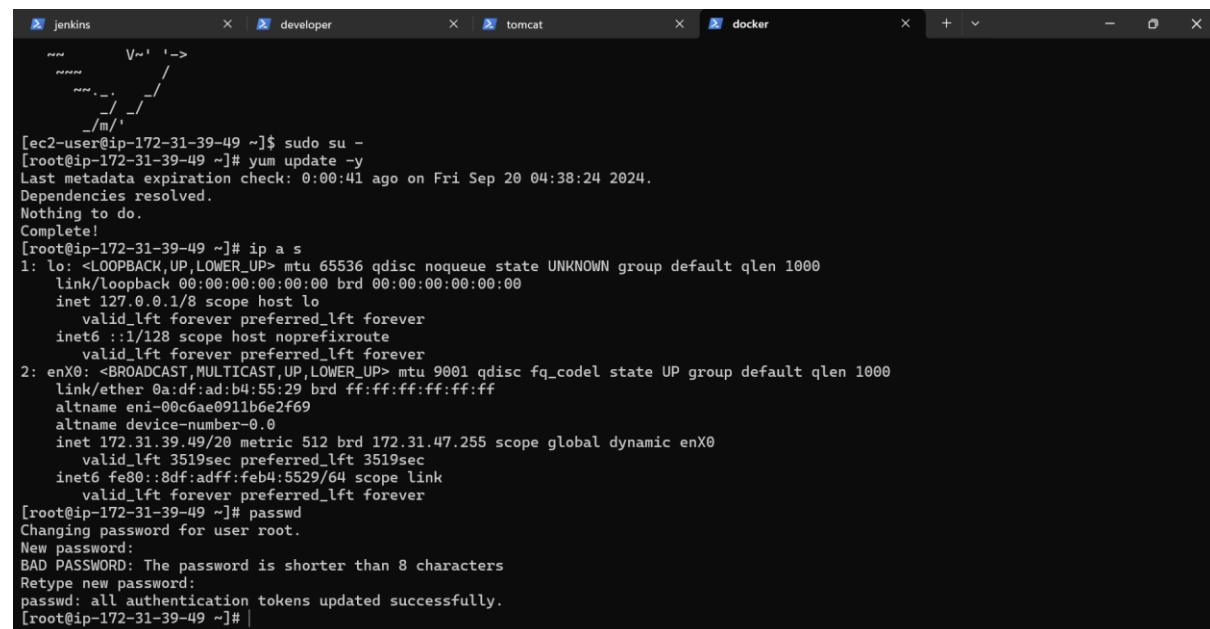
Successfully Deployed application using Tomcat!

## 4. Created Docker Server

### 4.1. Initiated amazon linux EC2 instance for docker-server and connected to local device via ssh



The screenshot shows the AWS CloudWatch Metrics interface. A single metric named "Docker-Server" is displayed with a value of 1.0. The metric has a unit of "Count" and is sampled every 1 minute. It is associated with the metric type "CloudWatch Metrics". The chart shows the metric's value over time.



The screenshot shows the AWS CloudWatch Metrics interface. A single metric named "Docker-Server" is displayed with a value of 1.0. The metric has a unit of "Count" and is sampled every 1 minute. It is associated with the metric type "CloudWatch Metrics". The chart shows the metric's value over time.

## 4.2. Install docker on Docker Server.

```
[root@ip-172-31-39-49 ~]# vim authorized_keys
[root@ip-172-31-39-49 ~]# cd /etc/ssh
[root@ip-172-31-39-49 ssh]# ls
moduli      ssh_config.d      ssh_host_ecdsa_key.pub  ssh_host_ed25519_key.pub  sshd_config.d
ssh_config  ssh_host_ecdsa_key  ssh_host_ed25519_key    sshd_config
[root@ip-172-31-39-49 ssh]# vim sshd_config
[root@ip-172-31-39-49 ssh]# cd
[root@ip-172-31-39-49 ~]# yum install docker -y
Last metadata expiration check: 0:12:55 ago on Fri Sep 20 04:38:24 2024.
Dependencies resolved.
=====
Package          Architecture Version       Repository  Size
=====
Installing:
docker           x86_64      25.0.6-1.amzn2023.0.2  amazonlinux 44 M
Installing dependencies:
containerd        x86_64      1.7.20-1.amzn2023.0.1   amazonlinux 35 M
iptables-libc     x86_64      1.8.8-3.amzn2023.0.2   amazonlinux 401 k
iptables-nft      x86_64      1.8.8-3.amzn2023.0.2   amazonlinux 183 k
libcgroup         x86_64      3.0-1.amzn2023.0.1    amazonlinux 75 k
libnetfilter_conntrack x86_64      1.0.8-2.amzn2023.0.2   amazonlinux 58 k
libnftnl          x86_64      1.0.1-19.amzn2023.0.2  amazonlinux 30 k
pigz              x86_64      1.2.2-2.amzn2023.0.2  amazonlinux 84 k
runc              x86_64      2.5-1.amzn2023.0.3    amazonlinux 83 k
amazonlinux        x86_64      1.1.13-1.amzn2023.0.1  amazonlinux 3.2 M
Transaction Summary
=====
Install 10 Packages

Total download size: 84 M
Installed size: 317 M
```

## 4.4. Generated ssh keys on Docker Server and changed configurations in sshd\_config for creating ssh-connection between Docker Server and Jenkins Server.

```
[root@ip-172-31-39-49 ~]# ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /root/.ssh/id_rsa
Your public key has been saved in /root/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:VD0n0fb5YS3yjLXNGB1PSCfN+y08gsiTf+D0+Eftzo root@ip-172-31-39-49.us-east-2.compute.internal
The key's randomart image is:
+---[RSA 3072]---+
| .o.*+o.|
| . .Bo8oo|
| . oBo**|
| . . o=+|
| .So o. +.+|
| o o + .=o..|
| o * + oo.|
| . +E* . |
| oo+|
+---[SHA256]---+
[root@ip-172-31-39-49 ~]# cd .ssh
[root@ip-172-31-39-49 .ssh]# vim authorized_keys
[root@ip-172-31-39-49 .ssh]# cd
[root@ip-172-31-39-49 ~]# cd /etc/ssh
[root@ip-172-31-39-49 ssh]# ls
moduli      ssh_config.d      ssh_host_ecdsa_key.pub  ssh_host_ed25519_key.pub  sshd_config.d
ssh_config  ssh_host_ecdsa_key  ssh_host_ed25519_key    sshd_config
[root@ip-172-31-39-49 ssh]# vim sshd_config
[root@ip-172-31-39-49 ssh]# cd
```

```

jenkins      developer      tomcat      docker
PermitRootLogin yes
#StrictModes yes
#MaxAuthTries 6
#MaxSessions 10

PubkeyAuthentication yes

# The default is to check both .ssh/authorized_keys and .ssh/authorized_keys2
# but this is overridden so installations will only check .ssh/authorized_keys
AuthorizedKeysFile      .ssh/authorized_keys

#AuthorizedPrincipalsFile none

# For this to work you will also need host keys in /etc/ssh/ssh_known_hosts
#HostbasedAuthentication no
# Change to yes if you don't trust ~/.ssh/known_hosts for
# HostbasedAuthentication
#IgnoreUserKnownHosts no
# Don't read the user's ~/.rhosts and ~/.shosts files
#IgnoreRhosts yes

# Explicitly disable PasswordAuthentication. By presetting it, we
# avoid the cloud-init set_passwords module modifying sshd_config and
# restarting sshd in the default instance launch configuration.
PasswordAuthentication yes
PermitEmptyPasswords yes

# Change to no to disable s/key passwords
#RshInteractiveAuthentication yes

# Kerberos options
-- INSERT --

```

66,25      38%

## 4.5. Added plugin Publish over SSH in Jenkins Dashboard.

The screenshot shows the Jenkins Plugins management interface. On the left, there's a sidebar with links for Updates, Available plugins (which is selected), Installed plugins, Advanced settings, and Download progress. The main area has a search bar with the query 'publish over'. A table lists available plugins:

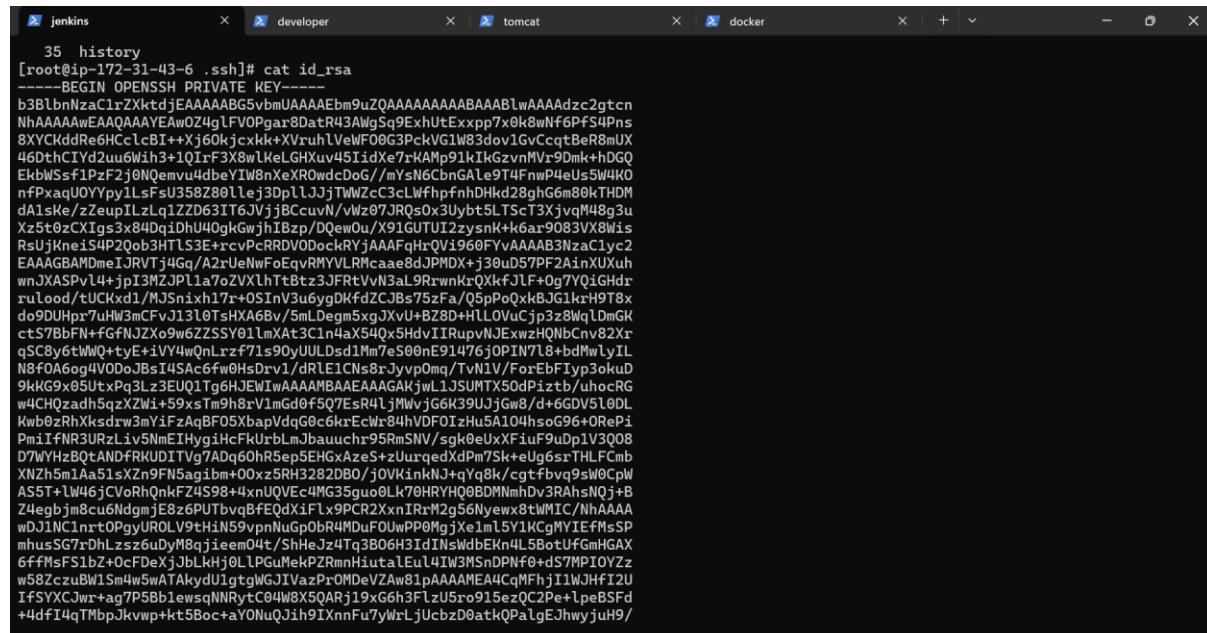
Install	Name	Released
<input type="checkbox"/>	Infrastructure plugin for Publish Over X 0.22 Send build artifacts somewhere.	6 yr 5 mo ago
<input checked="" type="checkbox"/>	Publish Over SSH 1.25 Artifact Uploaders   Build Tools Send build artifacts over SSH	1 yr 2 mo ago
<input type="checkbox"/>	Publish Over FTP 1.17 Artifact Uploaders Send build artifacts over FTP	2 yr 5 mo ago
<input type="checkbox"/>	Publish Over CIFS 0.16	

At the top right of the main area, there are 'Install' and 'Uninstall' buttons. The 'Install' button is highlighted in blue.

## 4.6. Configured AWS with previously created user access key and secret ke

```
9  ls
10 vim sshd_config
11 cd
12 yum install docker -y
13 systemctl start docker
14 systemctl enable docker
15 systemctl status docker
16 history
[root@ip-172-31-39-49 ~]# cat idclient_loop: send disconnect: Connection reset
PS C:\Users\10748164\Downloads> ssh -i "key_server.pem" ec2-user@ec2-3-21-125-163.us-east-2.compute.amazonaws.com
'          #
' \_ ####      Amazon Linux 2023
' \_ #####\
' \_ \###}
' \_ \#/
' \_ V-' '--> https://aws.amazon.com/linux/amazon-linux-2023
' \_ \_ \_ \_ \_ \
' \_ \_ \_ \_ \_ \
' \_ \_ \_ \_ \_ \
Last login: Fri Sep 20 04:38:53 2024 from 136.226.233.82
[ec2-user@ip-172-31-39-49 ~]$ sudo su -
Last login: Fri Sep 20 04:38:57 UTC 2024 on pts/1
[root@ip-172-31-39-49 ~]# aws configure
AWS Access Key ID [None]: AKIAWN26KBRN3S6G6KW
AWS Secret Access Key [None]: 2T7FI97jU030b+fD9+KAzHTWEBrjoBuCry7YVFbI
Default region name [None]: us-east-2
Default output format [None]:
[ec2-user@ip-172-31-39-49 ~]#
```

## 4.7. Copied private key of Jenkins server and Added in System section of Jenkins Dashboard.



```
35 history
[root@ip-172-31-43-6 .ssh]# cat id_rsa
-----BEGIN OPENSSH PRIVATE KEY-----
b3BlbnNzaClrzXktbjEAAAAABG5vbmcUAAAEBm9uZQAAAAAAAAAAABAblwAAAAdzc2gtcn
NhaAAAAwEAAQAAAYEawOz4gLFVOPgar8DatR43AWgSqExhUtExxpp7x0k8wNF6PfS4Pns
8XYCkddRe6HccLcB1++Xj60kjckh+XVruhleWFO0G3PckVG1w83dovlGvCcqteB8mUX
46DthCIyD2uu6wi3+1QIrF3X8w1keLGHXuv451idXe7rKAMp91kIkGzvnMvR9dmk+hDGQ
EkbwSsf1pF2j0NQemu4dbeYIW8nXeXR0wdcDoG/mysN6CbnGale9TfFnwP4eUs5W4KO
nfPxaqUOYpy1lsfU358280lej3DplJJjTwZcC3LwfhpnDhk2z8ghGm80kTHDM
dA1skc/zzeupILzlq1ZD63IT6JYjjBCCuVNLwz07JRQs0x3Ub75LTScT3XjvqM48g3u
Xz5t0zCXIgs3x84QgiUhU0gkGwjhIBzp/DQewOU/X9lGUTU12zysnK+k6ax9083VX8wIs
RsUjkneiS4P2Qb3HTLS3E+rcvPcRRDVODockRYjaAAFqHrQVi960FVvAAAB3NzaC1yc2
EAAAGBAMdmeIjRVt4Gq/A2r+eNwFoEqvRMVLRMcaae8dJPMDX+j30u057PF2AinUXuh
wnJXASPVl4+jp13MZJPl1a7oVXLhtBtz3jFRtvN3aL9rwNkrQXkfJL+F+0g7Y0iGhDr
ruL0c/Tkxd1/MSnixh17r+OSInV3u6ygDKfdZCJs75zfA/Q5pPoQxkBJG1kxH978x
do9DUHpr7uHW3nCfvJ13l0TsXA6Bv/5mLDegm5xgJxvU+BZ8D+HLL0VuCjp3z8WqlDmGK
ct57BbFN+fGfNZXo9w6ZSSY01mXAt3Cln4aX54QxsHdvIIUpvNjExwzQNbCnv82Xr
qSC8y6tWwQ+ty+EiVY4wQnLrzf71s9oyUULDs1Mm7eS00nE91476j0P1N7L8+bdMwlyIL
N8+f0A6og4V0DoJBs=14Sac6fw0HsDrv1/dRE1CNSsBrJyvp0mq/TVN1V/ForBfTyp3okuD
9kLG9x05UtxPq3Lz3EUQ1tgH6JEWIwAAAMBAAEAAAGAKjwL1JSUMTX50dPiZtb/uhocRG
w4CHQzadh5zxZw1+59x1m9h8v1mGd0f5Q7esR41jMwJG6K39UJjGw8/d+6GDV5l6DL
Kwb0zRhxsdw3mY1FzAqBF05XbapVdqG6c6krEcWl84hVDF0Izhu5A104hs0g96+0RePi
PmzIFNR3URzLiv5NmETIHgyiHcFKUrLmJbaauchr95RmSNV/sgk0elUxFiu9uOp1V3Q08
D7WYHzBQtANDFRKUDITvg7ADq60hR5ep5EHgxAzeS+zUuqedXdPm7Sk+eUg6s+THLFCmb
XNZh5m1Aa51sXzn9FN5ag1bm+00xZRH328DB0/j0VKinkNJ+qyq8k/cgtfbqv9sW0cpW
AS5T+1WL46jCVrOhNkfZ4598+4xnU0VEc4MG35gu0Lk70HRYHQ6BDMNmhd3RAhsNQj+B
Z4egbjm8cu6NldgmjE8z6PUTbvqbFeQdx1Flx9PCR2XxnIRtM2g56Nyewx8tWMIC/NhAAAA
wDj1NC1nr+tpGyUROL9tHn59vpnNuGp0bR4MDuF0uPP0Mgjx1m15Y1KcgMYIEfMsSP
mhusSG7xDhLsz6duyM8qjieem04/SfhHeJz4tq3B0Gh31dInswdbEKn4L5botufGmhGAX
6ffMfsS1bZ+0cDexjBjLkHj0LLPGuMekPZrmnHiutaEu14IW3NsDPMf0+dS7MP1OYzz
w5BzczuBw1Sm4w5wATkydUlg7gWGIjVazPr0MdeVzAw81pAAAAME44CmFhjIIWJHfT2U
IfSYXCJwr+ag7P5Bb1ewsqNRRytC04W8X5QARj19xG6h3FlzU5ro915ezQC2Pe+lpeBSFd
+4dfI4qTMbpJkvwp+kts5Boc+aYOnuQj1h9IXnnFuYwLjcbzD0atkQPalgEjhwyjuh9/
```

The screenshot shows the Jenkins 'System' configuration page under 'Manage Jenkins'. A large text area contains a long, encoded SSH private key. Below it is a checkbox labeled 'Disable exec'.

```
L*eeeeJnAgE5B053TtWwA0B5dI4nKtVWV3e40WVEnK3b00dPDCESR+gSEip007f01xyjH9uB78TAb/oCqmL2zplCfjLBhMqo95AFLMaonuJcGnhAqfiD3yj3+HmMjBxtE0B0wfs35Zj9aOrJvBHpYDpgX6DtspzYcgXtpoRWesX0yzlX6FmSz/Oiru4reHhsplPrJoTum1RGRix2E9sIG2XvEA4AAucm9vdEBpcC0xNzltMzEtNDMtNi51cy1YXN0LTiuY29tcHVOZS5pbnRlcmbAECAwQF-----END OPENSSH PRIVATE KEY-----
```

#### 4.8. Added ssh-server for Jenkins machine with private-ip-addr and tested configuration.

The screenshot shows the Jenkins 'System' configuration page under 'Manage Jenkins'. A text input field contains '/root'. Below it is a checkbox labeled 'Avoid sending files that have not changed'. A 'Test Configuration' button is visible on the right. The status is 'Success'.

Similarly added ssh-server for Docker machine with private-ip-addr and tested configuration.

#### 4.9. On Jenkins ssh-server added Exec Command to move and sync Project files to Docker server /opt folder.

The screenshot shows the Jenkins configuration page for the 'Maven-final-project' job. The left sidebar lists various configuration sections: General, Source Code Management, Build Triggers, Build Environment, Pre Steps, Build, Post Steps, Build Settings, and Post-build Actions. The 'Post-build Actions' section is currently selected and highlighted in grey. In the main panel, under 'SSH Publishers', there is a single entry named 'Jenkins'. This entry has an 'Advanced' dropdown menu. Below it, under 'Transfers', there is a 'Transfer Set' section with a 'Source files' input field which is currently empty. At the bottom of the configuration panel are two buttons: 'Save' and 'Apply'.

This screenshot shows the Jenkins configuration page for the 'Maven-final-project' job, specifically focusing on the 'Post-build Actions' section. The left sidebar shows standard Jenkins configuration options. The 'Post-build Actions' section is active. In the main panel, there are three configuration fields: 'Remove prefix' (with an empty input field), 'Remote directory' (with an empty input field), and 'Exec command' (containing the command `rsync -avh /var/lib/jenkins/workspace/Maven-final-project/* root@172.31.39.49:/opt`). Above these fields, a status message reads 'Powered by Jetty:// 10.0.20'.

## 4.10. Created AWS Elastic Container Registry and copied commands for pushing image to registry

The screenshot shows the AWS ECR console interface. The left sidebar has sections for Private registry (Repositories, Features & Settings) and Public registry (Repositories, Settings). Under Private registry, 'Repositories' is selected. The main area displays a table titled 'Repositories (1)' with one entry:

Repository name	URI	Created at	Tag immutability	Encryption type
milestone	442042551387.dkr.ecr.us-east-2.amazonaws.com/milestone	September 20, 2024, 10:40:50 (UTC+05:5)	Mutable	AES-256

At the top right, there is a 'Create repository' button.

The screenshot shows the AWS ECR console with the 'push commands' tab open for the 'milestone' repository. The left sidebar shows the same navigation as the previous screenshot. The main area contains the following instructions:

1. Retrieve an authentication token and authenticate your Docker client to your registry. Use the AWS CLI:  

```
aws ecr get-login-password --region us-east-2 | docker login --username AWS --password-stdin  
442042551387.dkr.ecr.us-east-2.amazonaws.com
```

Note: If you receive an error using the AWS CLI, make sure that you have the latest version of the AWS CLI and Docker installed.
2. Build your Docker image using the following command. For information on building a Docker file from scratch see the instructions [here](#). You can skip this step if your image is already built:  

```
docker build -t milestone .
```
3. After the build completes, tag your image so you can push the image to this repository:  

```
docker tag milestone:latest 442042551387.dkr.ecr.us-east-2.amazonaws.com/milestone:latest
```
4. Run the following command to push this image to your newly created AWS repository:  

```
docker push 442042551387.dkr.ecr.us-east-2.amazonaws.com/milestone:latest
```

At the bottom right, there is a 'Close' button.

## 4.11. On Docker ssh-server added a Exec Command to push Deployment Project Files to ECR to push image

The screenshot shows the Jenkins configuration interface for a project named "Maven-final-project". The "Post-build Actions" section is selected. A new "SSH Server" is being added with the name "Docker". A "Transfer Set" is also being configured under the "Transfers" section.

**SSH Server Configuration:**

- Name: Docker

**Transfer Set Configuration:**

- Source files: [empty field]

**Buttons:**

- Save
- Apply

The screenshot shows the Jenkins configuration interface for a project named "Maven-final-project". The "Post-build Actions" section is selected. An "Exec command" is being added to push deployment files to ECR.

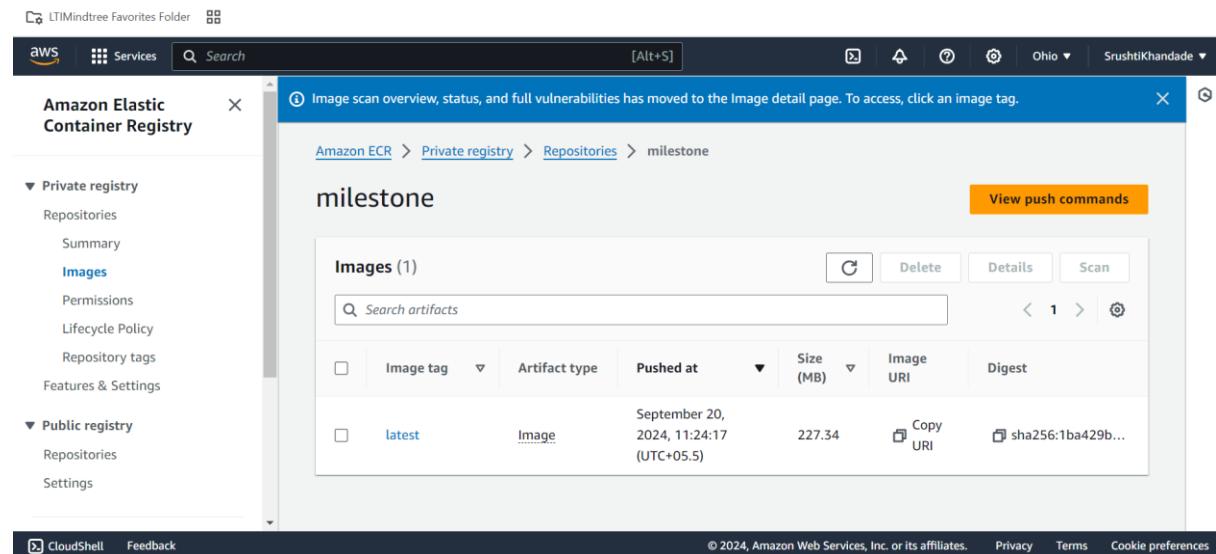
**Exec command Configuration:**

- Remove prefix: [empty field]
- Remote directory: [empty field]
- Exec command:  
cd /opt  
aws ecr get-login-password --region us-east-2 | docker login --username AWS --password-stdin  
442042551387.dkr.ecr.us-east-2.amazonaws.com  
docker build -t milestone .  
docker tag milestone:latest 442042551387.dkr.ecr.us-east-2.amazonaws.com/milestone:latest

**Buttons:**

- Save
- Apply

#### 4.12. Checked if latest image is pushed to Amazon ECR milestone2projectregistry.



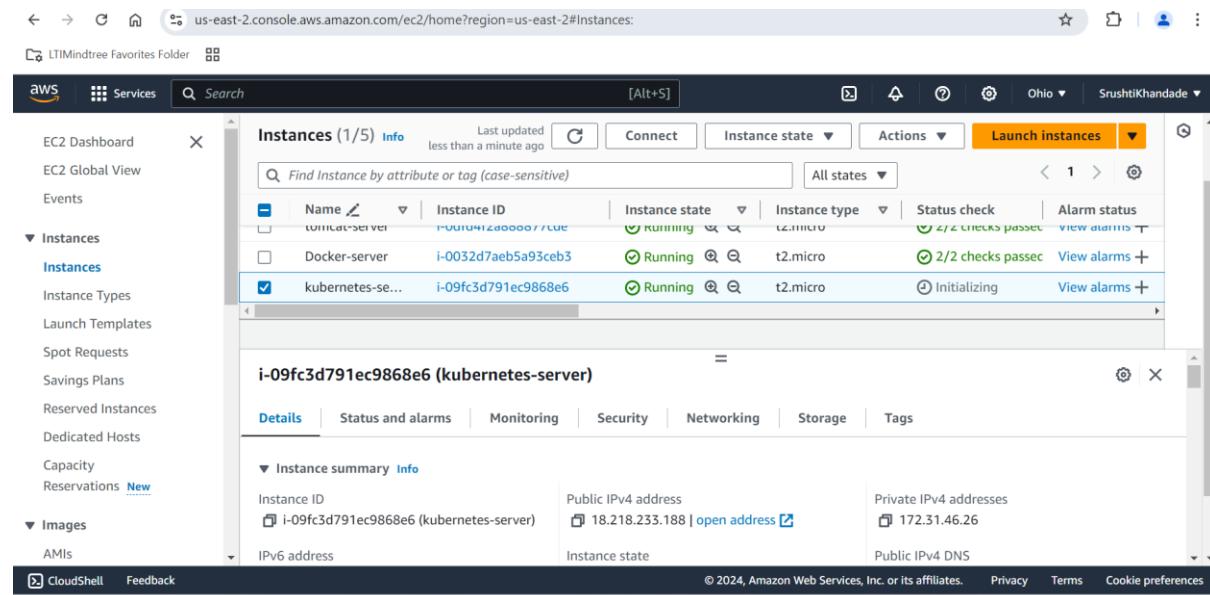
The screenshot shows the AWS ECR console interface. The left sidebar has sections for Private registry (Repositories, Summary, Images, Permissions, Lifecycle Policy, Repository tags, Features & Settings) and Public registry (Repositories, Settings). The main content area is titled 'milestone' and shows a table of images. The table has columns: Image tag, Artifact type, Pushed at, Size (MB), Image URI, and Digest. One row is visible: 'latest' (Image type), Pushed at 'September 20, 2024, 11:24:17 (UTC+05:5)', Size '227.34', and Digest 'sha256:1ba429b...'. There are buttons for 'View push commands', 'Delete', 'Details', and 'Scan' at the top of the table. A message banner at the top says 'Image scan overview, status, and full vulnerabilities has moved to the Image detail page. To access, click an image tag.' The bottom navigation bar includes CloudShell, Feedback, and links to AWS terms and cookie preferences.

Image tag	Artifact type	Pushed at	Size (MB)	Image URI	Digest
latest	Image	September 20, 2024, 11:24:17 (UTC+05:5)	227.34	<a href="#">Copy URI</a>	<a href="#">sha256:1ba429b...</a>

Latest image pushed successfully!

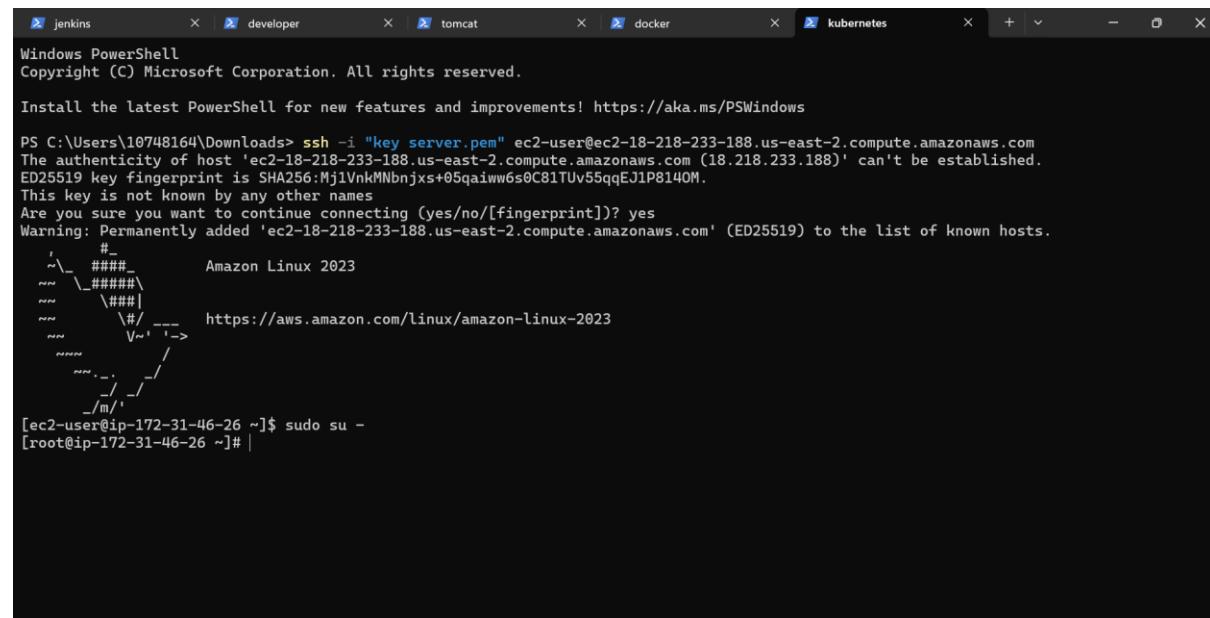
## 5. Created Kubernetes Server

### 5.1. Initiated amazon Linux EC2 instance and connected it to local machine via ssh.



The screenshot shows the AWS EC2 Instances page with three instances listed:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status
tomcat-server	i-0032d7aeb5a93ceb3	Running	t2.micro	2/2 checks passed	View alarms
kubernetes-se...	i-09fc3d791ec9868e6	Running	t2.micro	2/2 checks passed	View alarms
(unnamed)		Running	t2.micro	Initializing	View alarms



```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

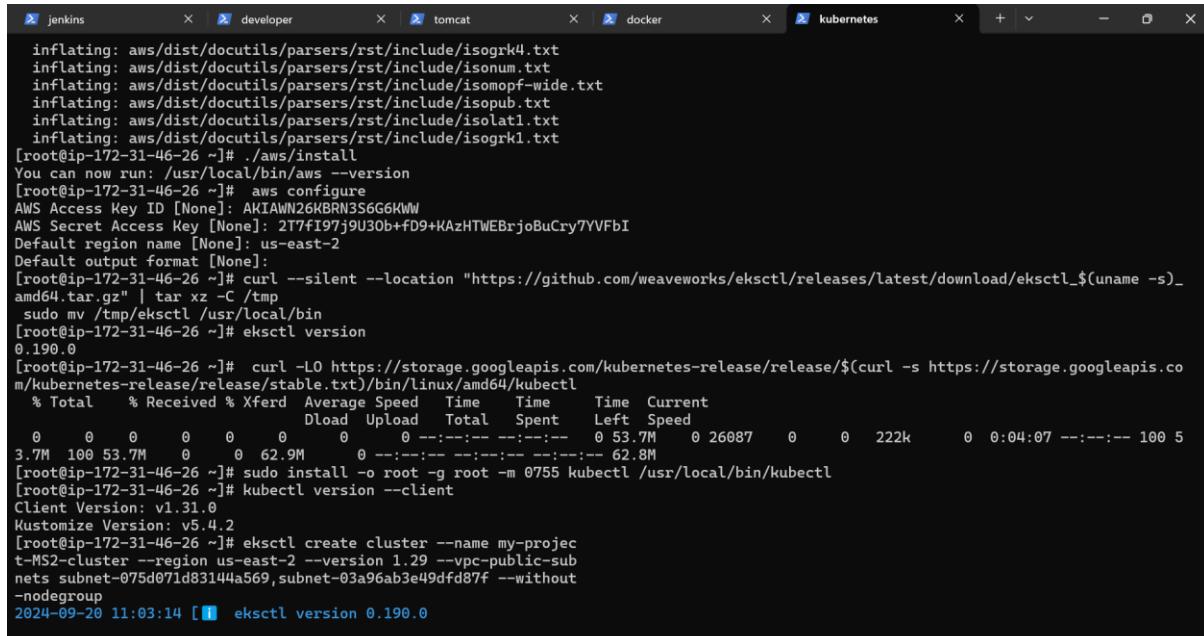
Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\10748164\Downloads> ssh -i "key_server.pem" ec2-user@ec2-18-218-233-188.us-east-2.compute.amazonaws.com
The authenticity of host 'ec2-18-218-233-188.us-east-2.compute.amazonaws.com (18.218.233.188)' can't be established.
ED25519 key fingerprint is SHA256:Mj1VnkJMNbnjxs+05qaiww6s0C81TUv55qqEJ1P814OM.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-18-218-233-188.us-east-2.compute.amazonaws.com' (ED25519) to the list of known hosts.

[ec2-user@ip-172-31-46-26 ~]$ sudo su -
[root@ip-172-31-46-26 ~]# |
```

5.2. Created AWS user with policies AmazonEKSClusterPolicy and AmazonEKSServicePolicy and added its access key and secret key to Kubernetes server.

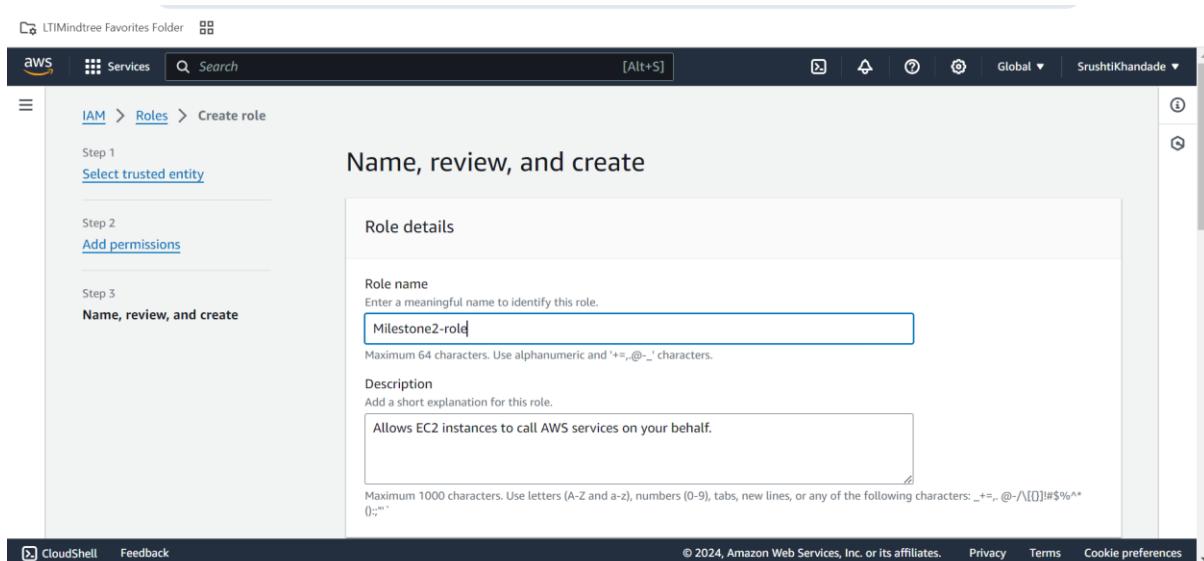
Installed eksctl tool on Kubernetes server and checked its version

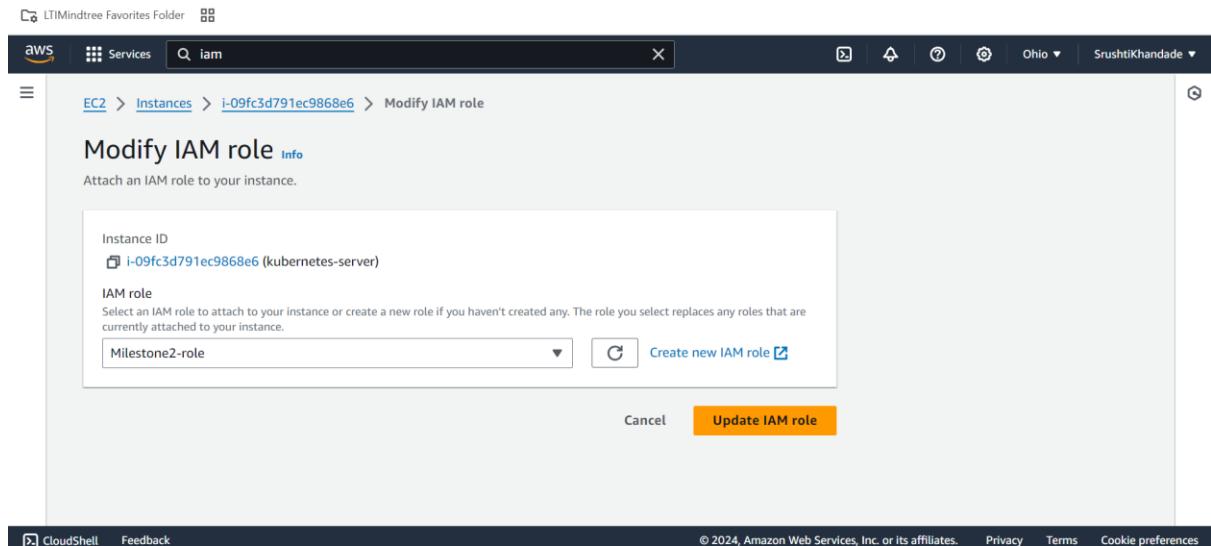


```
infating: aws/dist/docutils/parsers/rst/include/isogr4.txt
infating: aws/dist/docutils/parsers/rst/include/isonum.txt
infating: aws/dist/docutils/parsers/rst/include/isomopf-wide.txt
infating: aws/dist/docutils/parsers/rst/include/isopub.txt
infating: aws/dist/docutils/parsers/rst/include/isolat1.txt
infating: aws/dist/docutils/parsers/rst/include/isogrkl.txt
[root@ip-172-31-46-26 ~]# ./aws/install
You can now run: /usr/local/bin/aws --version
[root@ip-172-31-46-26 ~]# aws configure
AWS Access Key ID [None]: AKIAWN26KBRN3SG6KW
AWS Secret Access Key [None]: 2T7fI97j9U30b+fD9+KAzHTWEBrjoBuCry7YVFbI
Default region name [None]: us-east-2
Default output format [None]:
[root@ip-172-31-46-26 ~]# curl --silent --location "https://github.com/weaveworks/eksctl/releases/latest/download/eksctl_$(uname -s)_amd64.tar.gz" | tar xz -C /tmp
sudo mv /tmp/eksctl /usr/local/bin
[root@ip-172-31-46-26 ~]# eksctl version
0.190.0
[root@ip-172-31-46-26 ~]# curl -L0 https://storage.googleapis.com/kubernetes-release/release/$(curl -s https://storage.googleapis.com/kubernetes-release/release/stable.txt)/bin/linux/amd64/kubectl
% Total    % Received % Xferd  Average Speed   Time   Time  Current
          Dload  Upload   Total Spent   Left  Speed
0     0    0     0    0     0 0:53.7M  0 26087    0     0  222k      0  0:04:07 --- 100 5
3.7M 100 53.7M  0     0 62.9M  0 --- 62.8M
[root@ip-172-31-46-26 ~]# sudo install -o root -g root -m 0755 kubectl /usr/local/bin/kubectl
[root@ip-172-31-46-26 ~]# kubectl version --client
Client Version: v1.31.0
Kustomize Version: v5.4.2
[root@ip-172-31-46-26 ~]# eksctl create cluster --name my-project-MS2-cluster --region us-east-2 --version 1.29 --vpc-public-subnets subnet-075d071d83144a569,subnet-03a96ab3e49df87f --without-nodegroup
2024-09-20 11:03:14 [ℹ eksctl version 0.190.0
```

Create an IAM role and attach policies

Attaching role to instance





### 5.3. . Created cluster and nodes on Kubernetes Server

```
2024-09-20 11:03:14 [!] you can enable it with 'eksctl utils update-cluster-logging --enable-types={SPECIFY-YOUR-LOG-TYPES-HERE (e.g. .all)} --region=us-east-2 --cluster=my-project-MS2-cluster'
2024-09-20 11:03:14 [!] default addons coredns, vpc-cni, kube-proxy were not specified, will install them as EKS addons
2024-09-20 11:03:14 [!] 2 sequential tasks: { create cluster control plane "my-project-MS2-cluster",
  2 sequential sub-tasks: {
    1 task: { create addons },
    wait for control plane to become ready,
  }
}
2024-09-20 11:03:14 [!] building cluster stack "eksctl-my-project-MS2-cluster-cluster"
2024-09-20 11:03:15 [!] deploying stack "eksctl-my-project-MS2-cluster-cluster"
2024-09-20 11:03:45 [!] waiting for CloudFormation stack "eksctl-my-project-MS2-cluster-cluster"
2024-09-20 11:04:15 [!] waiting for CloudFormation stack "eksctl-my-project-MS2-cluster-cluster"
2024-09-20 11:05:15 [!] waiting for CloudFormation stack "eksctl-my-project-MS2-cluster-cluster"
2024-09-20 11:06:15 [!] waiting for CloudFormation stack "eksctl-my-project-MS2-cluster-cluster"
2024-09-20 11:07:15 [!] waiting for CloudFormation stack "eksctl-my-project-MS2-cluster-cluster"
2024-09-20 11:08:15 [!] waiting for CloudFormation stack "eksctl-my-project-MS2-cluster-cluster"
2024-09-20 11:09:15 [!] waiting for CloudFormation stack "eksctl-my-project-MS2-cluster-cluster"
2024-09-20 11:10:15 [!] waiting for CloudFormation stack "eksctl-my-project-MS2-cluster-cluster"
2024-09-20 11:11:15 [!] waiting for CloudFormation stack "eksctl-my-project-MS2-cluster-cluster"
2024-09-20 11:12:15 [!] waiting for CloudFormation stack "eksctl-my-project-MS2-cluster-cluster"
2024-09-20 11:13:15 [!] waiting for CloudFormation stack "eksctl-my-project-MS2-cluster-cluster"
2024-09-20 11:13:15 [!] creating addon
2024-09-20 11:13:16 [!] successfully created addon
2024-09-20 11:13:16 [!] recommended policies were found for "vpc-cni" addon, but since OIDC is disabled on the cluster, eksctl cannot configure the requested permissions; the recommended way to provide IAM permissions for "vpc-cni" addon is via pod identity associations; after addon creation is completed, add all recommended policies to the config file, under 'addon.PodIdentityAssociations', and run 'eksctl update addon'
2024-09-20 11:13:16 [!] creating addon
2024-09-20 11:13:16 [!] successfully created addon
2024-09-20 11:13:17 [!] creating addon
2024-09-20 11:13:17 [!] successfully created addon
```

```

jenkins  developer  tomcat  docker  kubernetes
[root@ip-172-31-46-26 ~]# ssh-keygen
Generating public/private rsa key pair.

Enter file in which to save the key (/root/.ssh/id_rsa): Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /root/.ssh/id_rsa
Your public key has been saved in /root/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:xvq2Ip/2C1QCM+bpDY1jIHDPgulifAs9Q7vK2RQb3E root@ip-172-31-46-26.us-east-2.compute.internal
The key's randomart image is:
+---[RSA 3072]---+
| . ..o.
| o.o .+E
| .*.++B. .
| o.=B+=+
| o =B..ooS
| ooo=.o
| o ... +
| . o o+.
| ..=o+=o
+---[SHA256]---+
[root@ip-172-31-46-26 ~]#
[root@ip-172-31-46-26 ~]# eksctl create nodegroup --cluster my-project-MS2-cluster --region us-east-2 --name my-project-node-group
--node-ami-family Ubuntu2004 --node-type t2.small --subnet-ids subnet-075d071d83144a569,subnet-03a96ab3e49dfd87f --nodes 3
--nodes-min 2 --nodes-max 4 --ssh-access --ssh-public-key /root/.ssh/id_rsa.pub
2024-09-20 11:57:45 [ℹ️] will use version 1.29 for new nodegroup(s) based on control plane version
2024-09-20 11:57:46 [ℹ️] nodegroup "my-project-node-group" will use "ami-076e03085ba202f9e" [Ubuntu2004/1.29]
2024-09-20 11:57:46 [ℹ️] using SSH public key "/root/.ssh/id_rsa.pub" as "eksctl-my-project-MS2-cluster-nodegroup-my-project-node-group"
2024-09-20 11:57:46 [ℹ️] 1 nodegroup (my-project-node-group) was included (based on the include/exclude rules)
2024-09-20 11:57:46 [ℹ️] will create a CloudFormation stack for each of 1 managed nodegroups in cluster "my-project-MS2-cluster"
2024-09-20 11:57:46 [ℹ️]
2 sequential tasks: { fix cluster compatibility, 1 task: { 1 task: { create managed nodegroup "my-project-node-group" } } }

```

```

jenkins  developer  tomcat  docker  kubernetes
}
2024-09-20 11:57:46 [ℹ️] checking cluster stack for missing resources
2024-09-20 11:57:46 [ℹ️] cluster stack has all required resources
2024-09-20 11:57:46 [ℹ️] deploying managed nodegroup stack "eksctl-my-project-MS2-cluster-nodegroup-my-project-node-group"
2024-09-20 11:57:46 [ℹ️] waiting for CloudFormation stack "eksctl-my-project-MS2-cluster-nodegroup-my-project-node-group"
2024-09-20 11:58:16 [ℹ️] waiting for CloudFormation stack "eksctl-my-project-MS2-cluster-nodegroup-my-project-node-group"
2024-09-20 11:59:03 [ℹ️] waiting for CloudFormation stack "eksctl-my-project-MS2-cluster-nodegroup-my-project-node-group"
2024-09-20 12:01:01 [ℹ️] waiting for CloudFormation stack "eksctl-my-project-MS2-cluster-nodegroup-my-project-node-group"
2024-09-20 12:02:26 [ℹ️] waiting for CloudFormation stack "eksctl-my-project-MS2-cluster-nodegroup-my-project-node-group"
2024-09-20 12:02:26 [ℹ️] no tasks
2024-09-20 12:02:26 [ℹ️] created 0 nodegroup(s) in cluster "my-project-MS2-cluster"
2024-09-20 12:02:26 [ℹ️] nodegroup "my-project-node-group" has 3 node(s)
2024-09-20 12:02:26 [ℹ️] node "ip-172-31-15-164.us-east-2.compute.internal" is ready
2024-09-20 12:02:26 [ℹ️] node "ip-172-31-2-129.us-east-2.compute.internal" is ready
2024-09-20 12:02:26 [ℹ️] node "ip-172-31-30-252.us-east-2.compute.internal" is ready
2024-09-20 12:02:26 [ℹ️] waiting for at least 2 node(s) to become ready in "my-project-node-group"
2024-09-20 12:02:26 [ℹ️] nodegroup "my-project-node-group" has 3 node(s)
2024-09-20 12:02:27 [ℹ️] node "ip-172-31-15-164.us-east-2.compute.internal" is ready
2024-09-20 12:02:27 [ℹ️] node "ip-172-31-2-129.us-east-2.compute.internal" is ready
2024-09-20 12:02:27 [ℹ️] node "ip-172-31-30-252.us-east-2.compute.internal" is ready
2024-09-20 12:02:27 [ℹ️] created 1 managed nodegroup(s) in cluster "my-project-MS2-cluster"
2024-09-20 12:02:27 [ℹ️] checking security group configuration for all nodegroups
2024-09-20 12:02:27 [ℹ️] all nodegroups have up-to-date cloudformation templates
[root@ip-172-31-46-26 ~]# kubectl get all
NAME           TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)    AGE
service/kubernetes   ClusterIP  10.100.0.1 <none>        443/TCP   53m
[root@ip-172-31-46-26 ~]# kubectl get nodes
NAME                  STATUS   ROLES      AGE     VERSION
ip-172-31-15-164.us-east-2.compute.internal  Ready    <none>    3m19s   v1.29.6
ip-172-31-2-129.us-east-2.compute.internal    Ready    <none>    3m19s   v1.29.6
ip-172-31-30-252.us-east-2.compute.internal   Ready    <none>    3m6s    v1.29.6
[root@ip-172-31-46-26 ~]#

```

5.4. Created Kubernetes SSH server on Jenkins Dashboard and tested its configuration.



## 5.5. Created deployment

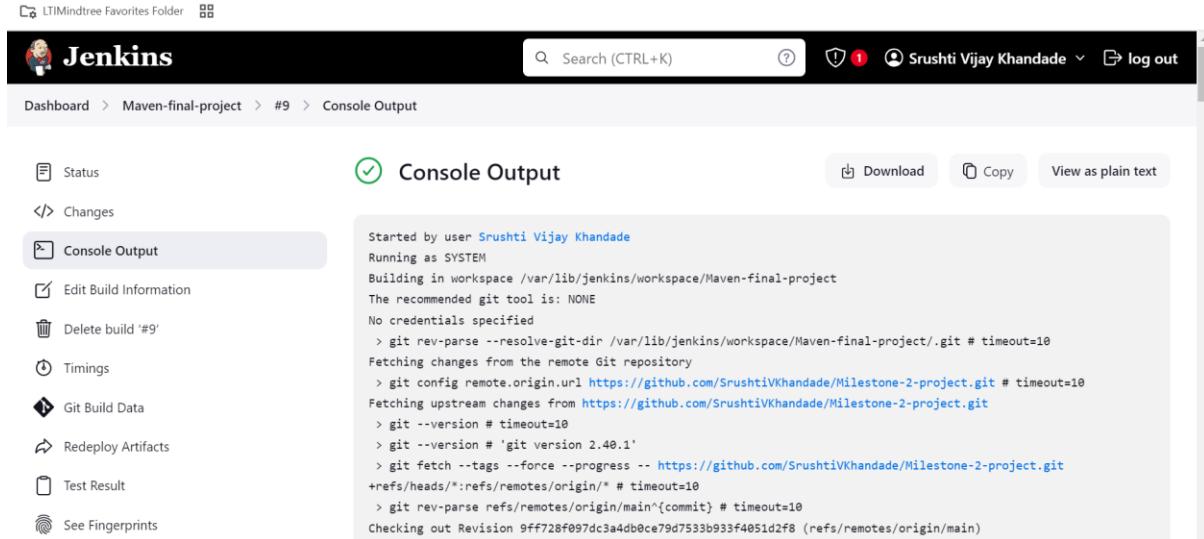
```
jenkins      x developer      x tomcat      x docker      x kubernetes      x + - 
apiVersion: apps/v1
kind: Deployment
metadata:
  name: shrushti-deployment
  labels:
    app: regapp
spec:
  replicas: 2
  selector:
    matchLabels:
      app: regapp
  template:
    metadata:
      labels:
        app: regapp
    spec:
      containers:
        - name: regapp
          image: 442042551387.dkr.ecr.us-east-2.amazonaws.com/milestone:latest
          imagePullPolicy: Always
          ports:
            - containerPort: 8080
~
```

5.6. In Milestone2ProjectDeployment item configuration added new SSH server Kubernetes and added Exec commands to run deployment and service files.

The screenshot shows the Jenkins configuration interface for a Maven project. On the left, a sidebar lists various configuration sections: General, Source Code Management, Build Triggers, Build Environment, Pre Steps, Build, Post Steps, Build Settings, and Post-build Actions. The 'Post-build Actions' section is currently selected. Within this section, there is a configuration for an 'SSH Server'. The 'Name' field is set to 'kubernetes'. Below this, under the 'Transfers' section, there is a 'Transfer Set' configuration. The 'Source files' field is empty. At the bottom of the configuration panel are 'Save' and 'Apply' buttons.

The screenshot shows the Jenkins configuration interface for a Maven project. The 'Post-build Actions' section is selected. Under the 'Transfers' section, there is a 'Transfer Set' configuration. The 'Exec command' field contains the command: `kubectl apply -f deployment.yaml`. This command is intended to apply a Kubernetes deployment configuration. A note below the exec command states: "All of the transfer fields (except for Exec timeout) support substitution of Jenkins environment variables". At the bottom of the configuration panel are 'Save' and 'Apply' buttons.

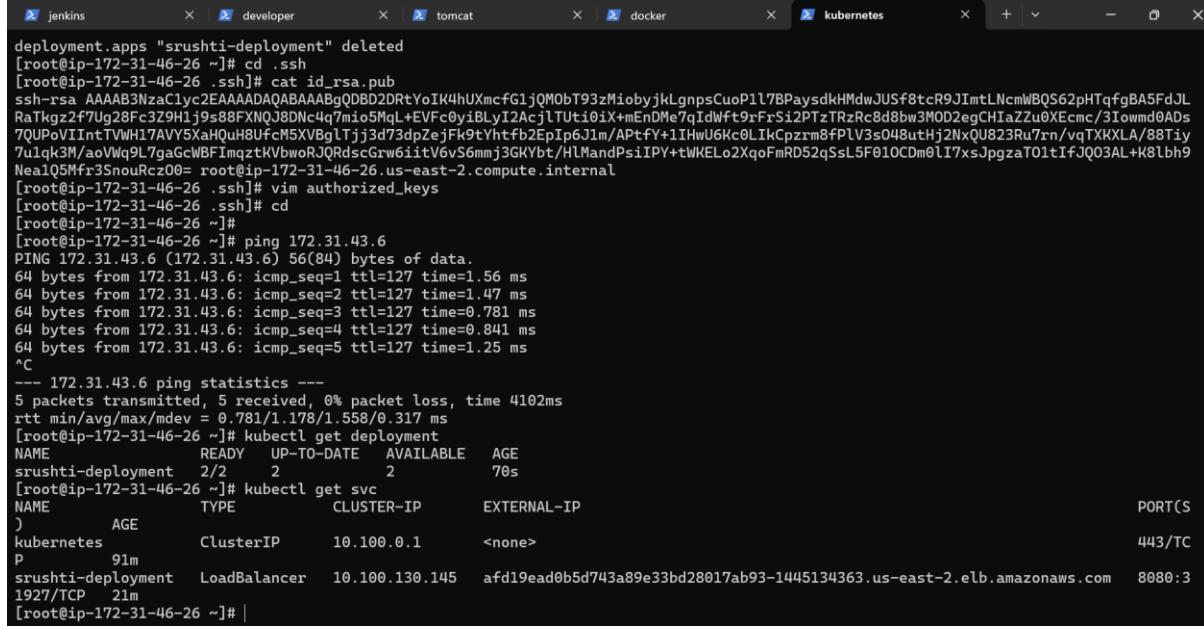
## 5.7. Created new build successfully with changed configurations.



The screenshot shows the Jenkins interface with a successful build output. The left sidebar has a 'Console Output' tab selected. The main area displays the build log:

```
Started by user Srushti Vijay Khandade
Running as SYSTEM
Building in workspace /var/lib/jenkins/workspace/Maven-final-project
The recommended git tool is: NONE
No credentials specified
> git rev-parse --resolve-git-dir /var/lib/jenkins/workspace/Maven-final-project/.git # timeout=10
Fetching changes from the remote Git repository
> git config remote.origin.url https://github.com/SrushtiVKhandade/Milestone-2-project.git # timeout=10
Fetching upstream changes from https://github.com/SrushtiVKhandade/Milestone-2-project.git
> git --version # timeout=10
> git --version # 'git version 2.40.1'
> git fetch --tags --force --progress -- https://github.com/SrushtiVKhandade/Milestone-2-project.git
+refs/heads/*:refs/remotes/origin/* # timeout=10
> git rev-parse refs/remotes/origin/main^{commit} # timeout=10
> git rev-parse refs/remotes/origin/main # timeout=10
Checking out Revision 9ff728f097dc3a4db0ce79d7533b933f4051d2f8 (refs/remotes/origin/main)
```

## 5.8. Copied external-ip of created service.



```
jenkins developer tomcat docker kubernetes
deployment.apps "srushti-deployment" deleted
[root@ip-172-31-46-26 ~]# cd .ssh
[root@ip-172-31-46-26 .ssh]# cat id_rsa.pub
ssh-rsa AAAAB3NzaC1yc2EAAAQABAAQgQDBD2DRtYoIk4hUxmcfG1j0M0bT93zMobyjkLgnpsCuoP1l7BPaydsdkHMdwJUSf8tcR9JImtLNcmWBQS62pHTqfgBA5FdJL
RaTkz2f7Ug28Fc329H1j9s88FXNQJ8DNc4q7nio5Mql+EVFc0y1BlyI2AcjLTUtioiX+mEnDm7qidWft9rFrS12PTzTRzRc8d8bw3MOD2egCHiaZzu0xEcmc/3Iowmd0ADs
7QUpoVIIntTWH17AVV5XaHQuH8UfcM5XVBqltjj3d73dpZejfK9tYhtfb2EpI6J1m/APtfY+1IHwU6Kc0L1kCpzrm8FPlV3s048utHj2NxQU823Ru7rn/vqTXKXL8/88TiY
7uIqk3M/aoVWq9L7gaGcWBFImqztkBvwoRJRQrdscGrw6iitV6vS6mmj3GKYbt/HlMandPsiIPY+tWKELo2XqoFmRD52qSsL5F010CDm0lI7xsJpgzaT01tIfJQ03AL+k8lbh9
Neal1Q5Mfr3SnouRcz00= root@ip-172-31-46-26.us-east-2.compute.internal
[root@ip-172-31-46-26 ~]# vim authorized_keys
[root@ip-172-31-46-26 ~]# cd
[root@ip-172-31-46-26 ~]#
[root@ip-172-31-46-26 ~]# ping 172.31.43.6
PING 172.31.43.6 (172.31.43.6) 56(84) bytes of data.
64 bytes from 172.31.43.6: icmp_seq=1 ttl=127 time=1.56 ms
64 bytes from 172.31.43.6: icmp_seq=2 ttl=127 time=1.47 ms
64 bytes from 172.31.43.6: icmp_seq=3 ttl=127 time=0.781 ms
64 bytes from 172.31.43.6: icmp_seq=4 ttl=127 time=0.841 ms
64 bytes from 172.31.43.6: icmp_seq=5 ttl=127 time=1.25 ms
^C
--- 172.31.43.6 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4102ms
rtt min/avg/max/mdev = 0.781/1.178/1.558/0.317 ms
[root@ip-172-31-46-26 ~]# kubectl get deployment
NAME           READY   UP-TO-DATE   AVAILABLE   AGE
srushti-deployment   2/2      2          2          70s
[root@ip-172-31-46-26 ~]# kubectl get svc
NAME            TYPE      CLUSTER-IP      EXTERNAL-IP
)             AGE
kubernetes      ClusterIP    10.100.0.1     <none>
P             91m
srushti-deployment   LoadBalancer  10.100.130.145  afd19ead0b5d743a89e33bd28017ab93-1445134363.us-east-2.elb.amazonaws.com  8080:3
1927/TCP  21m
[root@ip-172-31-46-26 ~]#
```

## 5.9. Pasted external-ip in browser.

Added /webapp path to the external-ip

The screenshot shows a web browser window with the following details:

- Address bar: afd19ead0b5d743a89e33bd28017ab93-1445134363.us-east-2.elb.amazonaws.com:8080/webapp/
- Page title: LTIMindtree Favorites Folder
- Form action: <form action="action\_page.php">
- Section header: **New user Register for DevOps Learning at LTIMindtree**
- Text: Please fill in this form to create an account.
- Input fields:
  - Enter Name [Enter Full Name]
  - Enter mobile [Enter mobile number]
  - Enter Email [Enter Email]
  - Password [Enter Password]
  - Repeat Password [Repeat Password]
- Text: By creating an account you agree to our [Terms & Privacy](#).
- Buttons:
  - Register
  - Already have an account? [Sign in](#).

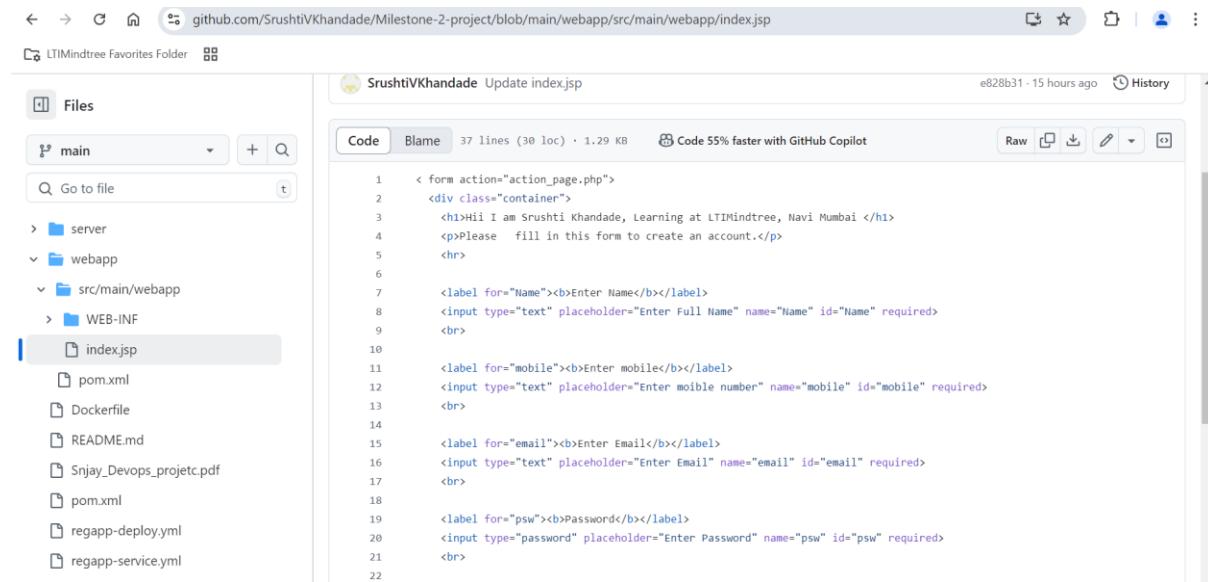
**Thank You, Happy Learning**

**See You Again**

Successfully Hosted Deployment on the Kubernetes!

## 6. Tested Automation

### 6.1. Made some changes in index.jsp and added and committed git changes.

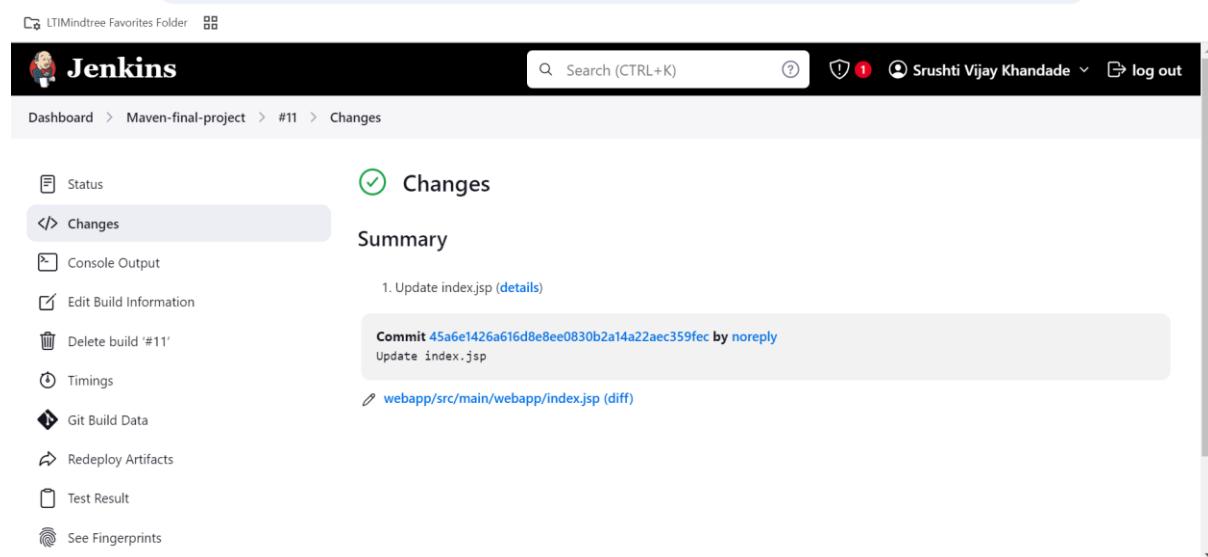


SrushtiVKhanda · Update index.jsp · e828b31 · 15 hours ago · History

Code 55% faster with GitHub Copilot

```
1 < form action="action_page.php">
2 <div class="container">
3 <h1>Hi I am Srushti Khandade, Learning at LTIMindtree, Navi Mumbai </h1>
4 <p>Please fill in this form to create an account.</p>
5 <hr>
6
7 <label for="Name"><b>Enter Name</b></label>
8 <input type="text" placeholder="Enter Full Name" name="Name" id="Name" required>
9 <br>
10
11 <label for="mobile"><b>Enter mobile</b></label>
12 <input type="text" placeholder="Enter mobile number" name="mobile" id="mobile" required>
13 <br>
14
15 <label for="email"><b>Enter Email</b></label>
16 <input type="text" placeholder="Enter Email" name="email" id="email" required>
17 <br>
18
19 <label for="psw"><b>Password</b></label>
20 <input type="password" placeholder="Enter Password" name="psw" id="psw" required>
21 <br>
```

### 6.2. Automatic build is generated on Jenkins Dashboard Milestone2ProjectDeployment item,



Dashboard > Maven-final-project > #11 > Changes

Changes

Summary

1. Update index.jsp (details)

Commit 45a6e1426a616d8e8ee0830b2a14a22aec359fec by noreply  
Update index.jsp

webapp/src/main/webapp/index.jsp (diff)

### 6.3. Changes updated on our final webapp http path

The screenshot shows a web browser window with the following details:

- Address Bar:** Not secure afd19ead0b5d743a89e33bd28017ab93-1445134363.us-east-2.elb.amazonaws.com:8080/webapp/
- Favorites:** LTIMindtree Favorites Folder
- Form Content:**

```
< form action="action_page.php">
```

**Hii I am Srushti Khandade, Learning at LTIMindtree, Navi Mumbai**

Please fill in this form to create an account.

Enter Name	Enter Full Name
Enter mobile	Enter mobile number
Enter Email	Enter Email
Password	Enter Password
Repeat Password	Repeat Password

By creating an account you agree to our [Terms & Privacy](#).

[Register](#)

Already have an account? [Sign in](#).

**Thank You, Happy Learning**

**See You Again**

Automation Working Successfully!

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