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

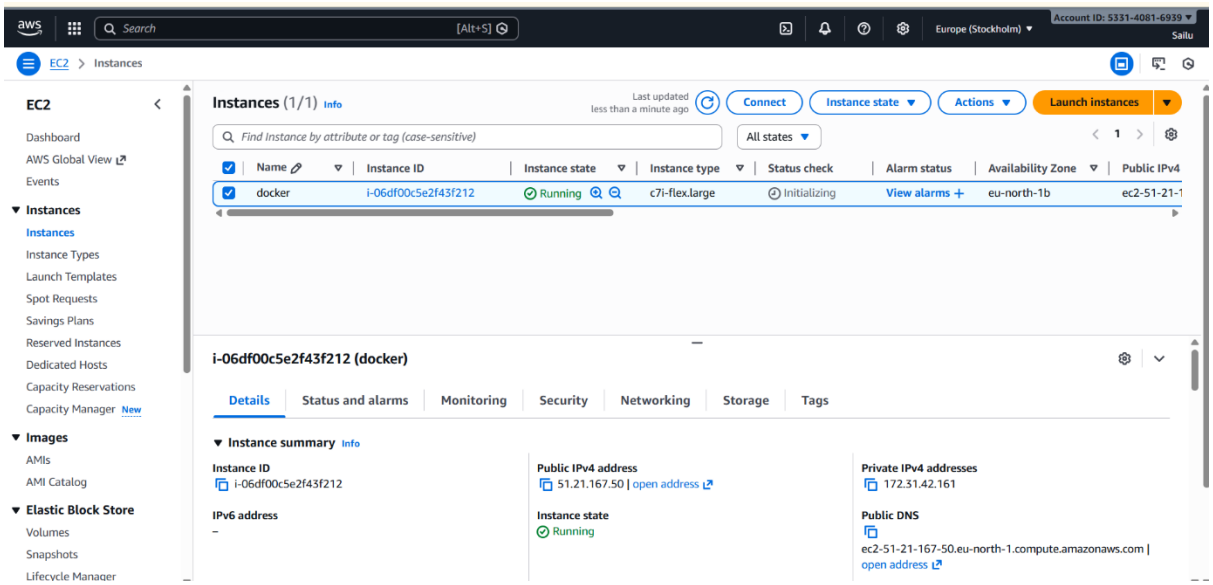
In this project:

- 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

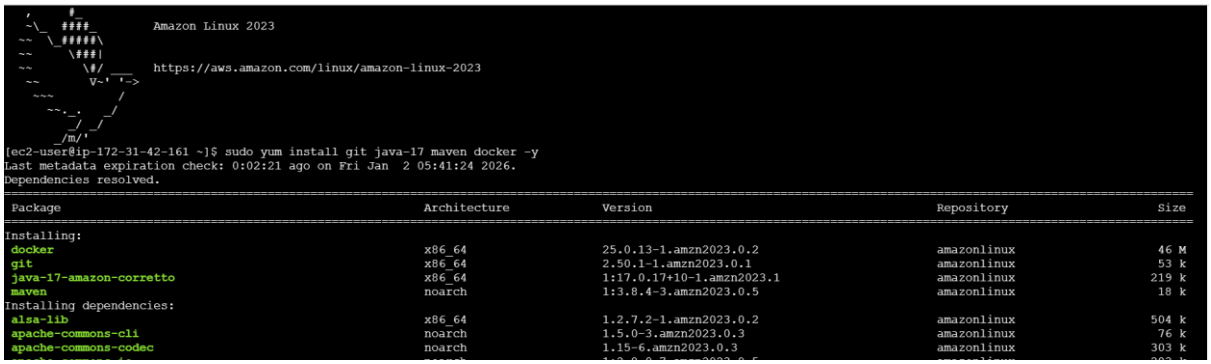
Launch an AWS EC2 instance.

- 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.



Step 3: Jenkins Reference (AWS)

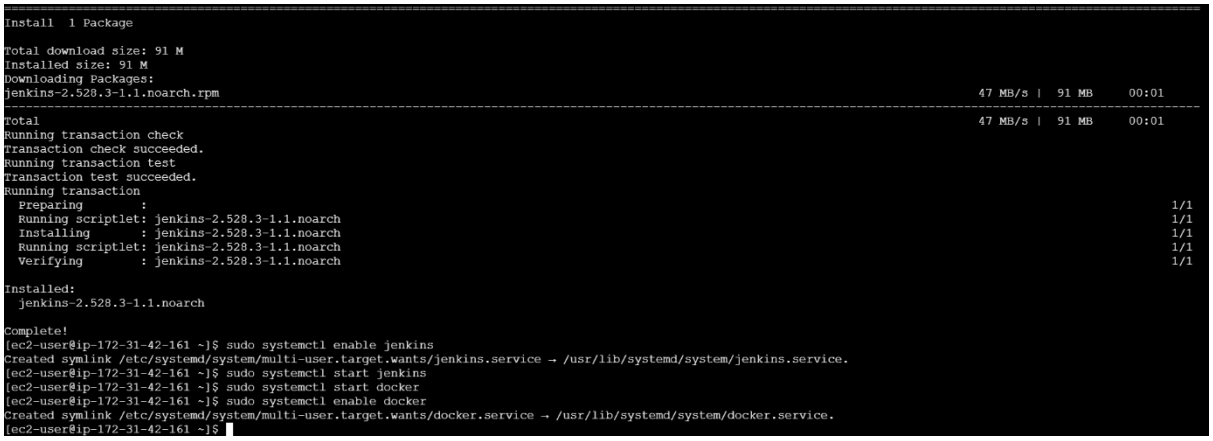
Open browser and search: Jenkins installation on AWS Follow the last 7 steps from Jenkins official documentation to complete Jenkins setup.

Step 4: Start and Enable Docker

Start Docker service and enable

. systemctl start docker

. systemctl enable docker



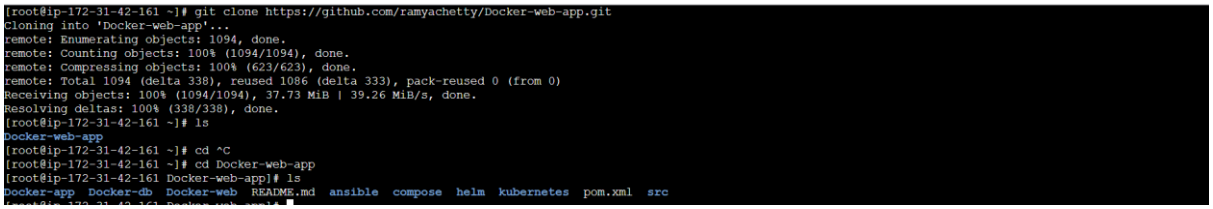
Step 5: Clone Project Repository

Download the project source code.

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

. cd docker-web-app

. ls



Step 6: Clean Old Files and Build Application

Remove unwanted files and build the Java application.

. rm -rf *

. mvn clean package

```
[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
[root@ip-172-31-42-161 Docker-web-app]# rm -rf Docker-web ansible helm kubernetes compose README.md
[root@ip-172-31-42-161 Docker-web-app]# ls
Docker-app  Docker-db  pom.xml  src
[root@ip-172-31-42-161 Docker-web-app]# mvn clean package
[INFO] Scanning for projects...
[INFO]
[INFO] ----------------------< com.visualpathit:vprofile >-----------------------
[INFO] Building Devops Webapp v2
[INFO] --------------------------------[ war ]---------------------------------
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-clean-plugin/2.5/maven-clean-plugin-2.5.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-clean-plugin/2.5/maven-clean-plugin-2.5.pom (3.9 kB at 20 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-plugins/22/maven-plugins-22.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-plugins/22/maven-plugins-22.pom (13 kB at 256 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/maven-parent/21/maven-parent-21.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/maven-parent/21/maven-parent-21.pom (26 kB at 549 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/apache/10/apache-10.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/apache/10/apache-10.pom (15 kB at 315 kB/s)
```

```
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/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)
Downloading 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)
Downloading 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/javax.inject-1.jar (2.5 kB at 7.9 kB/s)
Downloading 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: 2026-01-02T05:59:49Z
[INFO] ------------------------------------------------------------------------
[root@ip-172-31-42-161 Docker-web-app]#
```

Step 7: Application Dockerfile

Go to docker-app directory and create Dockerfile.

. cd docker-app

. rm -rf multistage

. vi Dockerfile

```
FROM tomcat:9-jre17

RUN rm -rf /usr/local/tomcat/webapps/*

COPY target/vprofile-v2.war /usr/local/tomcat/webapps/ROOT.war

EXPOSE 8080
CMD ["catalina.sh", "run"]

~
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~
"Dockerfile" 9L, 165B                                                    1,19          All
```

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::z8fcfsl4t2po956cgupmzo0yr: 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
```

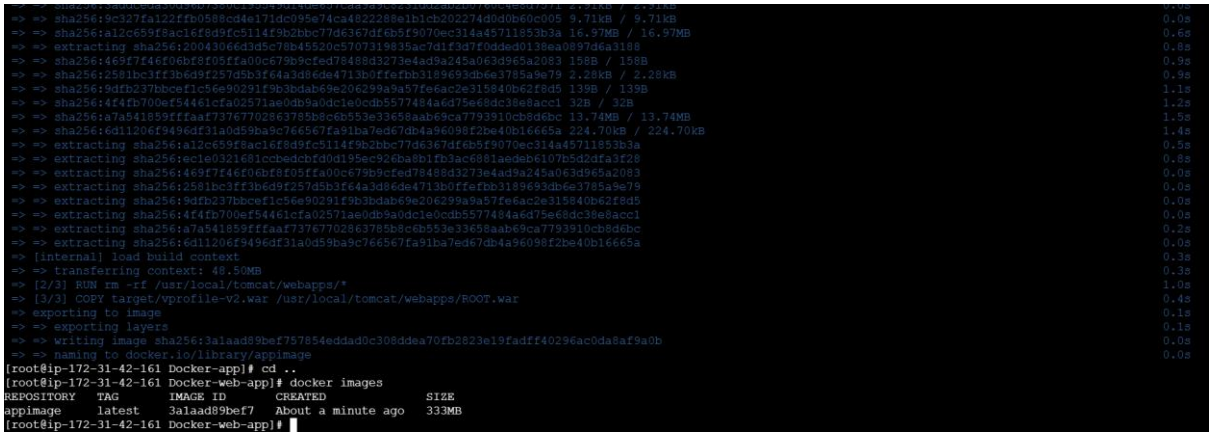
```
[root@ip-172-31-42-161 Docker-web-app]# ls
Docker-app  Docker-db  pom.xml  src  target
[root@ip-172-31-42-161 Docker-web-app]# cp -r target Docker-app//
[root@ip-172-31-42-161 Docker-web-app]# cd Docker-app
[root@ip-172-31-42-161 Docker-app]# ls
Dockerfile  target
[root@ip-172-31-42-161 Docker-app]# 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
 => => sha256:20043066d3d5c78b45520c5707319835ac7d1f3d7f0dded0138ea0897d6a3188 29.72MB / 29.72MB           0.6s
 => => sha256:ec1e0321681ccbedcbfd0d195ec926ba8b1fb3ac6881aedeb6107b5d2dfa3f28 47.06MB / 47.06MB           1.0s
 => => sha256:9c833690da455473137bac90391bf09b4aad6fb0dbf56229efe79fef6cdfbaa8 7.96kB / 7.96kB             0.0s
 => => sha256:3addceda30d96b7380c195549d14de657caa9a9c8231dd2ab2b0760c4e8d7571 2.91kB / 2.91kB             0.0s
 => => sha256:9c327fa122ffb0588cd4e171dc095e74ca4822288e1b1cb202274d0d0b60c005 9.71kB / 9.71kB             0.0s
 => => sha256:a12c659f8ac16f8d9fc5114f9b2bbc77d6367df6b5f9070ec314a45711853b3a 16.97MB / 16.97MB           0.6s
 => => extracting sha256:20043066d3d5c78b45520c5707319835ac7d1f3d7f0dded0138ea0897d6a3188                  0.8s
 => => sha256:469f7f46f06bf8f05ffa00c679b9cfed78488d3273e4ad9a245a063d965a2083 158B / 158B                 0.9s
 => => sha256:2581bc3ff3b6d9f257d5b3f64a3d86de4713b0ffefbb3189693db6e3785a9e79 2.28kB / 2.28kB             0.9s
 => => sha256:9dfb237bbcef1c56e90291f9b3bdab69e206299a9a57fe6ac2e315840b62f8d5 139B / 139B                 1.1s
 => => sha256:4f4fb700ef54461cfa02571ae0db9a0dc1e0cdb5577484a6d75e68dc38e8acc1 32B / 32B                   1.2s
 => => sha256:a7a541859fffaaf73767702863785b8c6b553e33658aab69ca7793910cb8d6bc 13.74MB / 13.74MB           1.5s
 => => sha256:6d11206f9496df31a0d59ba9c766567fa91ba7ed67db4a96098f2be40b16665a 224.70kB / 224.70kB         1.4s
 => => extracting sha256:a12c659f8ac16f8d9fc5114f9b2bbc77d6367df6b5f9070ec314a45711853b3a                  0.5s
 => => extracting sha256:ec1e0321681ccbedcbfd0d195ec926ba8b1fb3ac6881aedeb6107b5d2dfa3f28                  0.8s
 => => extracting sha256:469f7f46f06bf8f05ffa00c679b9cfed78488d3273e4ad9a245a063d965a2083                  0.0s
```

Step 9: Verify Docker Images

Check available Docker images.

. cd ..

. docker images

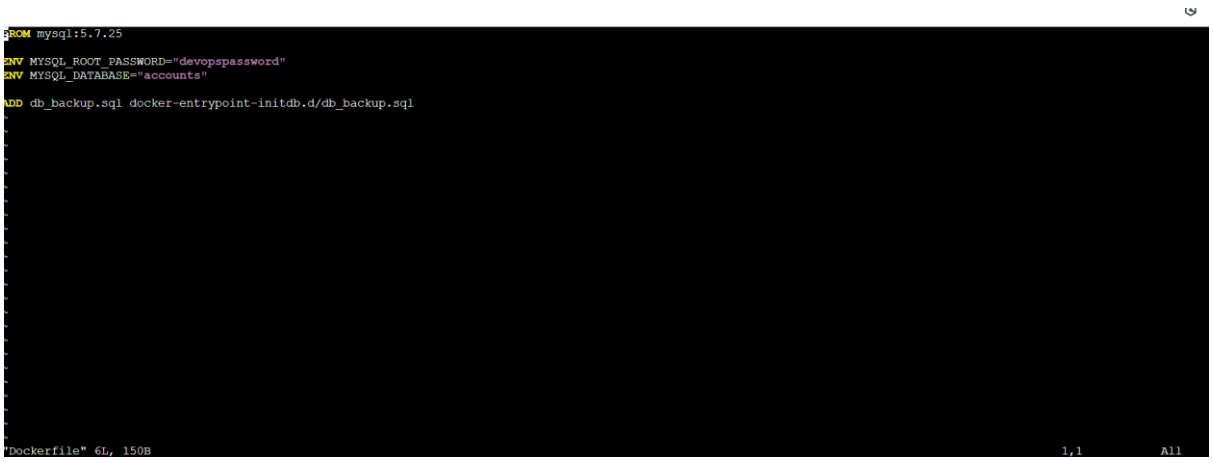


Step 10: Create Database Image

Create Docker image for MySQL database.

. cd docker-db

. vi Dockerfile



. 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                                   docker:default
 => [internal] load build definition from Dockerfile                        0.0s
 => => transferring dockerfile: 249B                                        0.0s
 => [internal] load metadata for docker.io/library/mysql:5.7.25             1.5s
 => [internal] load .dockerignore                                           0.0s
 => => transferring context: 2B                                             0.0s
 => [internal] load build context                                           0.0s
 => => transferring context: 6.28kB                                         0.0s
```

```
 => => extracting sha256:1ab7ae63ac60fbac1fe3febdf0c024fea01d69efb9fa31833d85cd6d315c6d73
 => => extracting sha256:08aa5f3680e94de0fedeafcb32c6c2a234083be3190b856fbd5c60da8e06d52a
 => => extracting sha256:a832d0a0972add8c1ebb637fc77685cebf2e862cd51619cdd3ccd0cdc98374c3
 => [2/2] ADD db_backup.sql docker-entrypoint-initdb.d/db_backup.sql
 => exporting to image
 => => exporting layers
 => => writing image sha256:9fedb2be2d5cb1d83a6a19f1ac2d28bf2be22bec8d7f10f3779cebf9c4905f4a
 => => 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
[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
[root@ip-172-31-42-161 Docker-db]# docker run -itd --name devopsdb -p 3306:3306 dbimage
d71e3dfe62fa8cf3e4e201d4561727de47b3b38fc36f9060b2466a67c95cb569
[root@ip-172-31-42-161 Docker-db]# docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED          STATUS          PORTS                                                  NAMES
d71e3dfe62fa   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.

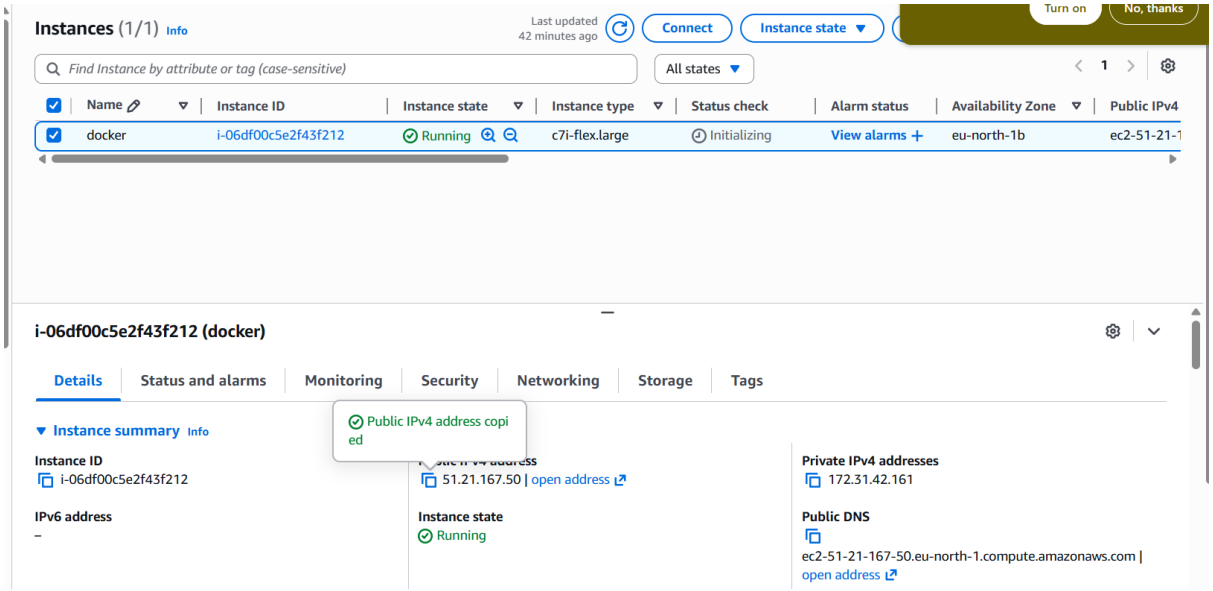
. docker run -itd --name devopsapp -p 8080:8080 --link devopsdb:mysql appimage

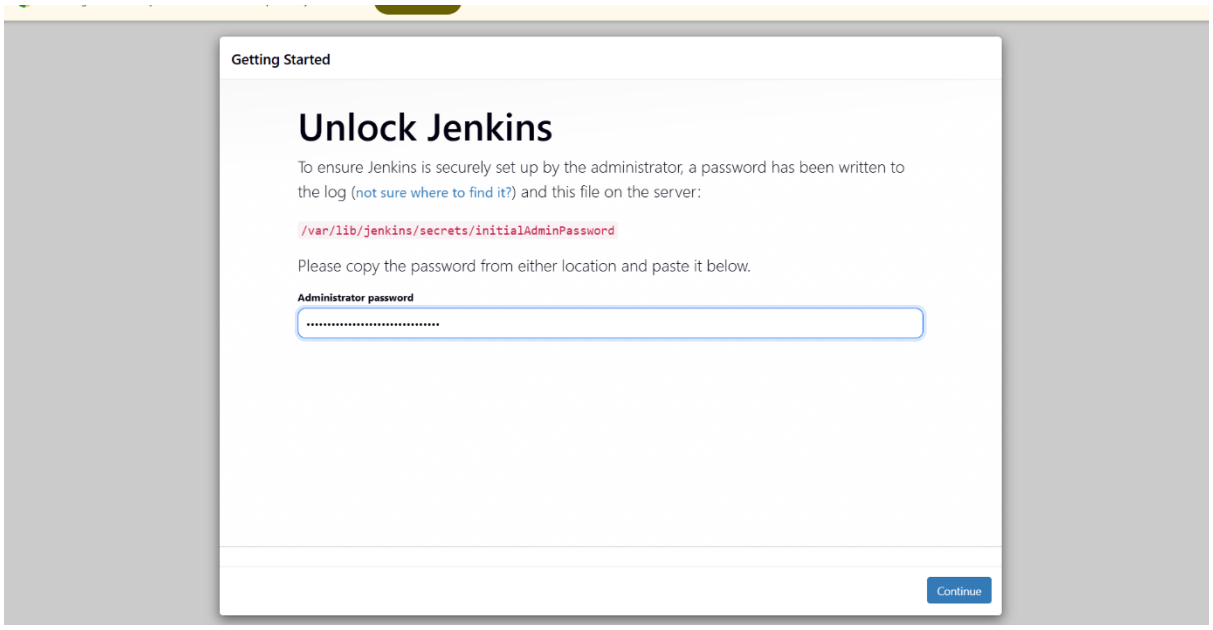
```
[root@ip-172-31-42-161 Docker-db]# docker run -itd --name devops -p 8081:8080 --link devopsdb:mysqlconnect appimage

a46d979fd49b952f4e563194efcac27ea02b37843499cbcce11701b7b0adceed
[root@ip-172-31-42-161 Docker-db]#
```

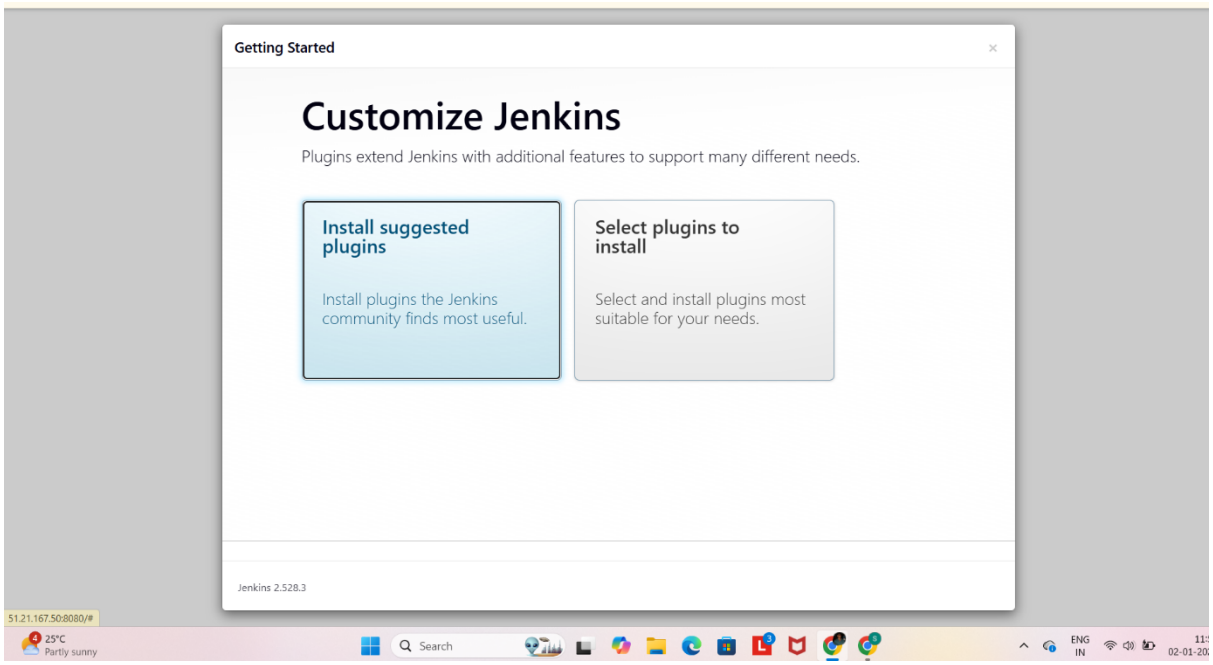
Step 13: Application Testing

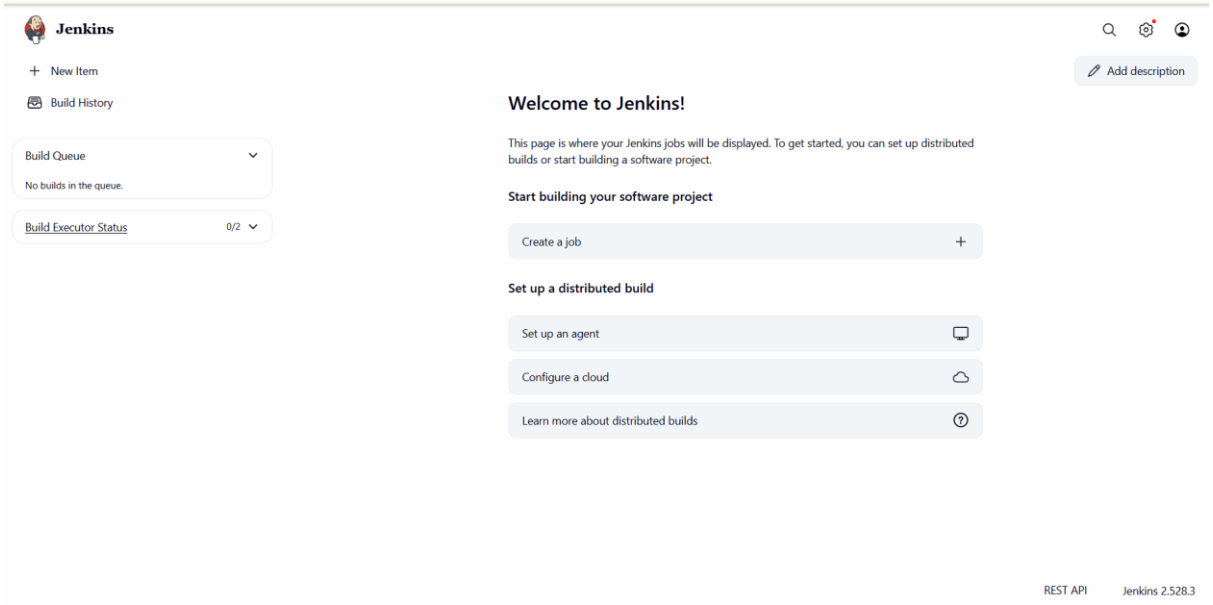
- Copy public IP of EC2 instance
- Open browser and access application
- Login using credentials
- Sign out

- Login again with same credentials









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

Jenkins

New Item

Build History

Build Queue

No builds in the queue.

Build Executor Status 0/2

Add description

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

REST API Jenkins 2.528.3