

# Jenkins + Docker Java Web Application Project

This document explains a simple real-time DevOps project using Jenkins, Docker, Java, and MySQL. The steps are written in easy language for beginners.

## Project Overview

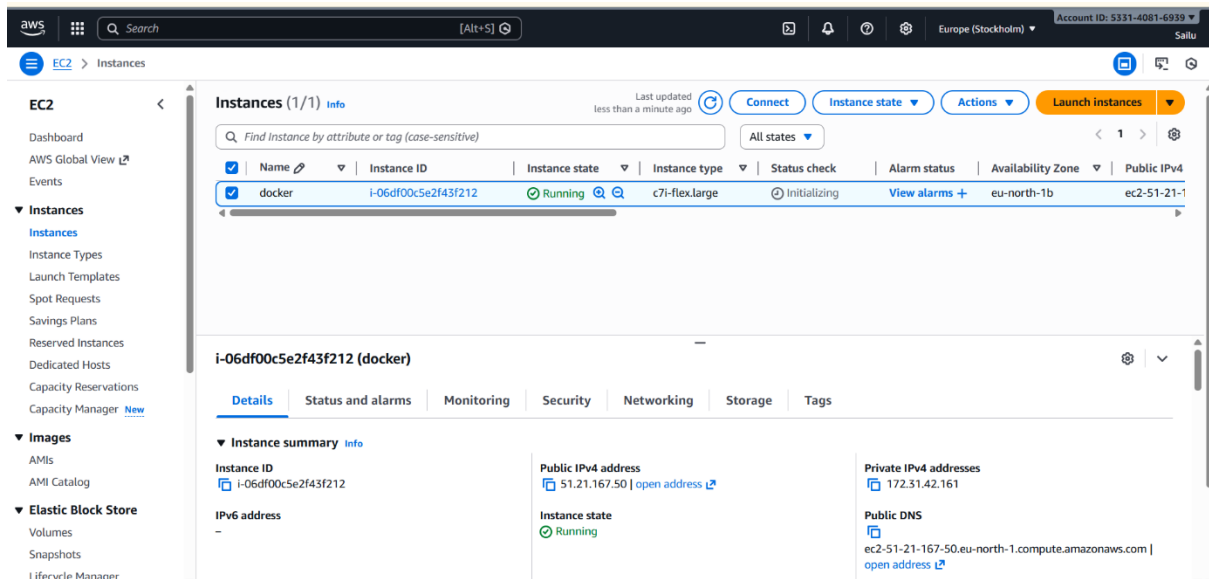
In this project:

- Jenkins is used for automation
- Java application is built using Maven
- Docker is used to create application and database containers
- Application is accessed using public IP

## Step 1: Launch EC2 Instance

Launch an AWS EC2 instance.

- Open port 8080 in the security group
- Connect to the instance using SSH



## Step 2: Install Required Software

Install Git, Java 17, Maven, and Docker.

```

Amazon Linux 2023
https://aws.amazon.com/linux/amazon-linux-2023

[ec2-user@ip-172-31-42-161 ~]$ sudo yum install git java-17 maven docker -y
Last metadata expiration check: 0:02:21 ago on Fri Jan 2 05:41:24 2026.
Dependencies resolved.

```

Package	Architecture	Version	Repository	Size
<b>Installing:</b>				
docker	x86_64	25.0.13-1.amzn2023.0.2	amazonlinux	46 M
git	x86_64	2.50.1-1.amzn2023.0.1	amazonlinux	53 k
java-17-amazon-corretto	x86_64	1:17.0.17+10-1.amzn2023.1	amazonlinux	219 k
maven	noarch	1:3.8.4-3.amzn2023.0.5	amazonlinux	18 k
<b>Installing dependencies:</b>				
alsa-lib	x86_64	1.2.7.2-1.amzn2023.0.2	amazonlinux	504 k
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

## Step 3: Jenkins Reference (AWS)

Open browser and search: Jenkins installation on AWS Follow the last 7 steps from Jenkins official documentation to complete Jenkins setup.

## Step 4: Start and Enable Docker

Start Docker service and enable

- `systemctl start docker`
- `systemctl enable docker`

```

Install 1 Package

Total download size: 91 M
Installed size: 91 M
Downloading Packages:
jenkins-2.528.3-1.1.noarch.rpm                                47 MB/s | 91 MB | 00:01
-----
Total                                                    47 MB/s | 91 MB | 00:01
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing                : jenkins-2.528.3-1.1.noarch                1/1
  Running scriptlet: jenkins-2.528.3-1.1.noarch                1/1
  Installing         : jenkins-2.528.3-1.1.noarch                1/1
  Running scriptlet: jenkins-2.528.3-1.1.noarch                1/1
  Verifying          : jenkins-2.528.3-1.1.noarch                1/1

Installed:
jenkins-2.528.3-1.1.noarch

Complete!
[ec2-user@ip-172-31-42-161 ~]$ sudo systemctl enable jenkins
Created symlink /etc/systemd/system/multi-user.target.wants/jenkins.service -> /usr/lib/systemd/system/jenkins.service.
[ec2-user@ip-172-31-42-161 ~]$ sudo systemctl start jenkins
[ec2-user@ip-172-31-42-161 ~]$ sudo systemctl start docker
[ec2-user@ip-172-31-42-161 ~]$ sudo systemctl enable docker
Created symlink /etc/systemd/system/multi-user.target.wants/docker.service -> /usr/lib/systemd/system/docker.service.
[ec2-user@ip-172-31-42-161 ~]$

```

## Step 5: Clone Project Repository

Download the project source code.

```

. git clone https://github.com/ramyachetty/Docker-web-app.git
. cd docker-web-app
. ls

```

```

[root@ip-172-31-42-161 ~]# git clone https://github.com/ramyachetty/Docker-web-app.git
Cloning into 'Docker-web-app'...
remote: Enumerating objects: 1094, done.
remote: Counting objects: 100% (1094/1094), done.
remote: Compressing objects: 100% (623/623), done.
remote: Total 1094 (delta 338), reused 1086 (delta 333), pack-reused 0 (from 0)
Receiving objects: 100% (1094/1094), 37.73 MiB | 39.26 MiB/s, done.
Resolving deltas: 100% (338/338), done.
[root@ip-172-31-42-161 ~]# ls
Docker-web-app
[root@ip-172-31-42-161 ~]# cd ^C
[root@ip-172-31-42-161 ~]# cd Docker-web-app
[root@ip-172-31-42-161 Docker-web-app]# ls
Docker-app Docker-db Docker-web README.md ansible compose helm kubernetes pom.xml src

```

## Step 6: Clean Old Files and Build Application

Remove unwanted files and build the Java application.

```

. rm -rf *
. mvn clean package

```

```
Downloaded from central: https://repo.maven.apache.org/maven2/org/sonatype/plexus/plexus-build-api/0.0.7/plexus-build-api-0.0.7.jar (8.5 kB at 32 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/javax/inject/javax.inject-1.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/eclipse/aether/aether-api/0.9.0.M2/aether-api-0.9.0.M2.jar (134 kB at 480 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/com/google/guava/guava/10.0.1/guava-10.0.1.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/eclipse/sisu/org.eclipse.sisu.plexus/0.0.0.M2a/org.eclipse.sisu.plexus-0.0.0.M2a.jar (202 kB at 700 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/com/google/code/findbugs/jsr305/1.3.9/jsr305-1.3.9.jar
Downloaded from central: https://repo.maven.apache.org/maven2/javax/enterprise/cdi-api/1.0/cdi-api-1.0.jar (45 kB at 154 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/sonatype/sisu/sisu-guice/3.1.0/sisu-guice-3.1.0-no_aop.jar
Downloaded from central: https://repo.maven.apache.org/maven2/javax/annotation/jsr250-api/1.0/jsr250-api-1.0.jar (5.8 kB at 19 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/eclipse/sisu/org.eclipse.sisu.inject/0.0.0.M2a/org.eclipse.sisu.inject-0.0.0.M2a.jar
Downloaded from central: https://repo.maven.apache.org/maven2/javax/inject/javax.inject-1.jar (2.5 kB at 7.9 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/asm/asm/3.3.1/asm-3.3.1.jar
Downloaded from central: https://repo.maven.apache.org/maven2/com/google/guava/guava/10.0.1/guava-10.0.1.jar (1.5 MB at 4.6 MB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/com/google/code/findbugs/jsr305/1.3.9/jsr305-1.3.9.jar (33 kB at 101 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/sonatype/sisu/sisu-guice/3.1.0/sisu-guice-3.1.0-no_aop.jar (357 kB at 1.0 MB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/eclipse/sisu/org.eclipse.sisu.inject/0.0.0.M2a/org.eclipse.sisu.inject-0.0.0.M2a.jar (202 kB at 578 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/asm/asm/3.3.1/asm-3.3.1.jar (44 kB at 122 kB/s)
[INFO] Packaging webapp
[INFO] Assembling webapp [vprofile] in [/root/.docker-web-app/target/vprofile-v2]
[INFO] Processing war project
[INFO] Copying webapp resources [/root/.docker-web-app/src/main/webapp]
[INFO] Building war: /root/.docker-web-app/target/vprofile-v2.war
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 39.525 s
[INFO] Finished at: 2026-01-02T05:59:49g
[root@ip-172-31-42-161 docker-web-app]#
```

- ```
. cd docker-app
. rm -rf multistage
. vi Dockerfile
```

# Step 8: Create Application Image

Copy WAR file and build application image.

```
. cd ..
```

```
. ls
```

```
. cp -rf target docker//
```

```
. cd docker-app
```

```
. ls
```

```
. docker build -t appimage .
```

```
[root@ip-172-31-42-161 Docker-app]# cd ..
[root@ip-172-31-42-161 Docker-web-app]# docker build -t appimage ./Docker-app/
[+] Building 0.5s (7/7) FINISHED                                docker:default
=> [internal] load build definition from Dockerfile            0.0s
=> => transferring dockerfile: 264B                             0.0s
=> [internal] load metadata for docker.io/library/tomcat:9-jre17 0.4s
=> [internal] load .dockerignore                               0.0s
=> => transferring context: 2B                                    0.0s
=> [1/3] FROM docker.io/library/tomcat:9-jre17@sha256:9c833690da455473137bac90391bf09b4aad6fb0dbf56229efe79fef6cdfbaa8 0.0s
=> => resolve docker.io/library/tomcat:9-jre17@sha256:9c833690da455473137bac90391bf09b4aad6fb0dbf56229efe79fef6cdfbaa8 0.0s
=> [internal] load build context                                0.0s
=> => transferring context: 2B                                    0.0s
=> CACHED [2/3] RUN rm -rf /usr/local/tomcat/webapps/*         0.0s
=> ERROR [3/3] COPY target/vprofile-v2.war /usr/local/tomcat/webapps/ROOT.war 0.0s

> [3/3] COPY target/vprofile-v2.war /usr/local/tomcat/webapps/ROOT.war:
-----
Dockerfile:5
-----
 3 |     RUN rm -rf /usr/local/tomcat/webapps/*
 4 |
 5 | >>> COPY target/vprofile-v2.war /usr/local/tomcat/webapps/ROOT.war
 6 |
 7 |     EXPOSE 8080
-----

ERROR: failed to solve: failed to compute cache key: failed to calculate checksum of ref ea9790d5-95c4-45ab-beca-44048dde0afb::z8fcfs14t2p0956cgupmzo0yr: failed to walk
/var/lib/docker/tmp/buildkit-mount3186165315/target: lstat /var/lib/docker/tmp/buildkit-mount3186165315/target: no such file or directory
[root@ip-172-31-42-161 Docker-web-app]# ls
Docker-app Docker-db pom.xml src target
[root@ip-172-31-42-161 Docker-web-app]# cp -r target Docker-app//
[root@ip-172-31-42-161 Docker-web-app]# cd Docker-app
```

```
[root@ip-172-31-42-161 Docker-web-app]# ls
Docker-app Docker-db pom.xml src target
[root@ip-172-31-42-161 Docker-web-app]# cp -r target Docker-app//
[root@ip-172-31-42-161 Docker-web-app]# cd Docker-app
[root@ip-172-31-42-161 Docker-app]# ls
Dockerfile target
[root@ip-172-31-42-161 Docker-app]# docker build -t appimage .
[+] Building 5.3s (8/8) FINISHED                                docker:default
=> [internal] load build definition from Dockerfile            0.0s
=> => transferring dockerfile: 264B                             0.0s
=> [internal] load metadata for docker.io/library/tomcat:9-jre17 0.4s
=> [internal] load .dockerignore                               0.0s
=> => transferring context: 2B                                    0.0s
=> [1/3] FROM docker.io/library/tomcat:9-jre17@sha256:9c833690da455473137bac90391bf09b4aad6fb0dbf56229efe79fef6cdfbaa8 3.3s
=> => resolve docker.io/library/tomcat:9-jre17@sha256:9c833690da455473137bac90391bf09b4aad6fb0dbf56229efe79fef6cdfbaa8 0.0s
=> => sha256:2f004306e3d5c78b45520c5707319835ac7d1f3d7f0dded0138ea0897d6a3188 29.72MB / 29.72MB 0.6s
=> => sha256:ec1e0321681ccbedcbfd0d195ec926ba8b1fb3ac6881aedeb6107b5d2dca3f28 47.06MB / 47.06MB 1.0s
=> => sha256:9c833690da455473137bac90391bf09b4aad6fb0dbf56229efe79fef6cdfbaa8 7.96kB / 7.96kB 0.0s
=> => sha256:3addceda30d96b7380c195549d14de657caa9a9c8231dd2ab2b0760c4e8d7571 2.91kB / 2.91kB 0.0s
=> => sha256:9c327fa122f1b0588cd4e171dc995e74ca4822288e1b1cb202274dddb60c005 9.71kB / 9.71kB 0.0s
=> => sha256:a12c65f9f6ac16f89f6c3114f9b2bdc77d6367d3f68f9070ec314a49711853b3a 16.97MB / 16.97MB 0.6s
=> => extracting sha256:2f004306e3d5c78b45520c5707319835ac7d1f3d7f0dded0138ea0897d6a3188 0.0s
=> => sha256:4697744f90bf9f05ffa00c679b3cfed74488d3273e4ad9a245a063d965a2083 158B / 158B 0.0s
=> => sha256:2581bcb3f73b6d9f257d5b3f64a3d86de4713b0ffefb3189693dbec3785a9e79 2.28kB / 2.28kB 0.0s
=> => sha256:9d9b237bbccf1c96e90291f9b3bdab69e206299a9a57fe6ac2e315840b62fbd9 139B / 139B 1.1s
=> => sha256:4f4fb700ef54461cfa02571ae0db9a0dc1e0cdd5577484a6d75e68dc38e8acc1 32B / 32B 1.2s
=> => sha256:a7a541859fffaaf73767702863785b8c6b553e33658aab69ca7793910cb8d6bc 13.74MB / 13.74MB 1.5s
=> => sha256:6d11206f9496df31a0d59ba9c766567fa91ba7ed67db4a9609ef2be40b16665a 224.70kB / 224.70kB 1.4s
=> => extracting sha256:a12c65f9f6ac16f89f6c3114f9b2bdc77d6367d3f68f9070ec314a49711853b3a 0.0s
=> => extracting sha256:ec1e0321681ccbedcbfd0d195ec926ba8b1fb3ac6881aedeb6107b5d2dca3f28 0.0s
=> => extracting sha256:4697744f90bf9f05ffa00c679b3cfed74488d3273e4ad9a245a063d965a2083 0.0s
```

# Step 9: Verify Docker Images

Check available Docker images.

```
. cd ..
```

## . docker images

```
=> sha256:9e327fa122ff0588cd4e171dc095e74ca4822288e1b1cb202274d0d0b60c005 9.71kB / 9.71kB 0.0s
=> sha256:a12c659f8ac16f8d9f5c5114f9b2bbc77d6367df6b5f9070ec314a45711853b3a 16.97MB / 16.97MB 0.6s
=> extracting sha256:20043066d3d5c78b45520c5707319835ac7d1f3d7f0dded0138ea0897d6a3188 0.8s
=> sha256:469f746f06bf8f05ffa00c679b9cfed78488d3273e4ad9a245a063d965a2083 158B / 158B 0.9s
=> sha256:2581bc3ff3b6d9f257d5b3f64a3d86de4713b0ffefb3189693db6e3785a9e79 2.28kB / 2.28kB 0.9s
=> sha256:94fb237b0bef1c56e90291f9b3dbab9e20d6299a9a57f6aac2e318940b62fde5 139B / 139B 1.1s
=> sha256:4f4fb700ef54461cfa02571ae0db9a0dc1e0cd5577484a6d75e68dc3e8aacc1 32B / 32B 1.2s
=> sha256:a7a541859fffaaf73767702863785b6c6b55e33658aabe6ca7793910cb8d6bc 13.74MB / 13.74MB 1.5s
=> sha256:6d1120ef9496df31a0d59ba9c766567fa91ba7ed67db4a96098f2be40b16665a 224.70kB / 224.70kB 1.4s
=> extracting sha256:a12c659f8ac16f8d9f5c5114f9b2bbc77d6367df6b5f9070ec314a45711853b3a 0.5s
=> extracting sha256:ec1e0321681ccbedcbfd0d195ec926ba8b1fb3ac6881aedeb6107b5d2dfa3f28 0.8s
=> extracting sha256:469f746f06bf8f05ffa00c679b9cfed78488d3273e4ad9a245a063d965a2083 0.0s
=> extracting sha256:2581bc3ff3b6d9f257d5b3f64a3d86de4713b0ffefb3189693db6e3785a9e79 0.0s
=> extracting sha256:94fb237b0bef1c56e90291f9b3dbab9e20d6299a9a57f6aac2e318940b62fde5 0.0s
=> extracting sha256:4f4fb700ef54461cfa02571ae0db9a0dc1e0cd5577484a6d75e68dc3e8aacc1 0.0s
=> extracting sha256:a7a541859fffaaf73767702863785b6c6b55e33658aabe6ca7793910cb8d6bc 0.2s
=> extracting sha256:6d1120ef9496df31a0d59ba9c766567fa91ba7ed67db4a96098f2be40b16665a 0.0s
[internal] load build context
=> transferring context: 48.50MB 0.3s
=> [2/3] RUN rm -rf /usr/local/tomcat/webapps/* 0.3s
=> [3/3] COPY target/vprofile-v2.war /usr/local/tomcat/webapps/ROOT.war 1.0s
=> exporting to image 0.4s
=> exporting layers 0.1s
=> writing image sha256:3a1aad89bef757854eddad0c308ddea70fb2823e19fadff40296ac0da8af9a0b 0.0s
=> naming to docker.io/library/appimage 0.0s
[root@ip-172-31-42-161 Docker-app]# cd ..
[root@ip-172-31-42-161 Docker-web-app]# docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
appimage latest 3a1aad89bef7 About a minute ago 333MB
[root@ip-172-31-42-161 Docker-web-app]#
```

## Step 10: Create Database Image

Create Docker image for MySQL database.

. cd docker-db

. vi Dockerfile

```
[root@ip-172-31-42-161 Docker-app]# cd ..
[root@ip-172-31-42-161 Docker-web-app]# docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
appimage latest 3a1aad89bef7 About a minute ago 333MB
[root@ip-172-31-42-161 Docker-web-app]# ls
Docker-app Docker-db pom.xml src target
[root@ip-172-31-42-161 Docker-web-app]# cd Docker-db
[root@ip-172-31-42-161 Docker-db]# ls
Dockerfile db backup.sql
[root@ip-172-31-42-161 Docker-db]#
```

```
FROM mysql:5.7.25

ENV MYSQL_ROOT_PASSWORD="devopspassword"
ENV MYSQL_DATABASE="accounts"

ADD db_backup.sql docker-entrypoint-initdb.d/db_backup.sql

"
Dockerfile" 6L, 150B 1,1 All
```

. docker build -t dbimage .

. docker images

```
[root@ip-172-31-42-161 Docker-web-app]# ls
Docker-app Docker-db pom.xml src target
[root@ip-172-31-42-161 Docker-web-app]# cd Docker-db
[root@ip-172-31-42-161 Docker-db]# ls
Dockerfile db backup.sql
[root@ip-172-31-42-161 Docker-db]# vi Dockerfile
[root@ip-172-31-42-161 Docker-db]# docker build -t dbimage .
[+] Building 6.6s (7/7) FINISHED
=> [internal] load build definition from Dockerfile                                docker:default
=> => transferring dockerfile: 249B  0.0s
=> [internal] load metadata for docker.io/library/mysql:5.7.25                  0.0s
=> [internal] load .dockerignore  1.5s
=> => transferring context: 2B  0.0s
=> [internal] load build context  0.0s
=> => transferring context: 6.28kB  0.0s

=> => extracting sha256:1d924ec30520e4d7a7c9b20e71bd1489c3b0279620074e4ad778a12c960dd3ed
=> => extracting sha256:1ab7ae63ac60fbac1fe3febd0c024fea01d69efb9fa31833d85cd6d315c6d73
=> => extracting sha256:08aa5f3680e94de0fedeaafb32c6c2a234083be3190b856fbd5c60da8e06d52a
=> => extracting sha256:a832d0a0972add8c1ebb637fc77685cebf2e862cd51619cdd3ccd0cdc98374c3
=> [2/2] ADD db_backup.sql docker-entrypoint-initdb.d/db_backup.sql
=> exporting to image
=> => exporting layers
=> => writing image sha256:9fedb2be2d5cb1d83a6a19flac2d28bf2be22bec8d7f10f3779cebf9c4905f4a
=> => naming to docker.io/library/dbimage
[root@ip-172-31-42-161 Docker-db]# docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
dbimage latest 9fedb2be2d5c 31 seconds ago 372MB
appimage latest 3a1aad89bef7 4 minutes ago 333MB
appimage latest 3a1aad89bef7 4 minutes ago 333MB
[root@ip-172-31-42-161 Docker-db]#
```

## Step 11: Run Database Container

Start database container first.

. docker run -itd --name devopsdb -p 3306:3306 dbimage

. docker ps

```
[root@ip-172-31-42-161 Docker-db]# docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
dbimage latest 9fedb2be2d5c 31 seconds ago 372MB
appimage latest 3a1aad89bef7 4 minutes ago 333MB
appimage latest 3a1aad89bef7 4 minutes ago 333MB
[root@ip-172-31-42-161 Docker-db]# docker run -itd --name devopsdb -p 3306:3306 dbimage
d71e3dfe2fa8cf3e4e201d4561727de47b3b38fc36f9060b2466a67c95cb569
[root@ip-172-31-42-161 Docker-db]# docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
d71e3dfe2fa dbimage "docker-entrypoint.s..." 12 seconds ago Up 11 seconds 0.0.0.0:3306->3306/tcp, :::3306->3306/tcp, 33060/tcp devopsdb
[root@ip-172-31-42-161 Docker-db]#
```

## Step 12: Run Application Container

Run application container and connect it to database.

. docker run -itd --name devopsapp -p 8080:8080 --link devopsdb:mysql appimage

```
[root@ip-172-31-42-161 Docker-db]# docker run -itd --name devops -p 8080:8080 --link devopsdb:mysqlconnect appimage
a46d979fd49b952f4e563194efcac27ea02b37843499cbcc11701b7b0adcecd
[root@ip-172-31-42-161 Docker-db]#
```

## Step 13: Application Testing

- Copy public IP of EC2 instance
- Open browser and access application
- Login using credentials
- Sign out

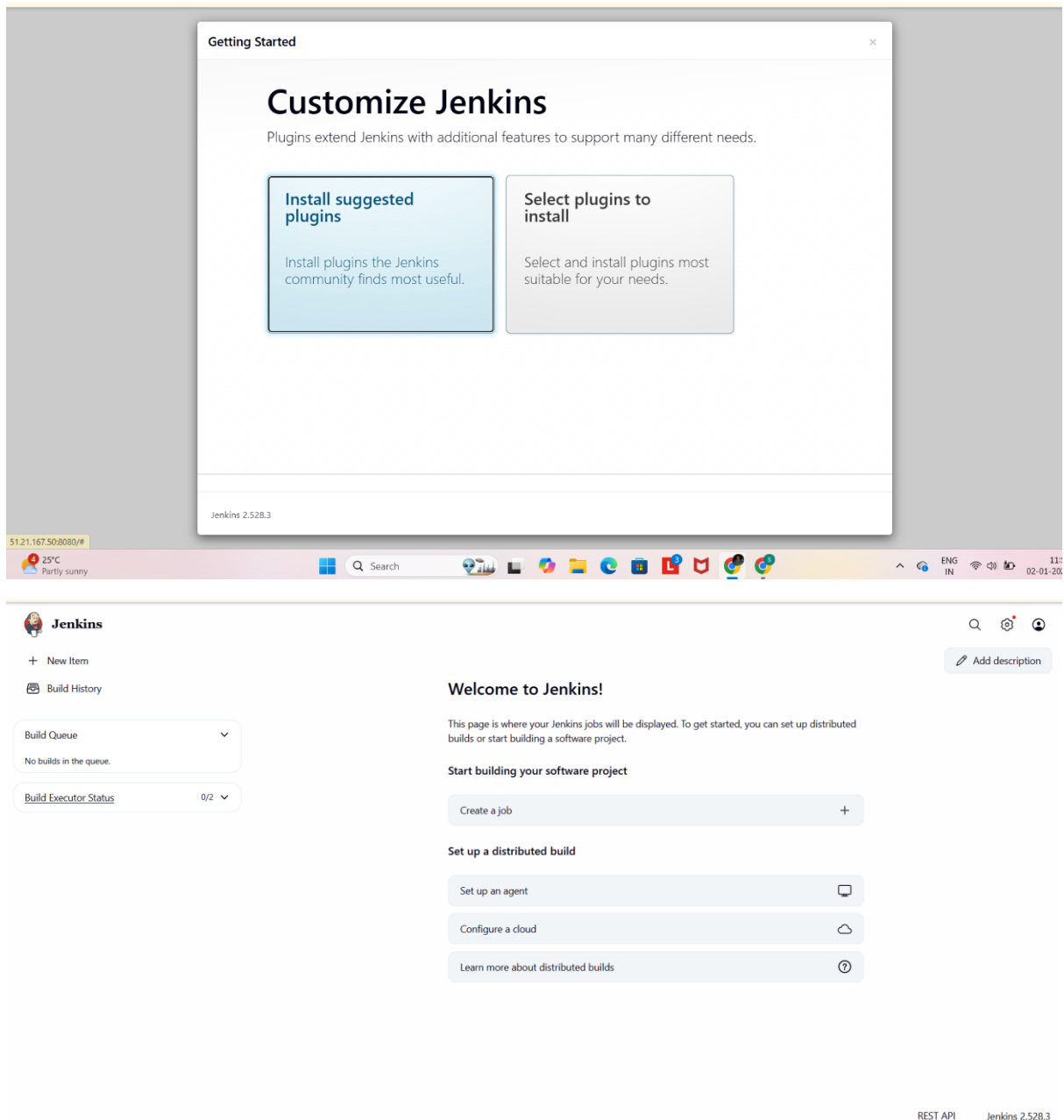
- Login again with same credentials

The screenshot displays the AWS Management Console for an EC2 instance named 'docker' (ID: i-06df00c5e2f43f212). The instance is in a 'Running' state. The console shows various details including the instance type (c7i-flex.large), status check (Initializing), and availability zone (eu-north-1b). A tooltip indicates that the public IPv4 address has been copied. Below the console, a terminal window shows the command to cat the initialAdminPassword file.

```
[root@ip-172-31-42-161 Docker-db]# sudo cat /var/lib/jenkins/secrets/initialAdminPassword
f4a8b0c6110c4ff8b3a0b4b055f17ee6
```

The screenshot shows the Jenkins 'Getting Started' screen. It prompts the user to 'Unlock Jenkins' by entering the administrator password. The password is shown as a series of dots in a text input field. A 'Continue' button is visible at the bottom right.





## Final Result

If login works correctly, the project is successful. This confirms application and database containers are working properly.



## Sign in to Jenkins

Username

sailaja

Password

...

☐ Keep me signed in

Sign in



+ New Item

Build History

Build Queue

No builds in the queue.

Build Executor Status

0/2

## Welcome to Jenkins!

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

### Start building your software project

Create a job



### Set up a distributed build

Set up an agent



Configure a cloud



Learn more about distributed builds



Add description