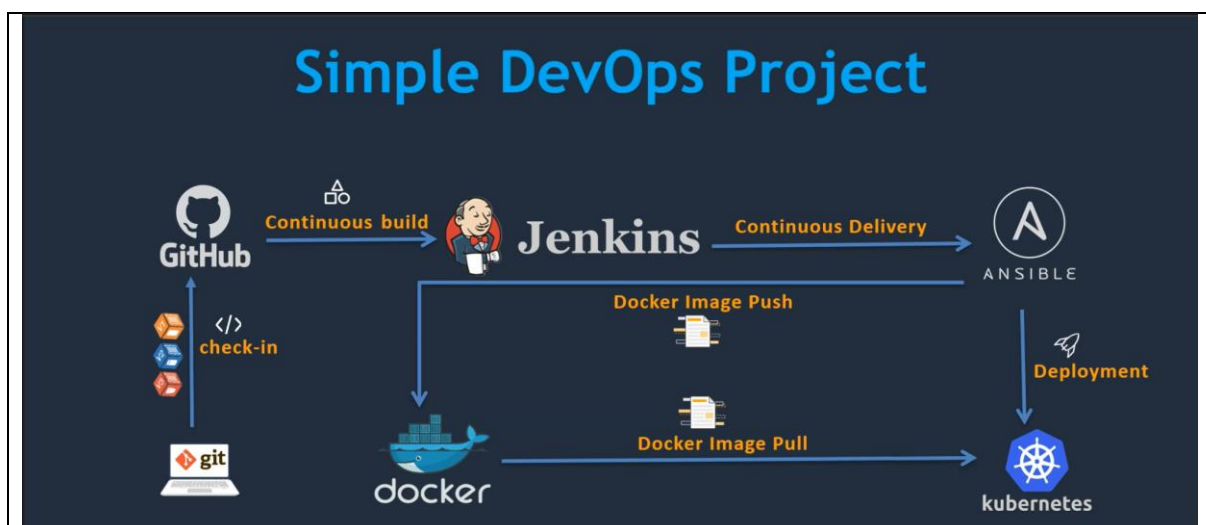


Simple Devops Projects

Requirements : CI/CD pipeline System

- Git - local version control system.
- GitHub - As Distributed version control system.
- Jenkins - Continuous Integration tool.
- Maven - As a Build Tool.
- Anisble - Configuration Management & Deployment tool.
- docker -Containerization
- Kubernetes - As Container Management Tool.

Flow Diagram : -



What Do we Cover?

Build and Deploy on Tomcat Server.

Setup CI/CD with GitHub, Jenkins, Maven & Tomcat.

- Setup Jenkins
- Setup & Configure Maven , Git.
- Setup Tomcat Server.
- Integrating GitHub,Maven ,Tomcat Server with Jenkins
- Create a CI and CD Job.
- Test the Deployment.

1. Deploy Artifacts on a Tomcat Server

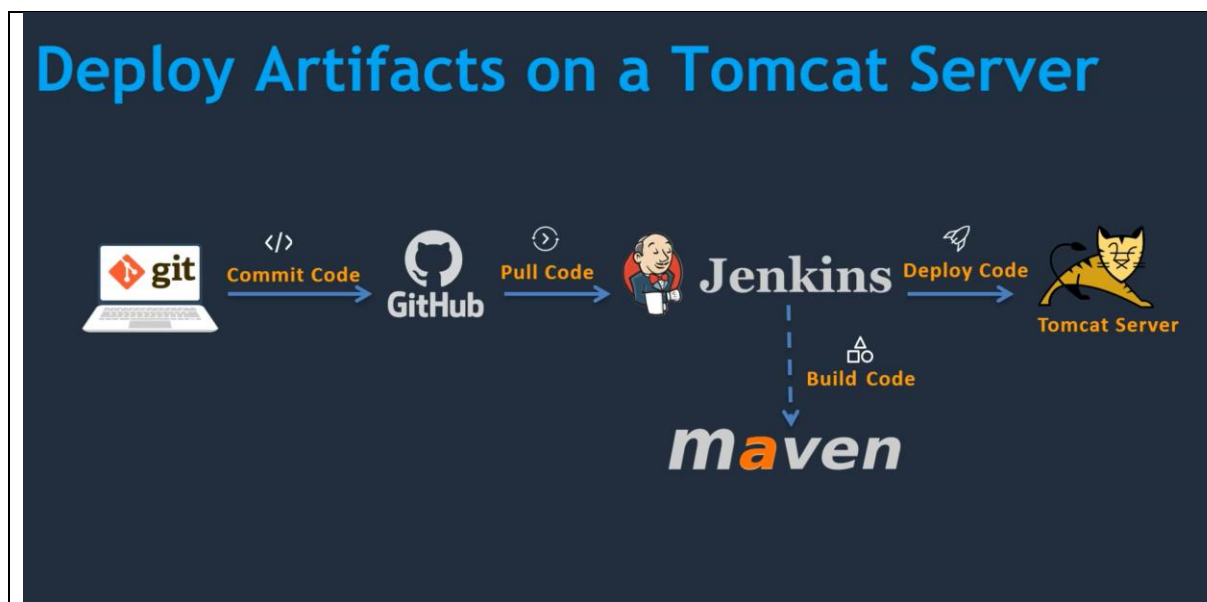


Fig. Deploy Artifacts on a Tomcat Server

Build and Deploy on Container.

Setup CI/CD with GitHub, Jenkins, Maven & Docker.

- Setting up the docker Environment.
- Write DockerFile.
- Create an Image and Container on Docker Host.
- Integrate Docker Host with Jenkins.
- Create CI/CD Job on Jenkins to build and deploy on container.

2. Deploy Artifacts on a Container

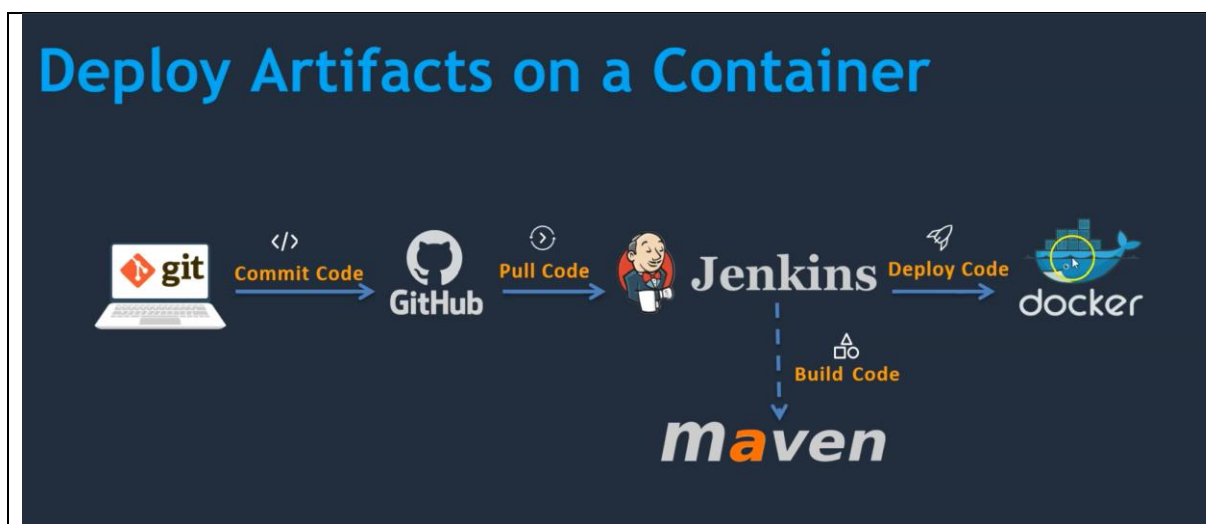


Fig. Deploy Artifacts on a Docker Container

Build and Deploy on Container.

CI/CD with GitHub, Jenkins, Maven, Ansible & Docker.

- Setting up the Ansible Server

- Integrate Docker Host with Ansible.
- Ansible playbook to create Image.
- Ansible playbook to create Container.
- Integrate Ansible with Jenkins.
- CI/CD Job to build code on Ansible & Deploy it on docker container.

3. Deploy Artifacts on a Container

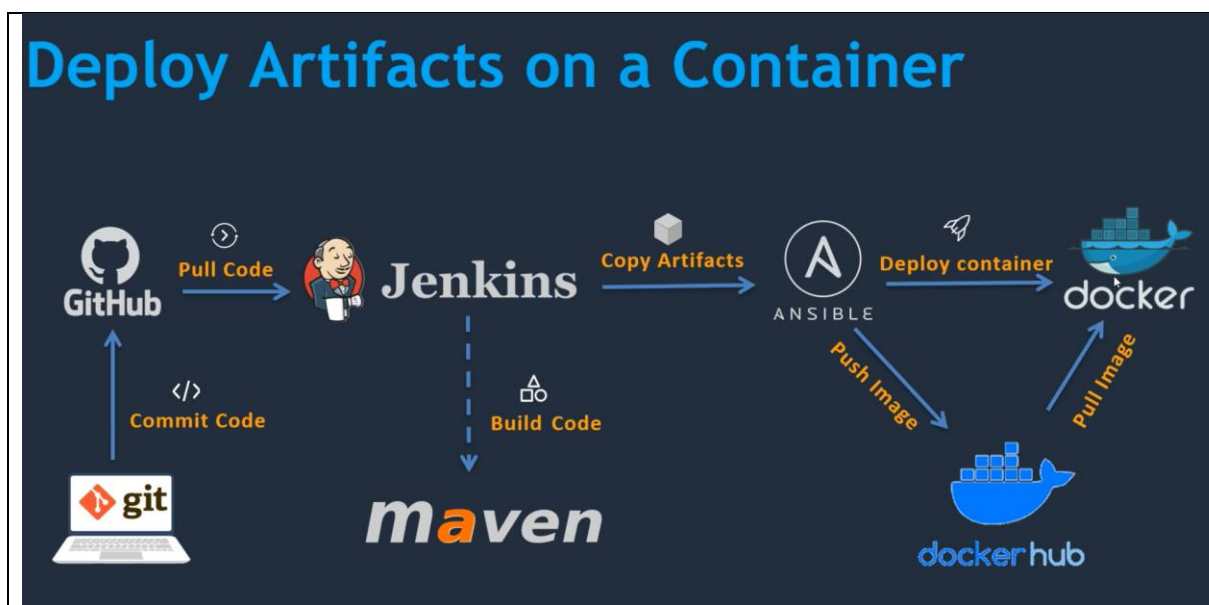


Fig. Deploy Artifacts on a Ansible Container.

Build and Deploy on Container.

CI/CD with GitHub, Jenkins, Maven, Ansible & Kubernetes.

- Setting up the Kubernetes (EKS).

- Write pod service and deployment manifest file.
- Integrate Kubernetes with Ansible.
- Ansible playbook to create deployment & service.
- CI/CD Job to build code on Ansible & Deploy it on Kubernetes.

4. Deploy Artifacts on a Kubernetes.

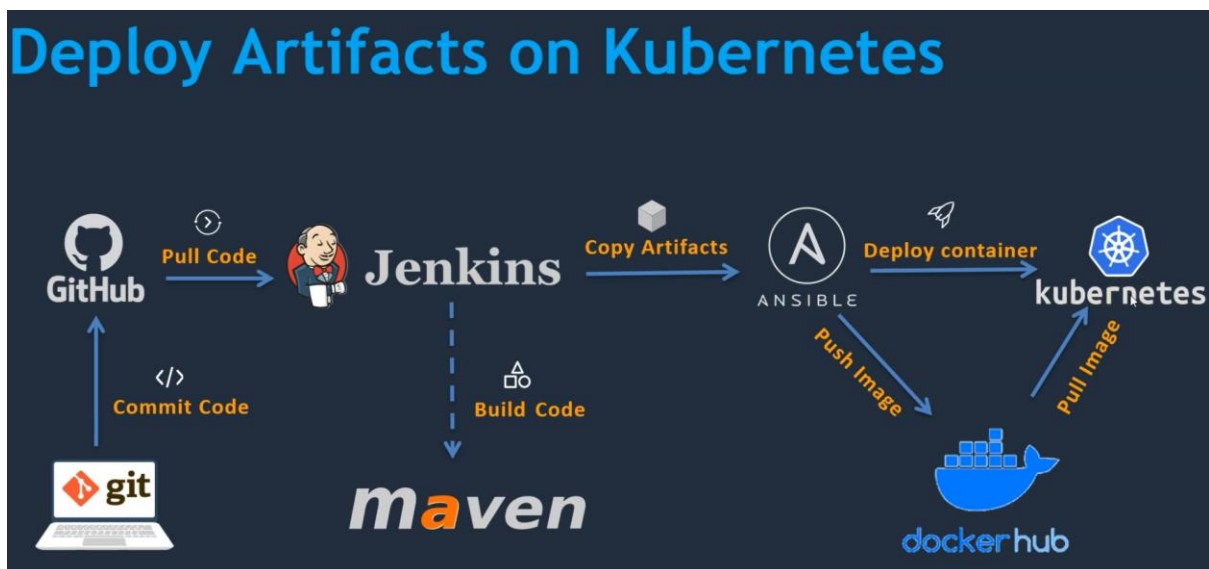


Fig. Deploy Artifacts on Kubernetes.

What is CI and CD

- Continuous Integration.
- Continuous Delivery.
- Continuous Deployment.

How Does CI and CD Works on AWS?



Fig. CI and CD Works on AWS.

How Does CI and CD Working on Devops?

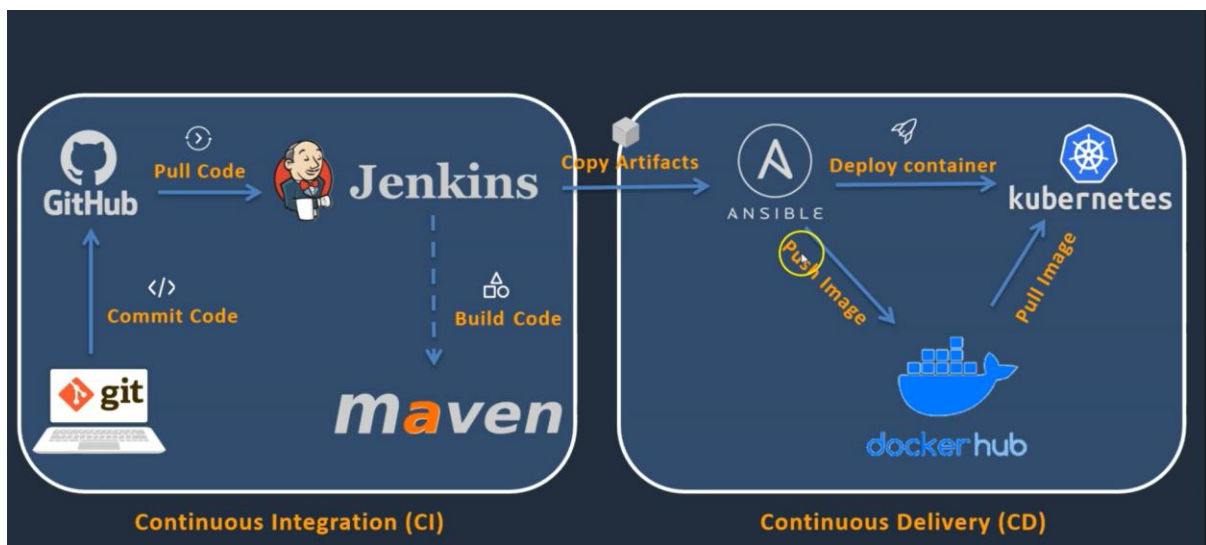


Fig. CI and CD Works on Devops.

Note: For Continuous Deployment we need multiple environments (With Manual Interventions).

Resources to Setup CI and CD pipeline.

- Free Tier AWS account.
- GitHub account (for source code and documentation).
- MobaXterm – enhanced terminal for windows with X11 Server tabbed SSH clients, network tool and much more.
- Git – local version control system.

CI and CD pipeline using Git, Jenkins & Maven.

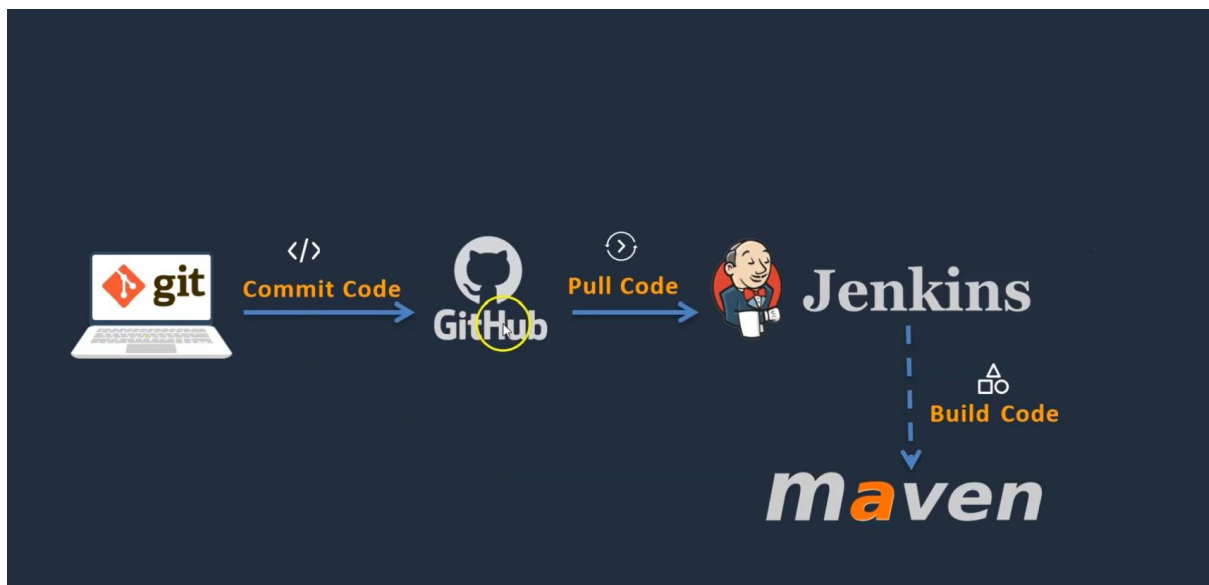


Fig. Build Code Jenkins on Maven

Setup Jenkins Server

- Setup a Linux EC2 instance
- Install Java
- Install Jenkins

- Start Jenkins
- Access Web UI on port 8080

Setup a Linux EC2 instance

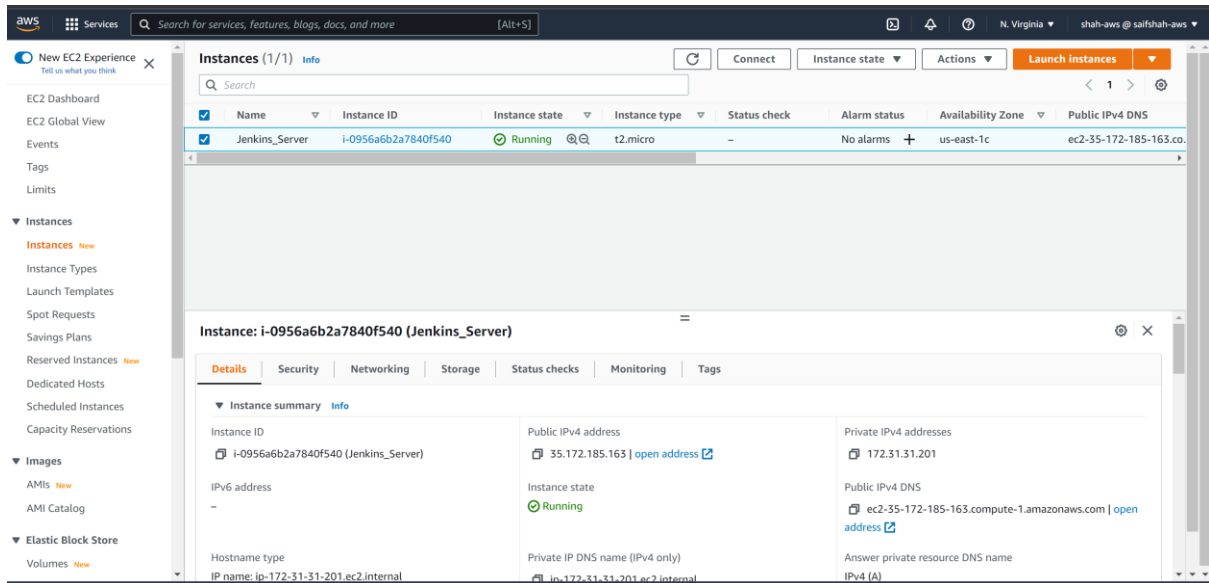


Fig. EC2 Instance for Jenkins Server

Installation of Jenkins

First Step:

Connecting MobaXterm

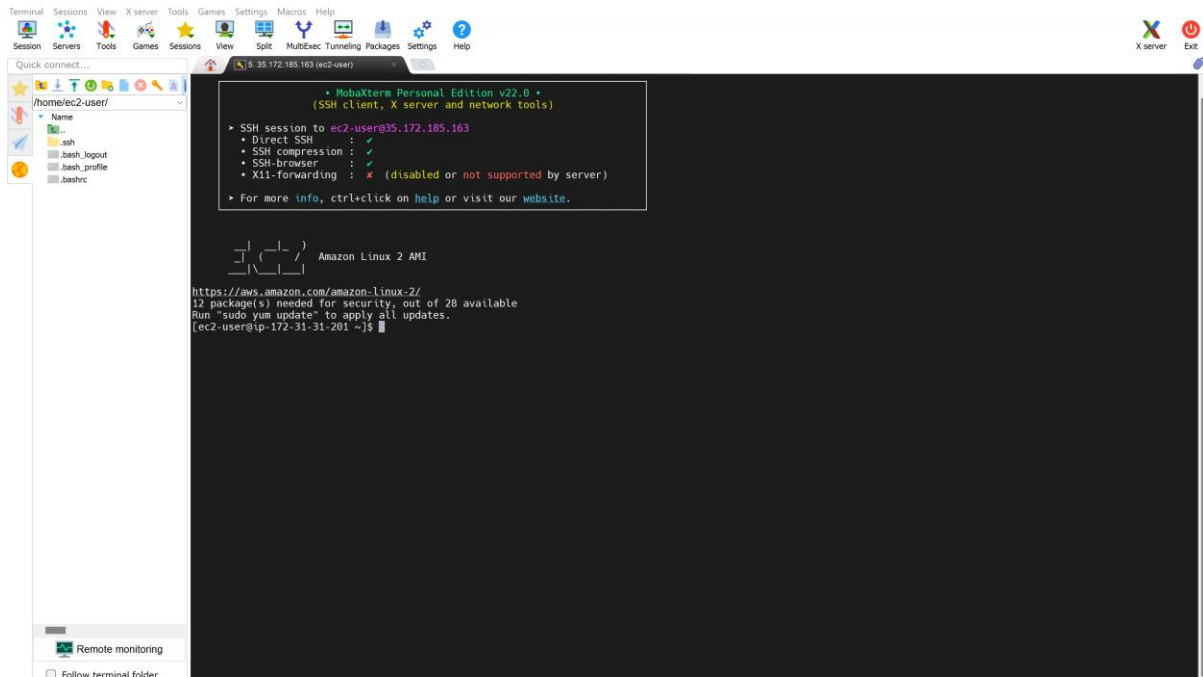


Fig. MobaXterm

Second Step:

Official website: - <https://pkg.jenkins.io/redhat-stable/>

```
sudo wget -O /etc/yum.repos.d/jenkins.repo https://pkg.jenkins.io/redhat-stable/jenkins.repo
sudo rpm --import https://pkg.jenkins.io/redhat-stable/jenkins.io.key
```

```
yum install epel-release //fails
sudo amazon-linux-extras install epel
sudo amazon-linux-extras install java-openjdk11
yum install jenkins
```

Installation of Java

```
[root@ip-172-31-31-201 ~]# java --version
```

openjdk 11.0.13 2021-10-19 LTS

OpenJDK Runtime Environment 18.9 (build 11.0.13+8-LTS)

OpenJDK 64-Bit Server VM 18.9 (build 11.0.13+8-LTS, mixed mode, sharing)

Jenkins Start

```
[root@ip-172-31-31-201 ~]# service jenkins status
```

- **jenkins.service - Jenkins Continuous Integration Server**

Loaded: loaded (/usr/lib/systemd/system/jenkins.service; disabled; vendor preset: disabled)

Active: inactive (dead)

```
[root@ip-172-31-31-201 ~]# service Jenkins start
```

Starting jenkins (via systemctl): [OK]

```
[root@ip-172-31-31-201 ~]# service jenkins status
```

- **jenkins.service - Jenkins Continuous Integration Server**

Loaded: loaded (/usr/lib/systemd/system/jenkins.service; disabled; vendor preset: disabled)

Active: active (running) since Sun 2022-05-01 19:02:31 UTC; 2min 3s ago

Main PID: 6549 (java)

CGroup: /system.slice/jenkins.service

└─6549 /usr/bin/java -Djava.awt.headless=true -jar /usr/share/java/jenkins.war --webroot=%C/jenkins/war --httpPort=8080

May 01 19:02:02 ip-172-31-31-201.ec2.internal jenkins[6549]: This may also be found at: /var/lib/jenkins/secrets/initialAdminPassword

May 01 19:02:02 ip-172-31-31-201.ec2.internal jenkins[6549]:

May 01 19:02:02 ip-172-31-31-201.ec2.internal jenkins[6549]:

May 01 19:02:02 ip-172-31-31-201.ec2.internal jenkins[6549]:

May 01 19:02:31 ip-172-31-31-201.ec2.internal jenkins[6549]: 2022-05-01
19:02:31.729+0000 [id=30] INFO
jenkins.InitReactorRunner\$1#onAttained...lization

May 01 19:02:31 ip-172-31-31-201.ec2.internal jenkins[6549]: 2022-05-01
19:02:31.755+0000 [id=23] INFO hudson.lifecycle.Lifecycle#onReady:
Je... running

May 01 19:02:31 ip-172-31-31-201.ec2.internal systemd[1]: Started Jenkins
Continuous Integration Server.

May 01 19:02:31 ip-172-31-31-201.ec2.internal jenkins[6549]: 2022-05-01
19:02:31.868+0000 [id=45] INFO
h.m.DownloadService\$Downloadable#load:...nstaller

May 01 19:02:31 ip-172-31-31-201.ec2.internal jenkins[6549]: 2022-05-01
19:02:31.869+0000 [id=45] INFO hudson.util.Retrier#start: Performed
t...tempt #1

May 01 19:02:31 ip-172-31-31-201.ec2.internal jenkins[6549]: 2022-05-01
19:02:31.878+0000 [id=45] INFO
hudson.model.AsyncPeriodicWork#lambda\$...0,935 ms

Hint: Some lines were ellipsized, use -l to show in full.

Access Web UI on port 8080:

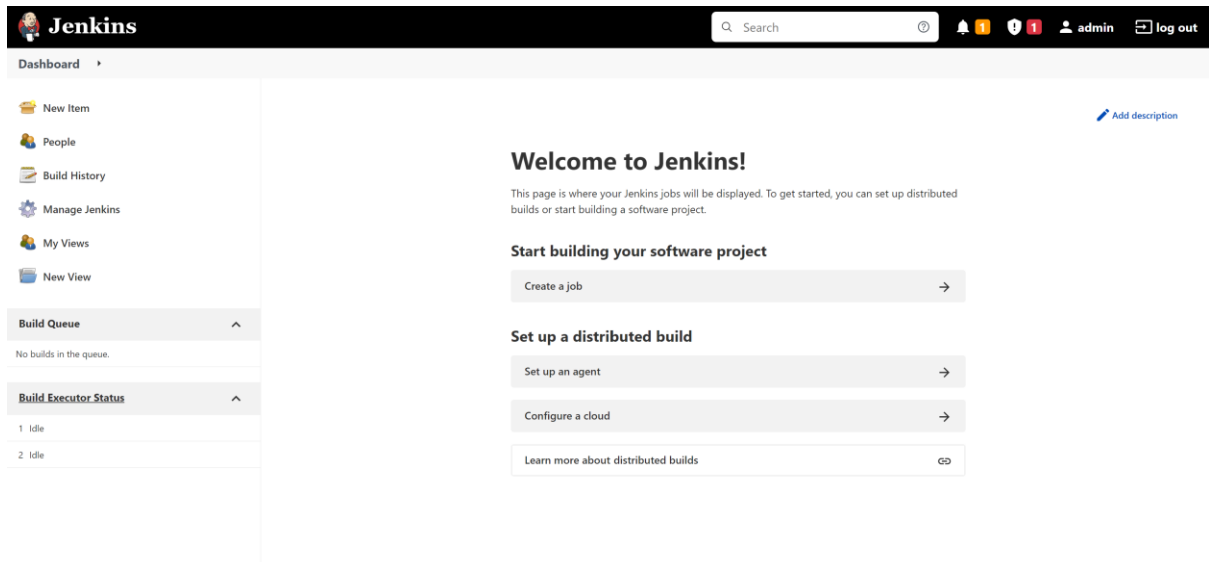


Fig. Access Web UI on port 8080

Run First Jenkins Job:

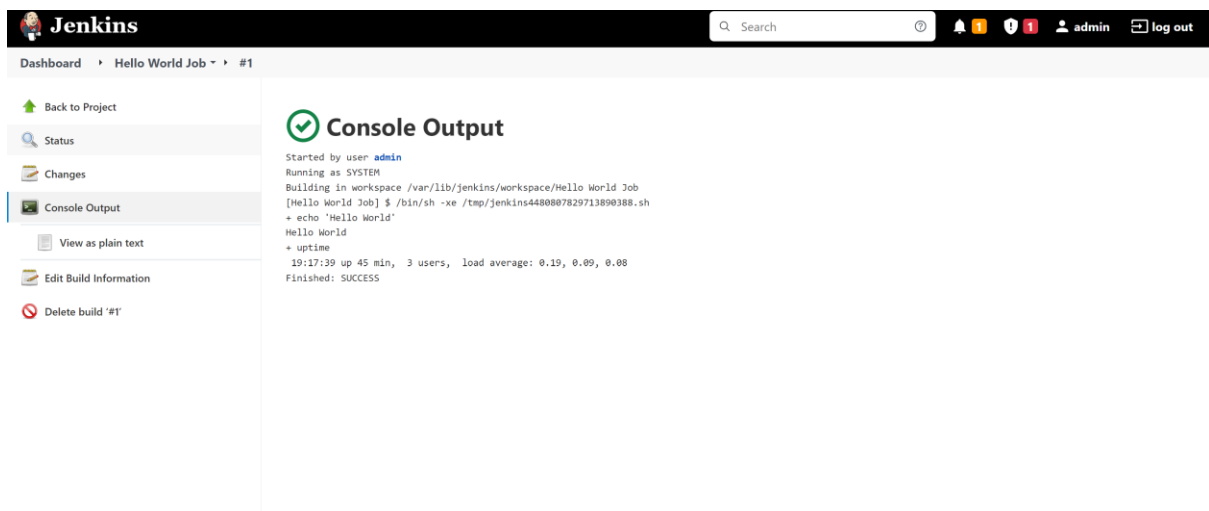


Fig. Run First Jenkins Job

Integrate Git with Jenkins

- Install Git on Jenkins Instances
- Install GitHub plug in on Jenkins GUI
- Configure Git on Jenkins GUI

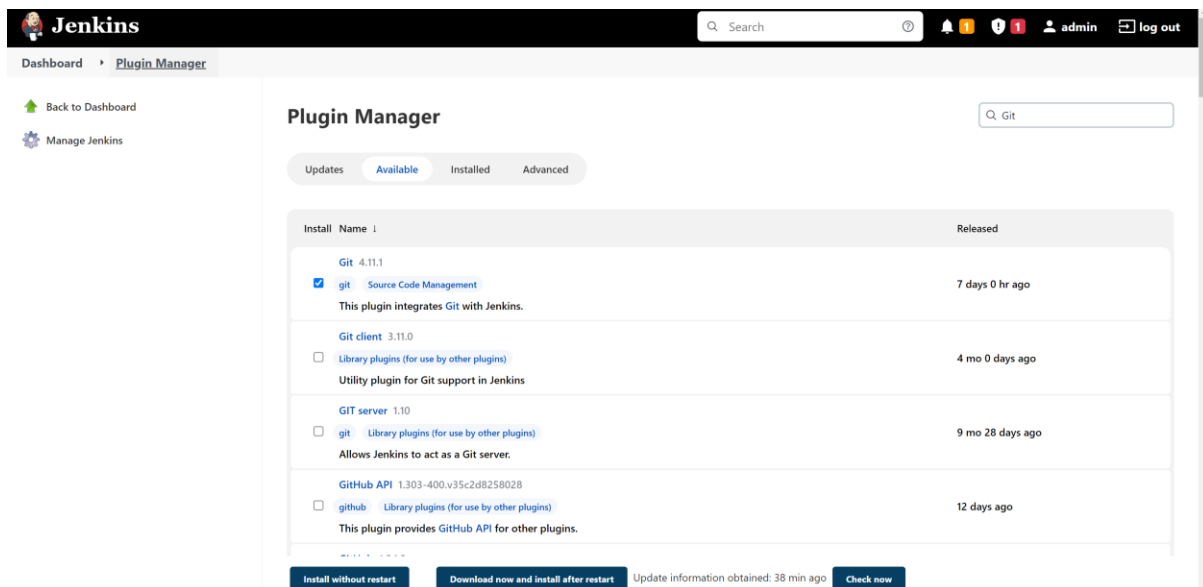
Install Git on Jenkins Instances:

```
yum install git
```

```
[root@Jenkins_Server ~]# git --version
```

```
git version 2.32.0
```

Install GitHub plug in on Jenkins GUI



The screenshot shows the Jenkins Plugin Manager interface. The 'Available' tab is selected, displaying a list of plugins. The 'git' plugin is checked for installation. The 'gitHub API' plugin is also visible but not checked. The interface includes a search bar, navigation links, and a table of available plugins.

| Install | Name | Released |
|-------------------------------------|---|------------------|
| <input checked="" type="checkbox"/> | Git 4.11.1 git Source Code Management This plugin integrates Git with Jenkins. | 7 days 0 hr ago |
| <input type="checkbox"/> | Git client 3.11.0 Library plugins (for use by other plugins) Utility plugin for Git support in Jenkins | 4 mo 0 days ago |
| <input type="checkbox"/> | GIT server 1.10 git Library plugins (for use by other plugins) Allows Jenkins to act as a Git server. | 9 mo 28 days ago |
| <input type="checkbox"/> | GitHub API 1.303-400.v35c2d8258028 github Library plugins (for use by other plugins) This plugin provides GitHub API for other plugins. | 12 days ago |

Fig. Plugin Integrates git with Jenkins.

Dashboard > Update Center

| | |
|--|---------|
| SSH Credentials | Success |
| Pipeline: Step API | Success |
| SSH server | Success |
| Plain Credentials | Success |
| Credentials Binding | Success |
| Pipeline: SCM Step | Success |
| JAXB | Success |
| Oracle Java SE Development Kit Installer | Success |
| Caffeine API | Success |
| Script Security | Success |
| Command Agent Launcher | Success |
| Apache HttpComponents Client 4.x API | Success |
| JSch dependency | Success |
| Git client | Success |
| SCM API | Success |
| Display URL API | Success |
| Mailer | Success |
| Git | Success |
| Loading plugin extensions | Success |

Fig. Success Plugin Integrates git with Jenkins.

Configure Git on Jenkins GUI

Dashboard > Global Tool Configuration

List of JDK installations on this system

Git

Git installations

Git

Name

Path to Git executable ?

Install automatically ?

[Delete Git](#)

[Add Git](#)

Maven

Maven installations

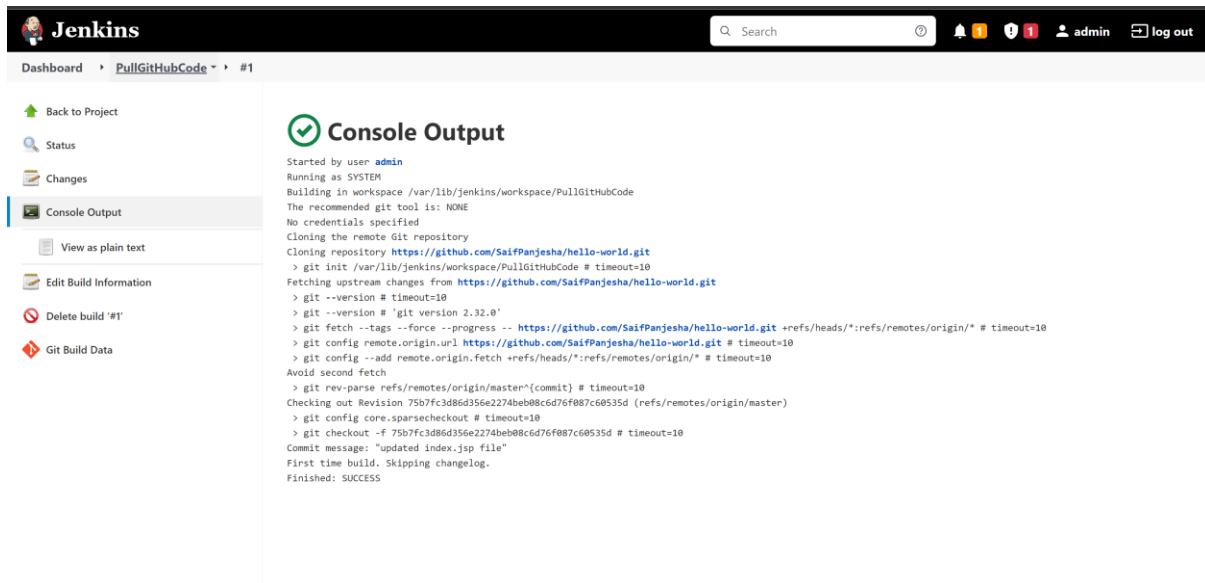
[Add Maven](#)

List of Maven installations on this system

[Save](#) [Apply](#)

Fig. Configure Git on Jenkins GUI

Run Jenkins Job to pull code from GitHub



The screenshot shows the Jenkins web interface. The top navigation bar includes the Jenkins logo, a search bar, and user information (admin, log out). The breadcrumb trail is Dashboard > PullGitHubCode > #1. The left sidebar contains navigation links: Back to Project, Status, Changes, Console Output (selected), View as plain text, Edit Build Information, Delete build '#1', and Git Build Data. The main content area displays the 'Console Output' for a build, which includes the following text:

```
Started by user admin
Running as SYSTEM
Building in workspace /var/lib/jenkins/workspace/PullGitHubCode
The recommended git tool is: NONE
No credentials specified
Cloning the remote Git repository
Cloning repository https://github.com/SaifPanjesha/hello-world.git
> git init /var/lib/jenkins/workspace/PullGitHubCode # timeout=10
Fetching upstream changes from https://github.com/SaifPanjesha/hello-world.git
> git --version # timeout=10
> git --version # 'git version 2.32.0'
> git fetch --tags --force --progress -- https://github.com/SaifPanjesha/hello-world.git +refs/heads/*:refs/remotes/origin/* # timeout=10
> git config remote.origin.url https://github.com/SaifPanjesha/hello-world.git # timeout=10
> git config --add remote.origin.fetch +refs/heads/*:refs/remotes/origin/* # timeout=10
Avoid second fetch
> git rev-parse refs/remotes/origin/master^{commit} # timeout=10
Checking out Revision 75b7fc3d86d35e2274beb08c6d76f087c60535d (refs/remotes/origin/master)
> git config core.sparsecheckout # timeout=10
> git checkout -f 75b7fc3d86d35e2274beb08c6d76f087c60535d # timeout=10
Commit message: "updated index.jsp file"
First time build. Skipping changelog.
Finished: SUCCESS
```

Fig Run Jenkins Job to pull code from GitHub

```
[root@Jenkins_Server ~]# cd /var/lib/jenkins/workspace/PullGitHubCode
```

```
[root@Jenkins_Server PullGitHubCode]# ll
```

```
total 24
```

```
-rw-r--r-- 1 jenkins jenkins 130 May  1 20:20 Dockerfile
```

```
-rw-r--r-- 1 jenkins jenkins 5970 May  1 20:20 pom.xml
```

```
-rw-r--r-- 1 jenkins jenkins 271 May  1 20:20 README.md
```

```
-rw-r--r-- 1 jenkins jenkins 479 May  1 20:20 regapp-deploy.yml
```

```
-rw-r--r-- 1 jenkins jenkins 195 May  1 20:20 regapp-service.yml
```

```
drwxr-xr-x 3 jenkins jenkins  32 May  1 20:20 server
```

```
drwxr-xr-x 3 jenkins jenkins  32 May  1 20:20 webapp
```

```
[root@Jenkins_Server PullGitHubCode]#
```

Integrate Maven with Jenkins

- Setup Maven on Jenkins Server
- Setup Environment Variables
 - JAVA_HOME, M2, M2_HOME
- Install Maven Plugin
- Configure Maven and Java

Setup Maven on Jenkins Server

```
[root@Jenkins_Server opt]# wget https://dlcdn.apache.org/maven/maven-3/3.8.5/binaries/apache-maven-3.8.5-bin.tar.gz
```

```
[root@Jenkins_Server opt]# ll
```

```
[root@Jenkins_Server opt]# mv apache-maven-3.8.5 maven
```

```
[root@Jenkins_Server opt]# cd maven
```

```
[root@Jenkins_Server ~]# cd /opt
```

```
[root@Jenkins_Server opt]# ll
```

```
[root@Jenkins_Server maven]# cd bin
```

```
[root@Jenkins_Server bin]# ll
```

```
[root@Jenkins_Server bin]# ./mvn -v
```

```
Apache Maven 3.8.5 (3599d3414f046de2324203b78ddcf9b5e4388aa0)
```

```
Maven home: /opt/maven
```

```
Java version: 11.0.13, vendor: Red Hat, Inc., runtime: /usr/lib/jvm/java-11-openjdk-11.0.13.0.8-1.amzn2.0.3.x86_64
```


Default locale: en_US, platform encoding: UTF-8

OS name: "linux", version: "4.14.275-207.503.amzn2.x86_64", arch: "amd64", family: "unix"

```
[root@Jenkins_Server bin]# cd ..
```

```
[root@Jenkins_Server maven]# cd bin
```

```
[root@Jenkins_Server bin]# mvn -v
```

```
[root@Jenkins_Server bin]# cd ~
```

```
[root@Jenkins_Server ~]# ll -a
```

Setup Environment Variables

JAVA_HOME, M2, M2_HOME

```
[root@Jenkins_Server ~]# vi .bash_profile
```

```
# .bash_profile
```

```
# Get the aliases and functions
```

```
if [ -f ~/.bashrc ]; then
```

```
    ~/.bashrc
```

```
fi
```

```
M2_HOME=/opt/maven
```

```
M2=/opt/maven/bin
```

```
JAVA_HOME=/usr/lib/jvm/java-11-openjdk-11.0.13.0.8-1.amzn2.0.3.x86_64
```

```
# User specific environment and startup programs
```

```
PATH=$PATH:$HOME/bin:$JAVA_HOME:$M2_HOME:$M2
```

```
export PATH
```

```
[root@Jenkins_Server ~]# echo $Path
```

```
[root@Jenkins_Server ~]# source .bash_profile
```

```
[root@Jenkins_Server ~]# echo $Path
```

```
[root@Jenkins_Server ~]# vi .bash_profile
```

```
[root@Jenkins_Server ~]# echo $Path
```

```
[root@Jenkins_Server ~]# logout
```

```
[root@Jenkins_Server /]# cd ~
```

```
[root@Jenkins_Server ~]# echo $path
```

```
[root@Jenkins_Server ~]# echo $PATH
```

```
/sbin:/bin:/usr/sbin:/usr/bin
```

```
[root@Jenkins_Server ~]# vi .bash_profile
```

```
[root@Jenkins_Server ~]# echo $PATH
```

```
/sbin:/bin:/usr/sbin:/usr/bin
```

```
[root@Jenkins_Server ~]# source .bash_profile
```

```
[root@Jenkins_Server ~]# echo $PATH
```

```
/sbin:/bin:/usr/sbin:/usr/bin:/root/bin:/usr/lib/jvm/java-11-openjdk-11.0.13.0.8-1.amzn2.0.3.x86_64:/opt/maven:/opt/maven/bin
```

```
[root@Jenkins_Server ~]# mvn -v
```

```
Apache Maven 3.8.5 (3599d3414f046de2324203b78ddcf9b5e4388aa0)
```

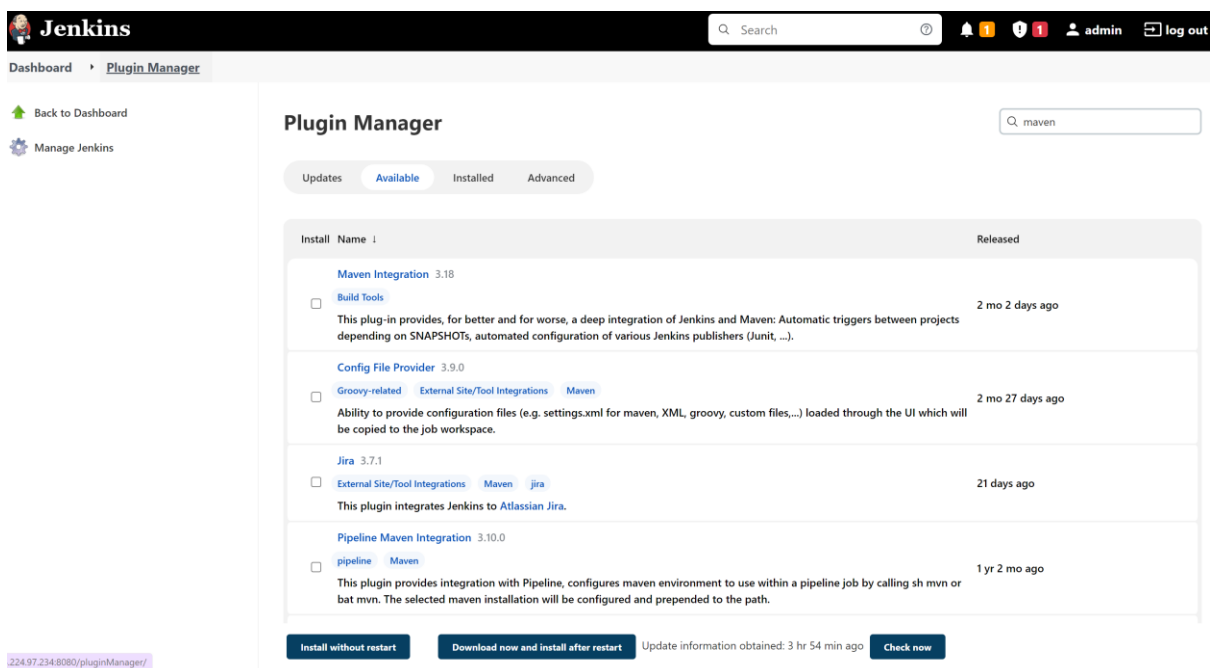
```
Maven home: /opt/maven
```

```
Java version: 11.0.13, vendor: Red Hat, Inc., runtime: /usr/lib/jvm/java-11-openjdk-11.0.13.0.8-1.amzn2.0.3.x86_64
```

```
Default locale: en_US, platform encoding: UTF-8
```

OS name: "linux", version: "4.14.275-207.503.amzn2.x86_64", arch: "amd64", family: "unix"

Install Maven Plugin



The screenshot shows the Jenkins Plugin Manager interface. The top navigation bar includes the Jenkins logo, a search bar, and user information (admin, log out). The main content area is titled "Plugin Manager" and has a search bar containing "maven". Below the title are tabs for "Updates", "Available", "Installed", and "Advanced". The "Available" tab is selected, showing a list of plugins. The list includes:

| Install | Name | Released |
|--------------------------|--|------------------|
| <input type="checkbox"/> | Maven Integration 3.18 Build Tools This plug-in provides, for better and for worse, a deep integration of Jenkins and Maven: Automatic triggers between projects depending on SNAPSHOTS, automated configuration of various Jenkins publishers (JUnit, ...). | 2 mo 2 days ago |
| <input type="checkbox"/> | Config File Provider 3.9.0 Groovy-related External Site/Tool Integrations Maven Ability to provide configuration files (e.g. settings.xml for maven, XML, groovy, custom files,...) loaded through the UI which will be copied to the job workspace. | 2 mo 27 days ago |
| <input type="checkbox"/> | Jira 3.7.1 External Site/Tool Integrations Maven jira This plugin integrates Jenkins to Atlassian Jira. | 21 days ago |
| <input type="checkbox"/> | Pipeline Maven Integration 3.10.0 pipeline Maven This plugin provides integration with Pipeline, configures maven environment to use within a pipeline job by calling sh mvn or bat mvn. The selected maven installation will be configured and prepended to the path. | 1 yr 2 mo ago |

At the bottom of the plugin list, there are buttons for "Install without restart" and "Download now and install after restart". A status message indicates "Update information obtained: 3 hr 54 min ago" and a "Check now" button.

Fig Maven Plugin

Configure Maven and Java

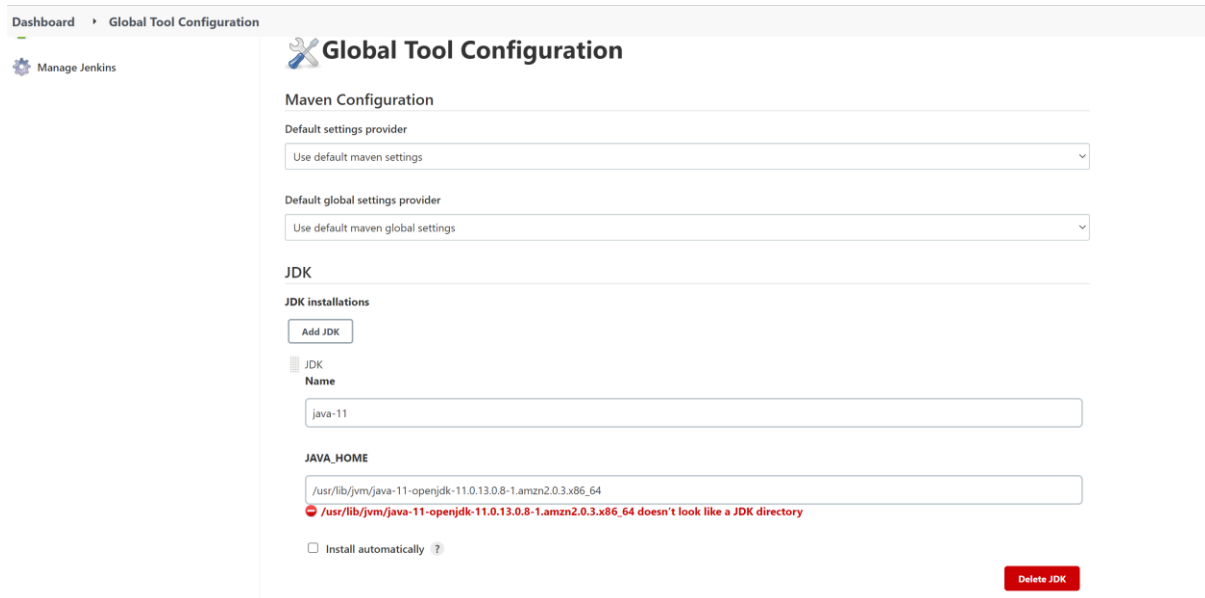


Fig. Java Global Tool Configuration.

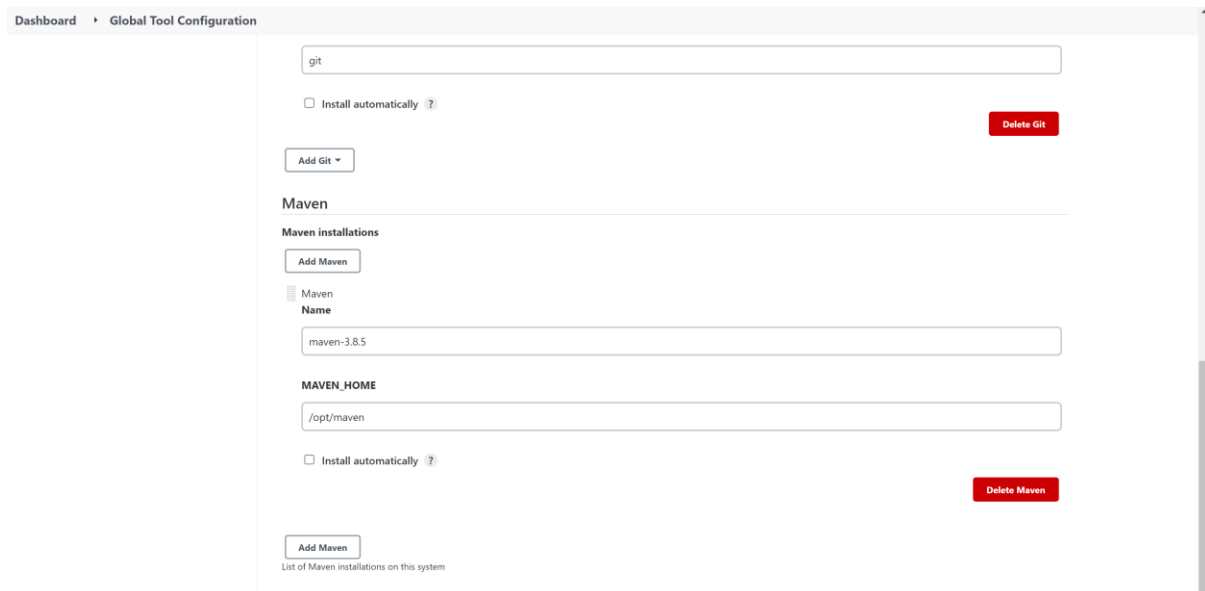


Fig. Maven Global Tool Configuration

Build a Java project using Jenkins and generate artifacts.

The screenshot shows the Jenkins 'Console Output' for a build named 'FirstMavenProject #1'. The output begins with 'Started by user admin' and 'Running as SYSTEM'. It details the cloning of a Git repository from 'https://github.com/SaifPanjeha/hello-world.git' and the execution of Maven commands to clean and install the project. The Maven output shows the discovery of new modules (server and webapp) and the successful completion of the build process.

```
Started by user admin
Running as SYSTEM
Building in workspace /var/lib/jenkins/workspace/FirstMavenProject
The recommended git tool is: NONE
No credentials specified
Cloning the remote Git repository
Cloning repository https://github.com/SaifPanjeha/hello-world.git
> git init /var/lib/jenkins/workspace/FirstMavenProject # timeout=10
Fetching upstream changes from https://github.com/SaifPanjeha/hello-world.git
> git --version # timeout=10
> git --version # 'git version 2.32.0'
> git fetch --tags --force --progress -- https://github.com/SaifPanjeha/hello-world.git +refs/heads/*:refs/remotes/origin/* # timeout=10
> git config remote.origin.url https://github.com/SaifPanjeha/hello-world.git # timeout=10
> git config --add remote.origin.fetch +refs/heads/*:refs/remotes/origin/* # timeout=10
Avoid second fetch
> git rev-parse refs/remotes/origin/master^{commit} # timeout=10
Checking out Revision 75b7fc3d86d356e2274beb08c6d76f087c60535d (refs/remotes/origin/master)
> git config core.sparsecheckout # timeout=10
> git checkout -f 75b7fc3d86d356e2274beb08c6d76f087c60535d # timeout=10
Commit message: "updated index.jsp file"
First time build. Skipping changelog.
Parsing POMs
Discovered a new module com.example.maven-project:maven-project Maven Project
Discovered a new module com.example.maven-project:server Server
Discovered a new module com.example.maven-project:webapp Webapp
Modules changed, recalculating dependency graph
Established TCP socket on 33317
[FirstMavenProject] $ /usr/lib/jvm/java-11-openjdk-11.0.13.0-8.1-amzn2.0.3.x86_64/bin/java -cp /var/lib/jenkins/plugins/maven-plugin/WEB-INF/lib/maven3-agent-1.13-jar:/opt/maven/boot/plexus-classworlds-2.6.0-jar:/opt/maven/conf/logging-jenkins.maven3.agent.Maven35Main:/opt/maven/var/lib/jenkins/XC/jenkins-war/WEB-INF/lib/remoting-4.13-jar /var/lib/jenkins/plugins/maven-plugin/WEB-INF/lib/maven3-interceptor-1.13-jar /var/lib/jenkins/plugins/maven-plugin/WEB-INF/lib/maven3-interceptor-commons-1.13-jar 33317
<---[JENKINS REMOTING CAPACITY]--->channel started
Executing Maven:  -B -f /var/lib/jenkins/workspace/FirstMavenProject/pom.xml clean install
[INFO] Scanning for projects...
[WARNING]
[WARNING] Some problems were encountered while building the effective model for com.example.maven-project:server:jar:1.0-SNAPSHOT
[WARNING] Reporting configuration should be done in <reporting> section, not in maven-site-plugin <configuration> as reportPlugins parameter.
```

This screenshot continues the Jenkins build output, showing the packaging of the 'webapp' module, the installation of the Maven plugin, and the final reactor summary. The summary indicates that the Maven Project, Server, and Webapp modules were all built successfully. The build concludes with archiving the artifacts and a 'Finished: SUCCESS' message.

```
WARNING: Please consider reporting this to the maintainers of com.thoughtworks.xstream.core.util.Fields
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
[INFO] Packaging webapp
[INFO] Assembling webapp [webapp] in [/var/lib/jenkins/workspace/FirstMavenProject/webapp/target/webapp]
[INFO] Processing war project
[INFO] Copying webapp resources [/var/lib/jenkins/workspace/FirstMavenProject/webapp/src/main/webapp]
[INFO] Webapp assembled in [57 msecs]
[INFO] Building war: /var/lib/jenkins/workspace/FirstMavenProject/webapp/target/webapp.war
[INFO] WEB-INF/web.xml already added, skipping
[INFO]
[INFO] --- maven-install-plugin:2.4:install (default-install) @ webapp ---
[INFO] Installing /var/lib/jenkins/workspace/FirstMavenProject/webapp/target/webapp.war to /var/lib/jenkins/.m2/repository/com/example/maven-project/webapp/1.0-SNAPSHOT/webapp-1.0-SNAPSHOT.war
[INFO] Installing /var/lib/jenkins/workspace/FirstMavenProject/webapp/pom.xml to /var/lib/jenkins/.m2/repository/com/example/maven-project/webapp/1.0-SNAPSHOT/webapp-1.0-SNAPSHOT.pom
[INFO] -----
[INFO] Reactor Summary for Maven Project 1.0-SNAPSHOT:
[INFO]
[INFO] Maven Project ..... SUCCESS [ 3.646 s]
[INFO] Server ..... SUCCESS [ 7.864 s]
[INFO] Webapp ..... SUCCESS [ 2.020 s]
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 16.157 s
[INFO] Finished at: 2022-05-02T09:12:40Z
[INFO] -----
[JENKINS] Archiving /var/lib/jenkins/workspace/FirstMavenProject/webapp/pom.xml to com.example.maven-project/webapp/1.0-SNAPSHOT/webapp-1.0-SNAPSHOT.pom
[JENKINS] Archiving /var/lib/jenkins/workspace/FirstMavenProject/webapp/target/webapp.war to com.example.maven-project/webapp/1.0-SNAPSHOT/webapp-1.0-SNAPSHOT.war
[JENKINS] Archiving /var/lib/jenkins/workspace/FirstMavenProject/server/pom.xml to com.example.maven-project/server/1.0-SNAPSHOT/server-1.0-SNAPSHOT.pom
[JENKINS] Archiving /var/lib/jenkins/workspace/FirstMavenProject/server/target/server.jar to com.example.maven-project/server/1.0-SNAPSHOT/server-1.0-SNAPSHOT.jar
[JENKINS] Archiving /var/lib/jenkins/workspace/FirstMavenProject/pom.xml to com.example.maven-project/maven-project/1.0-SNAPSHOT/maven-project-1.0-SNAPSHOT.pom
channel stopped
Finished: SUCCESS
```

Fig. Build a Java project using Jenkins

Generate Artifacts

```
root@jenkins_Server ~]# servc jenkins status
bash: servc: command not found
root@jenkins_Server ~]# sudo su -
last login: Mon May 2 09:16:07 UTC 2022 on pts/2
root@jenkins_Server ~]# service jenkins status
jenkins.service - Jenkins Continuous Integration Server
Loaded: loaded (/usr/lib/systemd/system/jenkins.service; disabled; vendor preset: disabled)
Active: active (running) since Mon 2022-05-02 09:05:22 UTC; 12min ago
Main PID: 14131 (java)
CGroup: /system.slice/jenkins.service
└─14131 /usr/bin/java -Djava.awt.headless=true -jar /usr/share/java/jenkins.war --webroot=%C/jenkins/war --httpPort=8080

May 02 09:12:51 Jenkins_Server jenkins[14131]: at java.base/java.security.SecureClassLoader.defineClass(SecureClassLoader.java:174)
May 02 09:12:51 Jenkins_Server jenkins[14131]: at java.base/jdk.internal.loader.BuiltinClassLoader.defineClass(BuiltinClassLoader.java:800)
May 02 09:12:51 Jenkins_Server jenkins[14131]: at java.base/jdk.internal.loader.BuiltinClassLoader.findClassOnClassPathOrNull(BuiltinClassLoader.java:698)
May 02 09:12:51 Jenkins_Server jenkins[14131]: at java.base/jdk.internal.loader.BuiltinClassLoader.loadClassOrNull(BuiltinClassLoader.java:621)
May 02 09:12:51 Jenkins_Server jenkins[14131]: at java.base/jdk.internal.loader.BuiltinClassLoader.loadClass(BuiltinClassLoader.java:579)
May 02 09:12:51 Jenkins_Server jenkins[14131]: at java.base/jdk.internal.loader.ClassLoaders$AppClassLoader.loadClass(ClassLoaders.java:178)
May 02 09:12:51 Jenkins_Server jenkins[14131]: at java.base/java.lang.ClassLoader.loadClass(ClassLoader.java:522)
May 02 09:12:51 Jenkins_Server jenkins[14131]: at java.instrument/sun.instrument.InstrumentationImpl.loadClassAndStartAgent(InstrumentationImpl.java:431)
May 02 09:12:51 Jenkins_Server jenkins[14131]: at java.instrument/sun.instrument.InstrumentationImpl.loadClassAndCallAgentMain(InstrumentationImpl.java:535)
May 02 09:12:51 Jenkins_Server jenkins[14131]: Agent failed to start!
root@jenkins_Server ~]# cd /var/lib/jenkins/workspace
root@jenkins_Server workspace]# ll
total 0
drwxr-xr-x 5 jenkins jenkins 147 May 2 09:12 FirstMavenProject
drwxr-xr-x 2 jenkins jenkins 6 May 1 19:17 Hello World Job
drwxr-xr-x 5 jenkins jenkins 147 May 1 20:20 PullGitHubCode
root@jenkins_Server workspace]# cd FirstMavenProject
root@jenkins_Server FirstMavenProject]# ll
total 24
-rw-r--r-- 1 jenkins jenkins 130 May 2 09:12 Dockerfile
-rw-r--r-- 1 jenkins jenkins 5970 May 2 09:12 pom.xml
-rw-r--r-- 1 jenkins jenkins 271 May 2 09:12 README.md
-rw-r--r-- 1 jenkins jenkins 470 May 2 09:12 regapp-deploy.yml
-rw-r--r-- 1 jenkins jenkins 195 May 2 09:12 regapp-service.yml
drwxr-xr-x 4 jenkins jenkins 46 May 2 09:12 server
drwxr-xr-x 4 jenkins jenkins 46 May 2 09:12 webapp
root@jenkins_Server FirstMavenProject]# cd webapp/
root@jenkins_Server webapp]# ll
total 4
-rw-r--r-- 1 jenkins jenkins 1141 May 2 09:12 pom.xml
drwxr-xr-x 3 jenkins jenkins 18 May 2 09:12 src
drwxr-xr-x 5 jenkins jenkins 76 May 2 09:12 target
root@jenkins_Server webapp]# cd target/
root@jenkins_Server target]# ll
total 4
drwxr-xr-x 2 jenkins jenkins 28 May 2 09:12 maven-archiver
drwxr-xr-x 2 jenkins jenkins 6 May 2 09:12 surefire
drwxr-xr-x 4 jenkins jenkins 54 May 2 09:12 webapp
-rw-r--r-- 1 jenkins jenkins 2899 May 2 09:12 webapp.war
root@jenkins_Server target]#
```

Fig. Artifacts Generated

Integrate Tomcat in CI/CD pipeline:

- Setup Tomcat Server
- Setup a Linux EC2 Instance
- Install Java
- Configure Tomcat
- Start Tomcat Server
- Access Web UI on port 8080

Setup a Linux EC2 Instance

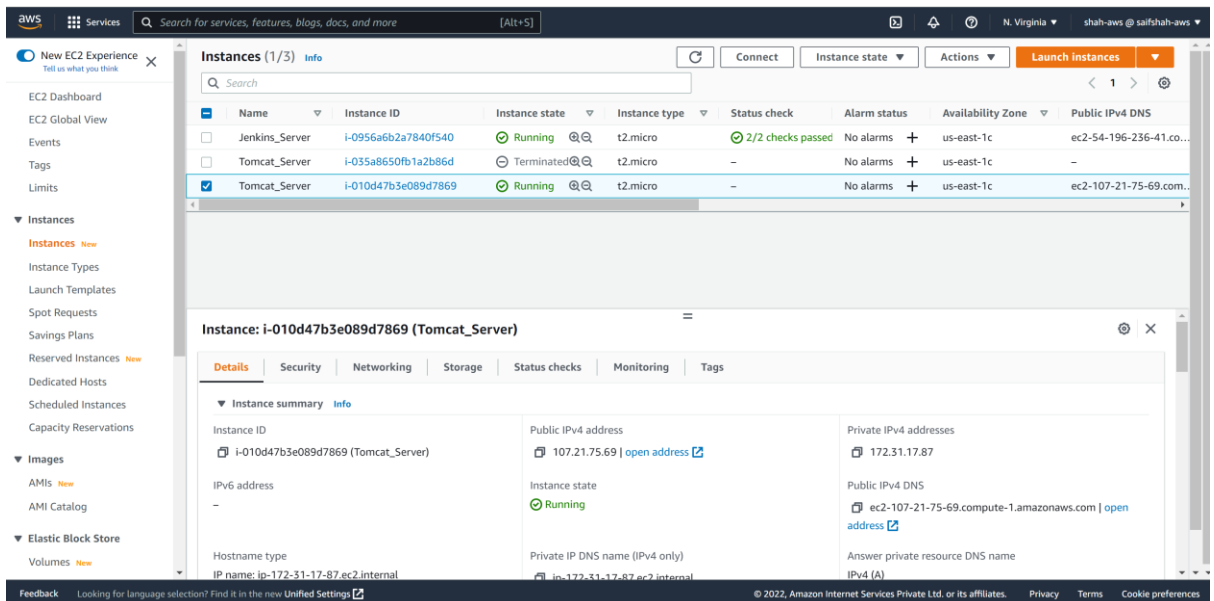


Fig. EC2 Instance for Tomcat Server

Install Java

```
61 dnsmasq2.85          available [ =stable ]
[root@ip-172-31-17-87 ~]# java --version
openjdk 11.0.13 2021-10-19 LTS
OpenJDK Runtime Environment 18.9 (build 11.0.13+8-LTS)
OpenJDK 64-Bit Server VM 18.9 (build 11.0.13+8-LTS, mixed mode, sharing)
[root@ip-172-31-17-87 ~]#
```

Fig. Installation of Java

Configure Tomcat

```

https://aws.amazon.com/amazon-linux-2/
12 package(s) needed for security, out of 28 available
Run "sudo yum update" to apply all updates.
[ec2-user@tomcat_server ~]$ sudo su -
Last login: Mon May  2 09:57:58 UTC 2022 on pts/0
[root@tomcat_server ~]# clear
[root@tomcat_server ~]# java --version
Unrecognized option: --version
Error: Could not create the Java Virtual Machine.
Error: A fatal exception has occurred. Program will exit.
[root@tomcat_server ~]# java --version
openjdk 11.0.13 2021-10-19 LTS
OpenJDK Runtime Environment 18.9 (build 11.0.13+8-LTS)
OpenJDK 64-Bit Server VM 18.9 (build 11.0.13+8-LTS; mixed mode, sharing)
[root@tomcat_server ~]# wget https://d1cdn.apache.org/tomcat/tomcat-9/v9.0.62/bin/apache-tomcat-9.0.62.tar.gz
--2022-05-02 10:42:15-- https://d1cdn.apache.org/tomcat/tomcat-9/v9.0.62/bin/apache-tomcat-9.0.62.tar.gz
Resolving d1cdn.apache.org (d1cdn.apache.org)... 151.101.2.132, 2a04:4e42::644
Connecting to d1cdn.apache.org (d1cdn.apache.org)|151.101.2.132|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 11560971 (11M) [application/x-gzip]
Saving to: 'apache-tomcat-9.0.62.tar.gz'

100%[=====] 11,560,971  ---K/s  in 0.05s

2022-05-02 10:42:15 (226 MB/s) - 'apache-tomcat-9.0.62.tar.gz' saved [11560971/11560971]

[root@tomcat_server ~]# ll
total 11296
-rw-r--r-- 1 root root      13 May  2 09:58 ;
-rw-r--r-- 1 root root 11560971 Mar 31 14:40 apache-tomcat-9.0.62.tar.gz
[root@tomcat_server ~]# tar -xvzf apache-tomcat-9.0.62.tar.gz
apache-tomcat-9.0.62/conf/
apache-tomcat-9.0.62/conf/catalina.policy
apache-tomcat-9.0.62/conf/catalina.properties
apache-tomcat-9.0.62/conf/context.xml
apache-tomcat-9.0.62/conf/jaspic-providers.xml
apache-tomcat-9.0.62/conf/jaspic-providers.xsd
apache-tomcat-9.0.62/conf/logging.properties
apache-tomcat-9.0.62/conf/server.xml
apache-tomcat-9.0.62/conf/tomcat-users.xml
apache-tomcat-9.0.62/conf/tomcat-users.xsd
apache-tomcat-9.0.62/conf/web.xml
apache-tomcat-9.0.62/bin/
apache-tomcat-9.0.62/lib/
apache-tomcat-9.0.62/logs/
apache-tomcat-9.0.62/temp/
apache-tomcat-9.0.62/webapps/
apache-tomcat-9.0.62/webapps/ROOT/

```

Fig .Tomcat Configuration

Start Tomcat Server

```

-rw-r----- 1 root root 18980 Mar 31 14:34 BUILDING.txt
drwx----- 2 root root   238 Mar 31 14:34 conf
-rw-r----- 1 root root  6210 Mar 31 14:34 CONTRIBUTING.md
drwxr-x---  2 root root  4096 May  2 10:42 lib
-rw-r----- 1 root root 57092 Mar 31 14:34 LICENSE
drwxr-x---  2 root root    6 Mar 31 14:34 logs
-rw-r----- 1 root root  2333 Mar 31 14:34 NOTICE
-rw-r----- 1 root root  3378 Mar 31 14:34 README.md
-rw-r----- 1 root root  6998 Mar 31 14:34 RELEASE-NOTES
-rw-r----- 1 root root 16497 Mar 31 14:34 RUNNING.txt
drwxr-x---  2 root root   30 May  2 10:42 temp
drwxr-x---  7 root root   81 Mar 31 14:34 webapps
drwxr-x---  2 root root    6 Mar 31 14:34 work
[root@tomcat_server tomcat]# cd bin
[root@tomcat_server bin]# ll
total 884
-rw-r----- 1 root root  34699 Mar 31 14:34 bootstrap.jar
-rw-r----- 1 root root  16840 Mar 31 14:34 catalina.bat
-rwxr-x---  1 root root  25294 Mar 31 14:34 catalina.sh
-rw-r----- 1 root root   1664 Mar 31 14:34 catalina-tasks.xml
-rw-r----- 1 root root   2123 Mar 31 14:34 ciphers.bat
-rwxr-x---  1 root root   1997 Mar 31 14:34 ciphers.sh
-rw-r----- 1 root root  25308 Mar 31 14:34 commons-daemon.jar
-rw-r----- 1 root root 210038 Mar 31 14:34 commons-daemon-native.tar.gz
-rw-r----- 1 root root   2040 Mar 31 14:34 configtest.bat
-rwxr-x---  1 root root   1922 Mar 31 14:34 configtest.sh
-rwxr-x---  1 root root   9100 Mar 31 14:34 daemon.sh
-rw-r----- 1 root root   2091 Mar 31 14:34 digest.bat
-rwxr-x---  1 root root   1965 Mar 31 14:34 digest.sh
-rw-r----- 1 root root   3606 Mar 31 14:34 makebase.bat
-rwxr-x---  1 root root   3382 Mar 31 14:34 makebase.sh
-rw-r----- 1 root root   3460 Mar 31 14:34 setclasspath.bat
-rwxr-x---  1 root root   3708 Mar 31 14:34 setclasspath.sh
-rw-r----- 1 root root   2020 Mar 31 14:34 shutdown.bat
-rwxr-x---  1 root root   1902 Mar 31 14:34 shutdown.sh
-rw-r----- 1 root root   2022 Mar 31 14:34 startup.bat
-rwxr-x---  1 root root   1904 Mar 31 14:34 startup.sh
-rw-r----- 1 root root   46897 Mar 31 14:34 tomcat-juli.jar
-rw-r----- 1 root root 429747 Mar 31 14:34 tomcat-native.tar.gz
-rw-r----- 1 root root   4574 Mar 31 14:34 tool-wrapper.bat
-rwxr-x---  1 root root   5540 Mar 31 14:34 tool-wrapper.sh
-rw-r----- 1 root root   2026 Mar 31 14:34 version.bat
-rwxr-x---  1 root root   1908 Mar 31 14:34 version.sh
[root@tomcat_server bin]# ./startup.sh
Using CATALINA_BASE:   /root/tomcat
Using CATALINA_HOME:   /root/tomcat
Using CATALINA_TMPDIR: /root/tomcat/temp
Using JRE_HOME:        /usr
Using CLASSPATH:       /root/tomcat/bin/bootstrap.jar:/root/tomcat/bin/tomcat-juli.jar
Using CATALINA_OPTS:
Tomcat started.

```

Fig Tomcat Server Started

Access Web UI on port 8080

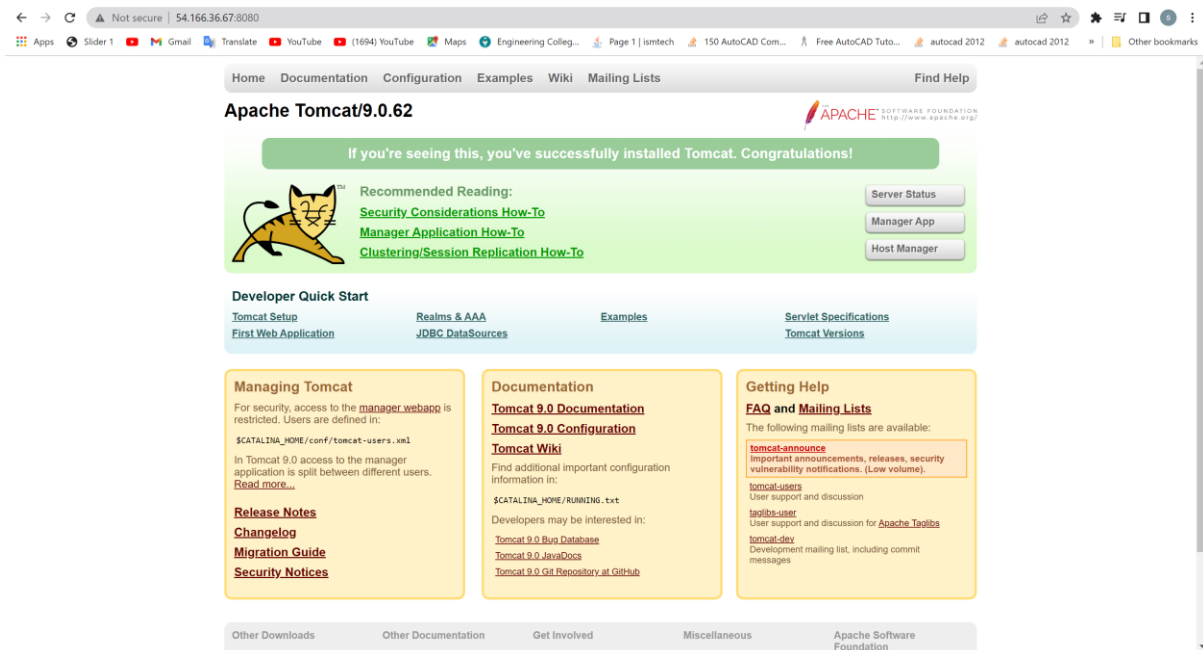
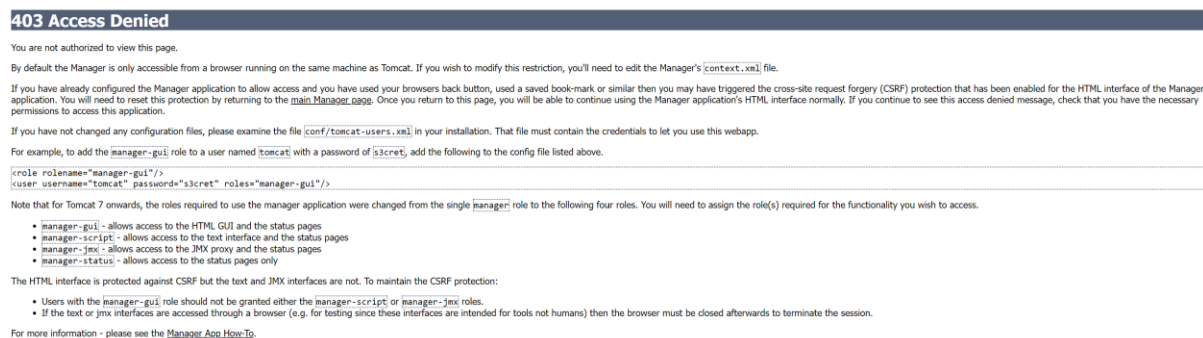


Fig. Access Web UI on port 8080

Edit Manage App Error



```
root@tomcat_server tomcat]# find -name context.xml
conf/context.xml
webapps/examples/META-INF/context.xml
webapps/host-manager/META-INF/context.xml
webapps/manager/META-INF/context.xml
root@tomcat_server tomcat]#
```

Fig. Manage App Error

vi ./webapps/host-manager/META-INF/context.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<!--
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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
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    http://www.apache.org/licenses/LICENSE-2.0

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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|0:0:0:0:0:0:1" />-->
  <Manager sessionAttributeValueClassNameFilter="java\.lang\.(?:Boolean|Integer|Long|Number|string)|org\.apache\.catalina\.filters\.CsrfPreventionFilter\$LruCache(?:\
$1)?|java\.util\.(?:Linked)?HashMap"/>
</Context>
```

Fig. allow access host manager in context file

vi ./webapps/manager/META-INF/context.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<!--
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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

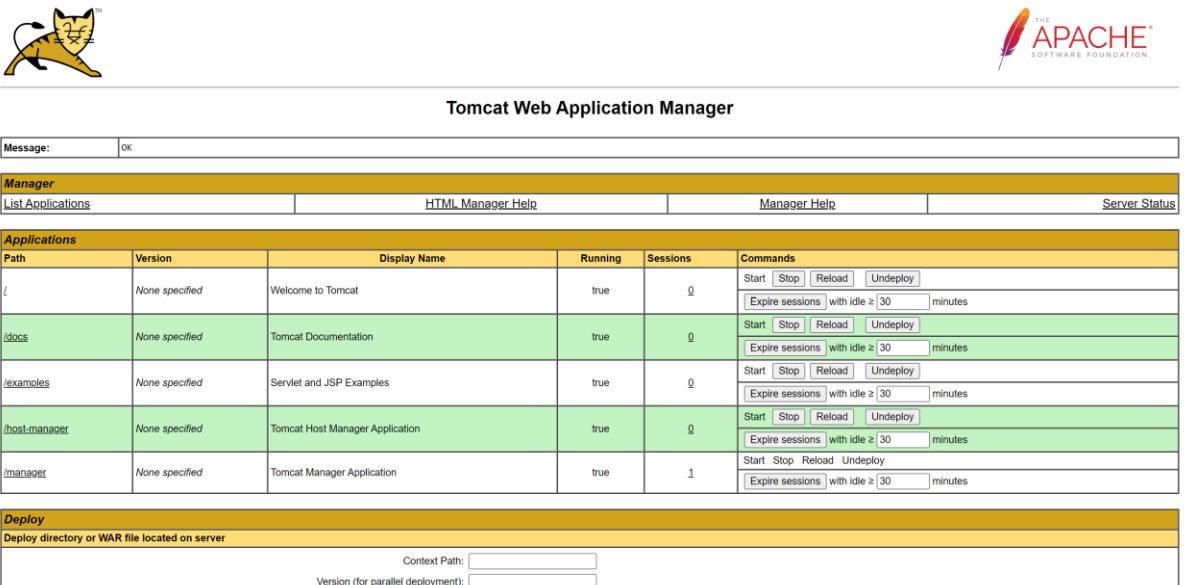
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distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.
-->
<Context 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|0:0:0:0:0:0:1" />-->
  <Manager sessionAttributeValueClassNameFilter="java\.lang\.(?:Boolean|Integer|Long|Number|string)|org\.apache\.catalina\.filters\.CsrfPreventionFilter\$LruCache(?:\
$1)?|java\.util\.(?:Linked)?HashMap"/>
</Context>
```

Fig. allow access manager in context file

Tomcat Start and Shutdown

`In -s /opt/apache-tomcat/bin/startup.sh /usr/local/bin/tomcatup`

`In -s /opt/apache-tomcat-<version>/bin/shutdown.sh
/usr/local/bin/tomcatdown`



Tomcat Web Application Manager

Message: OK

Manager

List Applications HTML Manager Help Manager Help Server Status

Applications

| Path | Version | Display Name | Running | Sessions | Commands |
|---------------|----------------|---------------------------------|---------|----------|--|
| / | None specified | Welcome to Tomcat | true | 0 | Start Stop Reload Undeploy Expire sessions with idle ≥ 30 minutes |
| /docs | None specified | Tomcat Documentation | true | 0 | Start Stop Reload Undeploy Expire sessions with idle ≥ 30 minutes |
| /examples | None specified | Servlet and JSP Examples | true | 0 | Start Stop Reload Undeploy Expire sessions with idle ≥ 30 minutes |
| /host-manager | None specified | Tomcat Host Manager Application | true | 0 | Start Stop Reload Undeploy Expire sessions with idle ≥ 30 minutes |
| /manager | None specified | Tomcat Manager Application | true | 1 | Start Stop Reload Undeploy Expire sessions with idle ≥ 30 minutes |

Deploy

Deploy directory or WAR file located on server

Context Path:

Version (for parallel deployment):

Fig. Tomcat Web Application Manager

Install Tomcat with Jenkins

Install plug- in “deploy -to -container”

Configure Tomcat Server with Credentials.

Install plug- in “deploy to container”

Plugin Manager

Updates

Available

Installed

Advanced

| Install | Name ↓ | Released |
|--------------------------|--|---------------|
| <input type="checkbox"/> | Deploy to container 1.16 Artifact Uploaders This plugin allows you to deploy a war to a container after a successful build. Glassfish 3.x remote deployment | 1 yr 6 mo ago |

Update information obtained: 16 hr ago

Installing Plugins/Upgrades

Preparation

- Checking internet connectivity
- Checking update center connectivity
- Success

Deploy to container Success

Loading plugin extensions Success

➡ [Go back to the top page](#)
(you can start using the installed plugins right away)

➡ Restart Jenkins when installation is complete and no jobs are running

Fig. Plug In deploy to container

Build Maven and Deploy to Tomcat Server

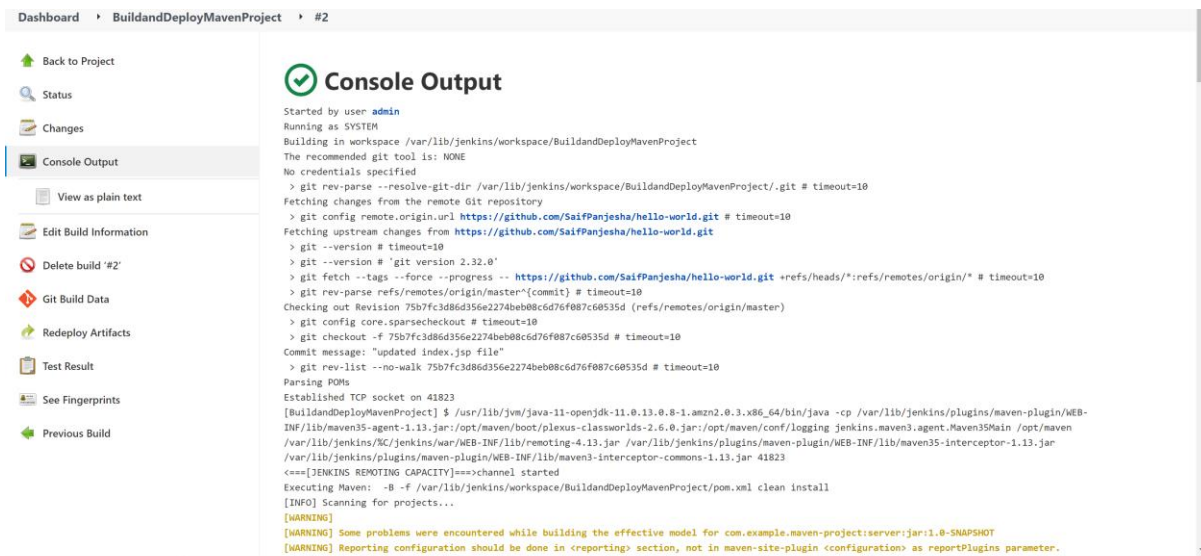


Fig. Build Maven

New user Register for DevOps Learning

Please fill in this form to create an account.

Enter Full Name

Enter mobile

Enter Email Address

Password

Repeat Password

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

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

Thankyou, Happy Learning

Build Amazing Carrer With Devops

Fig. Deploy to tomcat server

Deploy Artifacts on Tomcat Server -Using Git Bash

```

saiff@LAPTOP-H8UBOVRR MINGW64 ~
$ cd D:/Devops

saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops
$ pwd
/d/Devops

saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops
$ git clone https://github.com/SaifPanjesh/hello-world.git
Cloning into 'hello-world'...
remote: Enumerating objects: 403, done.
remote: Total 403 (delta 0), reused 0 (delta 0), pack-reused 403
Receiving objects: 100% (403/403), 45.79 KiB | 558.00 KiB/s, done.
Resolving deltas: 100% (90/90), done.

saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops
$ ll
total 4
drwxr-xr-x 1 saiff 197609 0 May  2 17:35  hello-world/
drwxr-xr-x 1 saiff 197609 0 May  2 00:39  'saiffaizalpanjesh -aws'/

saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops
$ cd hello-world

saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops/hello-world (master)
$ ll
total 12
-rw-r--r-- 1 saiff 197609  134 May  2 17:35 Dockerfile
-rw-r--r-- 1 saiff 197609  274 May  2 17:35 README.md
-rw-r--r-- 1 saiff 197609 6190 May  2 17:35 pom.xml
-rw-r--r-- 1 saiff 197609  507 May  2 17:35 regapp-deploy.yml
-rw-r--r-- 1 saiff 197609  209 May  2 17:35 regapp-service.yml
drwxr-xr-x 1 saiff 197609   0 May  2 17:35 server/
drwxr-xr-x 1 saiff 197609   0 May  2 17:35 webapp/

saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops/hello-world (master)
$ cd webapps/
bash: cd: webapps/: No such file or directory

saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops/hello-world (master)
$ cd webapp

saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops/hello-world/webapp (master)
$ ll
total 4
-rw-r--r-- 1 saiff 197609 1185 May  2 17:35 pom.xml
drwxr-xr-x 1 saiff 197609   0 May  2 17:35 src/

saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops/hello-world/webapp (master)
$ cd src/main

saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops/hello-world/webapp/src/main (master)
$ ll
total 0
drwxr-xr-x 1 saiff 197609 0 May  2 17:35 webapp/

saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops/hello-world/webapp/src/main (master)
$ cd webapp

saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops/hello-world/webapp/src/main/webapp (master)
$ ll
total 4
drwxr-xr-x 1 saiff 197609   0 May  2 17:35 WEB-INF/
-rw-r--r-- 1 saiff 197609 1354 May  2 17:35 index.jsp

saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops/hello-world/webapp/src/main/webapp (master)
$ vi index.jsp

saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops/hello-world/webapp/src/main/webapp (master)
$ git status
On branch master
Your branch is up to date with 'origin/master'.

Changes not staged for commit:

```

(use "git add <file>..." to update what will be committed)
(use "git restore <file>..." to discard changes in working directory)
modified: index.jsp

no changes added to commit (use "git add" and/or "git commit -a")

```
saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops/hello-world/webapp/src/main/webapp (master)
$ add .
bash: add: command not found
```

```
saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops/hello-world/webapp/src/main/webapp (master)
$ git add .
```

```
saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops/hello-world/webapp/src/main/webapp (master)
$ git status
On branch master
Your branch is up to date with 'origin/master'.
```

Changes to be committed:
(use "git restore --staged <file>..." to unstage)
modified: index.jsp

```
saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops/hello-world/webapp/src/main/webapp (master)
$ commit -m "updated index.jsp"
bash: commit: command not found
```

```
saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops/hello-world/webapp/src/main/webapp (master)
$ commit -m "updated index.jsp file"
bash: commit: command not found
```

```
saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops/hello-world/webapp/src/main/webapp (master)
$ git commit -m "updated index.jsp file"
[master 9d96f0d] updated index.jsp file
1 file changed, 1 insertion(+), 1 deletion(-)
```

```
saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops/hello-world/webapp/src/main/webapp (master)
$ git push origin master
Enumerating objects: 13, done.
Counting objects: 100% (13/13), done.
Delta compression using up to 8 threads
Compressing objects: 100% (5/5), done.
Writing objects: 100% (7/7), 560 bytes | 560.00 KiB/s, done.
Total 7 (delta 2), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
To https://github.com/SaifPanjesha/hello-world.git
75b7fc3..9d96f0d master -> master
```

```
saiff@LAPTOP-H8UBOVRR MINGW64 /d/Devops/hello-world/webapp/src/main/webapp (master)
$
```

Automate Build and Deploy using poll SCM

Integrating Docker in CI/CD pipeline

Setup a Docker Environment

Setup Docker Host

- Setup a Linux EC2 Instance
- Install Docker
- Start docker services
- Basic docker commands

Setup a Linux EC2 Instance

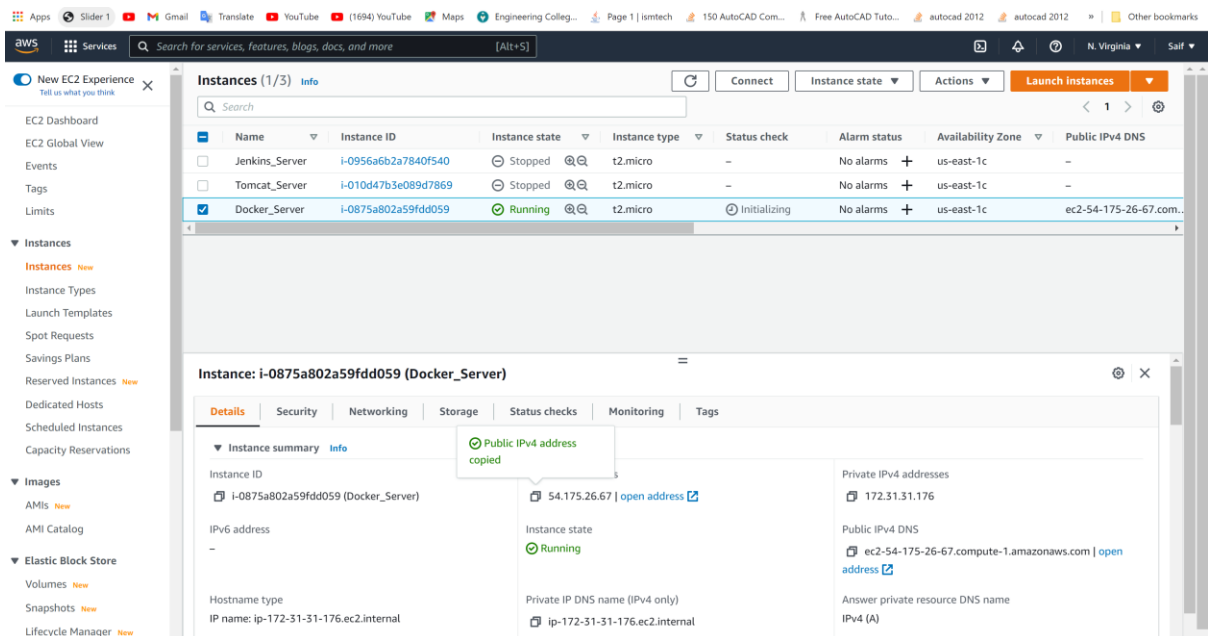


Fig. Docker Server EC2 Instance

Install Docker

```
[root@ip-172-31-31-176 ~]# yum install docker -y
```

Start docker services

```
[root@ip-172-31-31-176 ~]# service docker start
```

Basic docker commands

```
[root@ip-172-31-31-176 ~]# docker images
```

```
[root@ip-172-31-31-176 ~]# docker ps //running container
```

```
[root@ip-172-31-31-176 ~]# docker ps -a // all container
```

```
[root@ip-172-31-31-176 ~]# docker --version
```

```
[root@ip-172-31-31-176 ~]# docker --help
```

Create a Tomcat Container

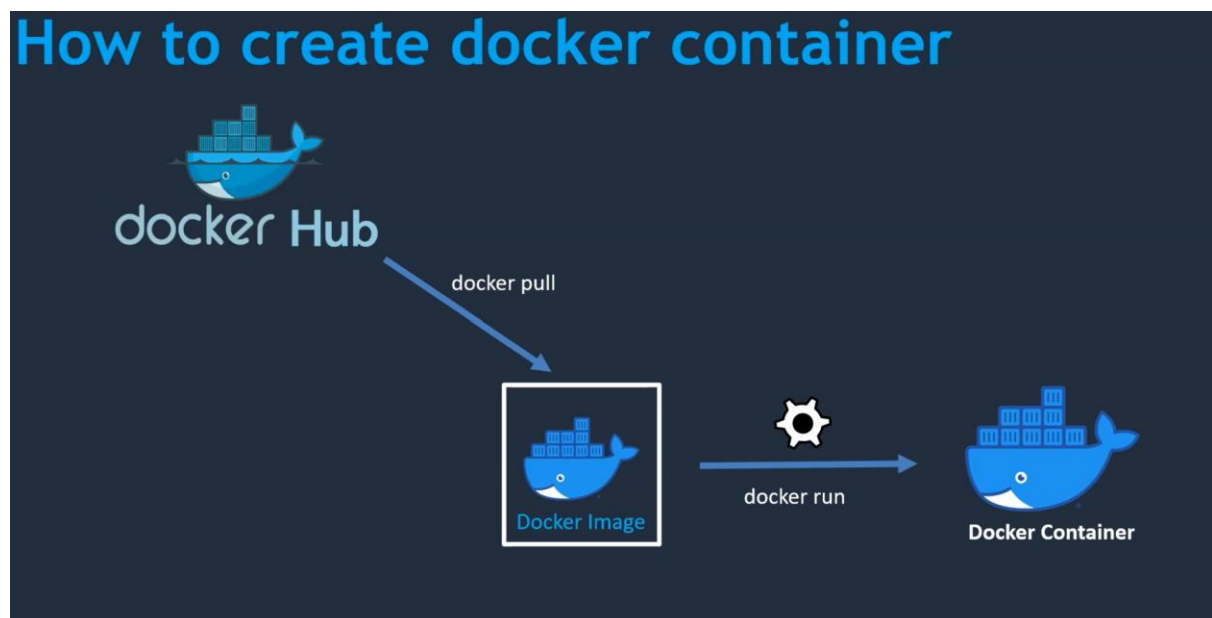


Fig. Creating Docker Container(<https://hub.docker.com/>)

- **Creating Images**

```
[root@dockerhost ~]# docker pull tomcat
```

```
[root@dockerhost ~]# docker images
```

| REPOSITORY | TAG | IMAGE ID | CREATED | SIZE |
|------------|--------|--------------|------------|-------|
| tomcat | latest | 0183eb12bb0c | 6 days ago | 680MB |

- Creating Container

```
[root@dockerhost ~]# docker ps
```

| CONTAINER ID | IMAGE | COMMAND | CREATED | STATUS | PORTS | NAMES |
|--------------|-------|---------|---------|--------|-------|-------|
|--------------|-------|---------|---------|--------|-------|-------|

```
[root@dockerhost ~]# docker run -d --name tomcat-container -p 8081:8080 tomcat
```

```
78e9303c67b9f67ca161776a1321da5cb8bad4b85e64c9753a84bf91359ace21
```

```
[root@dockerhost ~]# docker ps
```

| CONTAINER ID | IMAGE | COMMAND | CREATED | STATUS |
|--------------|-------|---------|---------|--------|
| PORTS | NAMES | | | |

```
78e9303c67b9 tomcat "catalina.sh run" 14 seconds ago Up 13 seconds  
0.0.0.0:8081->8080/tcp, :::8081->8080/tcp tomcat-container
```

```
[root@dockerhost ~]#
```

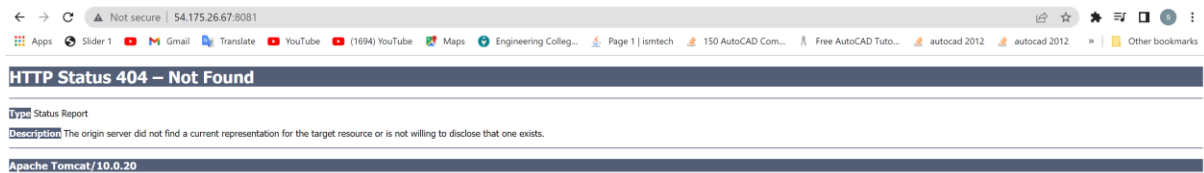


Fig. Tomcat Container

Fixing Tomcat Container Issue

```
root@dockerhost ~]# docker exec -it tomcat-container /bin/bash
root@78e9303c67b9:/usr/local/tomcat# ls
BUILDING.txt CONTRIBUTING.md LICENSE NOTICE README.md RELEASE-NOTES RUNNING.txt bin conf lib logs native-jni-lib temp webapps webapps.dist work
root@78e9303c67b9:/usr/local/tomcat# cd webapps
root@78e9303c67b9:/usr/local/tomcat/webapps# ls
root@78e9303c67b9:/usr/local/tomcat/webapps# cd .
root@78e9303c67b9:/usr/local/tomcat/webapps# cd ..
root@78e9303c67b9:/usr/local/tomcat# cd webapp.dist
bash: cd: webapp.dist: No such file or directory
root@78e9303c67b9:/usr/local/tomcat# cd webapps.dist
root@78e9303c67b9:/usr/local/tomcat/webapps.dist# ls
ROOT docs examples host-manager manager
root@78e9303c67b9:/usr/local/tomcat/webapps.dist# cp -R * ../webapps
root@78e9303c67b9:/usr/local/tomcat/webapps.dist# cd ..
root@78e9303c67b9:/usr/local/tomcat# cd webapps
root@78e9303c67b9:/usr/local/tomcat/webapps# ls
```

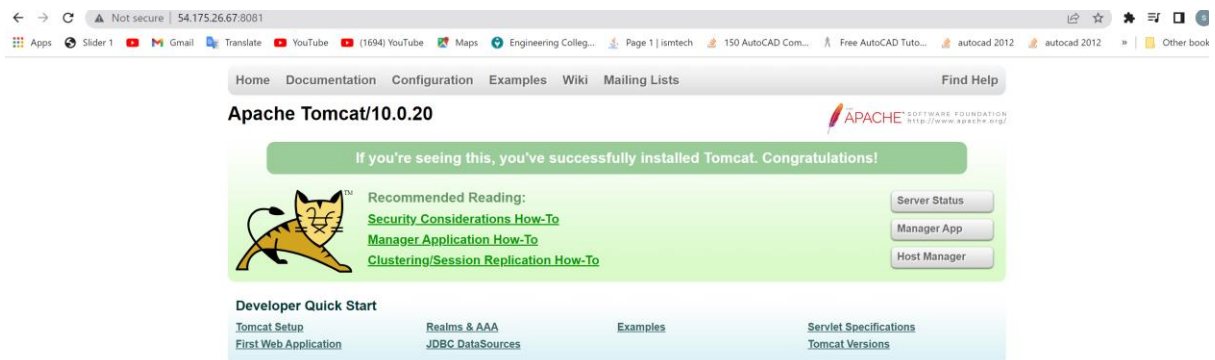


Fig. Fixing Tomcat Container Issue

```
[root@dockerhost ~]# docker ps -a
```

| CONTAINER ID | IMAGE | COMMAND | CREATED | STATUS |
|--------------|--------|-------------------|----------------|---------------|
| 78e9303c67b9 | tomcat | "catalina.sh run" | 21 minutes ago | Up 21 minutes |

0.0.0.0:8081->8080/tcp, :::8081->8080/tcp tomcat-container

```
[root@dockerhost ~]# docker stop tomcat-container
```

```
tomcat-container
```

```
[root@dockerhost ~]# docker ps -a
```

| CONTAINER ID | IMAGE | COMMAND | CREATED | STATUS |
|--------------|--------|-------------------|----------------|----------------------------|
| 78e9303c67b9 | tomcat | "catalina.sh run" | 22 minutes ago | Exited (143) 7 seconds ago |

tomcat-container

```
[root@dockerhost ~]# docker ps
```

| CONTAINER ID | IMAGE | COMMAND | CREATED | STATUS | PORTS | NAMES |
|--------------|-------|---------|---------|--------|-------|-------|
|--------------|-------|---------|---------|--------|-------|-------|

```
[root@dockerhost ~]# docker run -d --name tomca2 -p 8082:8080 tomcat:latest
```

```
d4c7db9d910fdceef014d3e3fc685e9ef04305627373c5e2df1db43c75c03fb
```

```
[root@dockerhost ~]# docker exec -it tomca2 /bin/bash
```

```
root@d4c7db9d910f:/usr/local/tomcat#
```

HTTP Status 404 – Not Found

Type Status Report

Description The origin server did not find a current representation for the target resource or is not willing to disclose that one exists.

Apache Tomcat/10.0.20

Fig. refuse to connect

Create a Docker File

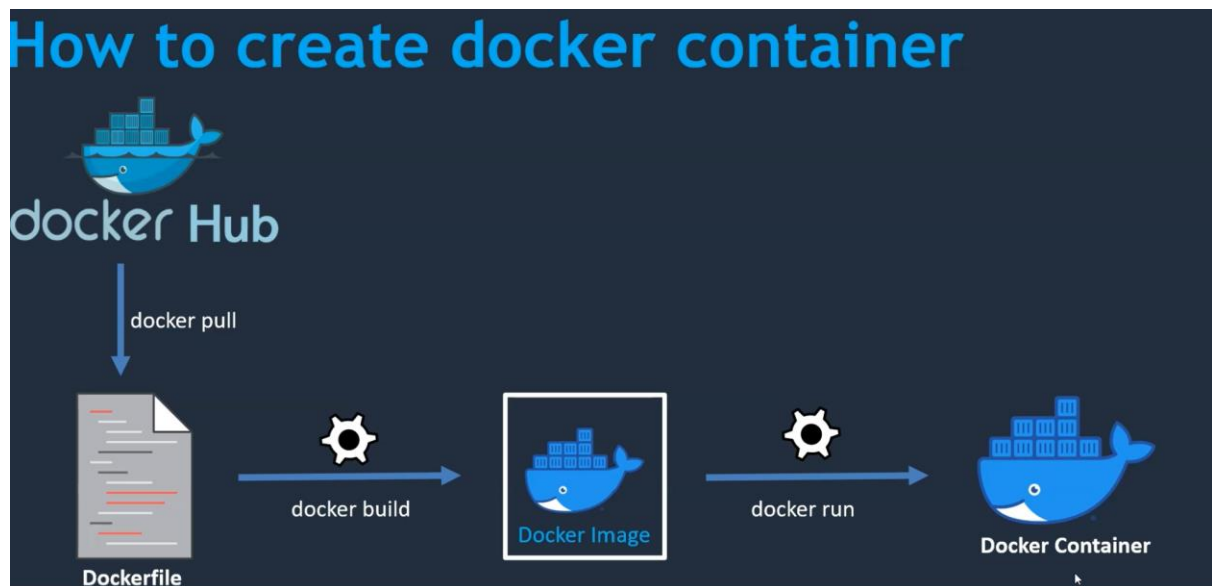


Fig. Create Docker File

Docker File

vi DockerFile

```
FROM centos
RUN mkdir /opt/tomcat/
WORKDIR /opt/tomcat
RUN curl -O https://dlcdn.apache.org/tomcat/tomcat-9/v9.0.62/bin/apache-tomcat-9.0.62.tar.gz
RUN tar -xvzf apache-tomcat-9.0.62.tar.gz
RUN mv apache-tomcat-9.0.62/* /opt/tomcat
RUN cd /etc/yum.repos.d/
RUN sed -i 's/mirrorlist/#mirrorlist/g' /etc/yum.repos.d/CentOS-*
RUN sed -i 's|#baseurl=http://mirror.centos.org|baseurl=http://vault.centos.org|g' /etc/yum.repos.d/CentOS-*
RUN yum -y install java
CMD /bin/bash
EXPOSE 8080

CMD ["/opt/tomcat/bin/catalina.sh", "run"]
```

Run:

```
docker build -t mytomcat .
```

Resolving Error for port 8082 Tomcat Container



Fig. refuse to connect

```
[root@dockerhost ~]# vi DockerFile
```

```
FROM tomcat:latest
```

```
RUN cp -R /usr/local/tomcat webpp.dist/* /usr/local/tomcatwebapps
```

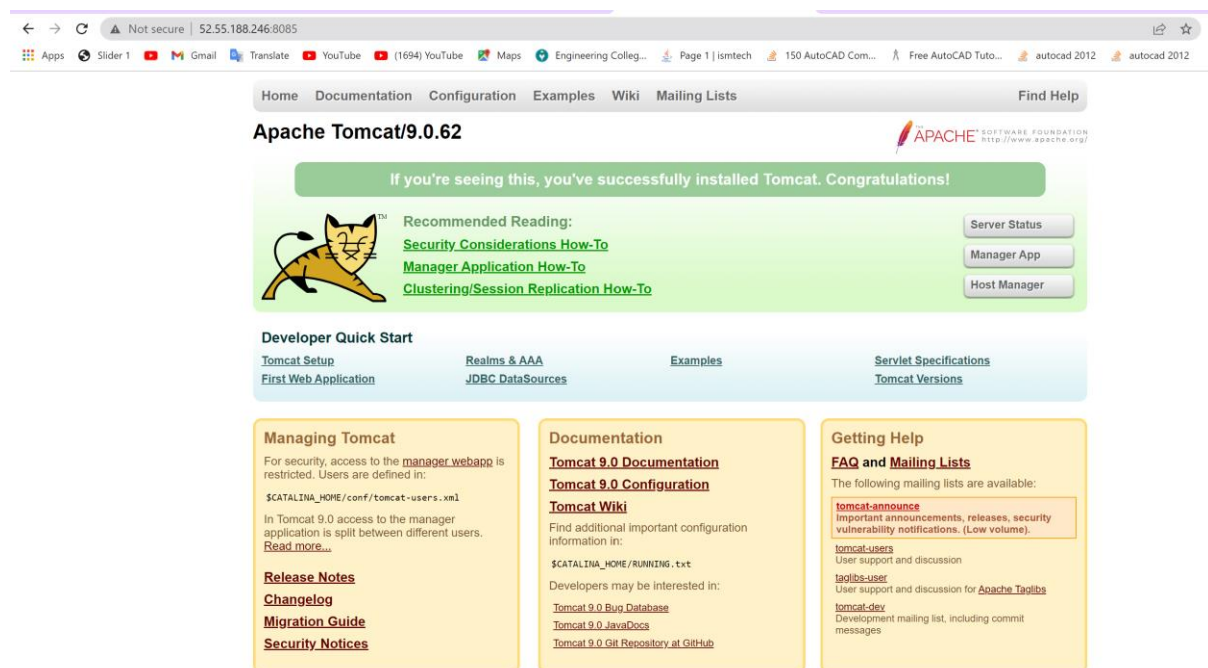


Fig. resolving error for port 8085 Apache Tomcat container

Integrate Docker with Jenkins

Create a docker admin user

Install "Publish Over SSH" plugin

Add Docker Host to Jenkins "configure systems"

```
[root@dockerhost ~]# cat /etc/passwd //User
```

```
[root@dockerhost ~]# cat /etc/group //Groups
```

```
[root@dockerhost ~]# useradd dockeradmin // Creating Users
```

```
[root@dockerhost ~]# passwd dockeradmin // Creating Password
```

Changing password for user dockeradmin.

New password:

BAD PASSWORD: The password contains the user name in some form

Retype new password:

passwd: all authentication tokens updated successfully.

```
[root@dockerhost ~]#
```

```
[root@dockerhost ~]# usermod -aG docker dockeradmin
```

// Modifying Docker Group

```
[root@dockerhost ~]# id dockeradmin
```

```
uid=1001(dockeradmin) gid=1001(dockeradmin)
```

```
groups=1001(dockeradmin),992(docker)
```

```
[root@dockerhost ~]#
```

```
[root@dockerhost ~]# vi /etc/ssh/sshd_config // Configure path password  
yes
```

```
[root@dockerhost ~]# vi /etc/ssh/sshd_config
```

```
[root@dockerhost ~]# service sshd reload
```

```
Redirecting to /bin/systemctl reload sshd.service
```

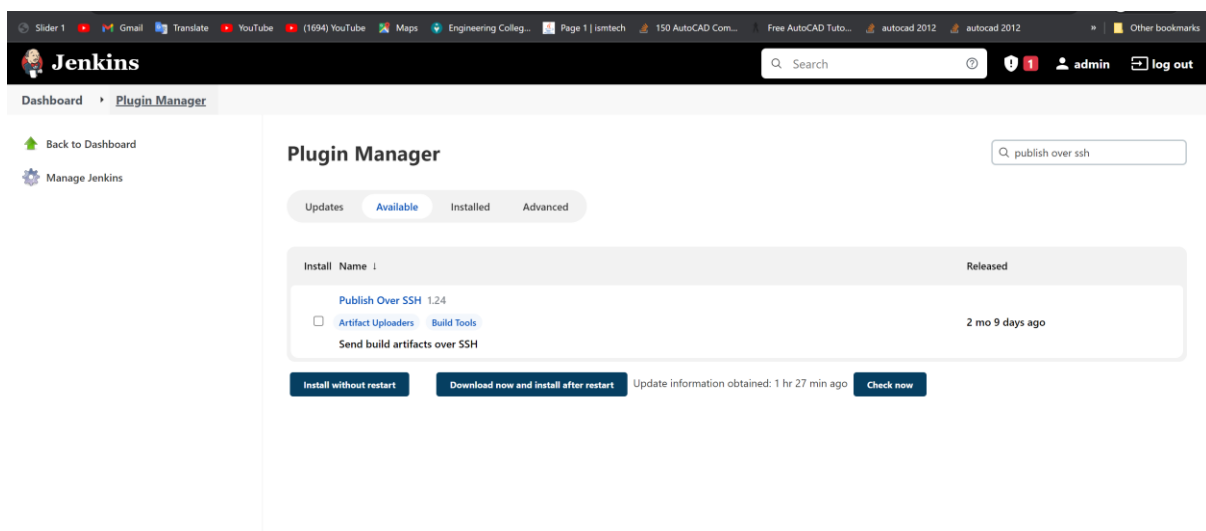
```
[root@dockerhost ~]#
```

```
__|__|
```

```
https://aws.amazon.com/amazon-linux-2/
```

```
[dockeradmin@dockerhost ~]$
```

Install “Publish Over SSH” plugin



The screenshot shows the Jenkins Plugin Manager interface. The top navigation bar includes the Jenkins logo, a search bar, and user information (admin, log out). The main content area is titled 'Plugin Manager' and features a search bar with the text 'publish over ssh'. Below the search bar, there are tabs for 'Updates', 'Available', 'Installed', and 'Advanced'. The 'Available' tab is selected, showing a table of available plugins. The table has columns for 'Install Name' and 'Released'. The 'Publish Over SSH' plugin is listed with version 1.24 and a release date of '2 mo 9 days ago'. Below the table, there are buttons for 'Install without restart', 'Download now and install after restart', and 'Check now'. The update information indicates it was obtained 1 hr 27 min ago.

| Install Name | Released |
|---|-----------------|
| <input type="checkbox"/> Publish Over SSH 1.24 Artifact Uploaders Build Tools Send build artifacts over SSH | 2 mo 9 days ago |

Fig. Publish Over SSH plugin

The screenshot shows the Jenkins Update Center interface. At the top, there is a search bar and the Jenkins logo. Below the navigation bar, the breadcrumb path is "Dashboard > Update Center". The left sidebar contains three menu items: "Back to Dashboard", "Manage Jenkins", and "Manage Plugins". The main content area is titled "Installing Plugins/Upgrades". Under the "Preparation" section, there is a list of steps: "Checking internet connectivity", "Checking update center connectivity", and "Success". Below this, four items are listed with green checkmarks and the word "Success": "bouncycastle API", "Infrastructure plugin for Publish Over X", "Publish Over SSH", and "Loading plugin extensions". At the bottom, there is a link "Go back to the top page" with a note "(you can start using the installed plugins right away)" and a checkbox "Restart Jenkins when installation is complete and no jobs are running".

Fig. Publish Over SSH plugin Success

Add Docker Host to Jenkins “configure systems”

The screenshot shows the "Configure Systems" page for the "Publish over SSH" plugin. At the top, there is a checkbox "Test configuration by sending test e-mail". The page is titled "Publish over SSH". Below the title, there are several sections: "Jenkins SSH Key" with a help icon, "Passphrase" with a help icon and a "Change Password" button, "Path to key" with a help icon and an empty text input field, "Key" with a help icon and a large empty text area, "Disable exec" with a help icon and an unchecked checkbox, and "SSH Servers" with a help icon. Under "SSH Servers", there is a table with one row: "SSH Server Name" with the value "dockerhost".

Fig. Configure System Success

<https://aws.amazon.com/amazon-linux-2/>

4 package(s) needed for security, out of 4 available

Run "sudo yum update" to apply all updates.

```
[dockeradmin@dockerhost ~]$ ssh-keygen
```

Generating public/private rsa key pair.

Enter file in which to save the key (/home/dockeradmin/.ssh/id_rsa):

/home/dockeradmin/.ssh/id_rsa already exists.

Overwrite (y/n)? y

Enter passphrase (empty for no passphrase):

Enter same passphrase again:

Your identification has been saved in /home/dockeradmin/.ssh/id_rsa.

Your public key has been saved in /home/dockeradmin/.ssh/id_rsa.pub.

The key fingerprint is:

SHA256:3NHEC/uXpcApXGxmukl0Ca3VwRMTOnyww48ZF+eyQZs
dockeradmin@dockerhost

The key's randomart image is:

```
+---[RSA 2048]-----+
| .o.+B*...  |
| o*=+BOo.  |
| +O.EBo+.o  |
| ..@.=o.=  .|
| .o S..o . + |
| .. .+  |
```

```
| . . |
```

```
|      |
```

```
|      |
```

```
+----[SHA256]-----+
```

```
[dockeradmin@dockerhost ~]$ cd /home/dockeradmin
```

```
[dockeradmin@dockerhost ~]$ ll
```

```
total 0
```

```
[dockeradmin@dockerhost ~]$ cd /.ssh
```

```
-bash: cd: /.ssh: No such file or directory
```

```
[dockeradmin@dockerhost ~]$ cd /home/dockeradmin/.ssh
```

```
[dockeradmin@dockerhost .ssh]$ ll
```

```
total 8
```

```
-rw----- 1 dockeradmin dockeradmin 1679 May 11 11:35 id_rsa
```

```
-rw-r--r-- 1 dockeradmin dockeradmin 404 May 11 11:35 id_rsa.pub
```


```
[dockeradmin@dockerhost .ssh]$
```


Jenkins Job to build and copy the artifacts on to docker host

Creating a new Job item:

Enter an item name

» Required field

 **Freestyle project**
This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.

 **Maven project**
Build a maven project. Jenkins takes advantage of your POM files and drastically reduces the configuration.

If you want to create a new item from other existing, you can use this option:


 Copy from

Fig. BuildandDeployonContainer item Created

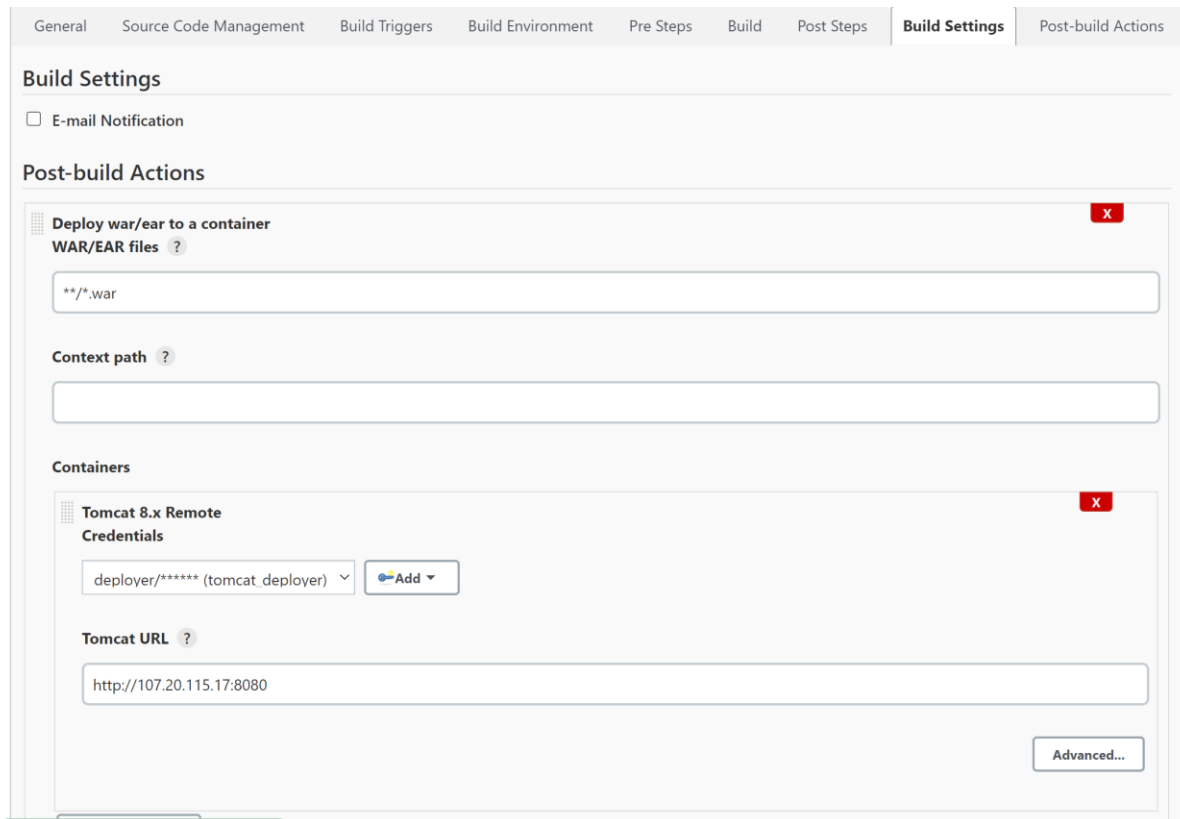


Fig. deleting Deploy war/ear on Container item.

Build Artifacts over SSH:



Fig. send build artifacts over SSH

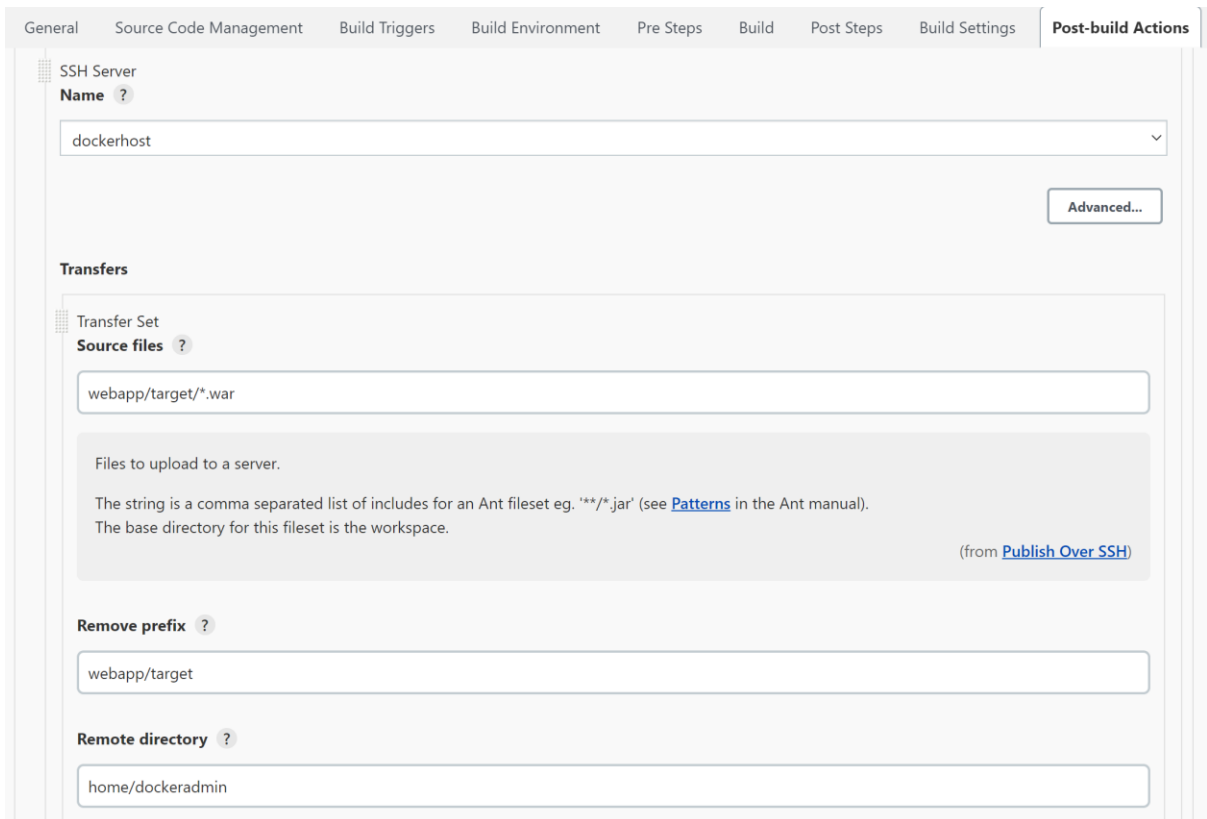


Fig. Configuring SSH Server

Test Case Success:

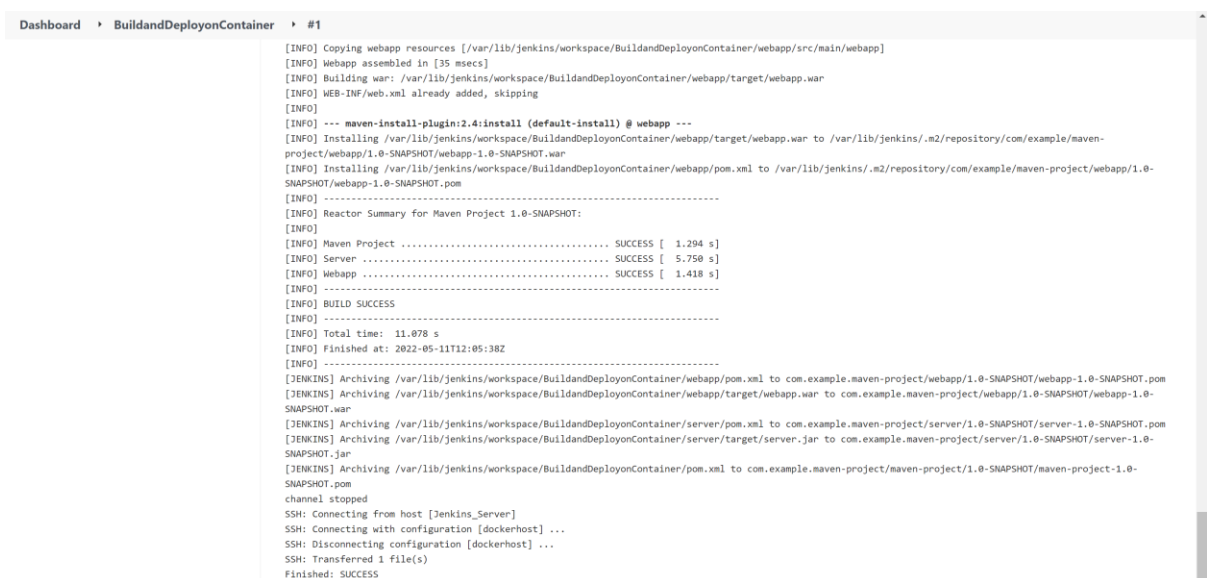


Fig. Success

```
[dockeradmin@dockerhost ~]$ ll
```

```
total 0
```

```
[dockeradmin@dockerhost ~]$ ll
```

```
total 0
```

```
drwxrwxr-x 3 dockeradmin dockeradmin 25 May 11 12:05 home
```

```
[dockeradmin@dockerhost ~]$ ll
```

```
total 4
```

```
drwxrwxr-x 3 dockeradmin dockeradmin 25 May 11 12:05 home
```

```
-rw-rw-r-- 1 dockeradmin dockeradmin 2912 May 11 12:07 webapp.war
```

```
[dockeradmin@dockerhost ~]$ rm -rf /home
```

```
rm: cannot remove '/home/ec2-user': Permission denied
```

```
rm: cannot remove '/home/dockeradmin': Permission denied
```

```
[dockeradmin@dockerhost ~]$ rm -rf home/
```

```
[dockeradmin@dockerhost ~]$ ll
```

```
total 0
```

```
[dockeradmin@dockerhost ~]$ ls
```

```
[dockeradmin@dockerhost ~]$ ll
```

```
total 0
```

```
[dockeradmin@dockerhost ~]$ cd ..
```

```
[dockeradmin@dockerhost home]$ ll
```

```
total 0
```

```
drwx----- 2 dockeradmin dockeradmin 6 May 11 12:08 dockeradmin
```

```
drwx----- 4 ec2-user ec2-user 125 May 2 21:42 ec2-user
```

```
[dockeradmin@dockerhost home]$ cd dockeradmin
```

```
[dockeradmin@dockerhost ~]$ ll
```

total 0

```
[dockeradmin@dockerhost ~]$ ll
```

total 4

```
-rw-r--r-- 1 dockeradmin dockeradmin 2912 May 11 12:09 webapp.war
```

Update Tomcat Docker File to automate deployment process

```
[root@dockerhost ~]# cd /opt
```

```
[root@dockerhost opt]# ll
```

total 0

```
drwxr-xr-x 4 root root 33 Apr 19 16:16 aws
```

```
drwx--x--x 4 root root 28 May 2 19:54 containerd
```

```
drwxr-xr-x 2 root root 6 Aug 16 2018 rh
```

```
[root@dockerhost opt]# mkdir docker
```

```
[root@dockerhost opt]# ll
```

total 0

```
drwxr-xr-x 4 root root 33 Apr 19 16:16 aws
```

```
drwx--x--x 4 root root 28 May 2 19:54 containerd
```

```
drwxr-xr-x 2 root root 6 May 11 14:14 docker
```

```
drwxr-xr-x 2 root root 6 Aug 16 2018 rh
```

Permission Given to docker admin :

```
[root@dockerhost opt]# chmod -R dockeradmin:dockeradmin docker
```

chmod: invalid mode: 'dockeradmin:dockeradmin'

Try 'chmod --help' for more information.

```
[root@dockerhost opt]# chown -R dockeradmin:dockeradmin docker
```

```
[root@dockerhost opt]# ll
```

```
total 0
```

```
drwxr-xr-x 4 root    root    33 Apr 19 16:16 aws
```

```
drwx--x--x 4 root    root    28 May  2 19:54 containerd
```

```
drwxr-xr-x 2 dockeradmin dockeradmin 6 May 11 14:14 docker
```

```
drwxr-xr-x 2 root    root    6 Aug 16 2018 rh
```

```
[root@dockerhost opt]# ls -ld
```

//Given Execution Permission

```
drwxr-xr-x 6 root root 59 May 11 14:14 .
```

Searching and moving Dockerfile in docker folder

```
[root@dockerhost opt]# cd root/
```

```
-bash: cd: root/: No such file or directory
```

```
[root@dockerhost opt]# cd /root
```

```
[root@dockerhost ~]# ll
```

```
total 8
```

```
-rw-r--r-- 1 root root 527 May  2 21:59 Dockerfile
```

```
-rw-r--r-- 1 root root 86 May  3 07:34 DockerFile
```

```
[root@dockerhost ~]# vi DockerFile
```

```
[root@dockerhost ~]# mv Dockerfile /opt/docker
```

```
[root@dockerhost ~]# cd /opt/docker
[root@dockerhost docker]# ll
total 4
-rw-r--r-- 1 root root 527 May  2 21:59 Dockerfile
[root@dockerhost docker]# chown -R dockeradmin:dockeradmin Dockerfile
[root@dockerhost docker]# ll
total 4
-rw-r--r-- 1 dockeradmin dockeradmin 527 May  2 21:59 Dockerfile
[root@dockerhost docker]#
```

Configuring path to copy in cd/opt :



The screenshot shows a configuration window with three input fields:

- Source files**: webapp/target/*.war
- Remove prefix**: webapp/target
- Remote directory**: //opt/docker

Fig. Remote Directory Path added

```
[root@dockerhost docker]# ll
total 8
-rw-r--r-- 1 dockeradmin dockeradmin 527 May  2 21:59 Dockerfile
-rw-r--r-- 1 dockeradmin dockeradmin 2912 May 11 14:31 webapp.war
[root@dockerhost docker]#
[root@dockerhost docker]# date
Wed May 11 14:34:06 UTC 2022
```

```
FROM tomcat:latest
```

```
RUN cp -R /usr/local/tomcat/webpp.dist/* /usr/local/tomcatwebapps
```

```
COPY ./*.war /usr/local/tomcatwebapps
```

```
[root@dockerhost docker]# ll
```

```
total 12
```

```
-rw-r--r-- 1 dockeradmin dockeradmin 527 May 2 21:59 Dockerfile
```

```
-rw-r--r-- 1 dockeradmin dockeradmin 86 May 3 07:34 DockerFile
```

```
-rw-r--r-- 1 dockeradmin dockeradmin 2912 May 11 14:31 webapp.war
```

```
[root@dockerhost docker]# date
```

```
Wed May 11 14:38:20 UTC 2022
```

```
[root@dockerhost docker]# vi DockerFile
```

```
[root@dockerhost docker]# vi DockerFile
```

```
[root@dockerhost docker]# docker build -t tomcat:v1 .
```

```
Cannot connect to the Docker daemon at unix:///var/run/docker.sock. Is the  
docker daemon running?
```

```
[root@dockerhost docker]# cat DockerFile
```

```
FROM tomcat:latest
```

```
RUN cp -R /usr/local/tomcat/webpp.dist/* /usr/local/tomcatwebapps
```

```
COPY ./*.war /usr/local/tomcatwebapps
```

```
[root@dockerhost docker]# service docker status
```

```
Redirecting to /bin/systemctl status docker.service
```

```
● docker.service - Docker Application Container Engine
```

```
Loaded: loaded (/usr/lib/systemd/system/docker.service; disabled; vendor  
preset: disabled)
```

Active: inactive (dead)

Docs: <https://docs.docker.com>

[root@dockerhost docker]# service docker start

Redirecting to /bin/systemctl start docker.service

[root@dockerhost docker]# docker build -t tomcat:v1 .

Sending build context to Docker daemon 7.168kB

Step 1/13 : FROM centos

---> 5d0da3dc9764

Step 2/13 : RUN mkdir /opt/tomcat/

---> Using cache

---> 29c2831a4695

Step 3/13 : WORKDIR /opt/tomcat

---> Using cache

---> ecea7cd5c77e

Step 4/13 : RUN curl -O <https://dlcdn.apache.org/tomcat/tomcat-9/v9.0.62/bin/apache-tomcat-9.0.62.tar.gz>

---> Using cache

---> 5123cdc2263f

Step 5/13 : RUN tar -xvzf apache-tomcat-9.0.62.tar.gz

---> Using cache

---> 4776da674d01

Step 6/13 : RUN mv apache-tomcat-9.0.62/* /opt/tomcat

---> Using cache

---> fce4b9b7e164

Step 7/13 : RUN cd /etc/yum.repos.d/

---> Using cache

---> f7a2265a5410

Step 8/13 : RUN sed -i 's/mirrorlist/#mirrorlist/g' /etc/yum.repos.d/CentOS-*

---> Using cache

---> 2e2e2d5d8a29

Step 9/13 : RUN sed -i

's|#baseurl=http://mirror.centos.org|baseurl=http://vault.centos.org|g' /etc/yum.repos.d/CentOS-*

---> Using cache

---> abdc8de2b2b

Step 10/13 : RUN yum -y install java

---> Using cache

---> 10ce50067582

Step 11/13 : CMD /bin/bash

---> Using cache

---> 4561a92d2242

Step 12/13 : EXPOSE 8080

---> Using cache

---> 95f4005d94f7

Step 13/13 : CMD ["/opt/tomcat/bin/catalina.sh", "run"]

---> Using cache

---> 9c295cdb7c8c

Successfully built 9c295cdb7c8c

Successfully tagged tomcat:v1

Checks Images:

[root@dockerhost docker]# docker images

| REPOSITORY | TAG | IMAGE ID | CREATED | SIZE |
|-------------------|------------|-----------------|----------------|-------------|
|-------------------|------------|-----------------|----------------|-------------|

demotomcat latest 9c295cdb7c8c 8 days ago 510MB
mytomcat latest 9c295cdb7c8c 8 days ago 510MB
tomcat v1 9c295cdb7c8c 8 days ago 510MB
tomcat latest 0183eb12bb0c 2 weeks ago 680MB
centos latest 5d0da3dc9764 7 months ago 231MB

Running Container :

```
[root@dockerhost docker]# docker run -d --name tomcatv1 -p 8086:8080  
tomcat:v1  
edef49a560653ec2a7d2c3cb260abdafaacea025654b5bf91e4124a61c18f0e5  
[root@dockerhost docker]# docker ps
```

| CONTAINER ID | IMAGE | COMMAND | CREATED | STATUS |
|--------------|-----------|---|---------------|--------------|
| edef49a56065 | tomcat:v1 | "/opt/tomcat/bin/cat..." | 7 seconds ago | Up 6 seconds |
| | | 0.0.0.0:8086->8080/tcp, :::8086->8080/tcp | | tomcatv1 |

```
[root@dockerhost docker]#
```

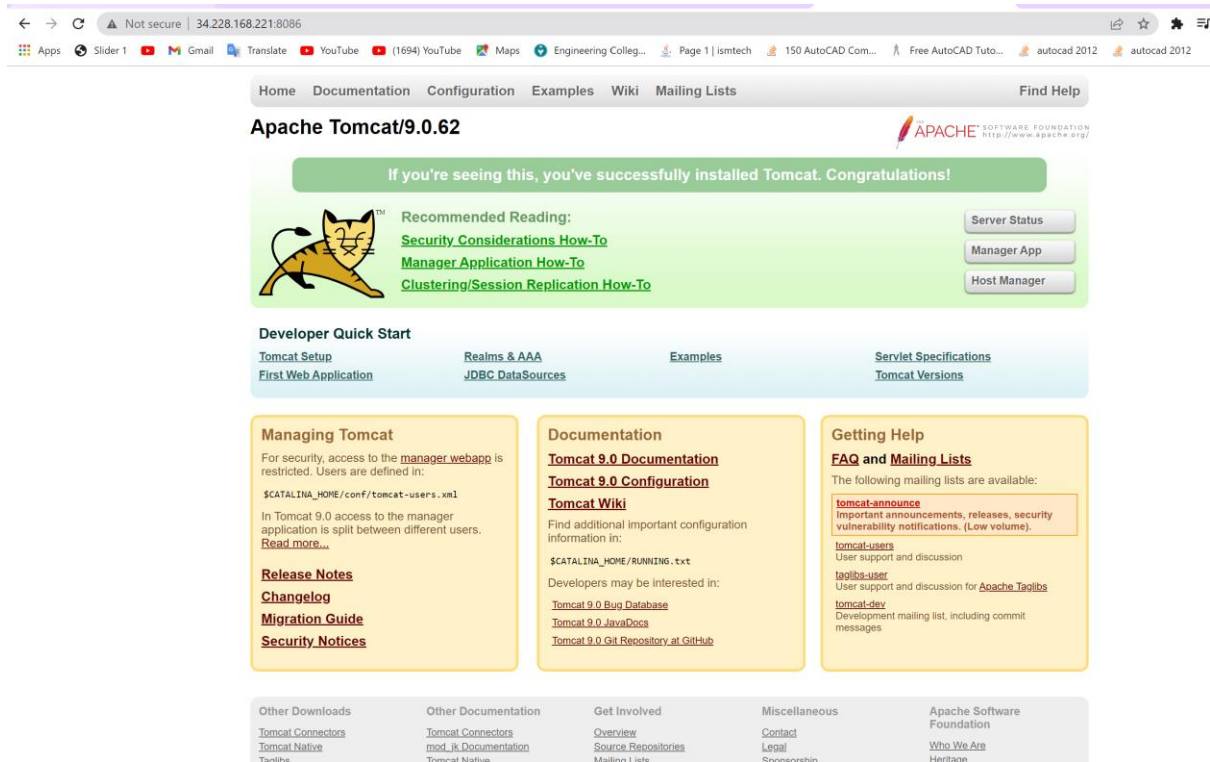


Fig. Tomcat Started

Automate Build and Deployment on Docker Container :

```
cd /opt/docker;
```

```
docker build -t regapp:v1 .;
```

```
docker run -d --name regapp:v1 -p 8087:8080 regapp:v1
```

Remove prefix ?

webapp/target

Remote directory ?

//opt/docker

Exec command ?

```
cd /opt/docker;
docker build -t regapp.v1 .;
docker run -d --name regapp.v1 -p 8087:8080 regapp.v1
```

All of the transfer fields (except for Exec timeout) support substitution of [Jenkins environment variables](#)

Advanced...

Fig. Configuration on Jenkins Server

```
[root@dockerhost ~]# service docker start
Redirecting to /bin/systemctl start docker.service
[root@dockerhost ~]# docker ps -a
CONTAINER ID        IMAGE               COMMAND                  CREATED            STATUS              PORTS                               NAMES
edef49a56065       tomcat:v1          "/opt/tomcat/bin/cat..." 24 minutes ago    Up 24 minutes      0.0.0.0:8086->8080/tcp, :::8086->8080/tcp tomcatv1
5251e0ac3ad9       demotomcat        "/opt/tomcat/bin/cat..." 8 days ago        Exited(143) 8 days ago                               mydemotomcat-container
183307c95d1b       mytomcat          "/opt/tomcat/bin/cat..." 8 days ago        Exited(143) 8 days ago                               mytomcat-server
13967cbc8a35       5d0da3dc9764      "/bin/sh -c 'sudo am..." 8 days ago        Exited(127) 8 days ago                               charming_chatterjee
36d65ecb9a6e       5d0da3dc9764      "/bin/sh -c 'amazon-..." 8 days ago        Exited(127) 8 days ago                               nifty_bell
c6093995c672       5d0da3dc9764      "/bin/sh -c 'yum ins..." 8 days ago        Exited(1) 8 days ago                               inspiring_franklin
74fc8513fff        5d0da3dc9764      "/bin/sh -c 'yum ins..." 8 days ago        Exited(1) 8 days ago                               stoic_rhodes
89d40f0ec25e       5d0da3dc9764      "/bin/sh -c 'yum ins..." 8 days ago        Exited(1) 8 days ago                               loving_heyrovsky
9ac2c0b28c45       5d0da3dc9764      "/bin/sh -c 'yum ins..." 8 days ago        Exited(1) 8 days ago                               nifty_thompson
d4c7db9d910f       tomcat:latest     "catalina.sh run"        8 days ago        Exited(143) 8 days ago                               tomca2
78e9303c67b9       tomcat            "catalina.sh run"        8 days ago        Exited(143) 8 days ago                               tomcat-container

[root@dockerhost ~]# docker stop
"docker stop" requires at least 1 argument.
See 'docker stop --help'.

Usage: docker stop [OPTIONS] CONTAINER [CONTAINER...]

Stop one or more running containers
[root@dockerhost ~]# docker stop edef49a56065
edef49a56065
[root@dockerhost ~]# docker ps -a
CONTAINER ID        IMAGE               COMMAND                  CREATED            STATUS              PORTS                               NAMES
edef49a56065       tomcat:v1          "/opt/tomcat/bin/cat..." 25 minutes ago    Exited(143) 5 seconds ago                               tomcatv1
5251e0ac3ad9       demotomcat        "/opt/tomcat/bin/cat..." 8 days ago        Exited(143) 8 days ago                               mydemotomcat-container
183307c95d1b       mytomcat          "/opt/tomcat/bin/cat..." 8 days ago        Exited(143) 8 days ago                               mytomcat-server
13967cbc8a35       5d0da3dc9764      "/bin/sh -c 'sudo am..." 8 days ago        Exited(127) 8 days ago                               charming_chatterjee
36d65ecb9a6e       5d0da3dc9764      "/bin/sh -c 'amazon-..." 8 days ago        Exited(127) 8 days ago                               nifty_bell
c6093995c672       5d0da3dc9764      "/bin/sh -c 'yum ins..." 8 days ago        Exited(1) 8 days ago                               inspiring_franklin
74fc8513fff        5d0da3dc9764      "/bin/sh -c 'yum ins..." 8 days ago        Exited(1) 8 days ago                               stoic_rhodes
89d40f0ec25e       5d0da3dc9764      "/bin/sh -c 'yum ins..." 8 days ago        Exited(1) 8 days ago                               loving_heyrovsky
9ac2c0b28c45       5d0da3dc9764      "/bin/sh -c 'yum ins..." 8 days ago        Exited(1) 8 days ago                               nifty_thompson
d4c7db9d910f       tomcat:latest     "catalina.sh run"        8 days ago        Exited(143) 8 days ago                               tomca2
78e9303c67b9       tomcat            "catalina.sh run"        8 days ago        Exited(143) 8 days ago                               tomcat-container

[root@dockerhost ~]# docker container prune
WARNING! This will remove all stopped containers.
Are you sure you want to continue? [y/N] y
Deleted Containers:
edef49a560653ec2a7d2c3cb260abdafaacea025654b5bf91e4124a61c18f0e5
5251e0ac3ad991f75f289e597f245643e124693162ffa58b542685b4ea64129d
183307c95d1b6c91603de52e753f9a0d16f8cee32fe7300b129b4c5c9e3486a4
13967cbc8a35d2df2c49041dfad83781246f33973dc1ad7c9f315f9e00096122
36d65ecb9a6ead4c6ca2cf7601cf26994fb0484eeca5e8eaf380f4b21397a032a
c6093995c672959c270618124a4022c7a395e0927951b695109f916265ada3c1
74fc8513fff4d3605c9a945ebc235af74f20eb4d1bbb524ff0ad5fe699866
89d40f0ec25eb5ee062f477a7ea33e6af614d70eafc30de77eaa509490b9a0c
9ac2c0b28c452a9b3fa50fd5023f14e7e1c34cea57e0a91899765517733a259
d4c7db9d910fdceef014d3e3fc685e9ef04305627373c5e2df1db43c75c03fb
78e9303c67b9f67ca161776a1321da5cb80ad4b85e64c9753a84bf91359ace21
```

Fig. Removing all running container

docker images prune -a // remove images

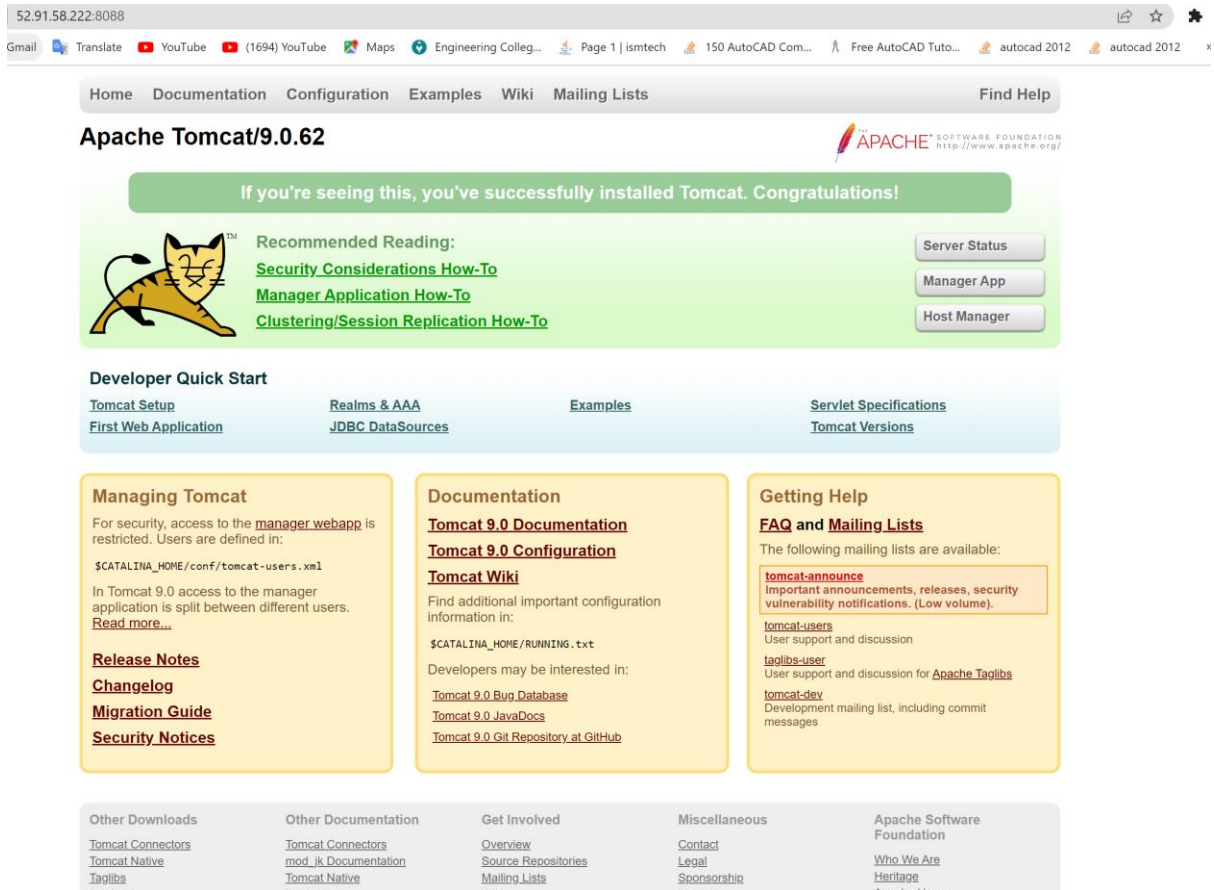


Fig . Tomcat Started on port 8088

Integrate Ansible in CI/CD Pipeline:

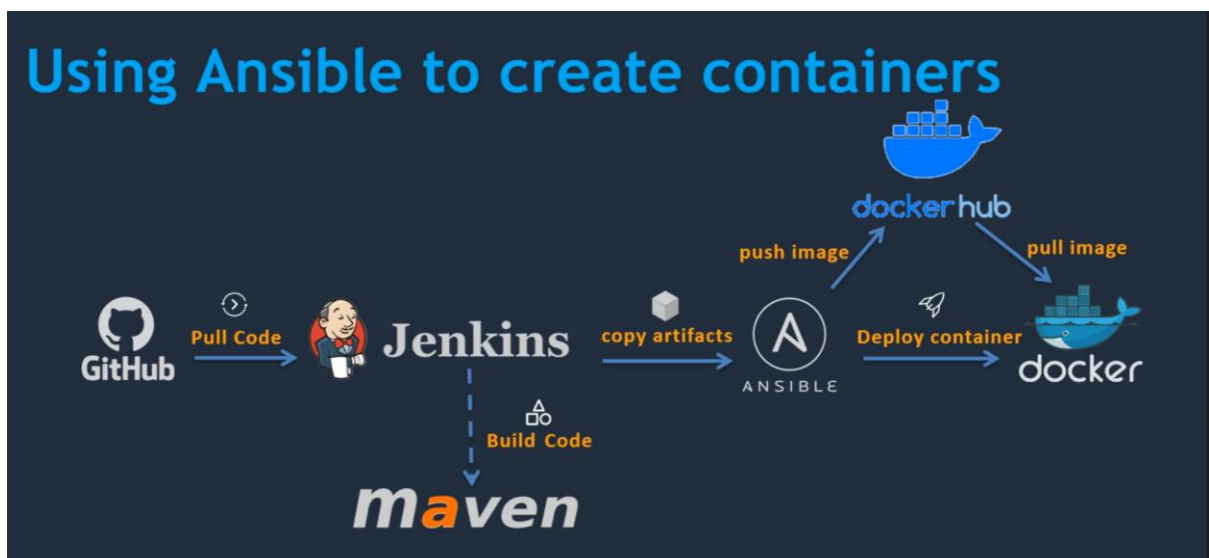


Fig. Using Ansible to create containers

Prepare Ansible Server:

- Setup EC2 Instance
- Setup hostname
- Create ansadmin users
- Add Users to sudoers file
- Generate ssh keys
- Enable Password Based Login
- Install Ansible

Setup EC2 Instance

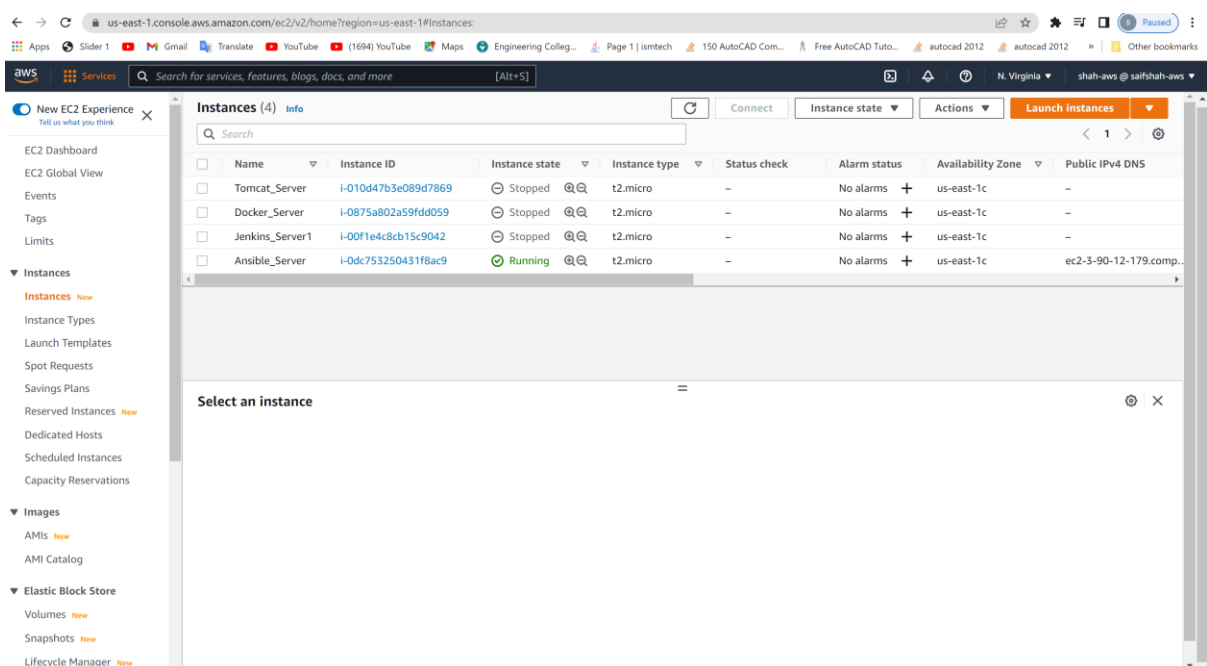
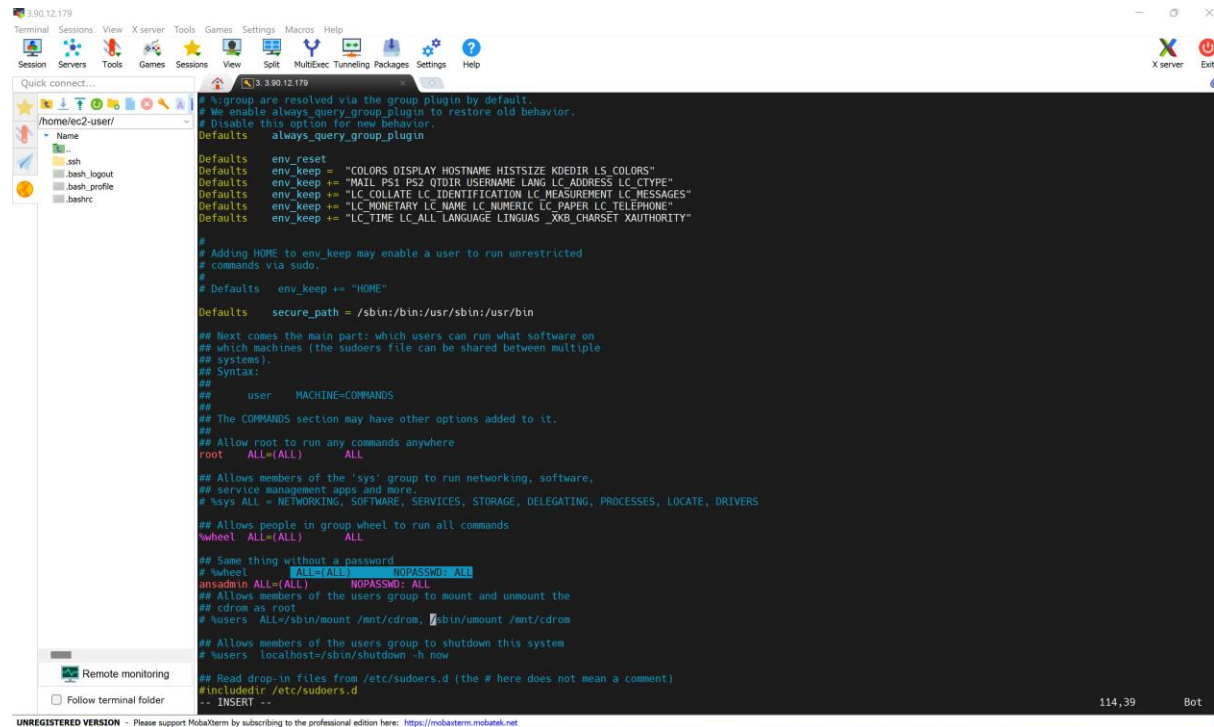


Fig. EC2 Instance Setup For Ansible

Add Users to sudoers file

The **sudoers file** is a file Linux and Unix administrators use to allocate system rights to system users.

Command to enter visudo



```
3.90.12.179
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect... /home/ec2-user/
Name
.ssh
.bash_logout
.bash_profile
.bashrc

# %group are resolved via the group plugin by default.
# We enable always_query_group_plugin to restore old behavior.
# Disable this option for new behavior.
Defaults    always_query_group_plugin

Defaults    env_reset
Defaults    env_keep = "COLORS DISPLAY HOSTNAME HISTSIZE KOEDIR LS_COLORS"
Defaults    env_keep += "MAIL PS1 PS2 QTDIR USERNAME LANG LC_ADDRESS LC_CTYPE"
Defaults    env_keep += "LC_COLLATE LC_IDENTIFICATION LC_MEASUREMENT LC_MESSAGES"
Defaults    env_keep += "LC_MONETARY LC_NAME LC_NUMERIC LC_PAPER LC_TELEPHONE"
Defaults    env_keep += "LC_TIME LC_ALL LANGUAGE LINGUAS _XKB_CHARSET XAUTHORITY"

#
# Adding HOME to env_keep may enable a user to run unrestricted
# commands via sudo.
#
# Defaults    env_keep += "HOME"

Defaults    secure_path = /sbin:/bin:/usr/sbin:/usr/bin

## Next comes the main part: which users can run what software on
## which machines (the sudoers file can be shared between multiple
## systems).
## Syntax:
##
## user MACHINE=COMMANDS
##
## The COMMANDS section may have other options added to it.
##
## Allow root to run any commands anywhere
root ALL=(ALL) ALL

## Allows members of the 'sys' group to run networking, software,
## service management apps and more.
# %sys ALL = NETWORKING, SOFTWARE, SERVICES, STORAGE, DELEGATING, PROCESSES, LOCATE, DRIVERS

## Allows people in group wheel to run all commands
%wheel ALL=(ALL) ALL

## Same thing without a password
# %wheel ALL=(ALL) NOPASSWD: ALL
nsadmin ALL=(ALL) NOPASSWD: ALL
## Allows members of the users group to mount and unmount the
## cdrom as root
# %users ALL=/sbin/mount /mnt/cdrom, /sbin/umount /mnt/cdrom

## Allows members of the users group to shutdown this system
# %users localhost=/sbin/shutdown -h now

## Read drop-in files from /etc/sudoers.d (the # here does not mean a comment)
#includeDir /etc/sudoers.d
-- INSERT --

114,39 Bot
UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: https://mobaxterm.mobatek.net
```

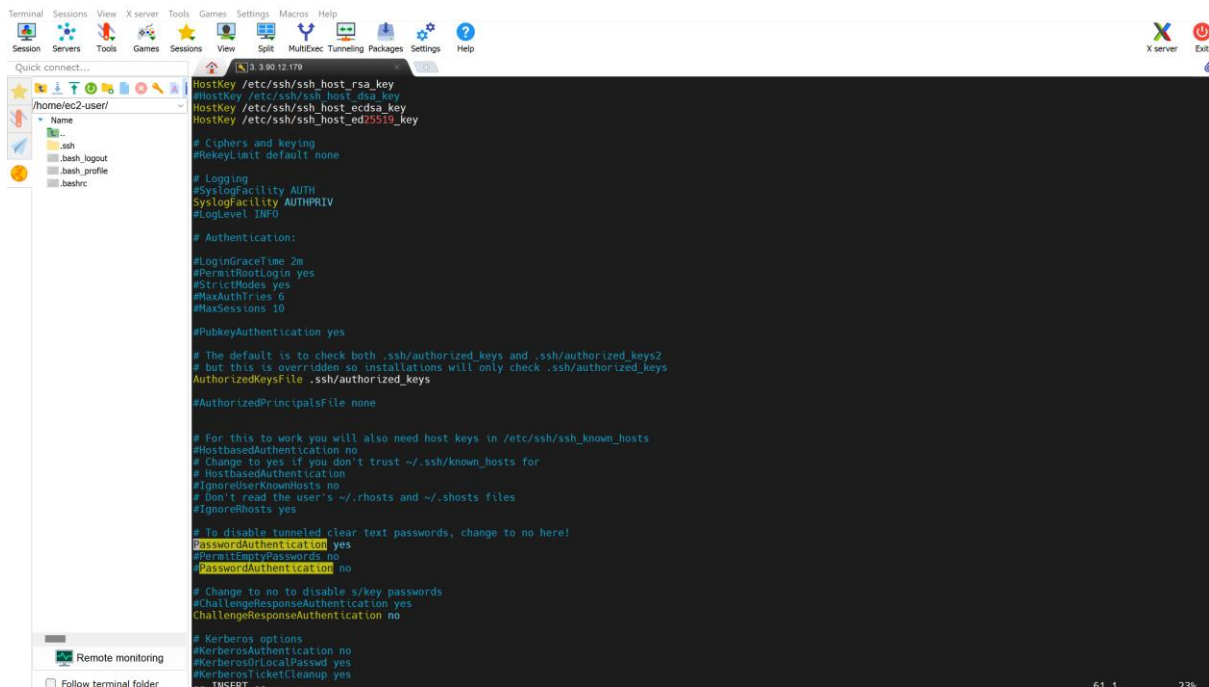
Fig. Add Users to sudoers file

- Note: Shift +g to end of line

Configuring SSH

```
[root@Ansible_Server ~]# vi /etc/ssh/sshd_config
```

```
[root@Ansible_Server ~]# service sshd reload
```



```
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
/home/ec2-user/
  .ssh
  .bash_logout
  .bash_profile
  .bashrc
  Remote monitoring
  Follow terminal folder

HostKey /etc/ssh/ssh_host_rsa_key
HostKey /etc/ssh/ssh_host_dsa_key
HostKey /etc/ssh/ssh_host_ecdsa_key
HostKey /etc/ssh/ssh_host_ed25519_key

# Ciphers and keying
#RekeyLimit default none

# Logging
#SyslogFacility AUTH
SyslogFacility AUTHPRIV
#LogLevel INFO

# Authentication:
#LoginGraceTime 2m
#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

# To disable tunneled clear text passwords, change to no here!
PasswordAuthentication yes
#PermitEmptyPasswords no
#PasswordAuthentication no

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

# Kerberos options
#KerberosAuthentication no
#KerberosLocalPasswd yes
#KerberosTicketCleanup yes
```

Fig. Configuring Passwd

Enable Password Based Login

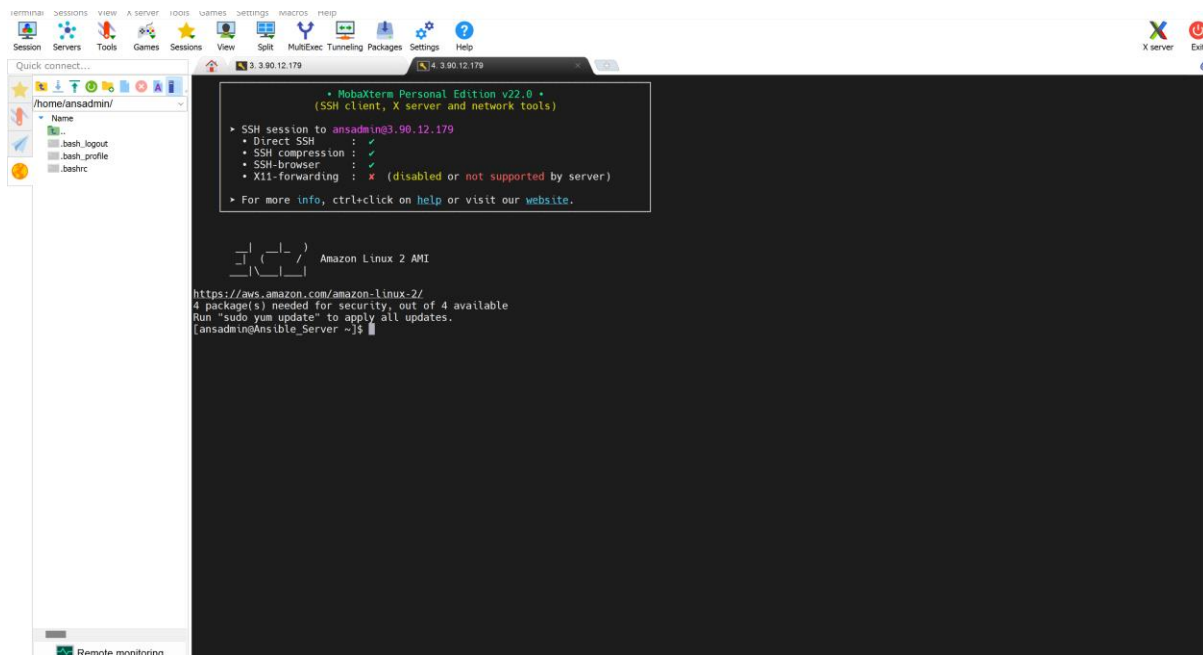


Fig. Login as ansadmin

Generated SSH Keys:

```
[ansadmin@Ansible_Server ~]$ ssh-keygen
```

Generating public/private rsa key pair.

Enter file in which to save the key (/home/ansadmin/.ssh/id_rsa):

Created directory '/home/ansadmin/.ssh'.

Enter passphrase (empty for no passphrase):

Enter same passphrase again:

Your identification has been saved in /home/ansadmin/.ssh/id_rsa.

Your public key has been saved in /home/ansadmin/.ssh/id_rsa.pub.

The key fingerprint is:

```
SHA256:+4bEKmcZCo4uVhQ8BYqwqn/bZwLbV+Cl30l0dUDJMIE
```

```
ansadmin@Ansible_Server
```

The key's randomart image is:

```
+---[RSA 2048]-----+
```

```
|..o.  .Eo |
```

```
|o..+  o o o|
```

```
|o. o   o ..|
```

```
|. .   . . . . |
```

```
|..  oS+.. |
```

```
|. . . . = . . . |
```

```
|.o.. = =. + o . |
```

```
|oo. =.B =.o o  |
```

```
|+....=. = ..  |
```

```
+----[SHA256]-----+
```

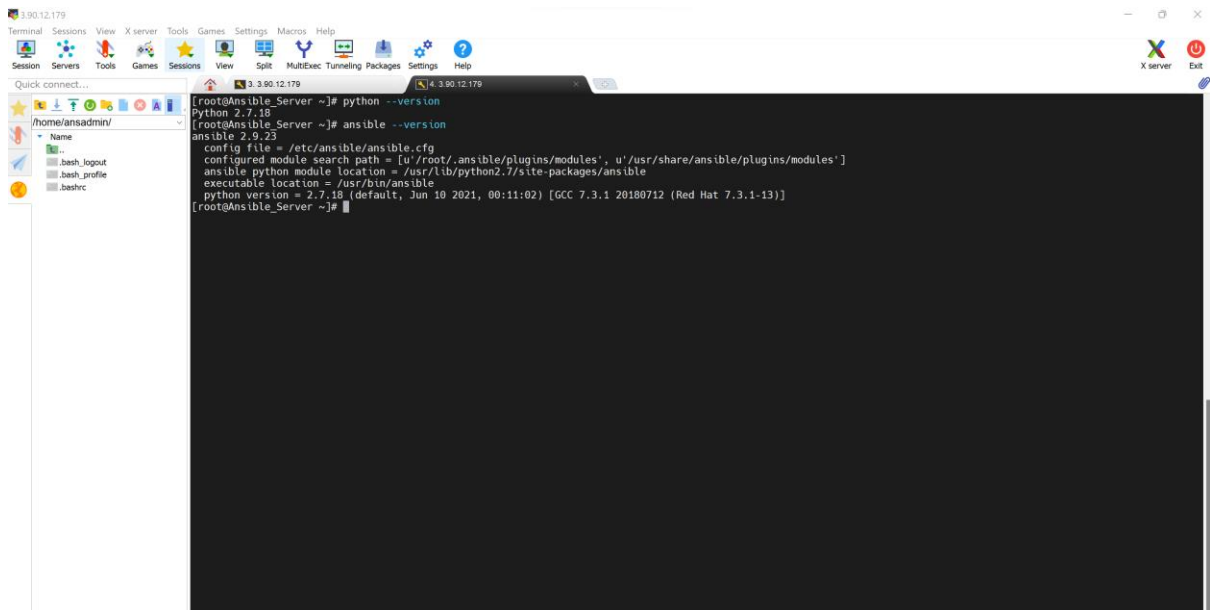
```
[ansadmin@Ansible_Server ~]$
```

Install Ansible

```
Amazon Linux 2 AMI
https://aws.amazon.com/amazon-linux-2/
4 package(s) needed for security, out of 4 available
Run "sudo yum update" to apply all updates.
[ansadmin@Ansible_Server ~]$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/ansadmin/.ssh/id_rsa):
Created directory '/home/ansadmin/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/ansadmin/.ssh/id_rsa.
Your public key has been saved in /home/ansadmin/.ssh/id_rsa.pub.
The key fingerprint is:
SHA256:+4bEKmcZC04Uvh08BYqmqn/bZvlbV+Cl30l0dUDJME ansadmin@Ansible_Server
The key's randomart image is:
+---[RSA 2048]-----+
|..o.  .Eo |
|o..+  o o o|
|o. o   o ..|
|. .   . . . . |
|. .   oS+.. |
|. . . . = . . . |
|.o.. = =. + o . |
|oo. =.B =.o o  |
|+....=. = ..  |
+----[SHA256]-----+
[ansadmin@Ansible_Server ~]$ ^C
[ansadmin@Ansible_Server ~]$ sudo su -
Last login: Thu May 12 19:30:07 UTC 2022 on pts/0
[root@Ansible_Server ~]# clear
[root@Ansible_Server ~]# yum install ansible
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd
amzn2-core
No package ansible available.
Error: Nothing to do

ansible is available in Amazon Linux Extra topic "ansible2"
To use, run
# sudo amazon-linux-extras install ansible2

Learn more at
https://aws.amazon.com/amazon-linux-2/faqs/#Amazon_Linux_Extras
[root@Ansible_Server ~]# amazon-linux-extras install ansible2
```



```
[root@Ansible_Server ~]# python --version
Python 2.7.18
[root@Ansible_Server ~]# ansible --version
ansible 2.9.23
config file = /etc/ansible/ansible.cfg
configured module search path = [u'/root/.ansible/plugins/modules', u'/usr/share/ansible/plugins/modules']
ansible python module location = /usr/lib/python2.7/site-packages/ansible
executable location = /usr/bin/ansible
python version = 2.7.18 (default, Jun 10 2021, 00:11:02) [GCC 7.3.1 20180712 (Red Hat 7.3.1-13)]
[root@Ansible_Server ~]#
```

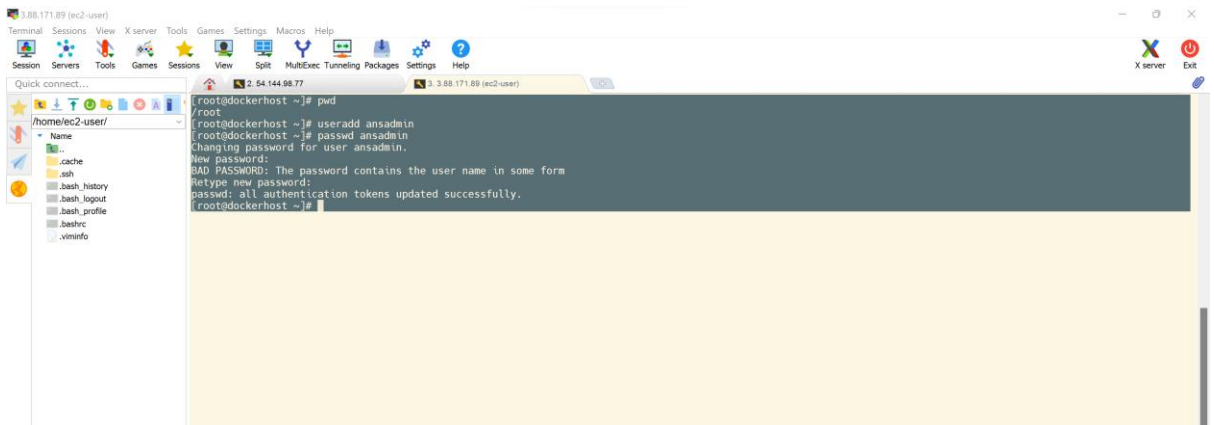
Fig. Installing Ansible

Note: For Installing Ansible required python which inbuilt comes amazon ec2 service.

Integrate Docker with Ansible:

- **On Docker Host**
 - Create ansadmin
 - Add ansadmin to sudoers file
 - Enable Password Based Login
- **On Ansible Node**
 - Add to host file
 - Copy ssh keys
 - Test the Connection

Create ansadmin

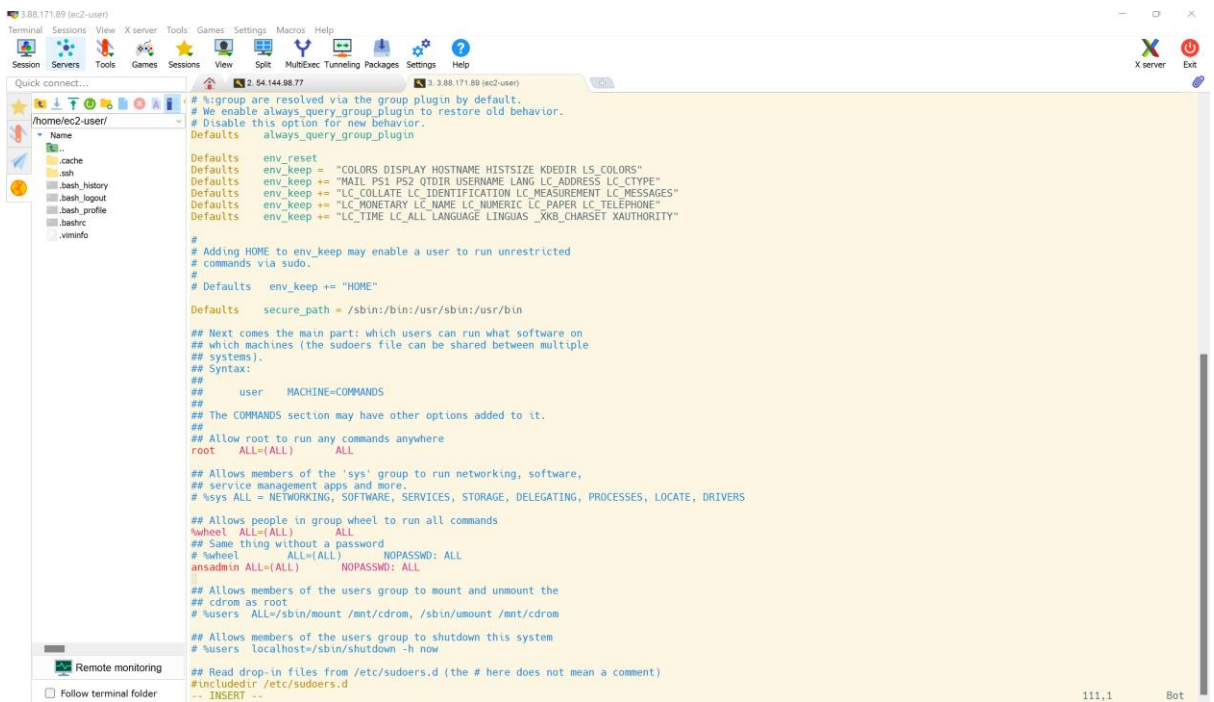


```
root@dockerhost ~]# pwd
/root
root@dockerhost ~]# useradd ansadmin
root@dockerhost ~]# passwd ansadmin
Changing password for user ansadmin.
New password:
BAD PASSWORD: The password contains the user name in some form
Retype new password:
passwd: all authentication tokens updated successfully.
root@dockerhost ~]#
```

Fig. Created ansadmin for docker

Add ansadmin to sudoers file

The **sudoers** file is a file Linux and Unix administrators use to allocate system rights to system users.



```
## %group are resolved via the group plugin by default.
## We enable always_query_group_plugin to restore old behavior.
## Disable this option for new behavior.
Defaults    always_query_group_plugin

Defaults    env_reset
Defaults    env_keep = "COLORS DISPLAY HOSTNAME HISTSIZE KDEDIR LS_COLORS"
Defaults    env_keep = "MAIL PS1 PS2 QTDIR USERNAME LANG LC_ADDRESS LC_CTYPE"
Defaults    env_keep = "LC_COLLATE LC_IDENTIFICATION LC_MEASUREMENT LC_MESSAGES"
Defaults    env_keep = "LC_MONETARY LC_NAME LC_NUMERIC LC_PAPER LC_TELEPHONE"
Defaults    env_keep = "LC_TIME LC_ALL LANGUAGE LINGUAS _XKB_CHARSET XAUTHORITY"

#
# Adding HOME to env_keep may enable a user to run unrestricted
# commands via sudo.
#
# Defaults    env_keep += "HOME"

Defaults    secure_path = /sbin:/bin:/usr/sbin:/usr/bin

## Next comes the main part: which users can run what software on
## which machines (the sudoers file can be shared between multiple
## systems).
## Syntax:
##
## user    MACHINE=COMMANDS
##
## The COMMANDS section may have other options added to it.
##
## Allow root to run any commands anywhere
root    ALL=(ALL)    ALL

## Allows members of the 'sys' group to run networking, software,
## service management apps and more.
## %sys ALL = NETWORKING, SOFTWARE, SERVICES, STORAGE, DELEGATING, PROCESSES, LOCATE, DRIVERS

## Allows people in group wheel to run all commands
%wheel  ALL=(ALL)    ALL
## Same thing without a password
%wheel  ALL=(ALL)    NOPASSWD: ALL
ansadmin ALL=(ALL)    NOPASSWD: ALL

## Allows members of the users group to mount and unmount the
## cdrom as root
%users  ALL=/sbin/mount /mnt/cdrom, /sbin/umount /mnt/cdrom

## Allows members of the users group to shutdown this system
%users  localhost=/sbin/shutdown -h now

## Read drop-in files from /etc/sudoers.d (the # here does not mean a comment)
#include_dir /etc/sudoers.d
-- INSERT --
```

Fig. Created ansadmin added to sudoers file

Enable Password Based Login

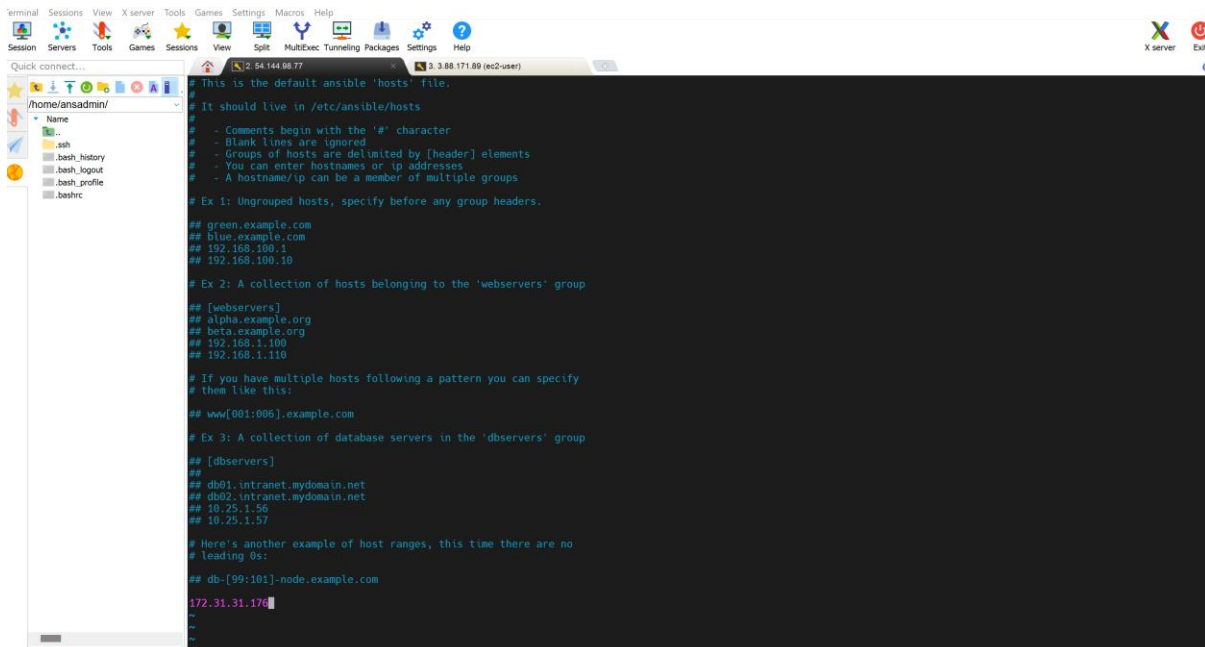
```
[root@dockehost ~]# vi /etc/ssh/ssh_config
[root@dockehost ~]# grep Password /etc/ssh/sshd_config
PasswordAuthentication yes
#PermitEmptyPasswords no
#PasswordAuthentication no
# PasswordAuthentication. Depending on your PAM configuration,
# PAM authentication, then enable this but set PasswordAuthentication
[root@dockehost ~]#
```

Fig. Enable Password Based Login

-----On Ansible Node-----

Add to host file

```
[root@Ansible_Server ~]# vi /etc/ansible/hosts
```



The screenshot shows a terminal window with the following content:

```
# This is the default ansible 'hosts' file.
# It should live in /etc/ansible/hosts
#
# - Comments begin with the '#' character
# - Blank lines are ignored
# - Groups of hosts are delimited by [header] elements
# - You can enter hostnames or ip addresses
# - A hostname/ip can be a member of multiple groups
#
# Ex 1: Ungrouped hosts, specify before any group headers.
## green.example.com
## blue.example.com
## 192.168.100.1
## 192.168.100.10
#
# Ex 2: A collection of hosts belonging to the 'webservers' group
## [webservers]
## alpha.example.org
## beta.example.org
## 192.168.1.100
## 192.168.1.110
#
# If you have multiple hosts following a pattern you can specify
# them like this:
## www[001:006].example.com
#
# Ex 3: A collection of database servers in the 'dbservers' group
## [dbservers]
##
## db01.intranet.mydomain.net
## db02.intranet.mydomain.net
## 10.25.1.56
## 10.25.1.57
#
# Here's another example of host ranges, this time there are no
# leading 0s:
## db-[99:101]-node.example.com
172.31.31.176
```

Fig. Added host ipconfig address from docker host

Copy ssh keys

```
[root@Ansible_Server ~]# vi /etc/ansible/hosts
[root@Ansible_Server ~]# ^C
[root@Ansible_Server ~]# ll -la
total 32
dr-xr-x--- 4 root root 156 May 12 23:16 .
dr-xr-xr-x 18 root root 257 May 12 19:16 ..
drwx----- 3 root root 17 May 12 19:59 .ansible
-rw----- 1 root root 110 May 12 20:44 .bash_history
-rw-r--r-- 1 root root 18 Oct 18 2017 .bash_logout
-rw-r--r-- 1 root root 176 Oct 18 2017 .bash_profile
-rw-r--r-- 1 root root 176 Oct 18 2017 .bashrc
-rw-r--r-- 1 root root 100 Oct 18 2017 .cshrc
drwx----- 2 root root 29 May 12 19:16 .ssh
-rw-r--r-- 1 root root 129 Oct 18 2017 .tcshrc
-rw----- 1 root root 6707 May 12 23:16 .viminfo
[root@Ansible_Server ~]# cd .ssh
[root@Ansible_Server .ssh]# ssh-copy-id 172.31.31.176

/usr/bin/ssh-copy-id: ERROR: failed to open ID file '/root/.pub': No such file or directory
(to install the contents of '/root/.pub' anyway, look at the -f option)
[root@Ansible_Server .ssh]# cd ..
[root@Ansible_Server ~]# ssh-copy-id 172.31.31.176

/usr/bin/ssh-copy-id: ERROR: failed to open ID file '/root/.pub': No such file or directory
(to install the contents of '/root/.pub' anyway, look at the -f option)
[root@Ansible_Server ~]# sudo su -ansadmin
su: 'invalid option -- 'a'
Try 'su --help' for more information.
[root@Ansible_Server ~]# sudo su - ansadmin
Last login: Thu May 12 23:14:30 UTC 2022 from 152.57.194.21 on pts/1
[ansadmin@Ansible_Server ~]$ ssh-copy-id 172.31.31.176
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/ansadmin/.ssh/id_rsa.pub"
The authenticity of host '172.31.31.176 (172.31.31.176)' can't be established.
ECDSA key fingerprint is SHA256:gflrc1pha6tJlqGxBdpGk0pLgS9Xk24wJVpF3IghX3s.
ECDSA key fingerprint is MD5:cc:2b:7d:e0:d1:b2:db:35:07:38:03:1f:47:68:8f:b4.
Are you sure you want to continue connecting (yes/no)? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install the new keys
ansadmin@172.31.31.176's password:

Number of key(s) added: 1

Now try logging into the machine, with: "ssh '172.31.31.176'"
and check to make sure that only the key(s) you wanted were added.
[ansadmin@Ansible_Server ~]$
```

```
• MobaXterm Personal Edition v22.0 •
  (SSH client, X server and network tools)

> SSH session to ec2-user@3.88.171.89
  • Direct SSH      : ✓
  • SSH compression : ✓
  • SSH-browser     : ✓
  • X11-forwarding  : ✗ (disabled or not supported by server)

> For more info, ctrl+click on help or visit our website.

Last login: Thu May 12 22:57:57 2022 from 152.57.194.21

  _ | ( _ | / )
  _ | \ | / | _
  _ | \ | / | _

Amazon Linux 2 AMI

https://aws.amazon.com/amazon-linux-2/
4 package(s) needed for security, out of 4 available
Run "sudo yum update" to apply all updates.
[ec2-user@dockehost ~]$ sudo - ansadmin
sudo: -: command not found
[ec2-user@dockehost ~]$ sudo su -ansadmin
su: 'invalid option -- 'a'
Try 'su --help' for more information.
[ec2-user@dockehost ~]$ sudo su - ansadmin
[ansadmin@dockehost ~]$ ls
[ansadmin@dockehost ~]$ ll
total 0
[ansadmin@dockehost ~]$ ll -la
total 12
drwx----- 3 ansadmin ansadmin 74 May 12 23:21 .
drwxr-xr-x 5 root root 57 May 12 22:58 ..
-rw-r--r-- 1 ansadmin ansadmtn 18 Jul 15 2020 .bash_logout
-rw-r--r-- 1 ansadmin ansadmtn 193 Jul 15 2020 .bash_profile
-rw-r--r-- 1 ansadmin ansadmtn 231 Jul 15 2020 .bashrc
drwx----- 2 ansadmin ansadmtn 29 May 12 23:21 .ssh
[ansadmin@dockehost ~]$ cd .ssh
[ansadmin@dockehost .ssh]$ ll
total 4
-rw----- 1 ansadmin ansadmin 405 May 12 23:21 authorized_keys
[ansadmin@dockehost .ssh]$ date
Thu May 12 23:27:09 UTC 2022
[ansadmin@dockehost .ssh]$
```

Fig. Copying sshkey to docker host.

```
[ansadmin@Ansible_Server ~]$ cat .ssh/id_rsa.pub
```

```
ssh-rsa
```

```
AAAAB3NzaC1yc2EAAAADAQABAAQCTCHrU93Nngsu3VtGfMvQktl1pktg  
GWyd9z8iyiak0Dizs8AiIPGEEwoP4ihhsx8l9loSU5i1D9/rGG2KtpQh95SXUzgfvu  
tnA/UEuEiPV1oTYpeteltG868/qsCLUME8b9nJU57g782QvnNBS4OBmNUHTQ6  
egxxpwtOzl/O1Oq8eNe84QODGyuOk7EJqjLxOh17B/BeRG07sKLvA/n183pep6  
dM+5OwdTe+c1wuoJ2V9mdD/fblfKkC789LofxNuZPuvOF5sn9KeuJ65pOuUn6t  
/L6Ev2vUw2YXe8FCQrBgY6Ab02Rlc2VufjfJ+nUXwaGoV67p/2VGcyQwXdvdcb  
ansadmin@Ansible_Server
```

```
[ansadmin@Ansible_Server ~]$
```

```
[ansadmin@dockerhost .ssh]$ cat authorized_keys
```

```
ssh-rsa
```

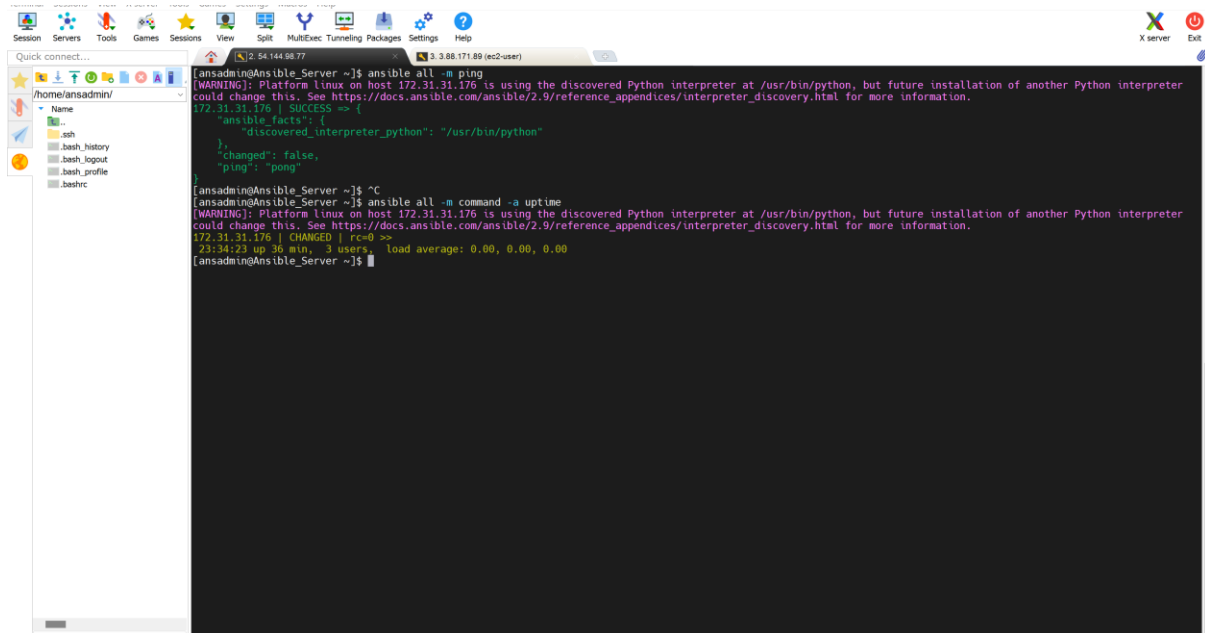
```
AAAAB3NzaC1yc2EAAAADAQABAAQCTCHrU93Nngsu3VtGfMvQktl1pktg  
GWyd9z8iyiak0Dizs8AiIPGEEwoP4ihhsx8l9loSU5i1D9/rGG2KtpQh95SXUzgfvu  
tnA/UEuEiPV1oTYpeteltG868/qsCLUME8b9nJU57g782QvnNBS4OBmNUHTQ6  
egxxpwtOzl/O1Oq8eNe84QODGyuOk7EJqjLxOh17B/BeRG07sKLvA/n183pep6  
dM+5OwdTe+c1wuoJ2V9mdD/fblfKkC789LofxNuZPuvOF5sn9KeuJ65pOuUn6t  
/L6Ev2vUw2YXe8FCQrBgY6Ab02Rlc2VufjfJ+nUXwaGoV67p/2VGcyQwXdvdcb  
ansadmin@Ansible_Server
```

```
[ansadmin@dockerhost .ssh]$
```

Test the Connection

```
[ansadmin@Ansible_Server ~]$ ansible all -m ping
```

```
[ansadmin@Ansible_Server ~]$ ansible all -m command -a uptime
```

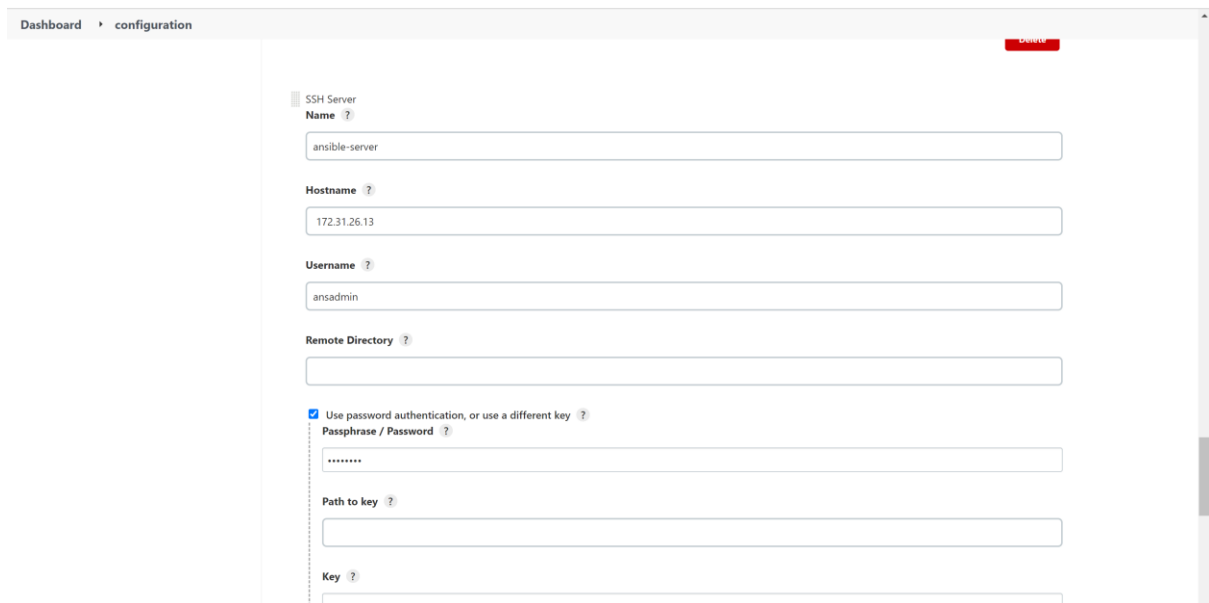


```
[ansadmin@Ansible_Server ~]$ ansible all -m ping
[WARNING]: Platform linux on host 172.31.31.176 is using the discovered Python interpreter at /usr/bin/python, but future installation of another Python interpreter could change this. See https://docs.ansible.com/ansible/2.9/reference_appendices/interpreter_discovery.html for more information.
172.31.31.176 | SUCCESS => {
  "ansible_facts": {
    "discovered_interpreter_python": "/usr/bin/python"
  },
  "changed": false,
  "ping": "pong"
}
[ansadmin@Ansible_Server ~]$ ^C
[ansadmin@Ansible_Server ~]$ ansible all -m command -a uptime
[WARNING]: Platform linux on host 172.31.31.176 is using the discovered Python interpreter at /usr/bin/python, but future installation of another Python interpreter could change this. See https://docs.ansible.com/ansible/2.9/reference_appendices/interpreter_discovery.html for more information.
172.31.31.176 | CHANGED | rc=0 =>
  23:34:23 up 36 min, 3 users, load average: 0.00, 0.00, 0.00
[ansadmin@Ansible_Server ~]$
```

```
[ansadmin@dockerhost .ssh]$ ^C
[ansadmin@dockerhost .ssh]$ uptime
23:36:35 up 39 min, 2 users, load average: 0.00, 0.00, 0.00
[ansadmin@dockerhost .ssh]$
```

Fig. Connection Success

Integrate Ansible with Jenkins:



Dashboard » configuration

SSH Server

Name ?
ansible-server

Hostname ?
172.31.26.13

Username ?
ansadmin

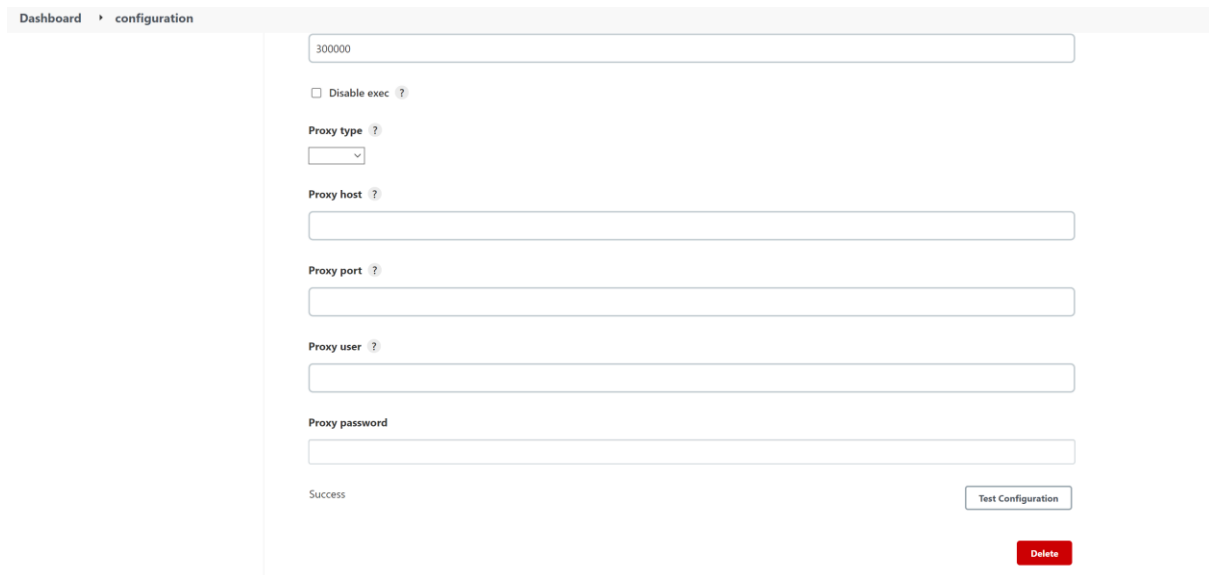
Remote Directory ?

Use password authentication, or use a different key ?
Passphrase / Password ?

Path to key ?

Key ?

Fig. Configuring Ansible with Jenkins



Dashboard » configuration

300000

Disable exec ?

Proxy type ?
▼

Proxy host ?

Proxy port ?

Proxy user ?

Proxy password

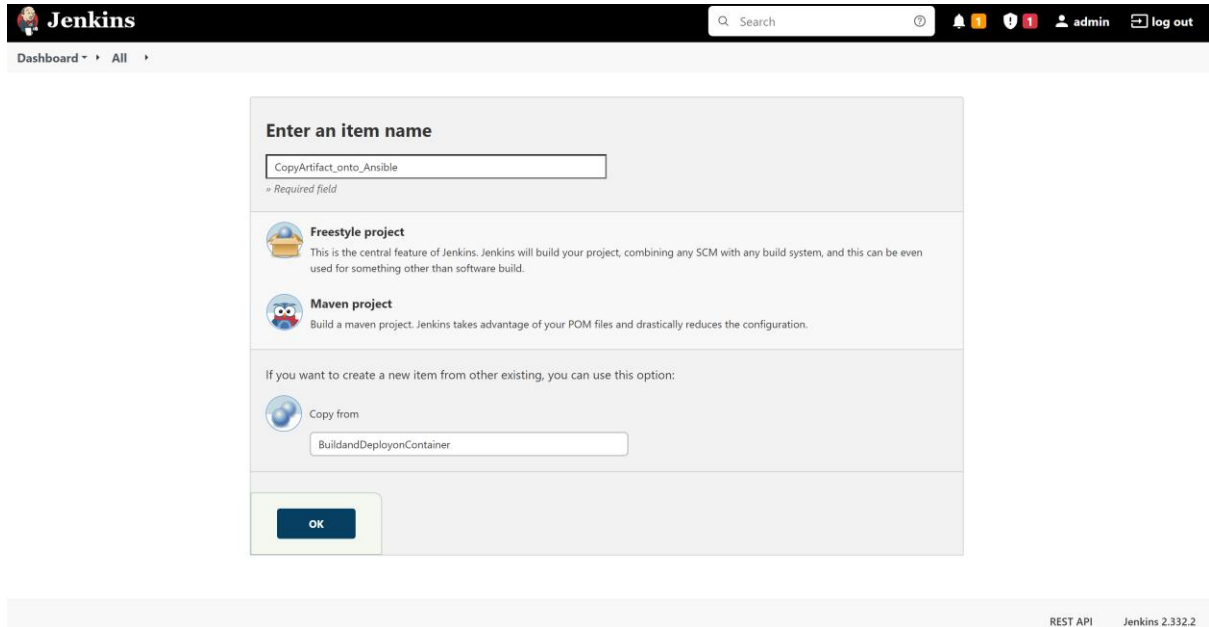
Success

Test Configuration

Delete

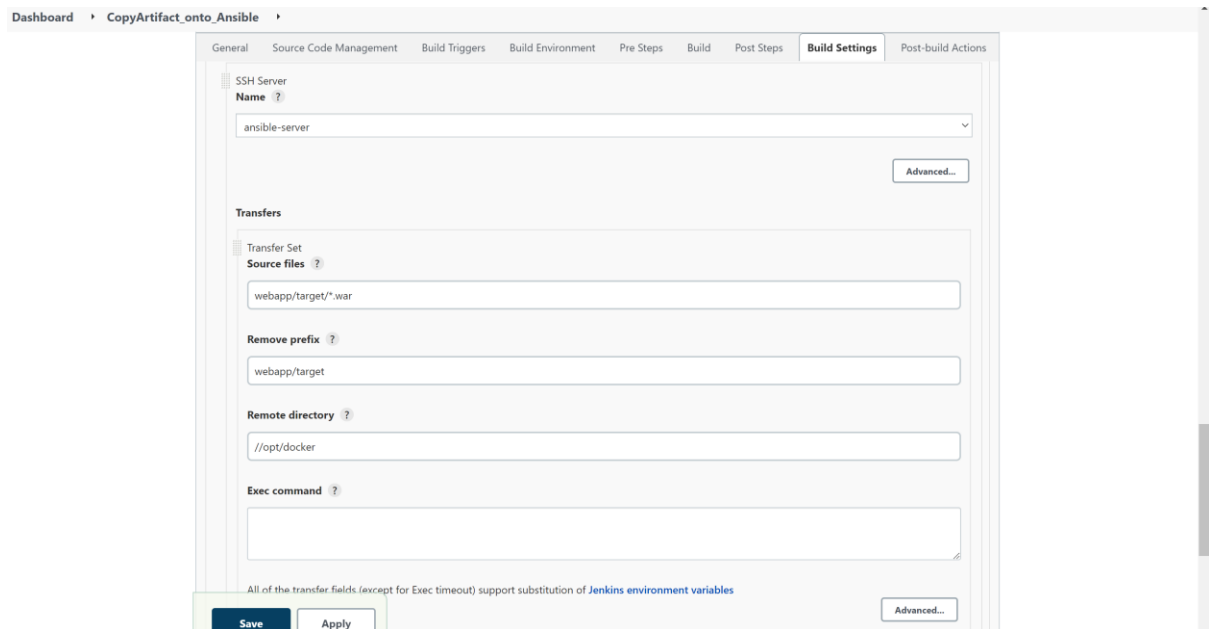
Fig. Testing Success and save it.

Creating Item:



The screenshot shows the Jenkins 'Enter an item name' dialog box. At the top, there is a search bar and user information (admin, log out). Below the search bar, the breadcrumb 'Dashboard > All >' is visible. The main content area is titled 'Enter an item name' and contains a text input field with the value 'CopyArtifact_onto_Ansible'. Below the input field, there is a note: '» Required field'. Underneath, there are two project type options: 'Freestyle project' and 'Maven project'. The 'Freestyle project' option is selected and has a description: 'This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.' The 'Maven project' option has a description: 'Build a maven project. Jenkins takes advantage of your POM files and drastically reduces the configuration.' Below these options, there is a section titled 'If you want to create a new item from other existing, you can use this option:' with a 'Copy from' option and a text input field containing 'BuildandDeployonContainer'. At the bottom left, there is an 'OK' button. At the bottom right, there is a footer with 'REST API' and 'Jenkins 2.332.2'.

Fig. CopyArtifact_onto_Ansible



The screenshot shows the Jenkins 'Build Settings' configuration page for an SSH Server. The breadcrumb is 'Dashboard > CopyArtifact_onto_Ansible >'. The page has several tabs: 'General', 'Source Code Management', 'Build Triggers', 'Build Environment', 'Pre Steps', 'Build', 'Post Steps', 'Build Settings' (selected), and 'Post-build Actions'. The 'SSH Server' section has a 'Name' field with the value 'ansible-server' and an 'Advanced...' button. Below this is the 'Transfers' section, which includes a 'Transfer Set' with the following fields: 'Source files' (webapp/target/*.war), 'Remove prefix' (webapp/target), and 'Remote directory' (/opt/docker). There is an empty 'Exec command' field. At the bottom, there is a note: 'All of the transfer fields (except for Exec timeout) support substitution of Jenkins environment variables'. At the bottom left, there are 'Save' and 'Apply' buttons. At the bottom right, there is an 'Advanced...' button.

Fig. Configuring SSH Server with ansible-server

Creating docker directory on Ansible Server:

```
[root@Ansible_Server ~]# cd /opt
```

```
[root@Ansible_Server opt]# ll
```

```
total 0
```

```
drwxr-xr-x 4 root root 33 Apr 28 19:54 aws
```

```
drwxr-xr-x 2 root root 6 Aug 16 2018 rh
```

```
[root@Ansible_Server opt]# mkdir docker
```

```
[root@Ansible_Server opt]# ll
```

```
total 0
```

```
drwxr-xr-x 4 root root 33 Apr 28 19:54 aws
```

```
drwxr-xr-x 2 root root 6 May 13 09:36 docker
```

```
drwxr-xr-x 2 root root 6 Aug 16 2018 rh
```

```
[root@Ansible_Server opt]# chown ansadmin:ansadmin docker
```

```
[root@Ansible_Server opt]# ll
```

```
total 0
```

```
drwxr-xr-x 4 root root 33 Apr 28 19:54 aws
```

```
drwxr-xr-x 2 ansadmin ansadmin 6 May 13 09:36 docker
```

```
drwxr-xr-x 2 root root 6 Aug 16 2018 rh
```

```
[root@Ansible_Server opt]#
```

Console Output:

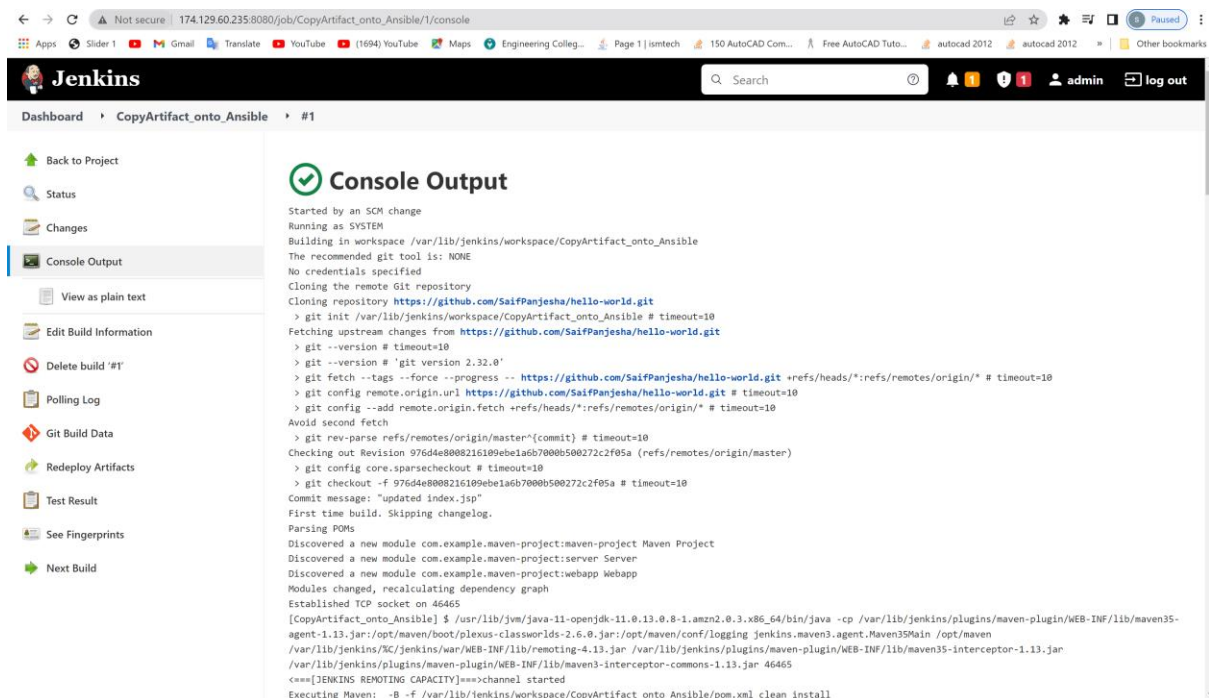


Fig. Success Build on Jenkins

```
[root@Ansible_Server opt]# cd docker
```

```
[root@Ansible_Server docker]# ll
```

```
total 4
```

```
-rw-rw-r-- 1 ansadmin ansadmin 2907 May 13 09:41 webapp.war
```

```
[root@Ansible_Server docker]# date
```

```
Fri May 13 09:42:51 UTC 2022
```

```
[root@Ansible_Server docker]#
```

Build an Image and create Container on Ansible

Step 1: Installing docker

```
[root@Ansible_Server docker] # yum install docker
```

```
[root@Ansible_Server docker]# cat /etc/group
```

```
chorny:x:994:  
stapusr:x:156:  
stapsys:x:157:  
stapdev:x:158:  
screen:x:84:  
tcpdump:x:72:  
ec2-user:x:1000:  
ansadmin:x:1001:  
cgred:x:993:  
docker:x:992:  
[root@Ansible_Server docker]#
```

remote monitoring

w terminal folder

Fig. Docker Successful Installed on Ansible

```
[root@Ansible_Server docker]# usermod -aG docker ansadmin
```

```
[root@Ansible_Server docker]# id ansadmin
```

```
uid=1001(ansadmin) gid=1001(ansadmin)  
groups=1001(ansadmin),992(docker)
```

```
[root@Ansible_Server docker]# service docker start
```

```
Redirecting to /bin/systemctl start docker.service
```

```
[root@Ansible_Server docker]# service docker status
```

```
Redirecting to /bin/systemctl status docker.service
```

- **docker.service - Docker Application Container Engine**

```
Loaded: loaded (/usr/lib/systemd/system/docker.service; disabled; vendor  
preset: disabled)
```

```
Active: active (running) since Fri 2022-05-13 11:51:21 UTC; 25s ago
```

Docs: <https://docs.docker.com>

Process: 3450 ExecStartPre=/usr/libexec/docker/docker-setup-runtimes.sh
(code=exited, status=0/SUCCESS)

Process: 3440 ExecStartPre=/bin/mkdir -p /run/docker (code=exited,
status=0/SUCCESS)

Main PID: 3458 (dockerd)

Tasks: 7

Memory: 27.4M

CGroup: /system.slice/docker.service

└─3458 /usr/bin/dockerd -H fd:// --
containerd=/run/containerd/containerd.sock --default-ulimit
nofile=32768:65536

May 13 11:51:21 Ansible_Server dockerd[3458]: time="2022-05-13T11:51:21.544859745Z" level=info msg="scheme \"unix\" not registered, fallback to default scheme" module=grpc

May 13 11:51:21 Ansible_Server dockerd[3458]: time="2022-05-13T11:51:21.545114355Z" level=info msg="ccResolverWrapper: sending update to cc: {[unix:///run/containerd/containerd.sock]} module=grpc

May 13 11:51:21 Ansible_Server dockerd[3458]: time="2022-05-13T11:51:21.545391892Z" level=info msg="ClientConn switching balancer to \"pick_first\"" module=grpc

May 13 11:51:21 Ansible_Server dockerd[3458]: time="2022-05-13T11:51:21.584329972Z" level=info msg="Loading containers: start."

May 13 11:51:21 Ansible_Server dockerd[3458]: time="2022-05-13T11:51:21.798738326Z" level=info msg="Default bridge (docker0) is assigned with an IP address 172.17.0.1" address="172.17.0.1"

May 13 11:51:21 Ansible_Server dockerd[3458]: time="2022-05-13T11:51:21.858803093Z" level=info msg="Loading containers: done."

May 13 11:51:21 Ansible_Server dockerd[3458]: time="2022-05-13T11:51:21.872257256Z" level=info msg="Docker daemon" commit=906f57f graphdriver(s)=overlay2 ...=20.10.13

May 13 11:51:21 Ansible_Server dockerd[3458]: time="2022-05-13T11:51:21.872693304Z" level=info msg="Daemon has completed initialization"

May 13 11:51:21 Ansible_Server systemd[1]: Started Docker Application Container Engine.

May 13 11:51:21 Ansible_Server dockerd[3458]: time="2022-05-13T11:51:21.898522550Z" level=info msg="API listen on /run/docker.sock"

Hint: Some lines were ellipsized, use -l to show in full.

[root@Ansible_Server docker]# ^C

Creating Docker File:

[ansadmin@Ansible_Server docker]\$ vi Dockerfile

```
FROM tomcat:latest
```

```
RUN cp -R /usr/local/tomcat/webpp.dist/* /usr/local/tomcatwebapps
```

```
COPY ./*.war /usr/local/tomcatwebapps
```

Build The File:

```
docker build -t regapp:v1 .
```

Docker Images

[ansadmin@Ansible_Server docker]\$ docker images

| REPOSITORY | TAG | IMAGE ID | CREATED | SIZE |
|------------|--------|--------------|--------------------|-------|
| regapp | v1 | 15574dfecf93 | About a minute ago | 510MB |
| tomcat | latest | 6a1271dfce51 | 36 hours ago | 680MB |
| centos | latest | 5d0da3dc9764 | 7 months ago | 231MB |

Create a Container out of it :

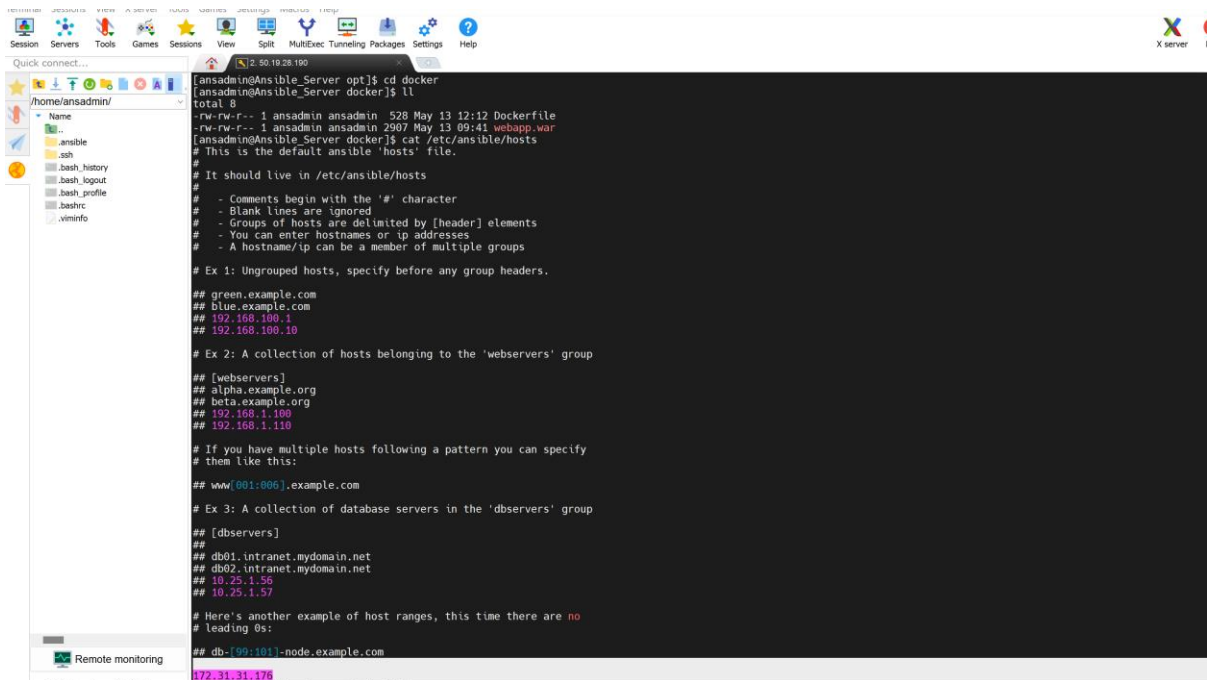
[ansadmin@Ansible_Server docker]\$ docker build -t regapp:v1 .

Output Console:

The screenshot shows the Apache Tomcat 9.0.62 web interface. At the top, there is a navigation bar with links for Home, Documentation, Configuration, Examples, Wiki, and Mailing Lists, along with a Find Help button. Below the navigation bar, a green banner displays the message: "If you're seeing this, you've successfully installed Tomcat. Congratulations!". To the left of this banner is the Tomcat logo (a stylized orange and black cat). To the right, under "Recommended Reading:", there are links for "Security Considerations How-To", "Manager Application How-To", and "Clustering/Session Replication How-To". Further right are buttons for "Server Status", "Manager App", and "Host Manager". Below the banner is a "Developer Quick Start" section with links for "Tomcat Setup", "Realms & AAA", "Examples", and "Servlet Specifications". The main content area is divided into three columns: "Managing Tomcat" (with links for "Release Notes", "Changelog", "Migration Guide", and "Security Notices"), "Documentation" (with links for "Tomcat 9.0 Documentation", "Tomcat 9.0 Configuration", and "Tomcat Wiki"), and "Getting Help" (with links for "FAQ and Mailing Lists", "tomcat-announce", "tomcat-users", "taglibs-user", and "tomcat-dev"). At the bottom, there is a footer with links for "Other Downloads", "Other Documentation", "Get Involved", "Miscellaneous", and "Apache Software".

Fig.Tomcat Started

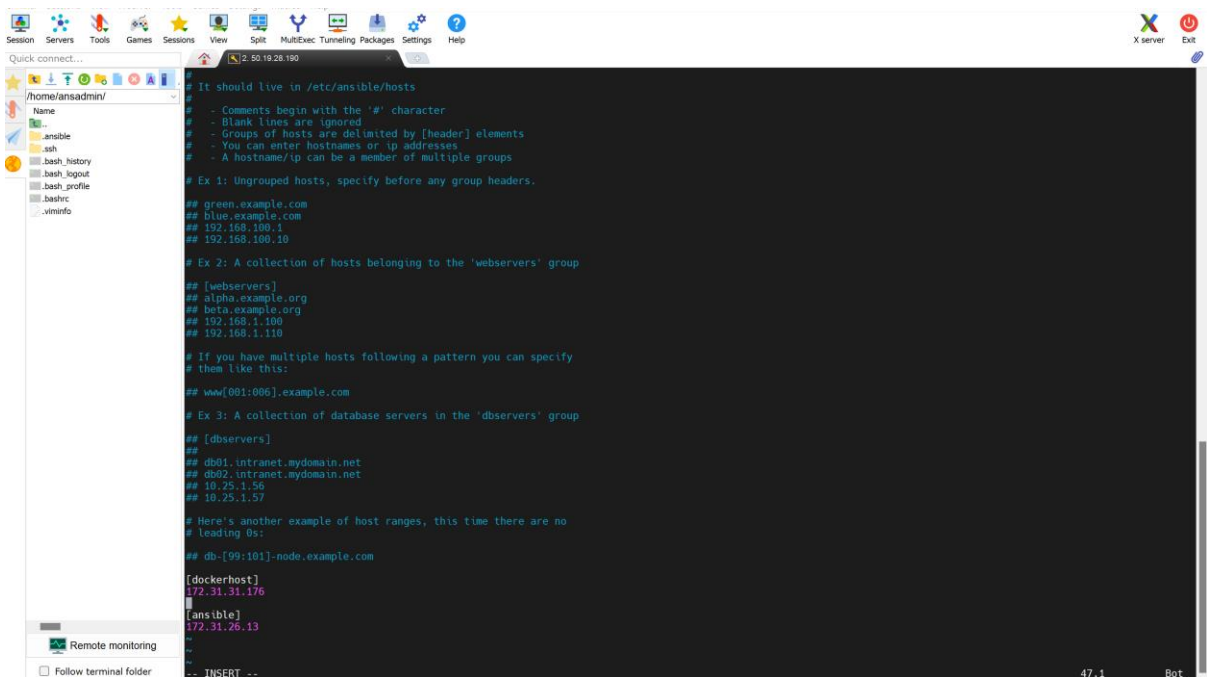
Ansible Playbook to create image and container



```
[ansadmin@Ansible_Server opt]$ cd docker
[ansadmin@Ansible_Server docker]$ ll
total 8
-rw-rw-r-- 1 ansadmin ansadmin 528 May 13 12:12 Dockerfile
-rw-rw-r-- 1 ansadmin ansadmin 2907 May 13 09:41 webapp.war
[ansadmin@Ansible_Server docker]$ cat /etc/ansible/hosts
# This is the default ansible 'hosts' file.
#
# It should live in /etc/ansible/hosts
#
# - Comments begin with the '#' character
# - Blank lines are ignored
# - Groups of hosts are delimited by [header] elements
# - You can enter hostnames or ip addresses
# - A hostname/ip can be a member of multiple groups
#
# Ex 1: Ungrouped hosts, specify before any group headers.
## green.example.com
## blue.example.com
## 192.168.100.1
## 192.168.100.10
#
# Ex 2: A collection of hosts belonging to the 'webservers' group
## [webservers]
## alpha.example.org
## beta.example.org
## 192.168.1.100
## 192.168.1.110
#
# If you have multiple hosts following a pattern you can specify
# them like this:
## www[001:006].example.com
#
# Ex 3: A collection of database servers in the 'dbservers' group
## [dbservers]
## db01.intranet.mydomain.net
## db02.intranet.mydomain.net
## 10.25.1.56
## 10.25.1.57
#
# Here's another example of host ranges, this time there are no
# leading 0s:
## db-[99:101]-node.example.com
172.31.31.176
```

Fig.Default ansible-playbook hosts

[ansadmin@Ansible_Server docker]\$ sudo vi /etc/ansible/hosts



```
# It should live in /etc/ansible/hosts
#
# - Comments begin with the '#' character
# - Blank lines are ignored
# - Groups of hosts are delimited by [header] elements
# - You can enter hostnames or ip addresses
# - A hostname/ip can be a member of multiple groups
#
# Ex 1: Ungrouped hosts, specify before any group headers.
## green.example.com
## blue.example.com
## 192.168.100.1
## 192.168.100.10
#
# Ex 2: A collection of hosts belonging to the 'webservers' group
## [webservers]
## alpha.example.org
## beta.example.org
## 192.168.1.100
## 192.168.1.110
#
# If you have multiple hosts following a pattern you can specify
# them like this:
## www[001:006].example.com
#
# Ex 3: A collection of database servers in the 'dbservers' group
## [dbservers]
## db01.intranet.mydomain.net
## db02.intranet.mydomain.net
## 10.25.1.56
## 10.25.1.57
#
# Here's another example of host ranges, this time there are no
# leading 0s:
## db-[99:101]-node.example.com
[dockerhost]
172.31.31.176
[ansible]
172.31.26.13
-- INSERT --
```

Fig. Adding address for host

```
[ansadmin@Ansible_Server docker]$ sudo vi /etc/ansible/hosts
```

```
[ansadmin@Ansible_Server docker]$ ansible all -a uptime
```

```
[WARNING]: Platform linux on host 172.31.31.176 is using the discovered  
Python interpreter at /usr/bin/python, but future installation of another  
Python interpreter
```

```
could change this. See
```

```
https://docs.ansible.com/ansible/2.9/reference\_appendices/interpreter\_discovery.html for more information.
```

```
172.31.31.176 | CHANGED | rc=0 >>
```

```
16:35:26 up 3 min, 2 users, load average: 0.01, 0.01, 0.00
```

```
[WARNING]: Platform linux on host 172.31.26.13 is using the discovered  
Python interpreter at /usr/bin/python, but future installation of another  
Python interpreter
```

```
could change this. See
```

```
https://docs.ansible.com/ansible/2.9/reference\_appendices/interpreter\_discovery.html for more information.
```

```
172.31.26.13 | CHANGED | rc=0 >>
```

```
16:35:26 up 32 min, 2 users, load average: 0.08, 0.02, 0.01
```

```
[ansadmin@Ansible_Server docker]$
```

Creating playbook:

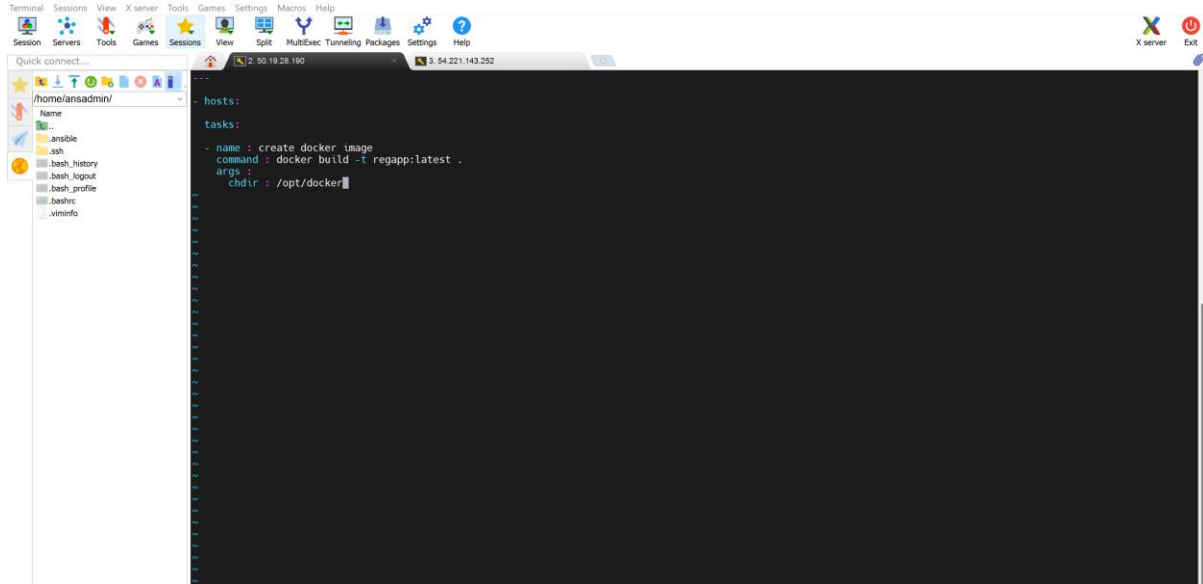


Fig. regapp.yml is created for ansible playbook

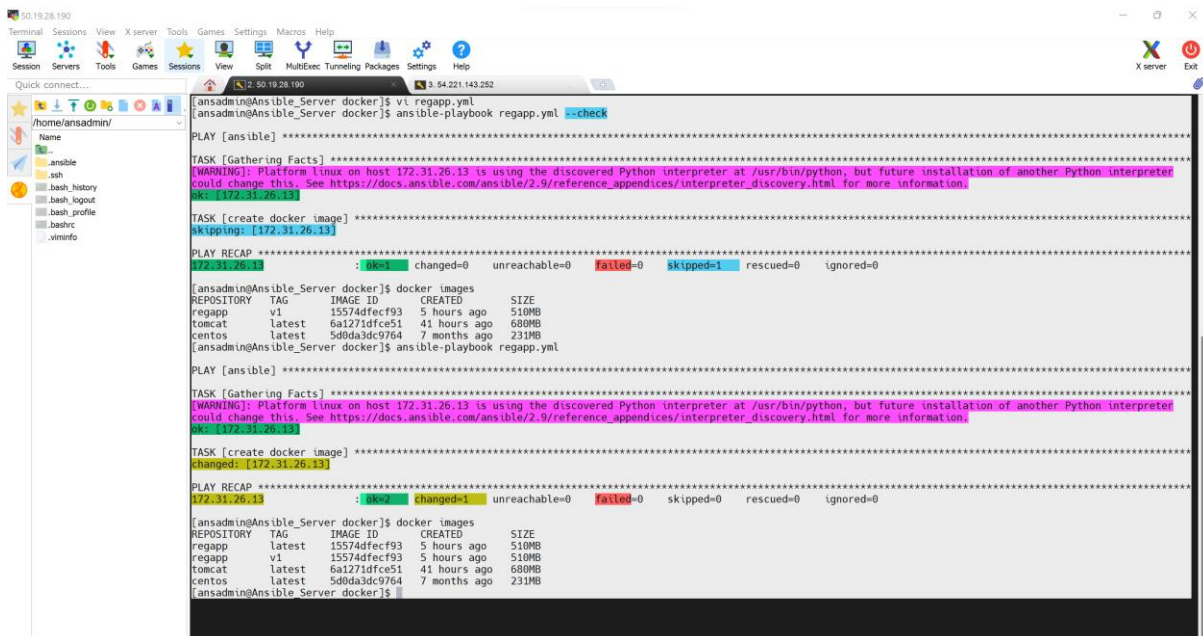


Fig. Successful docker Image is Created

Copying Images on dockerhub:

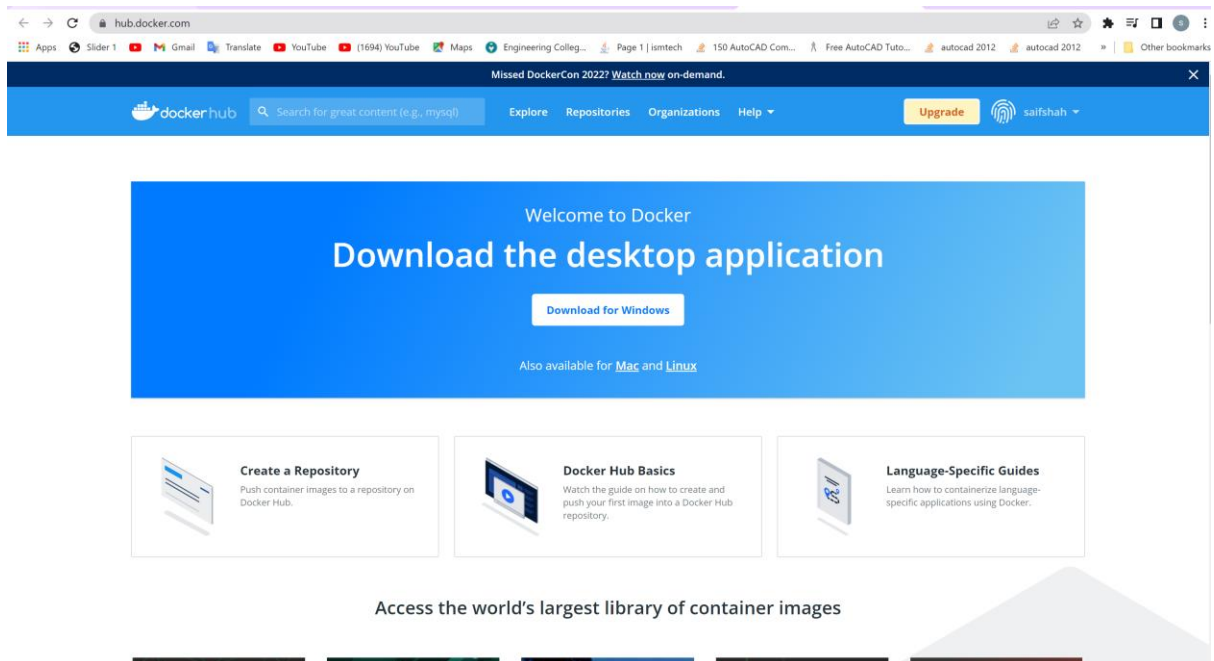


Fig .Dockerhub account

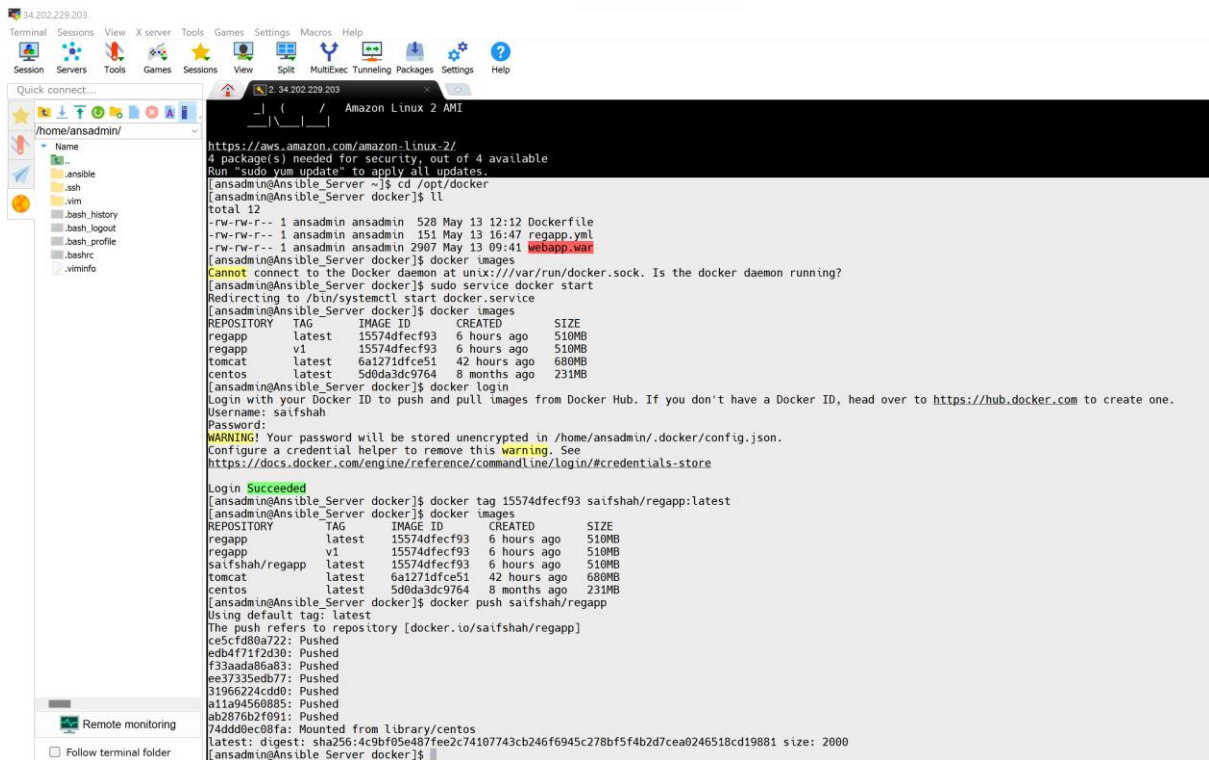


Fig. Added Images to Docker Hub

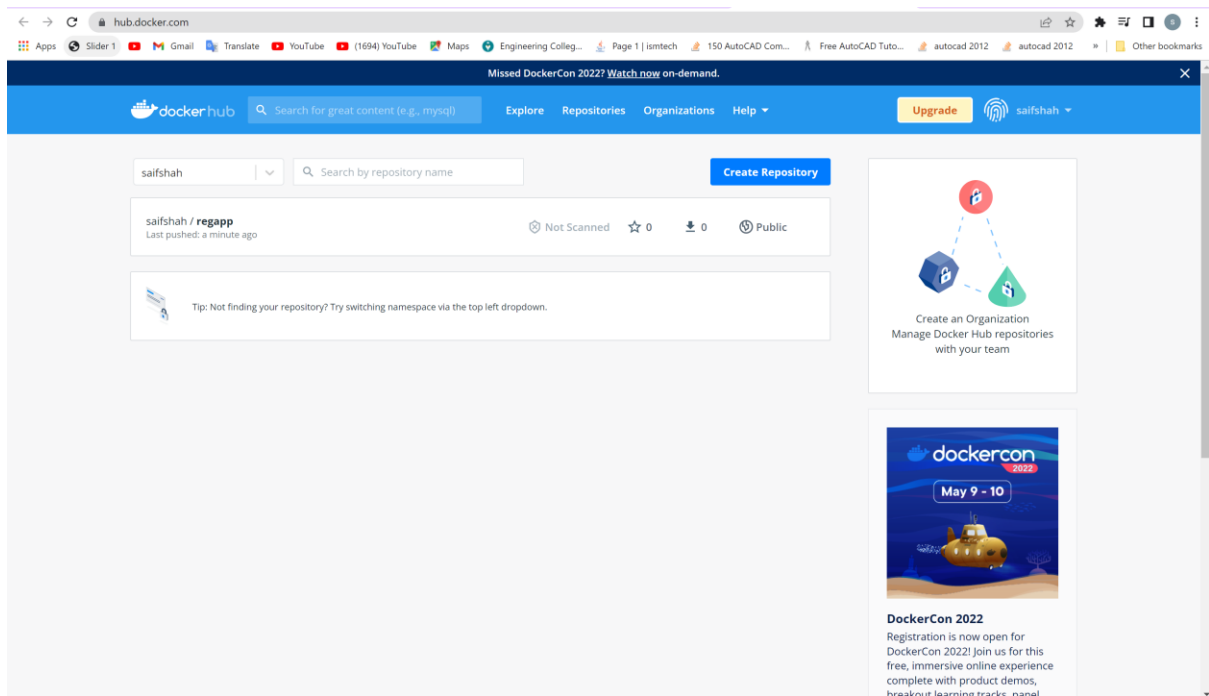


Fig. Successful Copying Images on Docker Hub

Jenkins Job to build an image on ansible:

[ansadmin@Ansible_Server docker]\$ vi regapp.yml

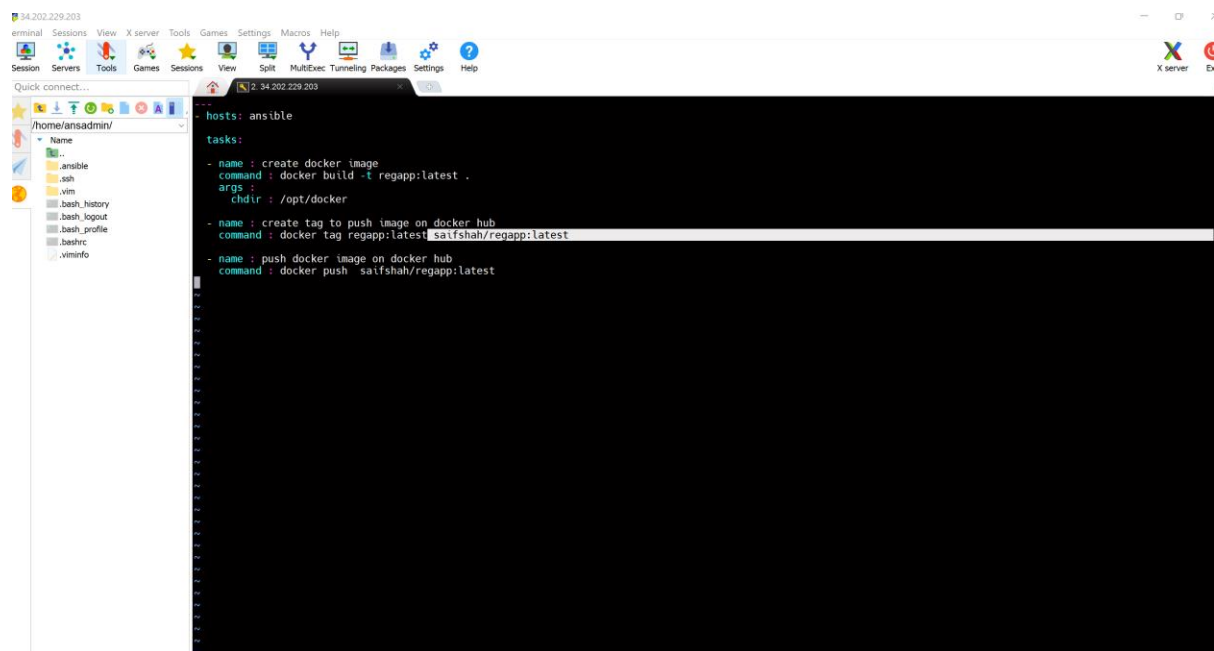


Fig. Created Ansible playbook

[ansadmin@Ansible_Server docker]\$ vi regapp.yml

[ansadmin@Ansible_Server docker]\$ ^C

[ansadmin@Ansible_Server docker]\$ ansible-playbook regapp.yml --check

PLAY [ansible]

```
*****
*****
*****
```

TASK [Gathering Facts]

```
*****
*****
*****
```

[WARNING]: Platform linux on host 172.31.26.13 is using the discovered Python interpreter at /usr/bin/python, but future installation of another Python interpreter

could change this. See

https://docs.ansible.com/ansible/2.9/reference_appendices/interpreter_discovery.html for more information.

ok: [172.31.26.13]

TASK [create docker image]

```
*****
*****
*****
```

skipping: [172.31.26.13]

TASK [create tag to push image on docker hub]

```
*****
*****
```

skipping: [172.31.26.13]

TASK [push docker image on docker hub]

skipping: [172.31.26.13]

PLAY RECAP

172.31.26.13 : ok=1 changed=0 unreachable=0 failed=0
skipped=3 rescued=0 ignored=0

[ansadmin@Ansible_Server docker]\$

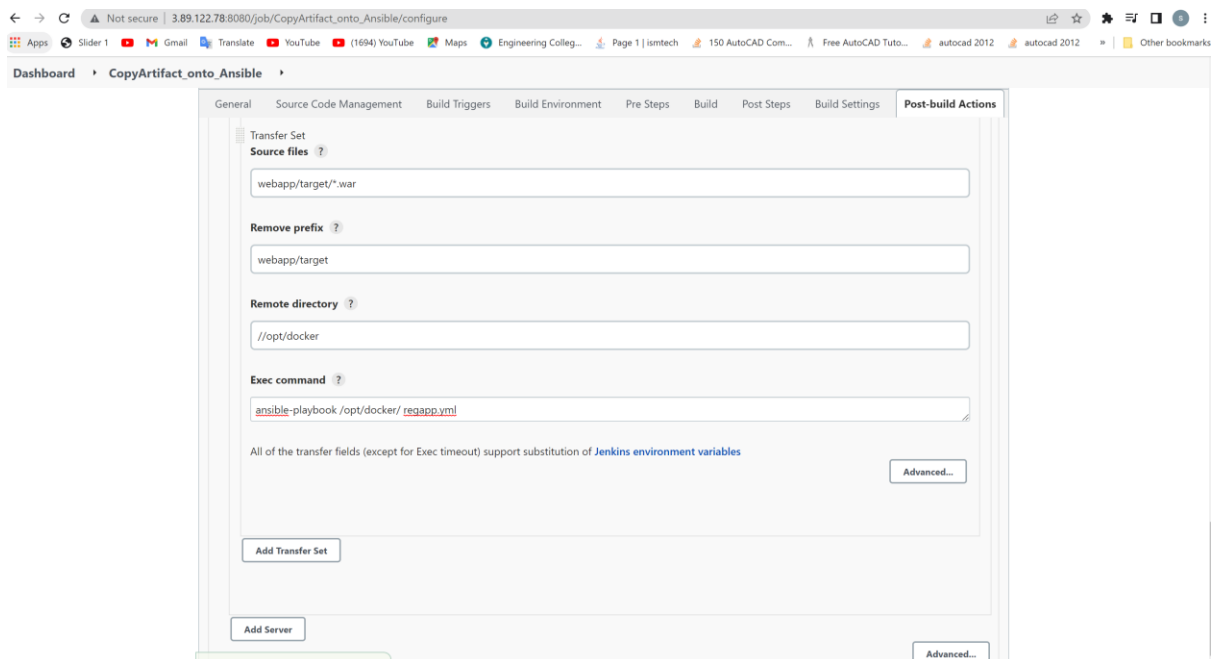


Fig. Configuring Artifact onto Ansible

ansible-playbook /opt/docker/regapp.yml

```
MINGW64/c/Users/saiff/hello-world/webapp/src/main/webapp
form action="action_page.php">
<div class="container">
  <h1> New User Register for DevOps Learning</h1>
  <p>Please fill in this form to create an account.</p>
  <hr>
  <label for="Name"><b>Enter Full Name</b></label>
  <input type="text" placeholder="Enter Full Name" name="Name" id="Name" required>
  <br>
  <label for="mobile"><b>Enter mobile</b></label>
  <input type="text" placeholder="Enter moible number" name="mobile" id="mobile" required>
  <br>
  <label for="email"><b>Enter Email Address</b></label>
  <input type="text" placeholder="Enter Email Address" name="email" id="email" required>
  <br>
  <label for="psw"><b>Password</b></label>
  <input type="password" placeholder="Enter Password" name="psw" id="psw" required>
  <br>
  <label for="psw-repeat"><b>Repeat Password</b></label>
  <input type="password" placeholder="Repeat Password" name="psw-repeat" id="psw-repeat" required>
  <hr>
  <br>
  <p>By creating an account you agree to our <a href="#">Terms and Privacy</a>.</p>
  <button type="submit" class="registerbtn">Register</button>
</div>
<div class="container signin">
  <p>Already have an account? <a href="#">Sign in</a>.</p>
</div>
  <h1> Thankyou, Happy Learning </h1>
  <h1>Build Amazing Carrer With Devops <h1>
  <b> I appreciate</b>
</form>
```

Fig. Editing index.jsp file

[ansadmin@Ansible_Server docker]\$ ll

total 12

- rw-rw-r-- 1 ansadmin ansadmin 528 May 13 12:12 Dockerfile
- rw-rw-r-- 1 ansadmin ansadmin 357 May 13 18:21 regapp.yml
- rw-rw-r-- 1 ansadmin ansadmin 2913 May 13 18:59 webapp.war

[ansadmin@Ansible_Server docker]\$ date

Fri May 13 19:00:02 UTC 2022

[ansadmin@Ansible_Server docker]\$ docker images

| REPOSITORY | TAG | IMAGE ID | CREATED | SIZE |
|------------|--------|--------------|-------------|-------|
| regapp | latest | 15574dfecf93 | 7 hours ago | 510MB |

regapp v1 15574dfecf93 7 hours ago 510MB

saifshah/regapp latest 15574dfecf93 7 hours ago 510MB

tomcat latest 6a1271dfce51 43 hours ago 680MB

centos latest 5d0da3dc9764 8 months ago 231MB

[ansadmin@Ansible_Server docker]\$

```
Dashboard > CopyArtifact_onto_Ansible > #9
[INFO] Assembling webapp [webapp] in [/var/lib/jenkins/workspace/CopyArtifact_onto_Ansible/webapp/target/webapp]
[INFO] Processing war project
[INFO] Copying webapp resources [/var/lib/jenkins/workspace/CopyArtifact_onto_Ansible/webapp/src/main/webapp]
[INFO] Webapp assembled in [100 msecs]
[INFO] Building war: /var/lib/jenkins/workspace/CopyArtifact_onto_Ansible/webapp/target/webapp.war
[INFO] WEB-INF/web.xml already added, skipping
[INFO]
[INFO] --- maven-install-plugin:2.4:install (default-install) @ webapp ---
[INFO] Installing /var/lib/jenkins/workspace/CopyArtifact_onto_Ansible/webapp/target/webapp.war to /var/lib/jenkins/.m2/repository/com/example/maven-project/webapp/1.0-SNAPSHOT/webapp-1.0-SNAPSHOT.war
[INFO] Installing /var/lib/jenkins/workspace/CopyArtifact_onto_Ansible/webapp/pom.xml to /var/lib/jenkins/.m2/repository/com/example/maven-project/webapp/1.0-SNAPSHOT/webapp-1.0-SNAPSHOT.pom
[INFO] -----
[INFO] Reactor Summary for Maven Project 1.0-SNAPSHOT:
[INFO]
[INFO] Maven Project ..... SUCCESS [ 1.702 s]
[INFO] Server ..... SUCCESS [ 9.680 s]
[INFO] Webapp ..... SUCCESS [ 2.588 s]
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 16.557 s
[INFO] Finished at: 2022-05-13T18:59:34Z
[INFO] -----
[JENKINS] Archiving /var/lib/jenkins/workspace/CopyArtifact_onto_Ansible/webapp/pom.xml to com.example.maven-project/webapp/1.0-SNAPSHOT/webapp-1.0-SNAPSHOT.pom
[JENKINS] Archiving /var/lib/jenkins/workspace/CopyArtifact_onto_Ansible/webapp/target/webapp.war to com.example.maven-project/webapp/1.0-SNAPSHOT/webapp-1.0-SNAPSHOT.war
[JENKINS] Archiving /var/lib/jenkins/workspace/CopyArtifact_onto_Ansible/server/pom.xml to com.example.maven-project/server/1.0-SNAPSHOT/server-1.0-SNAPSHOT.pom
[JENKINS] Archiving /var/lib/jenkins/workspace/CopyArtifact_onto_Ansible/server/target/server.jar to com.example.maven-project/server/1.0-SNAPSHOT/server-1.0-SNAPSHOT.jar
[JENKINS] Archiving /var/lib/jenkins/workspace/CopyArtifact_onto_Ansible/pom.xml to com.example.maven-project/maven-project/1.0-SNAPSHOT/maven-project-1.0-SNAPSHOT.pom
channel stopped
SSH: Connecting from host [Jenkins_Server]
SSH: Connecting with configuration [ansible-server] ...
SSH: EXEC: completed after 4,822 ms
SSH: Disconnecting configuration [ansible-server] ...
SSH: Transferred 1 file(s)
Finished: SUCCESS
```

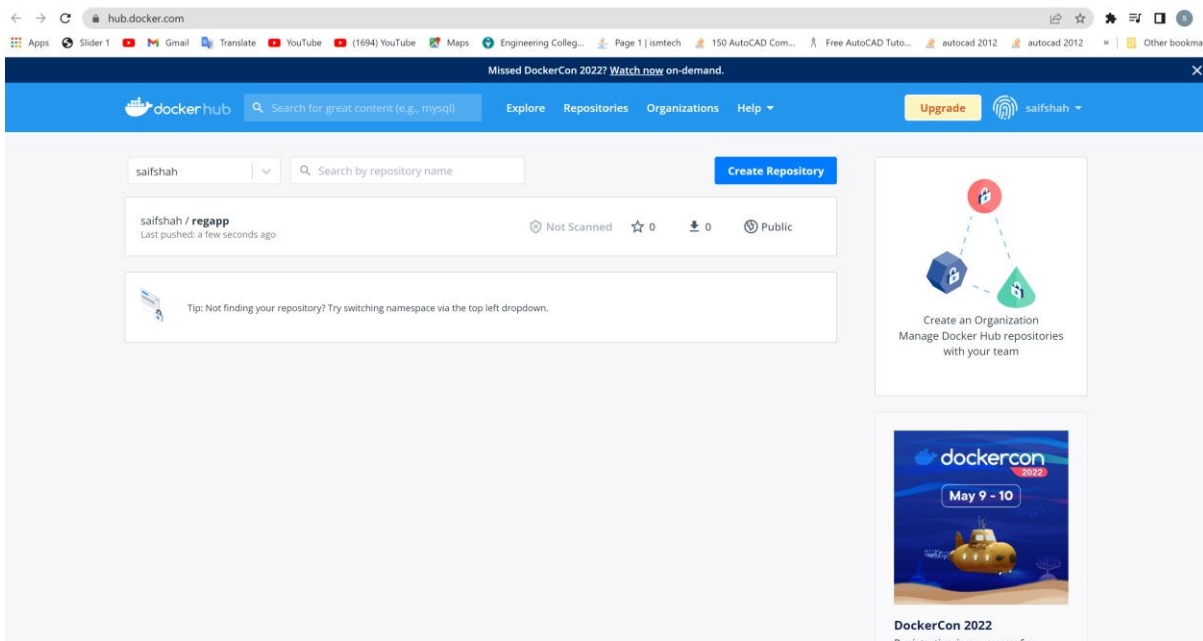


Fig. Success Build an image on ansible

How to create container on dockerhost using ansible playbook -Devops Project:

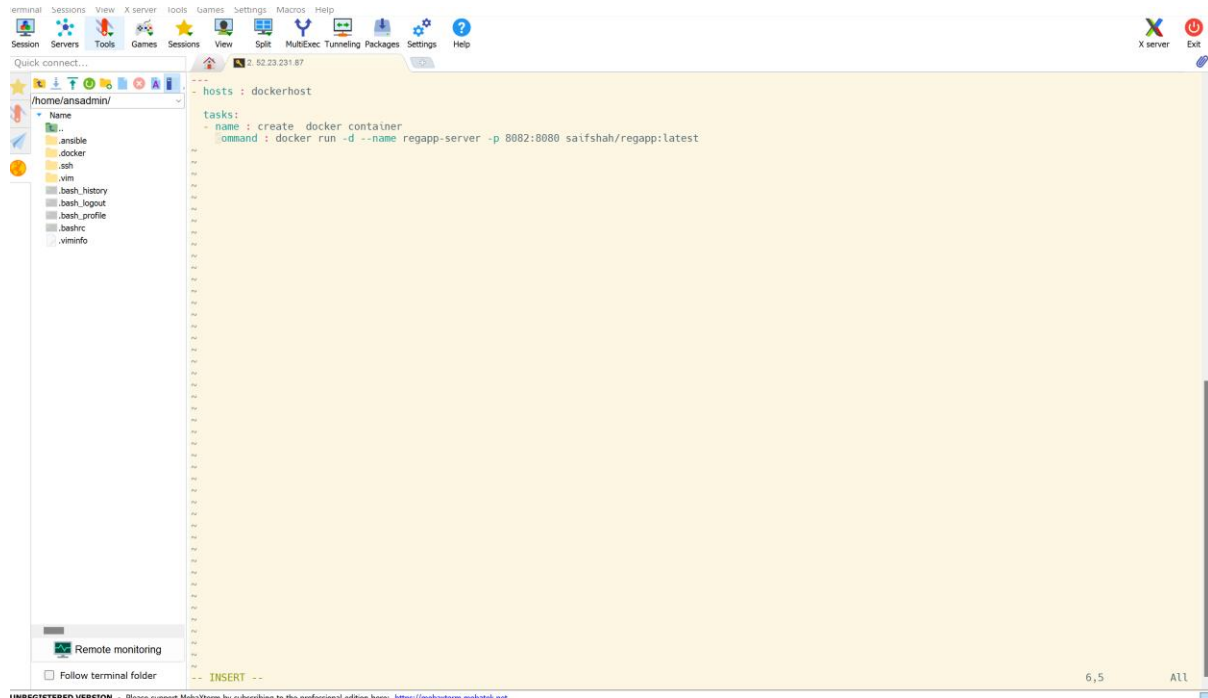


Fig. Create new dockerhosts playbook for ansible

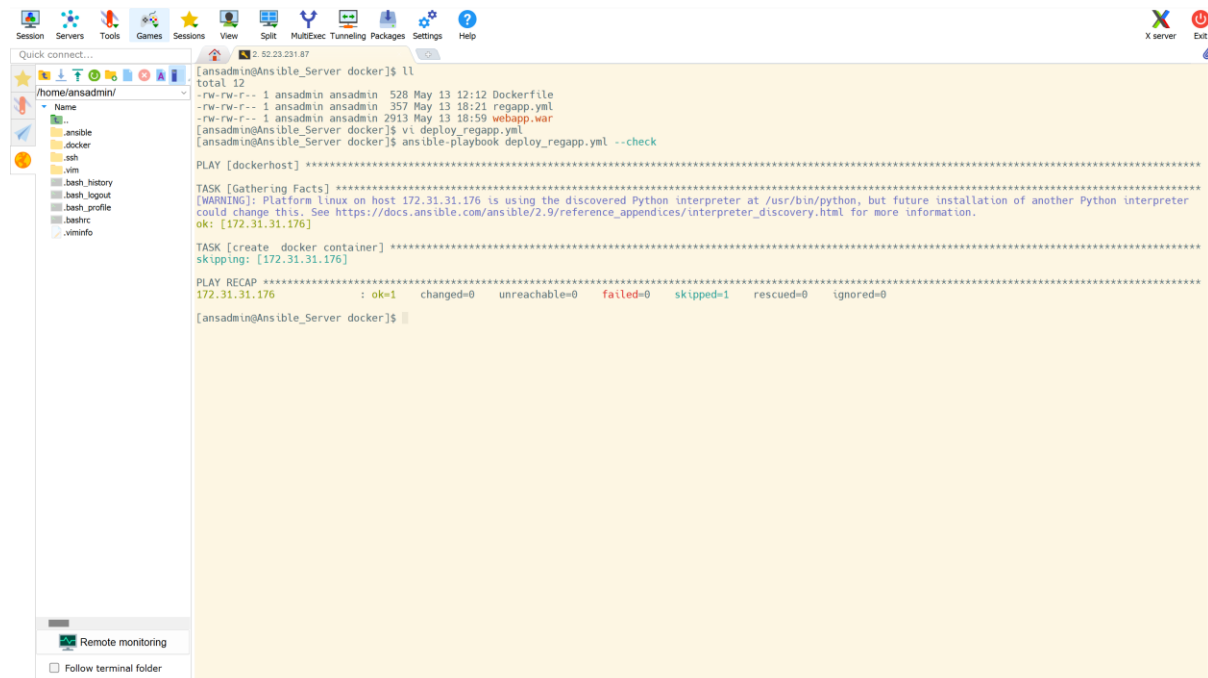


Fig. Successful Check

```
-rw-rw-r-- 1 ansadmin ansadmin 2913 May 13 18:59 webapp.war
[ansadmin@Ansible_Server docker]$ ansible-playbook deploy_regapp.yml --check

PLAY [dockerhost] *****

TASK [Gathering Facts] *****
[WARNING]: Platform linux on host 172.31.31.176 is using the discovered Python interpreter at /usr/bin/python, but future installation of another Python interp
could change this. See https://docs.ansible.com/ansible/2.9/reference_appendices/interpreter_discovery.html for more information.
ok: [172.31.31.176]

TASK [create docker container] *****
skipping: [172.31.31.176]

PLAY RECAP *****
172.31.31.176 : ok=1 changed=0 unreachable=0 failed=0 skipped=1 rescued=0 ignored=0

[ansadmin@Ansible_Server docker]$ ansible-playbook deploy_regapp.yml

PLAY [dockerhost] *****

TASK [Gathering Facts] *****
[WARNING]: Platform linux on host 172.31.31.176 is using the discovered Python interpreter at /usr/bin/python, but future installation of another Python interp
could change this. See https://docs.ansible.com/ansible/2.9/reference_appendices/interpreter_discovery.html for more information.
ok: [172.31.31.176]

TASK [create docker container] *****
fatal: [172.31.31.176]: FAILED! => {"changed": true, "cmd": ["docker", "run", "-d", "--name", "regapp-server", "-p", "8082:8080", "saifshah/regapp:latest"], "d
": "0:00:00.073060", "end": "2022-05-13 20:11:11.290303", "msg": "non-zero return code", "rc": 126, "start": "2022-05-13 20:11:11.217243", "stderr": "docker: Got
ion denied while trying to connect to the Docker daemon socket at unix:///var/run/docker.sock: Post \"http://%2Fvar%2Frun%2Fdocker.sock/v1.24/containers/create
egapp-server\": dial unix /var/run/docker.sock: connect: permission denied.\nSee 'docker run --help'.\", \"stderr_lines\": [\"docker: Got permission denied while t
o connect to the Docker daemon socket at unix:///var/run/docker.sock: Post \"http://%2Fvar%2Frun%2Fdocker.sock/v1.24/containers/create?name=regapp-server\": di
/var/run/docker.sock: connect: permission denied.\", \"See 'docker run --help'.\"], \"stdout\": \"\", \"stdout_lines\": []}

PLAY RECAP *****
172.31.31.176 : ok=1 changed=0 unreachable=0 failed=1 skipped=0 rescued=0 ignored=0

[ansadmin@Ansible_Server docker]$ ansible-playbook deploy_regapp.yml --check

PLAY [dockerhost] *****

TASK [Gathering Facts] *****
[WARNING]: Platform linux on host 172.31.31.176 is using the discovered Python interpreter at /usr/bin/python, but future installation of another Python interp
could change this. See https://docs.ansible.com/ansible/2.9/reference_appendices/interpreter_discovery.html for more information.
ok: [172.31.31.176]

TASK [create docker container] *****
skipping: [172.31.31.176]

PLAY RECAP *****
172.31.31.176 : ok=1 changed=0 unreachable=0 failed=0 skipped=1 rescued=0 ignored=0

[ansadmin@Ansible_Server docker]$
```

Fig. Error to fix permission

```
[root@dockerhost ~]# chmod 777 /var/run/docker.sock:
chmod: cannot access '/var/run/docker.sock:': No such file or directory
[root@dockerhost ~]# chmod 777 /var/run/docker.sock
[root@dockerhost ~]#
```

Fig. Fixed Permission Error

```
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect... 4 34.235.139.77 (ec2-user)
[ansadmin@Ansible_Server docker]$ ansible-playbook deploy_regapp.yml

PLAY [dockerhost] *****

TASK [Gathering Facts] *****
[WARNING]: Platform linux on host 172.31.31.176 is using the discovered Python interpreter at /usr/bin/python, but future installation of another Python interpreter
could change this. See https://docs.ansible.com/ansible/2.9/reference_appendices/interpreter_discovery.html for more information.
ok: [172.31.31.176]

TASK [create docker container] *****
changed: [172.31.31.176]

PLAY RECAP *****
172.31.31.176 : ok=2 changed=1 unreachable=0 failed=0 skipped=0 rescued=0 ignored=0

[ansadmin@Ansible_Server docker]$
```

Fig. ansible-playbook deploy-regapp.yml success

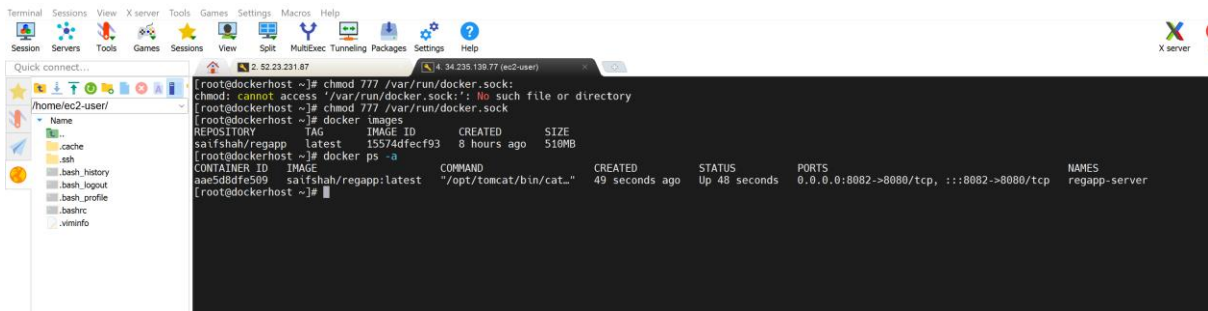


Fig. Images and Container are running

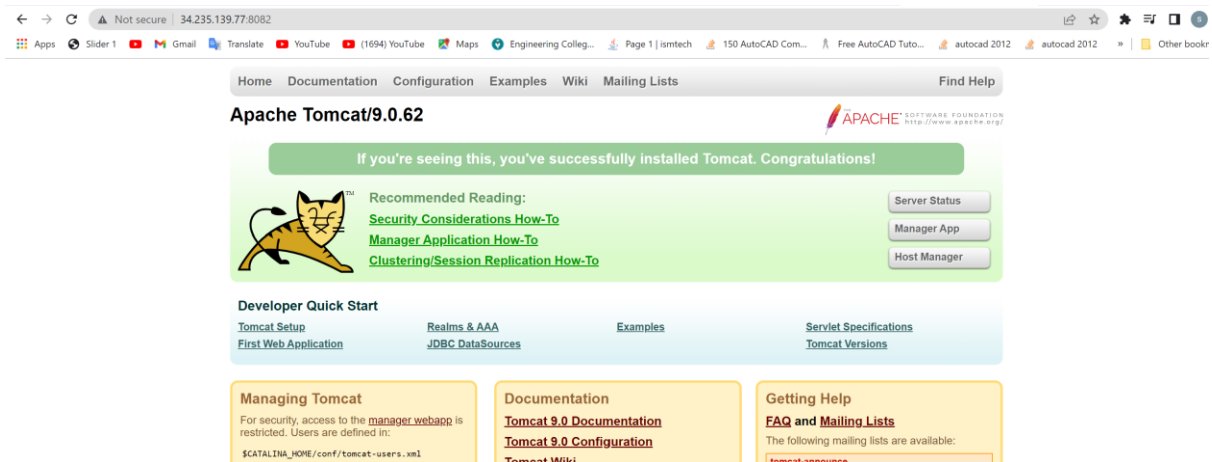


Fig. Access to the port 8082 on server

Continous deployment of docker container using ansible playbook

Deploy ansible playbook

- Remove existing container
- Remove existing image
- Create new container

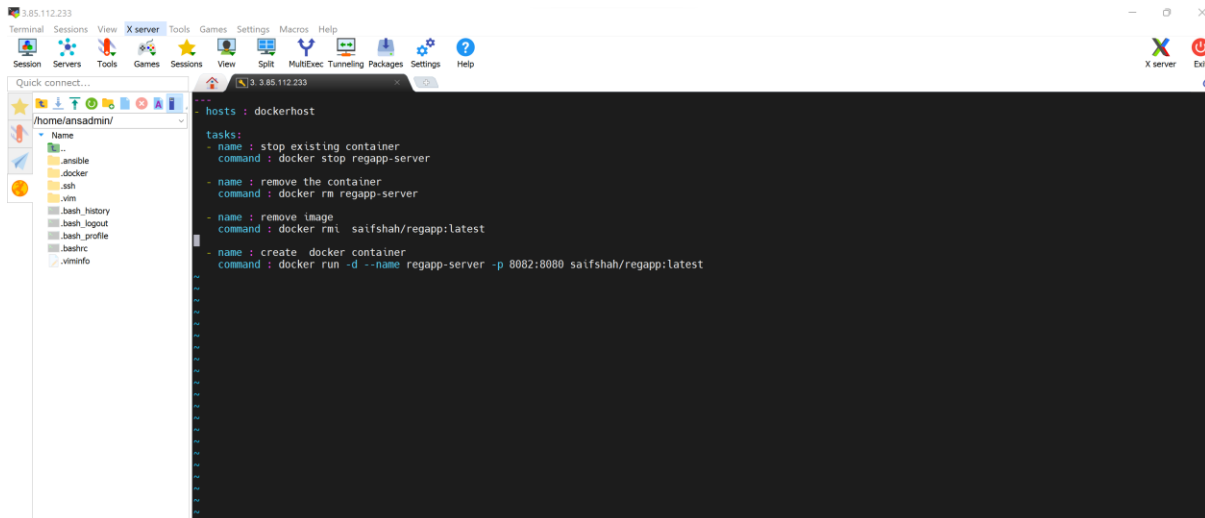


Fig. Creating ansible playbook

Note : ignore_errors : yes // ignoring the tasks

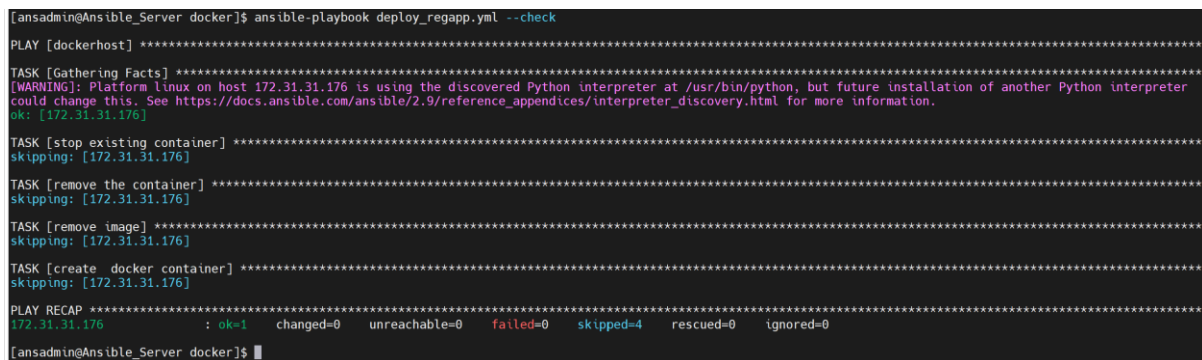


Fig . Check Successful

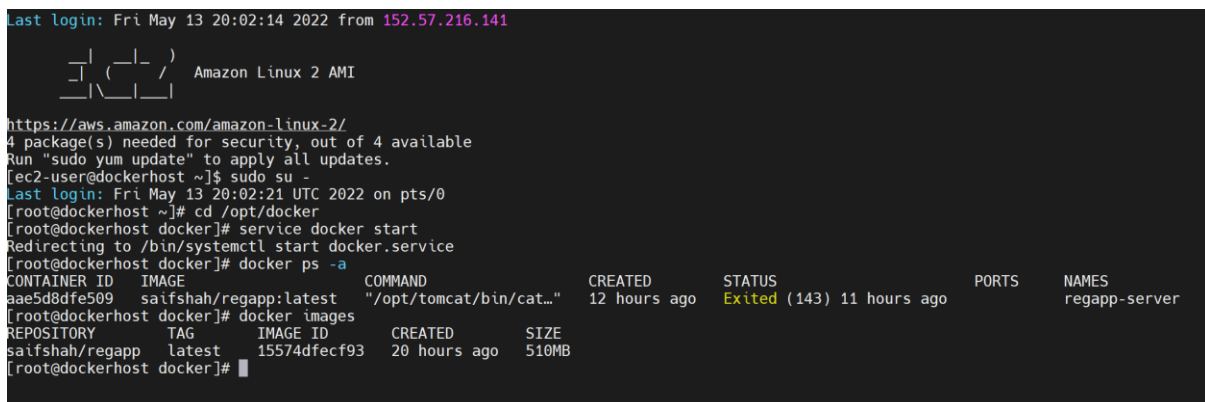


Fig . Docker Images and Container

```
[ansible@Ansible_Server docker]$ ansible-playbook deploy_regapp.yml
PLAY [dockerhost] *****
TASK [Gathering Facts] *****
[WARNING]: Platform linux on host 172.31.31.176 is using the discovered Python interpreter at /usr/bin/python, but future installation of another Python interpreter could change this. See https://docs.ansible.com/ansible/2.9/reference_appendices/interpreter_discovery.html for more information.
ok: [172.31.31.176]
TASK [stop existing container] *****
changed: [172.31.31.176]
TASK [remove the container] *****
changed: [172.31.31.176]
TASK [remove image] *****
changed: [172.31.31.176]
TASK [create docker container] *****
changed: [172.31.31.176]
PLAY RECAP *****
172.31.31.176 : ok=5 changed=4 unreachable=0 failed=0 skipped=0 rescued=0 ignored=0
```

Fig. Successful ansible playbook created

```
root@dockerhost docker]# docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
aifshah/regapp latest 15574dfecf93 20 hours ago 510MB
root@dockerhost docker]# docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
47675a7cd2a aifshah/regapp:latest "/opt/tomcat/bin/cat..." About a minute ago Up About a minute 0.0.0.0:8082->8080/tcp, :::8082->8080/tcp regapp-server
root@dockerhost docker]#
```

Fig . Docker images and container output after ansible playbook

Hint: https://docs.ansible.com/ansible/2.4/docker_image_module.html

Jenkins CI/CD to deploy on container using Ansible

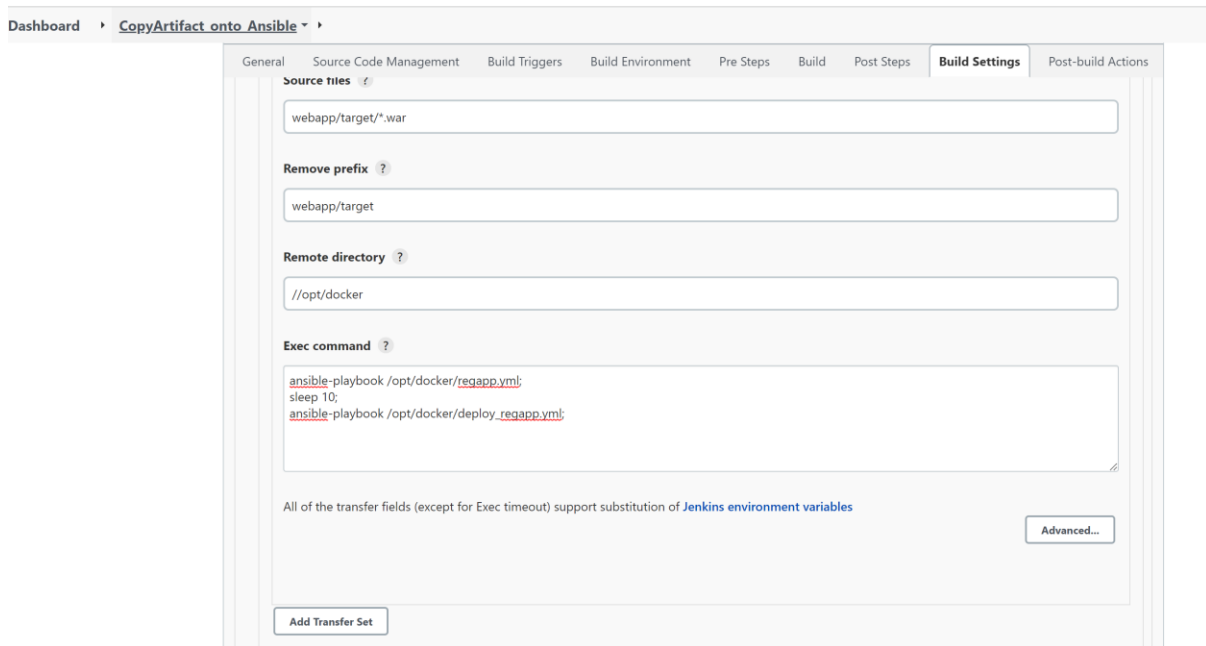


Fig. Configuring deploy_regapp.yml

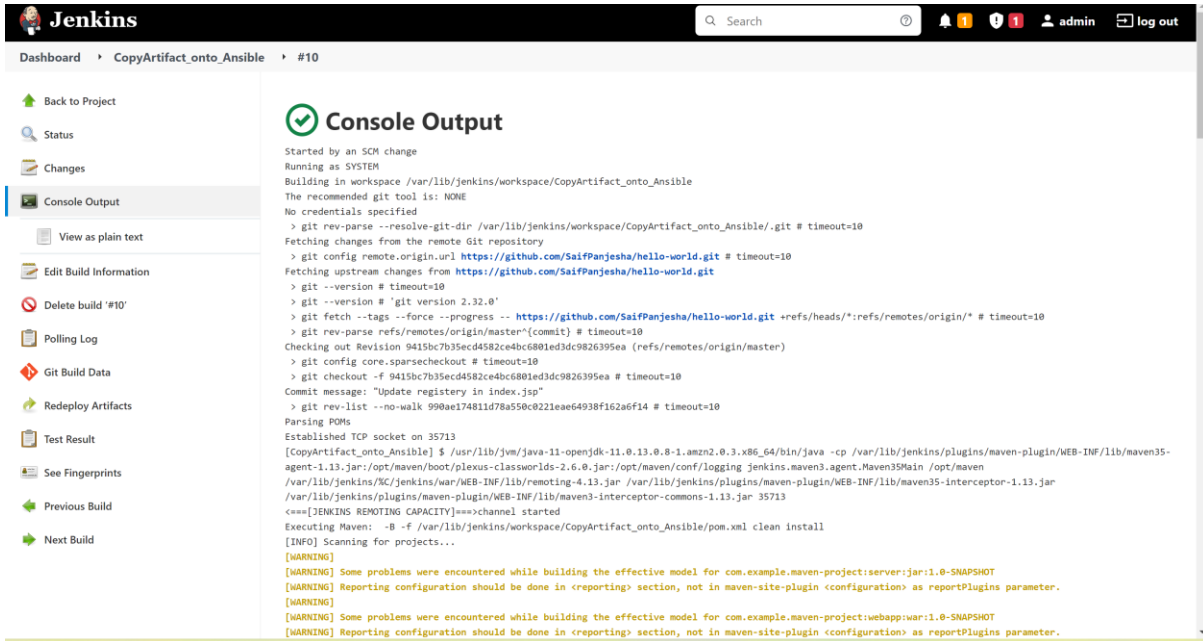


Fig. Build Success

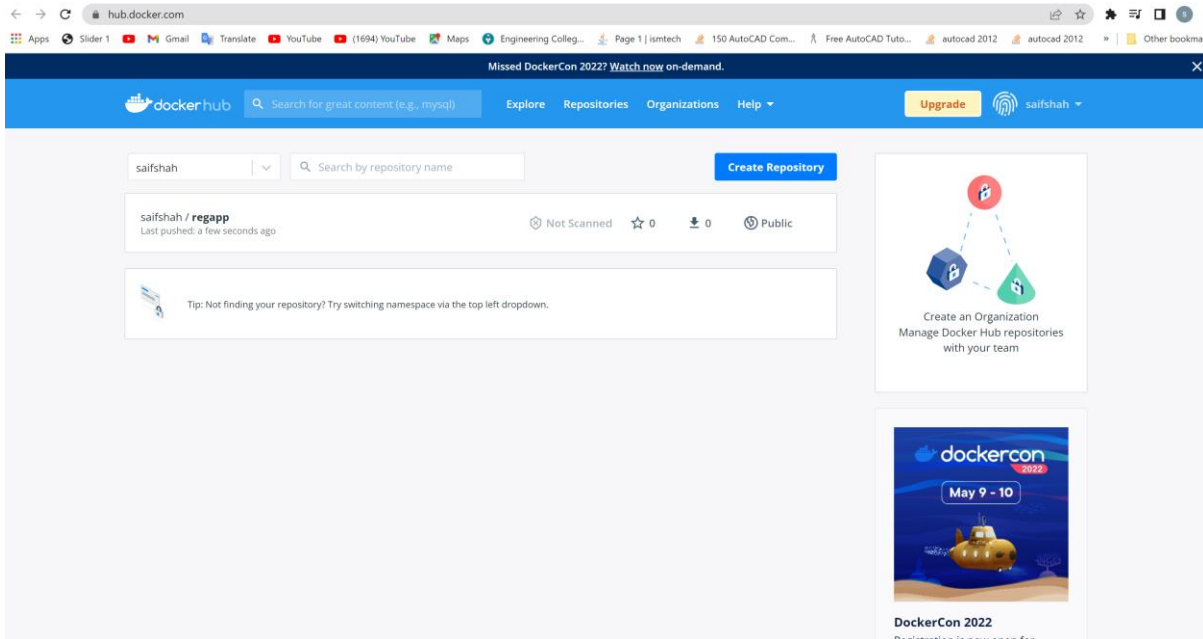


Fig. Success Build an image on ansible

Kubernetes:

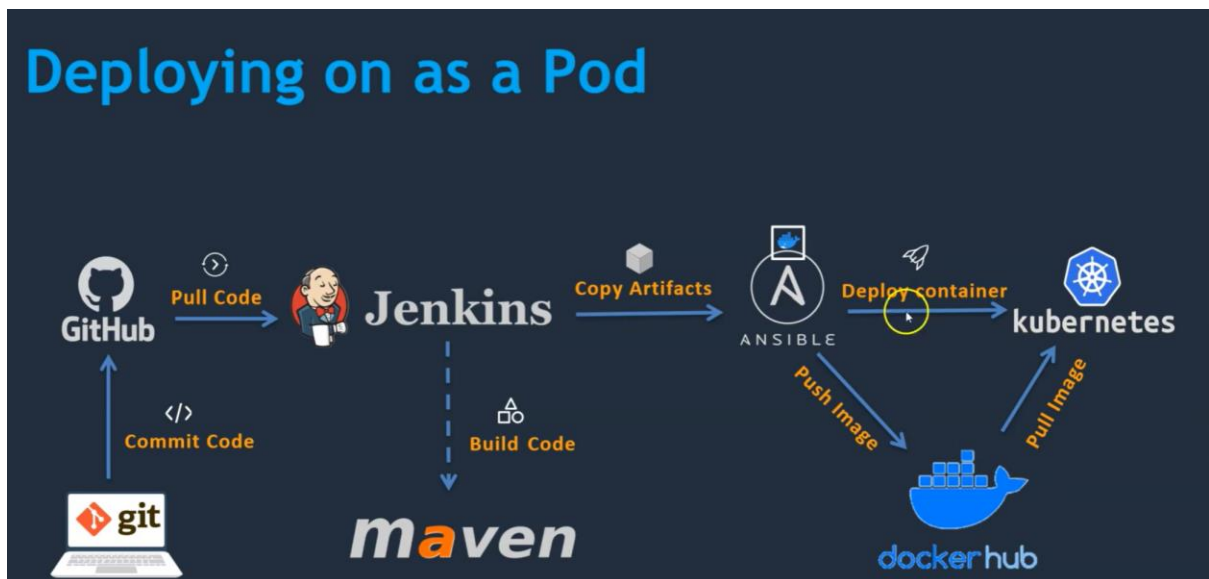


Fig. Kubernetes

Kubernetes installation methods:

Installing Kubernetes with deployment tools

[Bootstrapping clusters with kubeadm](#)

[Installing Kubernetes with kops](#)

[Installing Kubernetes with Kubespray](#)

Turnkey Cloud Solutions

Windows in Kubernetes

[Windows containers in Kubernetes](#)

EKS installation procedure

Kubernetes Setup using eksctl

Pre-requisites:

- an EC2 Instance

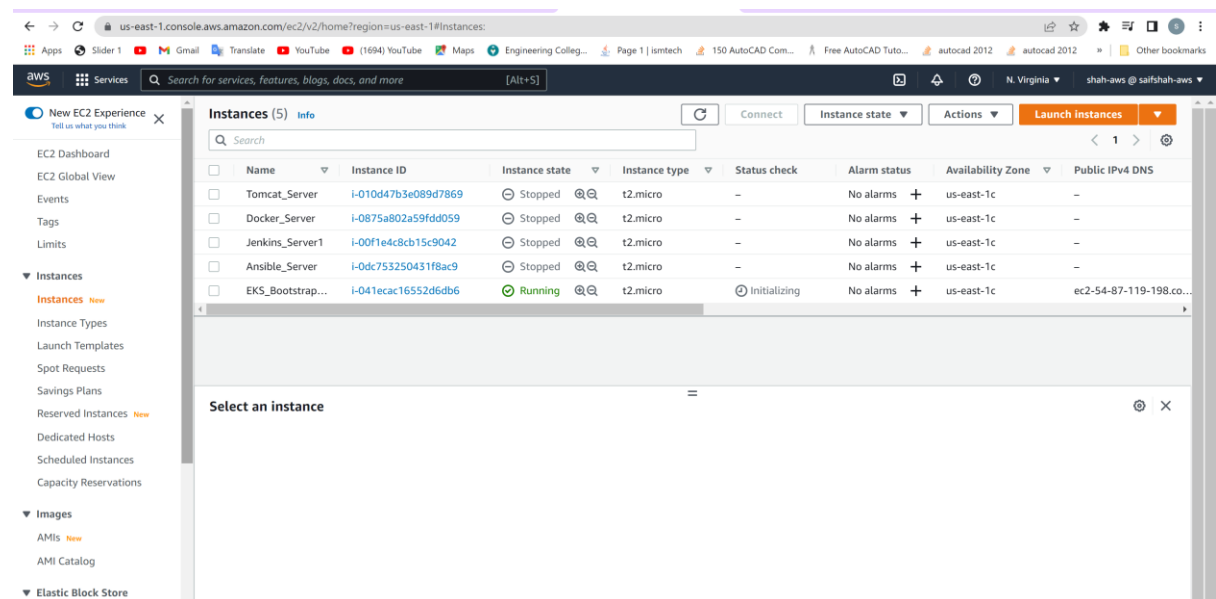


Fig. EKS Bootstrap Server

- Install AWSCLI latest version

```
curl "https://awscli.amazonaws.com/awscli-exe-linux-x86_64.zip" -o "awscliv2.zip"
```

```
unzip awscliv2.zip
```

```
sudo ./aws/install
```

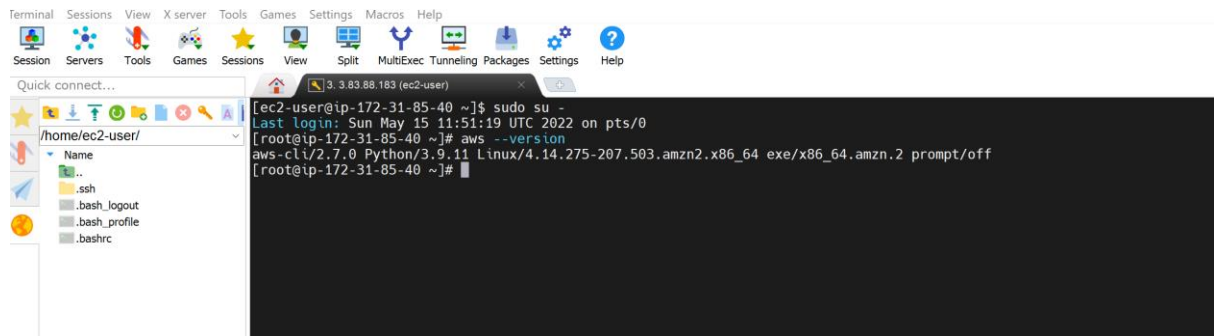


Fig. Successful AWS cli updated

1. Setup kubectl

a. Download kubectl version 1.22

curl -o kubectl <https://s3.us-west-2.amazonaws.com/amazon-eks/1.22.6/2022-03-09/bin/linux/amd64/kubectl>

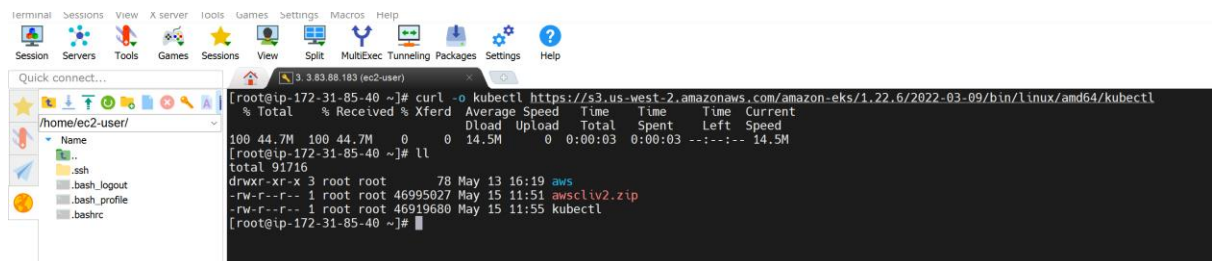


Fig. Kubectl version 1.22

b. Grant execution permissions to kubectl executable

`[root@ip-172-31-85-40 ~]# chmod +x kubectl`

c. Move kubectl onto /usr/local/bin

`[root@ip-172-31-85-40 ~]# mv kubectl /usr/local/bin`

d. Test that your kubectl installation was successful

```
[root@ip-172-31-85-40 ~]# kubectl version
```

```
Client Version: version.Info{Major:"1", Minor:"22+", GitVersion:"v1.22.6-eks-7d68063",
```

```
GitCommit:"f24e667e49fb137336f7b064dba897beed639bad",
```

```
GitTreeState:"clean", BuildDate:"2022-02-23T19:32:14Z",
```

```
GoVersion:"go1.16.12", Compiler:"gc", Platform:"linux/amd64"}
```

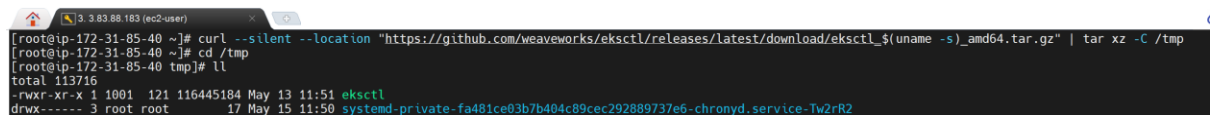
```
The connection to the server localhost:8080 was refused - did you specify the right host or port?
```

2. Setup eksctl

a. Download and extract the latest release

```
curl --silent --location
```

```
"https://github.com/weaveworks/eksctl/releases/latest/download/eksctl_$(uname -s)_amd64.tar.gz" | tar xz -C /tmp
```



```
[root@ip-172-31-85-40 ~]# curl --silent --location "https://github.com/weaveworks/eksctl/releases/latest/download/eksctl_$(uname -s)_amd64.tar.gz" | tar xz -C /tmp
[root@ip-172-31-85-40 ~]# cd /tmp
[root@ip-172-31-85-40 tmp]# ll
total 113716
-rwxr-xr-x 1 1001 121 116445184 May 13 11:51 eksctl
drwx----- 3 root root      17 May 15 11:50 systemd-private-fa401ce03b7b404c89cec292889737e6-chronyd.service-Tw2rR2
```

Fig. eksctl download and release

b. Move the extracted binary to /usr/local/bin

```
[root@ip-172-31-85-40 tmp]# mv eksctl /usr/local/bin
```

c. Test that your eksctl installation was successful

```
[root@ip-172-31-85-40 tmp]# eksctl version
```

0.97.0

3. Create an IAM Role and attach it to EC2 instance

Note: create IAM user with programmatic access if your bootstrap system is outside of AWS

IAM user should have access to IAM

EC2

CloudFormation

Note: Check eksctl documentaiton for [Minimum IAM policies](#)

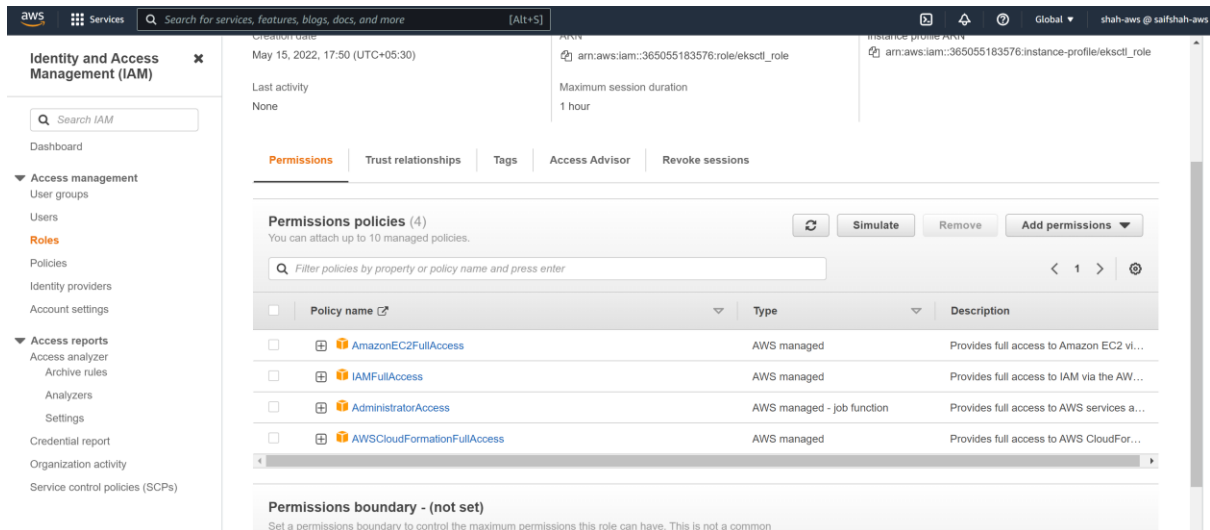


Fig. Created IAM role

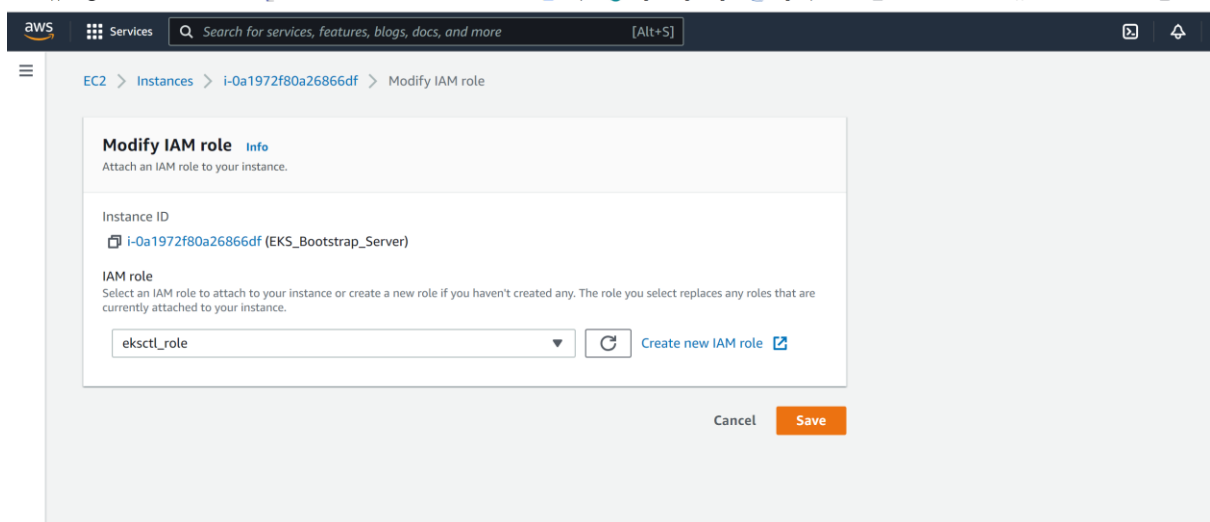


Fig. Role Save to EC2 Instance

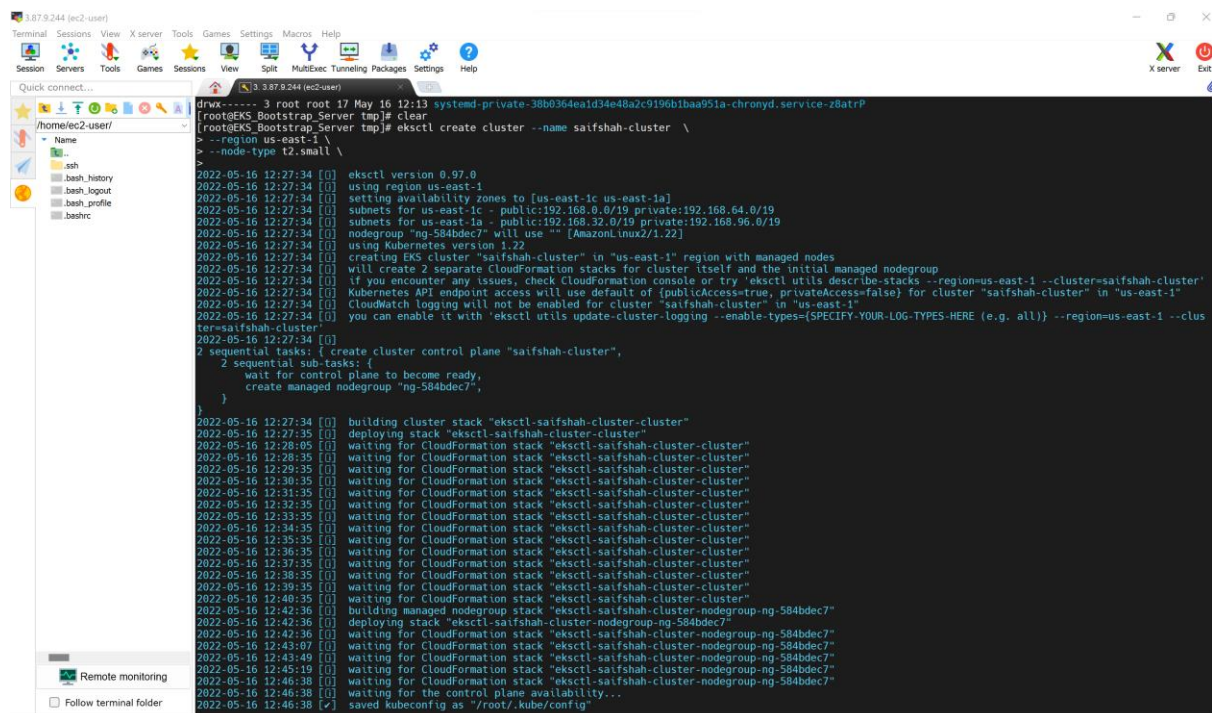
4. Create your cluster and nodes

```
eksctl create cluster --name cluster-name \  
--region region-name \  
--node-type instance-type \  
--nodes-min 2 \  
--nodes-max 2 \  
--zones <AZ-1>,<AZ-2>
```

Example :

```
eksctl create cluster --name saifshah-cluster \  
--region us-east-1 \  
--node-type t2.small
```

Output:



```
drwx----- 3 root root 17 May 16 12:13 systemd-private-38b03646a1d34e48a2c9196b1baa951a-chronyd.service-z8atrP  
[root@EKS_Bootstrap_Server tmp]# clear  
[root@EKS_Bootstrap_Server tmp]# eksctl create cluster --name saifshah-cluster \  
> --region us-east-1 \  
> --node-type t2.small \  
>  
2022-05-16 12:27:34 [0] eksctl version 0.97.0  
2022-05-16 12:27:34 [0] using region us-east-1  
2022-05-16 12:27:34 [0] setting availability zones to [us-east-1c us-east-1a]  
2022-05-16 12:27:34 [0] subnets for us-east-1c - public:192.168.0.0/19 private:192.168.64.0/19  
2022-05-16 12:27:34 [0] subnets for us-east-1a - public:192.168.32.0/19 private:192.168.96.0/19  
2022-05-16 12:27:34 [0] nodegroup "ng-584bdec7" will use "" [AmazonLinux2/1.22]  
2022-05-16 12:27:34 [0] using Kubernetes version 1.22  
2022-05-16 12:27:34 [0] creating EKS cluster "saifshah-cluster" in "us-east-1" region with managed nodes  
2022-05-16 12:27:34 [0] will create 2 separate CloudFormation stacks for cluster itself and the initial managed nodegroup  
2022-05-16 12:27:34 [0] if you encounter any issues, check CloudFormation console or try 'eksctl utils describe-stacks --region=us-east-1 --cluster=saifshah-cluster'  
2022-05-16 12:27:34 [0] Kubernetes API endpoint access will use default of {publicAccess=true, privateAccess=false} for cluster "saifshah-cluster" in "us-east-1"  
2022-05-16 12:27:34 [0] CloudWatch logging will not be enabled for cluster "saifshah-cluster" in "us-east-1"  
2022-05-16 12:27:34 [0] you can enable it with 'eksctl utils update-cluster-logging --enable-types={SPECIFY-YOUR-LOG-TYPES-HERE (e.g. all)} --region=us-east-1 --clus-  
ter=saifshah-cluster'  
2022-05-16 12:27:34 [0]  
2 sequential tasks: { create cluster control plane "saifshah-cluster",  
  wait for control plane to become ready,  
  create managed nodegroup "ng-584bdec7",  
}  
2022-05-16 12:27:34 [0] building cluster stack "eksctl-saifshah-cluster-cluster"  
2022-05-16 12:27:35 [0] deploying stack "eksctl-saifshah-cluster-cluster"  
2022-05-16 12:28:05 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"  
2022-05-16 12:28:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"  
2022-05-16 12:29:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"  
2022-05-16 12:30:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"  
2022-05-16 12:31:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"  
2022-05-16 12:32:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"  
2022-05-16 12:33:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"  
2022-05-16 12:34:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"  
2022-05-16 12:35:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"  
2022-05-16 12:36:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"  
2022-05-16 12:37:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"  
2022-05-16 12:38:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"  
2022-05-16 12:39:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"  
2022-05-16 12:40:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"  
2022-05-16 12:42:36 [0] building managed nodegroup stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"  
2022-05-16 12:42:36 [0] deploying stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"  
2022-05-16 12:42:36 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"  
2022-05-16 12:43:07 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"  
2022-05-16 12:43:49 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"  
2022-05-16 12:45:19 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"  
2022-05-16 12:46:38 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"  
2022-05-16 12:46:38 [0] waiting for the control plane availability...  
2022-05-16 12:46:38 [0] saved kubeconfig as "/root/.kube/config"
```

```

2022-05-16 12:27:34 [0] using Kubernetes version 1.22
2022-05-16 12:27:34 [0] creating EKS cluster "saifshah-cluster" in "us-east-1" region with managed nodes
2022-05-16 12:27:34 [0] will create 2 separate CloudFormation stacks for cluster itself and the initial managed nodegroup
2022-05-16 12:27:34 [0] if you encounter any issues, check CloudFormation console or try 'eksctl utils describe-stacks --region=us-east-1 --cluster=saifshah-cluster'
2022-05-16 12:27:34 [0] Kubernetes API endpoint access will use default of (publicAccess=true, privateAccess=false) for cluster "saifshah-cluster" in "us-east-1"
2022-05-16 12:27:34 [0] CloudWatch logging will not be enabled for cluster "saifshah-cluster" in "us-east-1"
2022-05-16 12:27:34 [0] you can enable it with 'eksctl utils update-cluster-logging --enable-types={SPECIFY-YOUR-LOG-TYPES-HERE (e.g. all)} --region=us-east-1 --cluster=saifshah-cluster'
2022-05-16 12:27:34 [0]
2 sequential tasks: { create cluster control plane "saifshah-cluster",
2 sequential sub-tasks: {
wait for control plane to become ready,
create managed nodegroup "ng-584bdec7",
}
}
2022-05-16 12:27:34 [0] building cluster stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:27:35 [0] deploying stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:28:05 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:28:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:29:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:30:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:31:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:32:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:33:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:34:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:35:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:36:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:37:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:38:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:39:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:40:35 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:42:36 [0] building managed nodegroup stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"
2022-05-16 12:42:36 [0] deploying stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"
2022-05-16 12:42:36 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"
2022-05-16 12:43:07 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"
2022-05-16 12:43:49 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"
2022-05-16 12:45:19 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"
2022-05-16 12:46:38 [0] waiting for CloudFormation stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"
2022-05-16 12:46:38 [0] saved kubeconfig as ~/root/.kube/config
2022-05-16 12:46:38 [0] no tasks
2022-05-16 12:46:38 [0] all EKS cluster resources for "saifshah-cluster" have been created
2022-05-16 12:46:38 [0] nodegroup "ng-584bdec7" has 2 node(s)
2022-05-16 12:46:38 [0] node "ip-192-168-60-68.ec2.internal" is ready
2022-05-16 12:46:38 [0] node "ip-192-168-7-5.ec2.internal" is ready
2022-05-16 12:46:38 [0] waiting for at least 2 node(s) to become ready in "ng-584bdec7"
2022-05-16 12:46:38 [0] nodegroup "ng-584bdec7" has 2 node(s)
2022-05-16 12:46:38 [0] node "ip-192-168-60-68.ec2.internal" is ready
2022-05-16 12:46:38 [0] node "ip-192-168-7-5.ec2.internal" is ready
2022-05-16 12:46:41 [0] kubectl command should work with ~/root/.kube/config; try 'kubectl get nodes'
2022-05-16 12:46:41 [0] EKS cluster "saifshah-cluster" in "us-east-1" region is ready
[root@EKS_Bootstrap_Server tmp]#

```

Fig. Cluster Created

The screenshot shows the AWS CloudFormation console for the us-east-1 region. It displays two stacks under the 'Stacks (2)' section:

| Stack name | Status | Created time | Description |
|---|-----------------|------------------------------|--|
| eksctl-saifshah-cluster-nodegroup-ng-584bdec7 | CREATE_COMPLETE | 2022-05-16 18:12:36 UTC+0530 | EKS Managed Nodes (SSH access: false) [created by eksctl] |
| eksctl-saifshah-cluster-cluster | CREATE_COMPLETE | 2022-05-16 17:57:34 UTC+0530 | EKS cluster (dedicated VPC: true, dedicated IAM: true) [created and managed by eksctl] |

Fig. Stacks in CloudFormation

5. To delete the EKS cluster

eksctl delete cluster saifshah --region us-east-1

6. Validate your cluster using by creating by checking nodes and by creating a pod

```

[root@EKS_Bootstrap_Server ~]# find - / -name saifshah
[root@EKS_Bootstrap_Server ~]# find - / -name eksctl-saifshah-cluster
[root@EKS_Bootstrap_Server ~]# ll
total 4596
drwxr-xr-x 3 root root 78 May 13 16:19 aws
-rw-r--r-- 1 root root 46995027 May 11 11:51 awscli-v2.zip
[root@EKS_Bootstrap_Server ~]# find - / -name saifshah-cluster
find: '/proc/6169': No such file or directory
find: '/proc/6170': No such file or directory
[root@EKS_Bootstrap_Server ~]# cd /tmp
[root@EKS_Bootstrap_Server tmp]# cat /root/. kube/config
apiVersion: v1
clusters:
- cluster:
  certificate-authority-data: LS0tLS1CRUdJTiBDRVJUSUZ3Q0FURSB0LS0tck13SUUvbnVakNDQWZ0F3S1UJZ01COURBTkja3Foa2LHOXcWQkFRc0ZBREFFWTVJNd0VWURUWUVERXdwcmRXSmKY201bGRHVn
  name: saifshah-cluster.us-east-1.eksctl.io
contexts:
- context:
  cluster: saifshah-cluster.us-east-1.eksctl.io
  user: i-0a1972f80a26866df@saifshah-cluster.us-east-1.eksctl.io
current-context: i-0a1972f80a26866df@saifshah-cluster.us-east-1.eksctl.io
kind: Config
preferences: {}
users:
- name: i-0a1972f80a26866df@saifshah-cluster.us-east-1.eksctl.io
  user:
    exec:
      apiVersion: client.authentication.k8s.io/v1alpha1
      args:
      - eks
      - get-token
      - saifshah-cluster
      - --region
      - us-east-1
      command: aws
    env:
      - name: AWS_STS_REGIONAL_ENDPOINTS
        value: regional
      provideClusterInfo: false

```

Fig. cat /root/. kube/config

```

[root@EKS_Bootstrap_Server tmp]# kubectl get nodes
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
NAME                STATUS    ROLES    AGE    VERSION
ip-192-168-60-68.ec2.internal    Ready    <none>   16m   v1.22.6-eks-7d68063
ip-192-168-7-5.ec2.internal      Ready    <none>   16m   v1.22.6-eks-7d68063

[root@EKS_Bootstrap_Server tmp]# kubectl get all
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
NAME                TYPE          CLUSTER-IP    EXTERNAL-IP    PORT(S)    AGE
service/kubernetes  ClusterIP    10.100.0.1    <none>         443/TCP    26m

```

Fig. Created nodes and check all service/Kubernetes

Creating a pod:

```

[root@EKS_Bootstrap_Server tmp]# kubectl run webapp --image=htpd;
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
pod/webapp created
[root@EKS_Bootstrap_Server tmp]# kubectl get all
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
NAME                STATUS    RESTARTS    AGE
pod/webapp          0/1      ImagePullBackOff    0      51s

NAME                CLUSTER-IP    EXTERNAL-IP    PORT(S)    AGE
service/kubernetes  ClusterIP    10.100.0.1    <none>     443/TCP    36m

```

Fig . Pod Successful created

Command for only showing pod:

```
[root@EKS_Bootstrap_Server tmp]# kubectl get po
```

Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.

| NAME | READY | STATUS | RESTARTS | AGE |
|--------|-------|------------------|----------|-------|
| webapp | 0/1 | ImagePullBackOff | 0 | 2m44s |

```
[root@EKS_Bootstrap_Server tmp]#
```

Run Kubernetes Basic Commands:

7. Deploying Nginx Container

```
kubectl create deployment demo-nginx --image=nginx --replicas=2 --port=80
```

```
# kubectl deployment regapp --image=satifshah/regapp --replicas=2 --  
port=8080
```

```
kubectl get all
```

```
kubectl get pod
```



```

[root@EKS_Bootstrap_Server tmp]# kubectl create deployment demo-nginx --image=nginx --port=80 --replicas=2
error: exactly one NAME is required, got 2
See 'kubectl create deployment -h' for help and examples
[root@EKS_Bootstrap_Server tmp]# kubectl create deployment demo-nginx --image=nginx --port=80
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
deployment.apps/demo-nginx created
[root@EKS_Bootstrap_Server tmp]# kubectl get all
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
NAME                READY   STATUS    RESTARTS   AGE
pod/demo-nginx-848d469579-pc7mc  1/1     Running   0           40s
pod/demo-nginx-848d469579-wljjj  1/1     Running   0           40s

NAME                TYPE          CLUSTER-IP   EXTERNAL-IP   PORT(S)   AGE
service/kubernetes  ClusterIP    10.100.0.1   <none>        443/TCP   72m

NAME                READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/demo-nginx  2/2     2            2           48s

NAME                DESIRED   CURRENT   READY   AGE
replicaset.apps/demo-nginx-848d469579  2         2         2       40s
[root@EKS_Bootstrap_Server tmp]# kubectl get po
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
NAME                READY   STATUS    RESTARTS   AGE
demo-nginx-848d469579-pc7mc  1/1     Running   0           62s
demo-nginx-848d469579-wljjj  1/1     Running   0           62s
[root@EKS_Bootstrap_Server tmp]# kubectl get pod
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
NAME                READY   STATUS    RESTARTS   AGE
demo-nginx-848d469579-pc7mc  1/1     Running   0           70s
demo-nginx-848d469579-wljjj  1/1     Running   0           70s
[root@EKS_Bootstrap_Server tmp]# kubectl get deploy
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
NAME                READY   UP-TO-DATE   AVAILABLE   AGE
demo-nginx          2/2     2            2           107s
[root@EKS_Bootstrap_Server tmp]# kubectl get replicaset
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
NAME                DESIRED   CURRENT   READY   AGE
demo-nginx-848d469579  2         2         2       2m53s
[root@EKS_Bootstrap_Server tmp]#

```

Fig. Deploying Nginx Container

8. Expose the deployment as service. This will create an ELB in front of those 2 containers and allow us to publicly access them.

kubectl expose deployment demo-nginx --port=80 --type=LoadBalancer
kubectl expose deployment regapp --port=8080 --type=LoadBalancer
kubectl get services -o wide

```

[root@EKS_Bootstrap_Server tmp]# kubectl expose deployment demo-nginx --port=8080 --type=LoadBalancer
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
Error from server (NotFound): deployments.apps "demo-nginx" not found
[root@EKS_Bootstrap_Server tmp]# kubectl expose deployment demo-nginx --port=80 --type=LoadBalancer
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
service/demo-nginx exposed
[root@EKS_Bootstrap_Server tmp]# kubectl get all
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
NAME                READY   STATUS    RESTARTS   AGE
pod/demo-nginx-848d469579-pc7mc  1/1     Running   0           11m
pod/demo-nginx-848d469579-wljjj  1/1     Running   0           11m

NAME                TYPE          CLUSTER-IP   EXTERNAL-IP   PORT(S)   AGE
service/demo-nginx  LoadBalancer  10.100.41.107  a5e7c80d74c5f46029e7050de1ead81d-921720739-us-east-1.elb.amazonaws.com  80:32674/TCP  36s
service/kubernetes  ClusterIP    10.100.0.1   <none>        443/TCP   83m

NAME                READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/demo-nginx  2/2     2            2           11m

NAME                DESIRED   CURRENT   READY   AGE
replicaset.apps/demo-nginx-848d469579  2         2         2       11m
[root@EKS_Bootstrap_Server tmp]# ^C
[root@EKS_Bootstrap_Server tmp]#

```

Fig. Deployment as a service

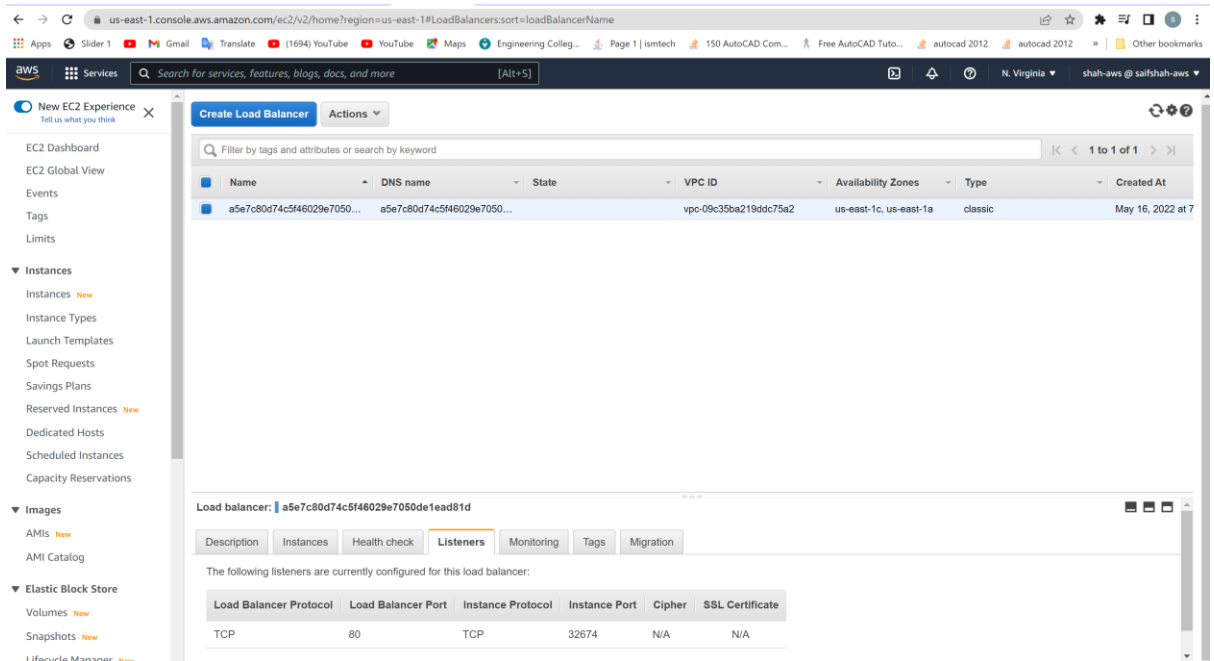


Fig. Created load balancer after deployment.

kubectl get services -o wide

```

root@EKS_Bootstrap_Server tmp]# kubectl get services -o wide
kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
NAME      TYPE      CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE      SELECTOR
demo-nginx LoadBalancer 10.100.41.107    a5e7c80d74c5f46029e7050de1ead81d-921720739.us-east-1.elb.amazonaws.com 80:32674/TCP    7m6s    app=demo-nginx
kubernetes ClusterIP 10.100.0.1      <none>           443/TCP          90m     <none>

```

Fig. Kubectl services.

Create a Manifest File:

```
[root@EKS_Bootstrap_Server ~]# cd /tmp
[root@EKS_Bootstrap_Server tmp]# kubectl get all
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
NAME                READY   STATUS    RESTARTS   AGE
pod/demo-nginx-848d469579-pc7mc  1/1    Running   0           32m
pod/demo-nginx-848d469579-wljjj  1/1    Running   0           32m

NAME                TYPE                CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
service/demo-nginx  LoadBalancer       10.100.41.107   a5e7c80d74c5f46029e7050de1ead81d-921720739.us-east-1.elb.amazonaws.com  80:32674/TCP    21m
service/kubernetes  ClusterIP           10.100.0.1      <none>           443/TCP          104m

NAME                READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/demo-nginx  2/2    2             2           32m

NAME                DESIRED   CURRENT   READY   AGE
replicaset.apps/demo-nginx-848d469579  2         2         2       32m
[root@EKS_Bootstrap_Server tmp]# delete deployment demo-nginx
-bash: delete: command not found
[root@EKS_Bootstrap_Server tmp]# kubectl delete deployment demo-nginx
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
deployment.apps "demo-nginx" deleted
[root@EKS_Bootstrap_Server tmp]# kubectl get all
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
NAME                TYPE                CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
service/demo-nginx  LoadBalancer       10.100.41.107   a5e7c80d74c5f46029e7050de1ead81d-921720739.us-east-1.elb.amazonaws.com  80:32674/TCP    22m
service/kubernetes  ClusterIP           10.100.0.1      <none>           443/TCP          105m
[root@EKS_Bootstrap_Server tmp]# kubectl delete service/demo-nginx
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
service "demo-nginx" deleted
```

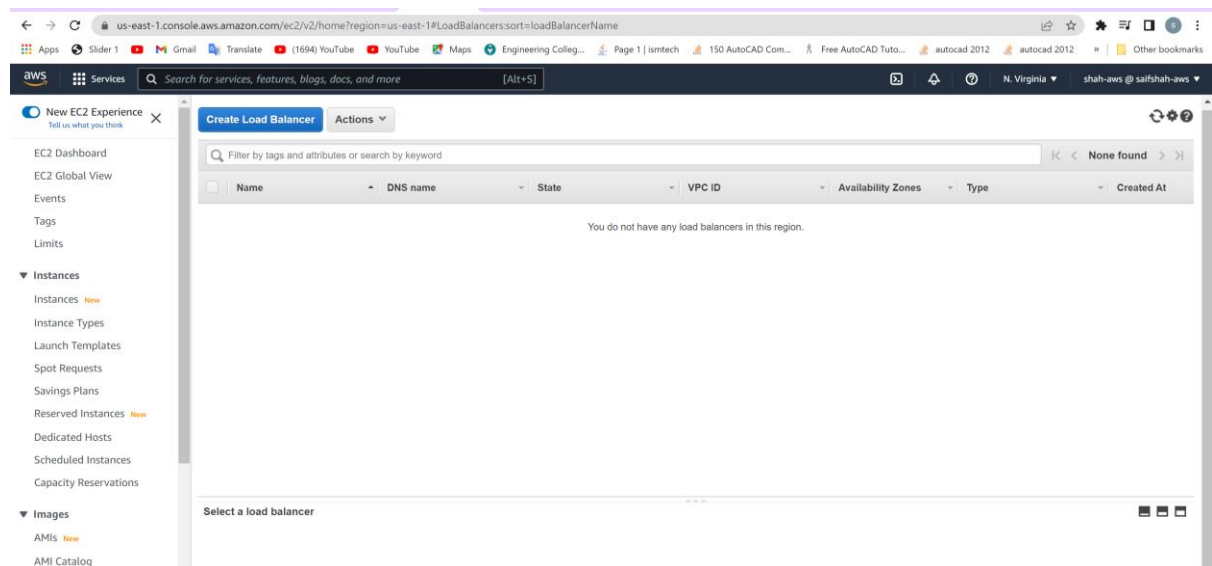


Fig. Deleted earlier configuration

Creating a manifest file:

```
[root@EKS_Bootstrap_Server tmp]# vi pod.yml
```

```
apiVersion v1
```

```
kind: pod
```

```
metadata:
```

```
  name: data-pod
```

```
  labels:
```

```
    users: my-user
```

```
spec:
```

```
  containers:
```

```
    - name: demo-nginx
```

```
      image: nginx
```

```
      ports:
```

```
        - name: demo-nginx
```

```
          containerPort: 80
```

Creating a service manifest file:

```
[root@EKS_Bootstrap_Server tmp]# vi service.yml
```

```
[root@EKS_Bootstrap_Server tmp]# cat service.yml
```

```
apiVersion: v1
```

```
kind: Service
```

```
metadata:
```

```
  name: demo-Service
```

spec:

ports:

- name: nginx-port

port: 80

targetPort: 80

type: LoadBalancer

Output: pod.yml

[root@EKS_Bootstrap_Server tmp]# cat pod.yml

apiVersion: v1

kind: Pod

metadata:

name: nginx-pod

labels:

app: demo-app

spec:

containers:

- name: nginx-container

image: nginx

ports:

- name: nginx

containerPort: 80

[root@EKS Bootstrap Server tmp]# kubectl apply -f pod.yml //applying

Kubeconfig user entry is using deprecated API version

client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.

pod/nginx-pod created

[root@EKS Bootstrap Server tmp]# kubectl get all

Kubeconfig user entry is using deprecated API version

client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.

NAME READY STATUS RESTARTS AGE

pod/nginx-pod 1/1 Running 0 25s

NAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE

service/kubernetes ClusterIP 10.100.0.1 <none> 443/TCP 7h37m

[root@EKS Bootstrap Server tmp]#

Output : service.yml

[root@EKS Bootstrap Server tmp]# clear

[root@EKS Bootstrap Server tmp]# ll

total 8

-rw-r--r-- 1 root root 199 May 16 20:11 pod.yml

-rw-r--r-- 1 root root 160 May 16 20:16 service.yml

drwx----- 3 root root 17 May 16 19:39 systemd-private-

2a2e6e9d1ac347feaab952b1c678ed15-chronyd.service-2einFz

[root@EKS Bootstrap Server tmp]# cat service.yml

apiVersion: v1

kind: Service

metadata:

name: demo-service

spec:

ports:

- name: nginx-port

port: 80

targetPort: 80

type: LoadBalancer

[root@EKS Bootstrap Server tmp]# kubectl apply -f service.yml

Kubeconfig user entry is using deprecated API version

client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.

service/demo-service created

[root@EKS Bootstrap Server tmp]# kubectl get all

Kubeconfig user entry is using deprecated API version

client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.

NAME READY STATUS RESTARTS AGE

pod/nginx-pod 1/1 Running 0 5m32s

NAME TYPE CLUSTER-IP EXTERNAL-IP

PORT(S) AGE

service/demo-service LoadBalancer 10.100.56.237
afade1324bbc8455fa7b71537a4bcf6e-1513829373.us-east-
1.elb.amazonaws.com 80:31295/TCP 22s

service/kubernetes ClusterIP 10.100.0.1 <none>
443/TCP 7h42m

[root@EKS Bootstrap Server tmp]#

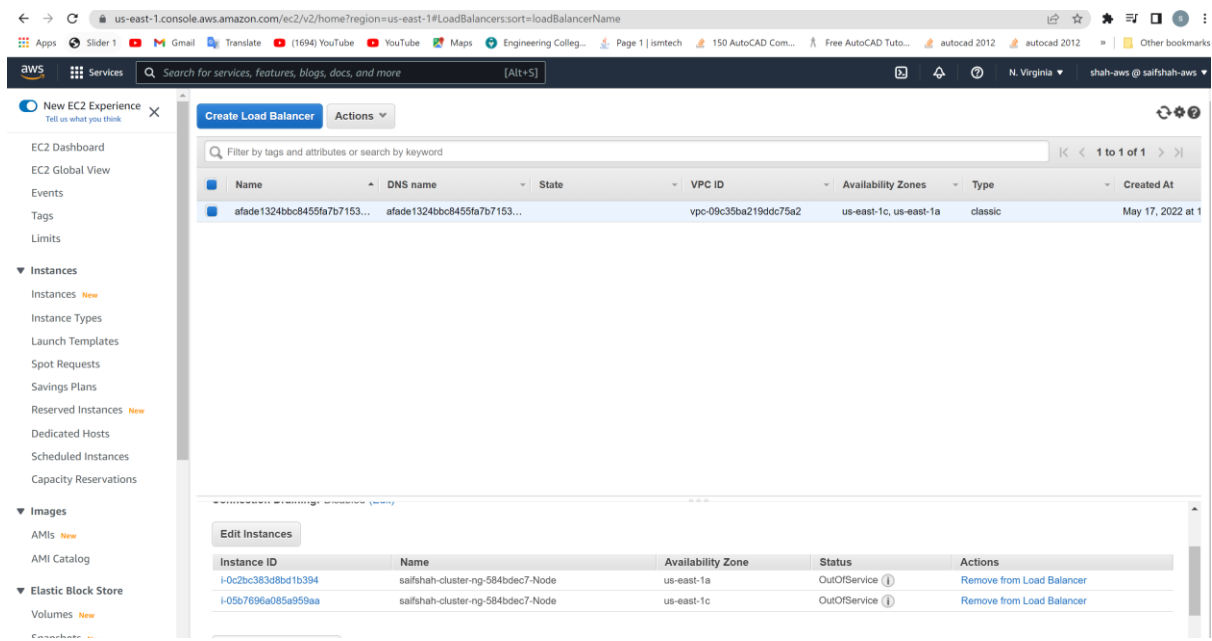
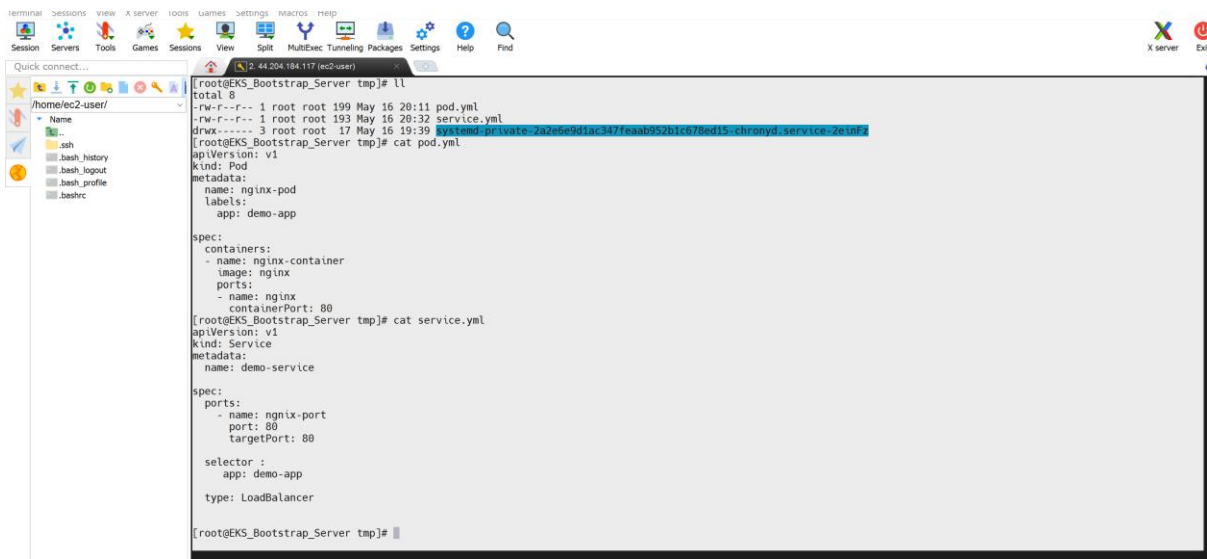


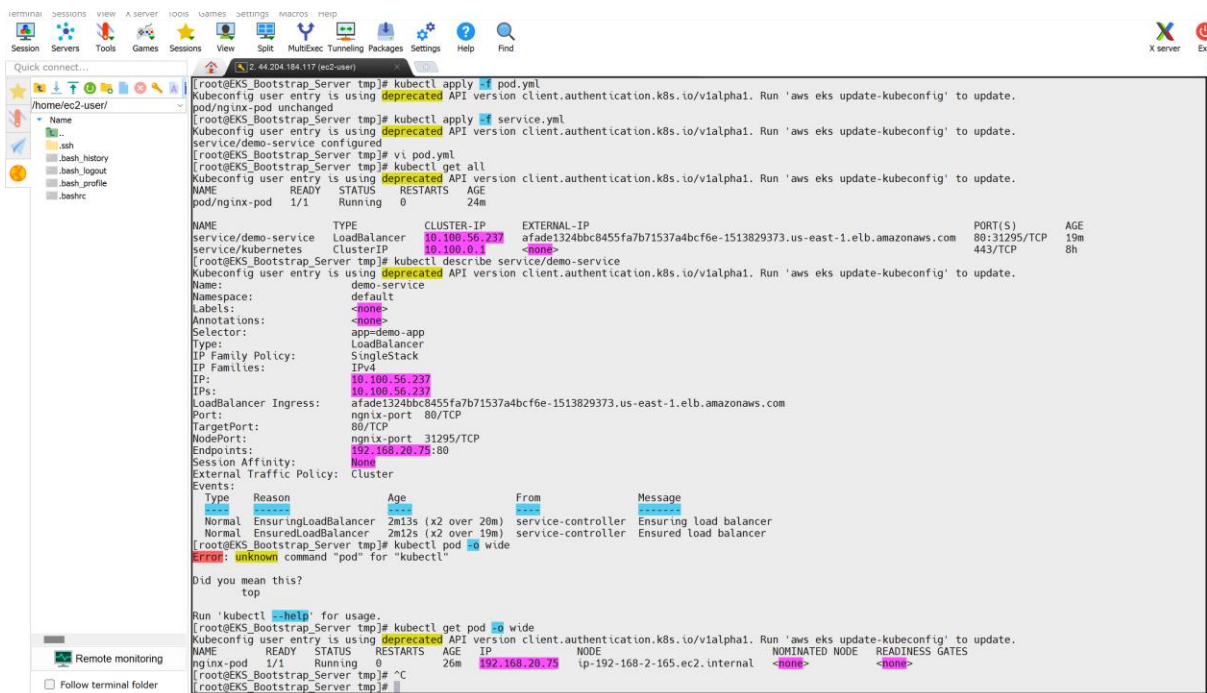
Fig. LoadBalancer is created.

Setup Pod and Service:



```
[root@EKS_Bootstrap_Server tmp]# ll
total 8
-rw-r--r-- 1 root root 199 May 16 20:11 pod.yml
-rw-r--r-- 1 root root 193 May 16 20:32 service.yml
drwx----- 3 root root 17 May 16 19:39 systemd-private-7a2e6e0d1ac347feab952b1c67bed15-chromyd.service-2e1nf
[root@EKS_Bootstrap_Server tmp]# cat pod.yml
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  labels:
    app: demo-app
spec:
  containers:
  - name: nginx-container
    image: nginx
    ports:
    - name: nginx
      containerPort: 80
[root@EKS_Bootstrap_Server tmp]# cat service.yml
apiVersion: v1
kind: Service
metadata:
  name: demo-service
spec:
  ports:
  - name: nginx-port
    port: 80
    targetPort: 80
  selector:
    app: demo-app
  type: LoadBalancer
[root@EKS_Bootstrap_Server tmp]#
```

Fig. Adding Label as a selector app



```
[root@EKS_Bootstrap_Server tmp]# kubectl apply -f pod.yml
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
pod/nginx-pod unchanged
[root@EKS_Bootstrap_Server tmp]# kubectl apply -f service.yml
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
service/demo-service configured
[root@EKS_Bootstrap_Server tmp]# vi pod.yml
[root@EKS_Bootstrap_Server tmp]# kubectl get all
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
NAME READY STATUS RESTARTS AGE
pod/nginx-pod 1/1 Running 0 24m

NAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE
service/demo-service LoadBalancer 10.100.56.237 afade1324bbc8455fa7b71537a4bcf6e-1513829373.us-east-1.elb.amazonaws.com 80:31295/TCP 19m
service/kubernetes ClusterIP 10.100.0.1 <none> 443/TCP 8h
[root@EKS_Bootstrap_Server tmp]# kubectl describe service/demo-service
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
Name: demo-service
Namespace: default
Labels: <none>
Annotations: <none>
Selector: app=demo-app
Type: LoadBalancer
IP Family Policy: SingleStack
IP Families: IPv4
IP: 10.100.56.237
IPs: 10.100.56.237
LoadBalancer Ingress: afade1324bbc8455fa7b71537a4bcf6e-1513829373.us-east-1.elb.amazonaws.com
Port: nginx-port 80/TCP
TargetPort: 80/TCP
NodePort: nginx-port 31295/TCP
Endpoints: 192.168.20.75:80
Session Affinity: None
External Traffic Policy: Cluster
Events:
  Type Reason Age From Message
  ----
  Normal EnsuringLoadBalancer 2m13s (x2 over 20m) service-controller Ensuring load balancer
  Normal EnsuredLoadBalancer 2m12s (x2 over 19m) service-controller Ensured load balancer
[root@EKS_Bootstrap_Server tmp]# kubectl pod -o wide
Error: unknown command "pod" for "kubectl"
Did you mean this?
  top
Run 'kubectl --help' for usage.
[root@EKS_Bootstrap_Server tmp]# kubectl get pod -o wide
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
NAME READY STATUS RESTARTS AGE IP NODE NOMINATED NODE READINESS GATES
nginx-pod 1/1 Running 0 26m 192.168.20.75 tp-192-168-2-165.ec2.internal <None> <None>
[root@EKS_Bootstrap_Server tmp]# ^C
[root@EKS_Bootstrap_Server tmp]#
```

Fig. Using Labels & Selector

Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.

Thank you for using nginx.

Fig. Output Successful out of Service Load Balancer Working.

Integrating Kubernetes in CI/CD pipeline:

Deleting previous configuration:

```
[root@EKS_Bootstrap_Server tmp]# kubectl get all
```

```
Kubeconfig user entry is using deprecated API version  
client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to  
update.
```

```
NAME          READY  STATUS   RESTARTS  AGE  
pod/nginx-pod 1/1    Running  0          35m
```

```
NAME          TYPE          CLUSTER-IP    EXTERNAL-IP  
PORT(S)      AGE
```

```
service/demo-service LoadBalancer 10.100.56.237  
afade1324bbc8455fa7b71537a4bcf6e-1513829373.us-east-  
1.elb.amazonaws.com 80:31295/TCP 30m
```

```
service/kubernetes ClusterIP 10.100.0.1 <none>  
443/TCP 8h
```

```
[root@EKS_Bootstrap_Server tmp]# kubectl delete pod/nginx-pod
```

Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.

pod "nginx-pod" deleted

```
[root@EKS_Bootstrap_Server tmp]# kubectl get po
```

Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.

No resources found in default namespace.

```
[root@EKS_Bootstrap_Server tmp]# kubectl delete service/demo-service
```

Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.

service "demo-service" deleted

```
[root@EKS_Bootstrap_Server tmp]#
```

Write a deployment file:

```
[root@EKS_Bootstrap_Server ~]# cat regapp-deploy.yml
```

```
apiVersion: apps/v1
```

```
kind: Deployment
```

```
metadata:
```

```
  name: saifshah-regapp
```

```
  labels:
```

```
    app: regapp
```

spec:

replicas: 3

selector:

matchLabels:

app: regapp

template:

metadata:

labels:

app: regapp

spec:

containers:

- name: regapp

image: saifshah/regapp

imagePullPolicy: Always

ports:

- containerPort: 8080

strategy:

type: RollingUpdate

rollingUpdate:

maxSurge: 1

maxUnavailable: 1

[root@EKS_Bootstrap_Server ~]# cat regapp-service.yml

apiVersion: v1

kind: Service

metadata:

name: saifshah-service

labels:

app: regapp

spec:

selector:

app: regapp

ports:

- port: 8080

targetPort: 8080

type: LoadBalancer

[root@EKS_Bootstrap_Server ~]#

[root@EKS_Bootstrap_Server ~]# ls

aws awscli2.zip regapp-deploy.yml regapp-service.yml

[root@EKS_Bootstrap_Server ~]# kubectl apply -f regapp-deploy.yml

Kubeconfig user entry is using deprecated API version

client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.

error: error when retrieving current configuration of:

Resource: "apps/v1, Resource=deployments", GroupVersionKind: "apps/v1, Kind=Deployment"

Name: "saifshah/regapp", Namespace: "default"

```
from server for: "regapp-deploy.yml": invalid resource name
"saifshah/regapp": [may not contain '/']
```

```
[root@EKS_Bootstrap_Server ~]# vi regapp-deploy.yml
```

```
[root@EKS_Bootstrap_Server ~]# clear
```

```
[root@EKS_Bootstrap_Server ~]# ls
```

```
aws awscliv2.zip regapp-deploy.yml regapp-service.yml
```

```
[root@EKS_Bootstrap_Server ~]# kubectl apply -f regapp-deploy.yml
```

```
Kubeconfig user entry is using deprecated API version
client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to
update.
```

```
deployment.apps/saifshah-regapp created
```

```
[root@EKS_Bootstrap_Server ~]# vi regapp-service.yml
```

```
[root@EKS_Bootstrap_Server ~]# kubectl apply -f regapp-service.yml
```

```
Kubeconfig user entry is using deprecated API version
client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to
update.
```

```
service/saifshah-service created
```

```
[root@EKS_Bootstrap_Server ~]# kubectl get all
```

```
Kubeconfig user entry is using deprecated API version
client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to
update.
```

| NAME | READY | STATUS | RESTARTS | AGE |
|--------------------------------------|-------|---------|----------|-------|
| pod/saifshah-regapp-67dc7d6554-5gdbh | 1/1 | Running | 0 | 3m53s |
| pod/saifshah-regapp-67dc7d6554-n8vfm | 1/1 | Running | 0 | 3m53s |
| pod/saifshah-regapp-67dc7d6554-q4bnf | 1/1 | Running | 0 | 3m53s |

| NAME | TYPE | CLUSTER-IP | EXTERNAL-IP |
|---------|------|------------|-------------|
| PORT(S) | AGE | | |

```
service/kubernetes ClusterIP 10.100.0.1 <none>
443/TCP 24h
```

```
service/saifshah-service LoadBalancer 10.100.223.173
a1968e704ce994e9e8a9832790201698-1437160444.us-east-
1.elb.amazonaws.com 8080:32727/TCP 3m4s
```

```
NAME READY UP-TO-DATE AVAILABLE AGE
deployment.apps/saifshah-regapp 3/3 3 3 3m53s
```

```
NAME DESIRED CURRENT READY AGE
replicaset.apps/saifshah-regapp-67dc7d6554 3 3 3 3m53s
```

```
[root@EKS_Bootstrap_Server ~]# kubectl describe
```

```
error: You must specify the type of resource to describe. Use "kubectl api-
resources" for a complete list of supported resources.
```

```
[root@EKS_Bootstrap_Server ~]# kubectl describe service/saifshah-service
```

```
Kubeconfig user entry is using deprecated API version
client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to
update.
```

```
Name: saifshah-service
```

```
Namespace: default
```

```
Labels: app=regapp
```

```
Annotations: <none>
```

```
Selector: app=regapp
```

```
Type: LoadBalancer
```

```
IP Family Policy: SingleStack
```

```
IP Families: IPv4
```

```
IP: 10.100.223.173
```

```
IPs: 10.100.223.173
```

LoadBalancer Ingress: a1968e704ce994e9e8a9832790201698-1437160444.us-east-1.elb.amazonaws.com

Port: <unset> 8080/TCP

TargetPort: 8080/TCP

NodePort: <unset> 32727/TCP

Endpoints:

192.168.0.41:8080,192.168.27.33:8080,192.168.33.84:8080

Session Affinity: None

External Traffic Policy: Cluster

Events:

| Type | Reason | Age | From | Message |
|------|--------|-----|------|---------|
|------|--------|-----|------|---------|

| Type | Reason | Age | From | Message |
|------|--------|-----|------|---------|
|------|--------|-----|------|---------|

| | | | | |
|--------|----------------------|-------|--------------------|------------------------|
| Normal | EnsuringLoadBalancer | 3m42s | service-controller | Ensuring load balancer |
|--------|----------------------|-------|--------------------|------------------------|

| | | | | |
|--------|---------------------|-------|--------------------|-----------------------|
| Normal | EnsuredLoadBalancer | 3m37s | service-controller | Ensured load balancer |
|--------|---------------------|-------|--------------------|-----------------------|

[root@EKS_Bootstrap_Server ~]# kubectl get pod -o wide

Kubeconfig user entry is using deprecated API version

client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.

| NAME | READY | STATUS | RESTARTS | AGE | IP | NODE |
|------|-------|--------|----------|-----|----|------|
|------|-------|--------|----------|-----|----|------|

| | | | | | | |
|----------------------------------|-----|---------|---|-------|--------------|------------------------------|
| saifshah-regapp-67dc7d6554-5gdbh | 1/1 | Running | 0 | 5m38s | 192.168.0.41 | ip-192-168-0-77.ec2.internal |
|----------------------------------|-----|---------|---|-------|--------------|------------------------------|

| | | | | | | |
|----------------------------------|-----|---------|---|-------|---------------|-------------------------------|
| saifshah-regapp-67dc7d6554-n8vfm | 1/1 | Running | 0 | 5m38s | 192.168.33.84 | ip-192-168-48-13.ec2.internal |
|----------------------------------|-----|---------|---|-------|---------------|-------------------------------|

| | | | | | | |
|----------------------------------|-----|---------|---|-------|---------------|------------------------------|
| saifshah-regapp-67dc7d6554-q4bnf | 1/1 | Running | 0 | 5m38s | 192.168.27.33 | ip-192-168-0-77.ec2.internal |
|----------------------------------|-----|---------|---|-------|---------------|------------------------------|

[root@EKS_Bootstrap_Server ~]#

After deletion 3 pods in replica set :

```
[root@EKS_Bootstrap_Server ~]# kubectl delete pod saifshah-regapp-67dc7d6554-5gdbh
```

```
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
```

```
pod "saifshah-regapp-67dc7d6554-5gdbh" deleted
```

```
[root@EKS_Bootstrap_Server ~]# kubectl get pod -o wide
```

```
Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.
```

| NAME | READY | STATUS | RESTARTS | AGE | IP | NODE |
|------|-------|--------|----------|-----|----|------|
|------|-------|--------|----------|-----|----|------|

| NOMINATED NODE | READINESS GATES |
|---|-------------------|
| saifshah-regapp-67dc7d6554-n8vfm | 1/1 Running 0 12m |
| 192.168.33.84 ip-192-168-48-13.ec2.internal | <none> <none> |

| | |
|--|-------------------|
| saifshah-regapp-67dc7d6554-q4bnf | 1/1 Running 0 12m |
| 192.168.27.33 ip-192-168-0-77.ec2.internal | <none> <none> |

| | |
|---|---------------------|
| saifshah-regapp-67dc7d6554-r6mkj | 1/1 Running 0 6s |
| 192.168.18.246 ip-192-168-0-77.ec2.internal | <none> <none> //new |

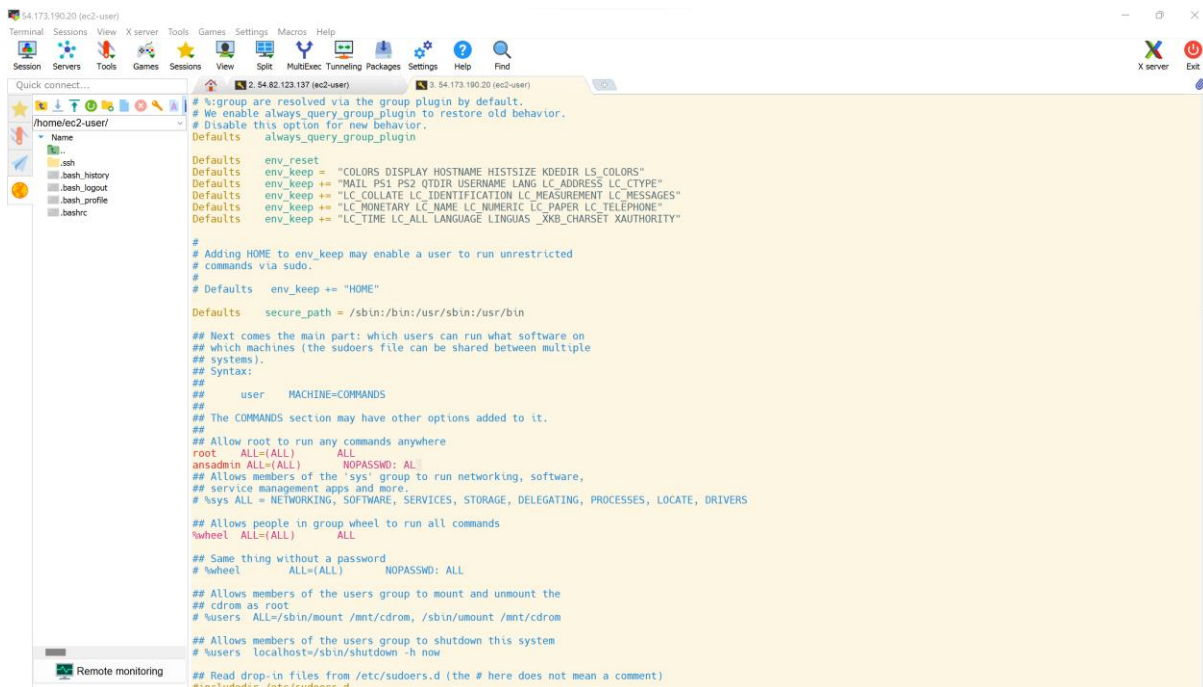
pod created

```
[root@EKS_Bootstrap_Server ~]#
```

Integrate Kubernetes Bootstrap Server with Ansible:

On Bootstrap Server:

- Create ansadmin
`[root@EKS_Bootstrap_Server ~]# useradd ansadmin`
`[root@EKS_Bootstrap_Server ~]# visudo`
- Add ansadmin to sudoers file



```
54.173.190.20 (ec2-user)
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help Find
Quick connect...
/home/ec2-user/
Name
.ssh
.bash_history
.bash_logout
.bash_profile
.bashrc
# %group are resolved via the group plugin by default.
# We enable always_query_group_plugin to restore old behavior.
# Disable this option for new behavior.
Defaults    always_query_group_plugin

Defaults    env_reset
Defaults    env_keep = "COLORS DISPLAY HOSTNAME HISTSIZE KDEDIR LS_COLORS"
Defaults    env_keep += "MAIL PS1 PS2 QTDIR USERNAME LANG LC_ADDRESS LC_CTYPE"
Defaults    env_keep += "LC_COLLATE LC_IDENTIFICATION LC_MEASUREMENT LC_MESSAGES"
Defaults    env_keep += "LC_MONETARY LC_NAME LC_NUMERIC LC_PAPER LC_TELEPHONE"
Defaults    env_keep += "LC_TIME LC_ALL LANGUAGE LINGUAS _XKB_CHARSET XAUTHORITY"

#
# Adding HOME to env_keep may enable a user to run unrestricted
# commands via sudo.
#
# Defaults    env_keep += "HOME"
Defaults    secure_path = /sbin:/bin:/usr/sbin:/usr/bin

## Next comes the main part: which users can run what software on
## which machines (the sudoers file can be shared between multiple
## systems).
## Syntax:
##
## user MACHINE=COMMANDS
##
## The COMMANDS section may have other options added to it.
##
## Allow root to run any commands anywhere
root    ALL=(ALL)    ALL
ansadmin ALL=(ALL)    NOPASSWD: ALL
## Allows members of the 'sys' group to run networking, software,
## service management apps and more.
## %sys ALL = NETWORKING, SOFTWARE, SERVICES, STORAGE, DELEGATING, PROCESSES, LOCATE, DRIVERS

## Allows people in group wheel to run all commands
%wheel  ALL=(ALL)    ALL

## Same thing without a password
%wheel  ALL=(ALL)    NOPASSWD: ALL

## Allows members of the users group to mount and unmount the
## cdrom as root
## %users ALL=/sbin/mount /mnt/cdrom, /sbin/umount /mnt/cdrom

## Allows members of the users group to shutdown this system
## %users localhost=/sbin/shutdown -h now

## Read drop-in files from /etc/sudoers.d (the # here does not mean a comment)
#include_dir /etc/sudoers.d
```

Fig. Add ansadmin to sudoers file

- Enable Password based login

[root@EKS_Bootstrap_Server ~]# service sshd reload
Redirecting to /bin/systemctl reload sshd.service

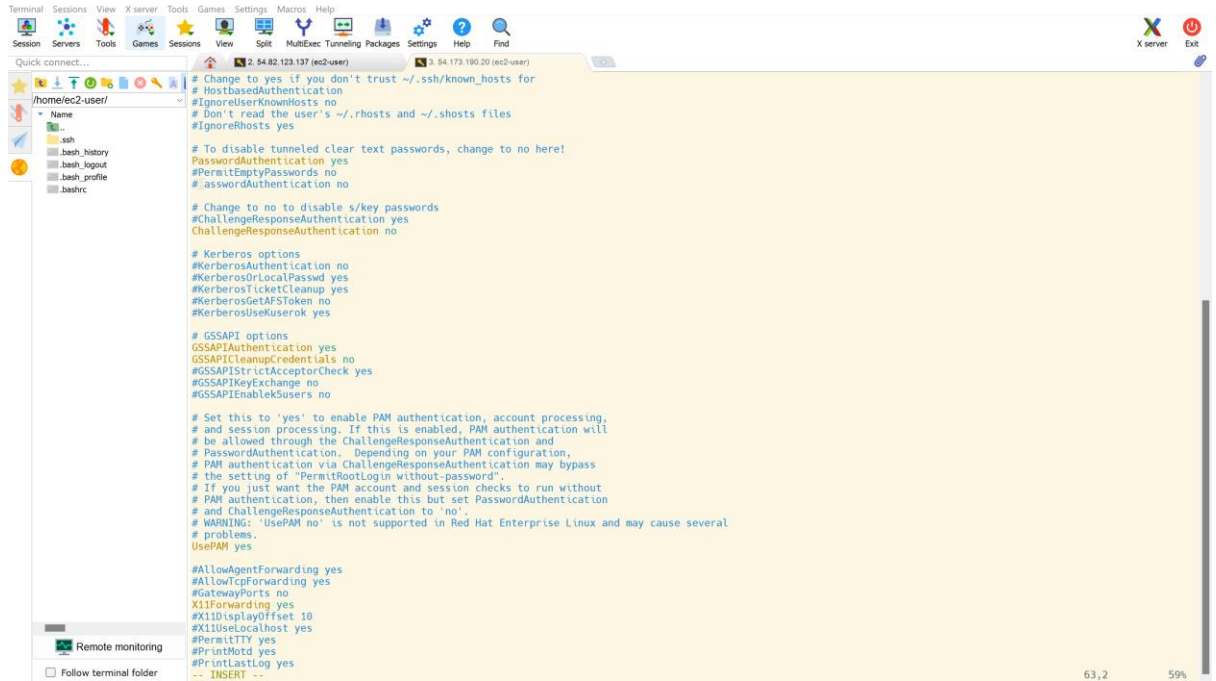


Fig. [root@EKS_Bootstrap_Server ~]# vi /etc/ssh/sshd_config

On Ansible Node:

[root@Ansible Server ~]# sudo su - ansadmin

Last login: Sat May 14 08:19:14 UTC 2022 from 152.57.213.2 on pts/1

[ansadmin@Ansible Server ~]\$ cd /opt/docker

[ansadmin@Ansible Server docker]\$ ll

total 16

-rw-rw-r-- 1 ansadmin ansadmin 381 May 14 07:49 deploy regapp.yml

-rw-rw-r-- 1 ansadmin ansadmin 528 May 13 12:12 Dockerfile

-rw-rw-r-- 1 ansadmin ansadmin 357 May 13 18:21 regapp.yml

-rw-rw-r-- 1 ansadmin ansadmin 2913 May 14 08:28 webapp.war

[ansadmin@Ansible Server docker]\$ mv regapp.yml
create image regapp.yml

[ansadmin@Ansible Server docker]\$ ll

total 16

-rw-rw-r-- 1 ansadmin ansadmin 357 May 13 18:21
create image regapp.yml

-rw-rw-r-- 1 ansadmin ansadmin 381 May 14 07:49 deploy regapp.yml

-rw-rw-r-- 1 ansadmin ansadmin 528 May 13 12:12 Dockerfile

-rw-rw-r-- 1 ansadmin ansadmin 2913 May 14 08:28 webapp.war

[ansadmin@Ansible Server docker]\$ cat deploy regapp.yml

- hosts : dockerhost

tasks:

- name : stop existing container

command : docker stop regapp-server

- name : remove the container

command : docker rm regapp-server

- name : remove image

command : docker rmi saifshah/regapp:latest

- name : create docker container

command : docker run -d --name regapp-server -p 8082:8080
saifshah/regapp:latest

```
[ansadmin@Ansible Server docker]$ mv deploy regapp.yml  
docker deployment regapp.yml
```

```
[ansadmin@Ansible Server docker]$ ll
```

```
total 16
```

```
-rw-rw-r-- 1 ansadmin ansadmin 357 May 13 18:21  
create image regapp.yml
```

```
-rw-rw-r-- 1 ansadmin ansadmin 381 May 14 07:49  
docker deployment regapp.yml
```

```
-rw-rw-r-- 1 ansadmin ansadmin 528 May 13 12:12 Dockerfile
```

```
-rw-rw-r-- 1 ansadmin ansadmin 2913 May 14 08:28 webapp.war
```

```
[ansadmin@Ansible Server docker]$
```

```
[root@EKS Bootstrap Server ~]# passwd ansadmin
```

```
Changing password for user ansadmin.
```

```
New password:
```

```
BAD PASSWORD: The password contains the user name in some form
```

```
Retype new password:
```

```
passwd: all authentication tokens updated successfully.
```

```
[root@EKS Bootstrap Server ~]#
```

- Add to hosts file

```
[ansadmin@Ansible_Server docker]$ vi hosts
```

```
[ansadmin@Ansible_Server docker]$ cat hosts
```

```
localhost
```

```
[kubernetes]
```

172.31.85.40

[ansible]

172.31.26.13

[ansadmin@Ansible_Server docker]\$

- Copy ssh keys

```
[ansadmin@Ansible_Server docker]$ ssh-copy-id 172.31.85.40
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed:
"/home/ansadmin/.ssh/id_rsa.pub"
The authenticity of host '172.31.85.40 (172.31.85.40)' can't be
established.
ECDSA key fingerprint is
SHA256:eBN1hfJascvuNM/WaTVamjZqJOqCVahsgPQKljMW+0E.
ECDSA key fingerprint is
MD5:5f:dd:07:95:8a:01:be:8a:85:a8:52:7e:4e:e7:46:a2.
Are you sure you want to continue connecting (yes/no)? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s),
to filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are
prompted now it is to install the new keys
ansadmin@172.31.85.40's password:
```

```
Number of key(s) added: 1
```

```
Now try logging into the machine, with: "ssh '172.31.85.40'"
and check to make sure that only the key(s) you wanted were added.
```

- Test the Connection

```
[ansadmin@Ansible_Server docker]$ ansible -i hosts all -a uptime
[WARNING]: Platform linux on host 172.31.85.40 is using the
discovered Python interpreter at /usr/bin/python, but future
installation of another Python interpreter
could change this. See
https://docs.ansible.com/ansible/2.9/reference\_appendices/interpreter\_discovery.html for more information.
172.31.85.40 | CHANGED | rc=0 >>
18:47:04 up 25 min, 3 users, load average: 0.00, 0.00, 0.00
[WARNING]: Platform linux on host localhost is using the discovered
Python interpreter at /usr/bin/python, but future installation of
another Python interpreter
could change this. See
https://docs.ansible.com/ansible/2.9/reference\_appendices/interpreter\_discovery.html for more information.
localhost | CHANGED | rc=0 >>
18:47:04 up 26 min, 4 users, load average: 0.00, 0.00, 0.00
[WARNING]: Platform linux on host 172.31.26.13 is using the
discovered Python interpreter at /usr/bin/python, but future
installation of another Python interpreter
could change this. See
https://docs.ansible.com/ansible/2.9/reference\_appendices/interpreter\_discovery.html for more information.
172.31.26.13 | CHANGED | rc=0 >>
18:47:04 up 26 min, 4 users, load average: 0.00, 0.00, 0.00
```

Create Ansible Playbooks for deployment and Service File:

```
[ansadmin@Ansible_Server docker]$ vi kube_deploy.yml
```

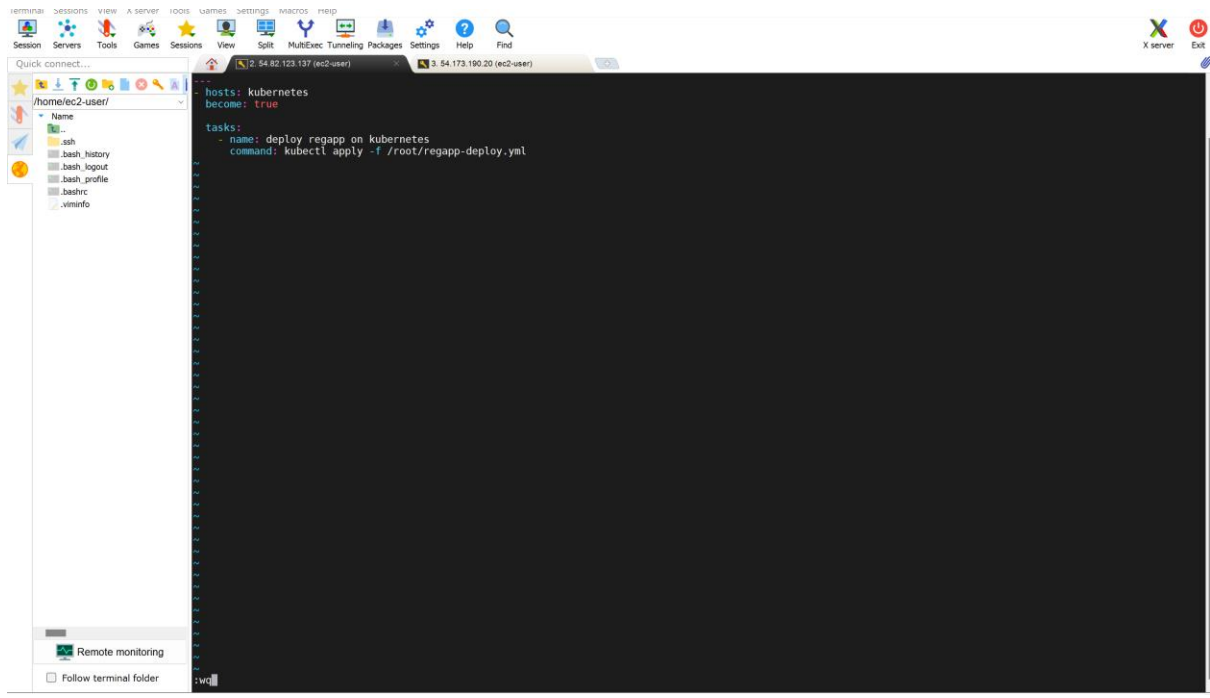


Fig. Kubernetes deploy file created

[ansadmin@Ansible Server docker]\$ vi kube_service.yml

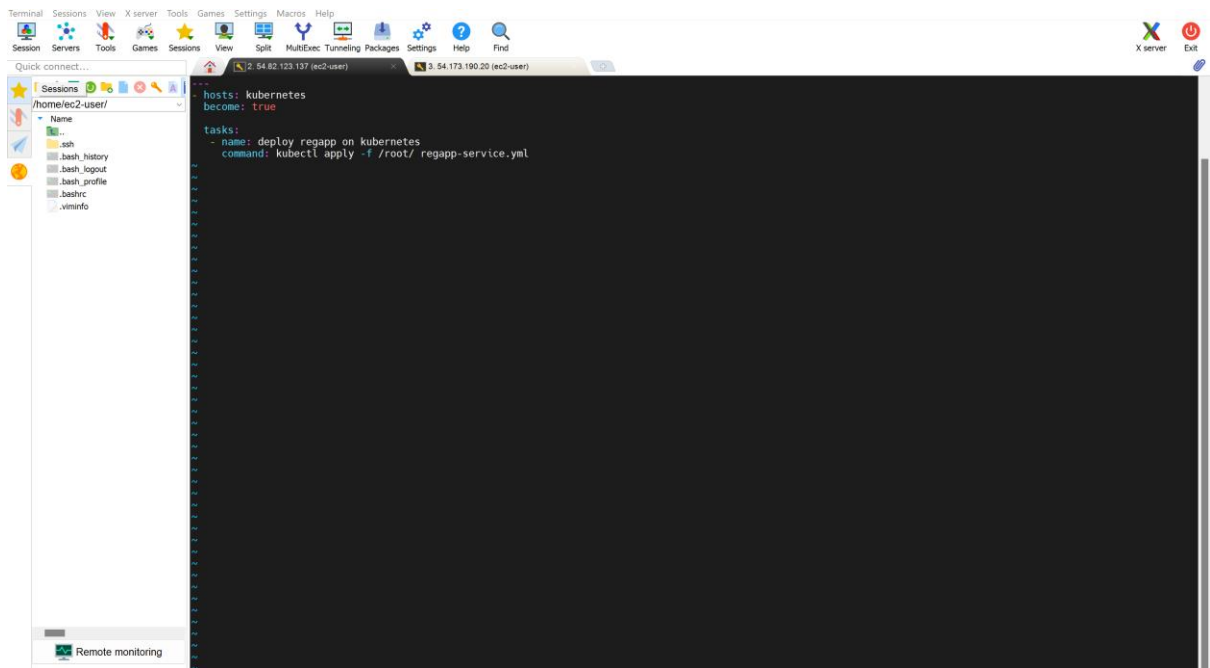


Fig. Kubernetes service file created

[ansadmin@Ansible Server docker]\$ ls

create image regapp.yml docker deployment regapp.yml Dockerfile hosts webapp.war

[ansadmin@Ansible Server docker]\$ vi kube_deploy.yml

[ansadmin@Ansible Server docker]\$ vi kube_deploy.yml

[ansadmin@Ansible Server docker]\$ ^C

[ansadmin@Ansible Server docker]\$ vi kube_service.yml

[ansadmin@Ansible Server docker]\$ ^C

[ansadmin@Ansible Server docker]\$ ansible-playbook -i /root/docker/hosts kube_deploy.yml

[WARNING]: Unable to parse /root/docker/hosts as an inventory source

[WARNING]: No inventory was parsed, only implicit localhost is available

[WARNING]: provided hosts list is empty, only localhost is available. Note that the implicit localhost does not match 'all'

[WARNING]: Could not match supplied host pattern, ignoring: kubernetes

PLAY [kubernetes]

skipping: no hosts matched

PLAY RECAP

[ansadmin@Ansible Server docker]\$ ansible-playbook -i /opt/docker/hosts kube_deploy.yml

PLAY [kubernetes]

```
*****  
*****  
*****
```

TASK [Gathering Facts]

```
*****  
*****  
*****
```

[WARNING]: Platform linux on host 172.31.85.40 is using the discovered Python interpreter at /usr/bin/python, but future installation of another Python interpreter

could change this. See

https://docs.ansible.com/ansible/2.9/reference_appendices/interpreter_discovery.html for more information.

ok: [172.31.85.40]

TASK [deploy regapp on kubernetes]

```
*****  
*****  
***
```

fatal: [172.31.85.40]: FAILED! => {"changed": false, "cmd": "kubectl apply -f /root/regapp-deploy.yml", "msg": "[Errno 2] No such file or directory", "rc": 2}

PLAY RECAP

```
*****  
*****  
*****
```

172.31.85.40 : ok=1 changed=0 unreachable=0 failed=1 skipped=0 rescued=0 ignored=0

```
[ansadmin@Ansible Server docker]$ vi kube_deploy.yml
```

```
[ansadmin@Ansible Server docker]$ ansible-playbook -i /opt/docker/hosts  
kube_deploy.yml
```

```
PLAY [kubernetes]
```

```
*****  
*****  
*****
```

```
TASK [Gathering Facts]
```

```
*****  
*****  
*****
```

```
fatal: [172.31.85.40]: UNREACHABLE! => {"changed": false, "msg": "Failed to  
connect to the host via ssh: Permission denied (publickey,gssapi-  
keyex,gssapi-with-mic,password).", "unreachable": true}
```

```
PLAY RECAP
```

```
*****  
*****  
*****
```

```
172.31.85.40 : ok=0 changed=0 unreachable=1 failed=0  
skipped=0 rescued=0 ignored=0
```

```
[ansadmin@Ansible Server docker]$ vi kube_deploy.yml
```

```
[ansadmin@Ansible Server docker]$ ls
```

```
create_image regapp.yml docker deployment regapp.yml Dockerfile hosts  
kube_deploy.yml kube_service.yml webapp.war
```

```
[ansadmin@Ansible Server docker]$ vi kube_service.yml
```

```
[ansadmin@Ansible Server docker]$
```

```
[ansadmin@Ansible Server docker]$ ansible-playbook -i /opt/docker/hosts  
kube_deploy.yml
```

```
PLAY [kubernetes]
```

```
*****  
*****  
*****
```

```
TASK [Gathering Facts]
```

```
*****  
*****  
*****
```

```
fatal: [172.31.85.40]: UNREACHABLE! => {"changed": false, "msg": "Failed to  
connect to the host via ssh: Permission denied (publickey,gssapi-  
keyex,gssapi-with-mic,password).", "unreachable": true}
```

```
PLAY RECAP
```

```
*****  
*****  
*****
```

```
172.31.85.40 : ok=0 changed=0 unreachable=1 failed=0  
skipped=0 rescued=0 ignored=0
```

```
[ansadmin@Ansible Server docker]$ vi kube_deploy.yml
```

```
[ansadmin@Ansible Server docker]$ ls
```

```
create_image regapp.yml docker deployment regapp.yml Dockerfile hosts  
kube_deploy.yml kube_service.yml webapp.war
```

```
[ansadmin@Ansible Server docker]$ vi kube_service.yml
```

[ansadmin@Ansible Server docker]\$ ^C

[ansadmin@Ansible Server docker]\$ ansible-playbook -i /opt/docker/hosts kube_deploy.yml

PLAY [kubernetes]

```
*****
*****
*****
```

TASK [Gathering Facts]

```
*****
*****
*****
```

fatal: [172.31.85.40]: UNREACHABLE! => {"changed": false, "msg": "Failed to connect to the host via ssh: Permission denied (publickey,gssapi-keyex,gssapi-with-mic,password).", "unreachable": true}

PLAY RECAP

```
*****
*****
*****
```

172.31.85.40 : ok=0 changed=0 unreachable=1 failed=0 skipped=0 rescued=0 ignored=0

[ansadmin@Ansible Server docker]\$

[ansadmin@Ansible Server docker]\$ ssh copy-id 172.31.85.40

-bash: ssh copy-id: command not found

[ansadmin@Ansible Server docker]\$ ssh-copy-id 172.31.85.40

/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed:
"/home/ansadmin/.ssh/id_rsa.pub"

/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter
out any that are already installed

/usr/bin/ssh-copy-id: WARNING: All keys were skipped because they already
exist on the remote system.

(if you think this is a mistake, you may want to use -f option)

[ansadmin@Ansible Server docker]\$ ansible-playbook -i /opt/docker/hosts
kube_deploy.yml

PLAY [kubernetes]

TASK [Gathering Facts]

fatal: [172.31.85.40]: UNREACHABLE! => {"changed": false, "msg": "Failed to
connect to the host via ssh: Permission denied (publickey,gssapi-
keyex,gssapi-with-mic,password).", "unreachable": true}

PLAY RECAP

172.31.85.40 : ok=0 changed=0 unreachable=1 failed=0
skipped=0 rescued=0 ignored=0

[ansadmin@Ansible Server docker]\$ ssh-copy-id 172.31.85.40

/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed:

"/home/ansadmin/.ssh/id_rsa.pub"

/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed

/usr/bin/ssh-copy-id: WARNING: All keys were skipped because they already exist on the remote system.

(if you think this is a mistake, you may want to use -f option)

[ansadmin@Ansible Server docker]\$ ssh-copy-id root@172.31.85.40

/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed:

"/home/ansadmin/.ssh/id_rsa.pub"

/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed

/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install the new keys

root@172.31.85.40's password:

Number of key(s) added: 1

Now try logging into the machine, with: "ssh 'root@172.31.85.40'"

and check to make sure that only the key(s) you wanted were added.

[ansadmin@Ansible Server docker]\$ vi kube_service.yml

```
[ansadmin@Ansible Server docker]$ cat kube_deploy.yml
```

```
---
```

```
- hosts: kubernetes
```

```
#become: true
```

```
user: root
```

```
tasks:
```

```
- name: deploy regapp on kubernetes
```

```
command: kubectl apply -f regapp-deploy.yml
```

```
[ansadmin@Ansible Server docker]$ cat kube_service.yml
```

```
---
```

```
- hosts: kubernetes
```

```
# become: true
```

```
user : root
```

```
tasks:
```

```
- name: deploy regapp on kubernetes
```

```
command: kubectl apply -f regapp-service.yml
```

```
[ansadmin@Ansible Server docker]$ ansible-playbook -i /opt/docker/hosts  
kube_service.yml
```

```
PLAY [kubernetes]
```

```
*****
```

```
*****
```

```
*****
```

```
TASK [Gathering Facts]
```

```
*****
```

[WARNING]: Platform linux on host 172.31.85.40 is using the discovered Python interpreter at /usr/bin/python, but future installation of another Python interpreter

could change this. See

https://docs.ansible.com/ansible/2.9/reference_appendices/interpreter_discovery.html for more information.

ok: [172.31.85.40]

TASK [deploy regapp on kubernetes]

*

changed: [172.31.85.40]

PLAY RECAP

172.31.85.40 : ok=2 changed=1 unreachable=0 failed=0

skipped=0 rescued=0 ignored=0

[ansadmin@Ansible Server docker]\$

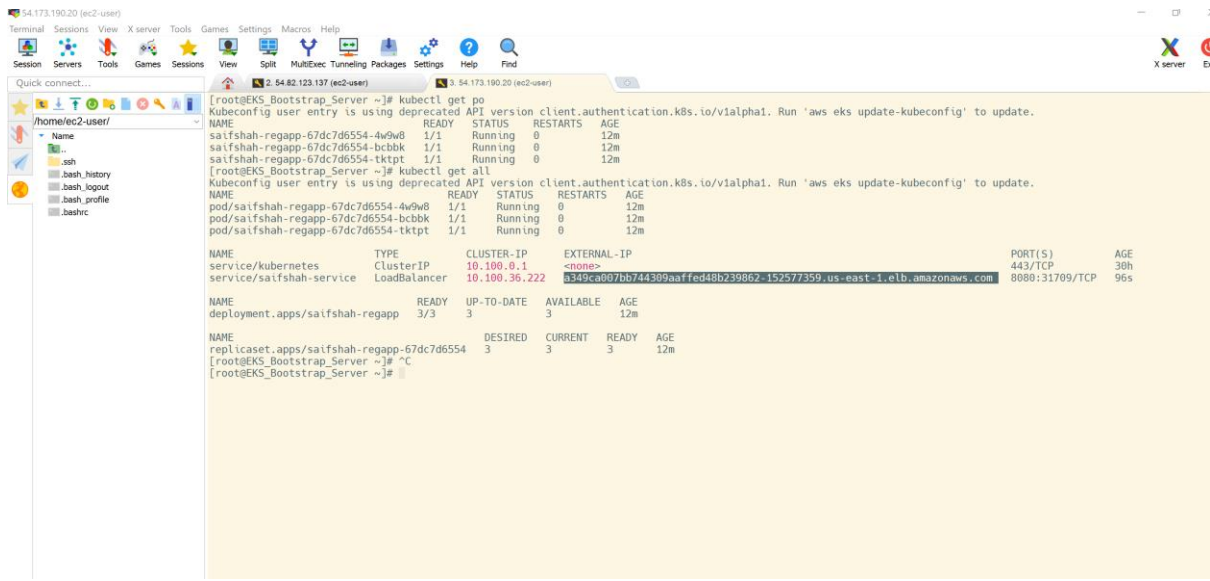


Fig. Ansible Deploy and Service playbook

Create Jenkins Deployment Job for Kubernetes:

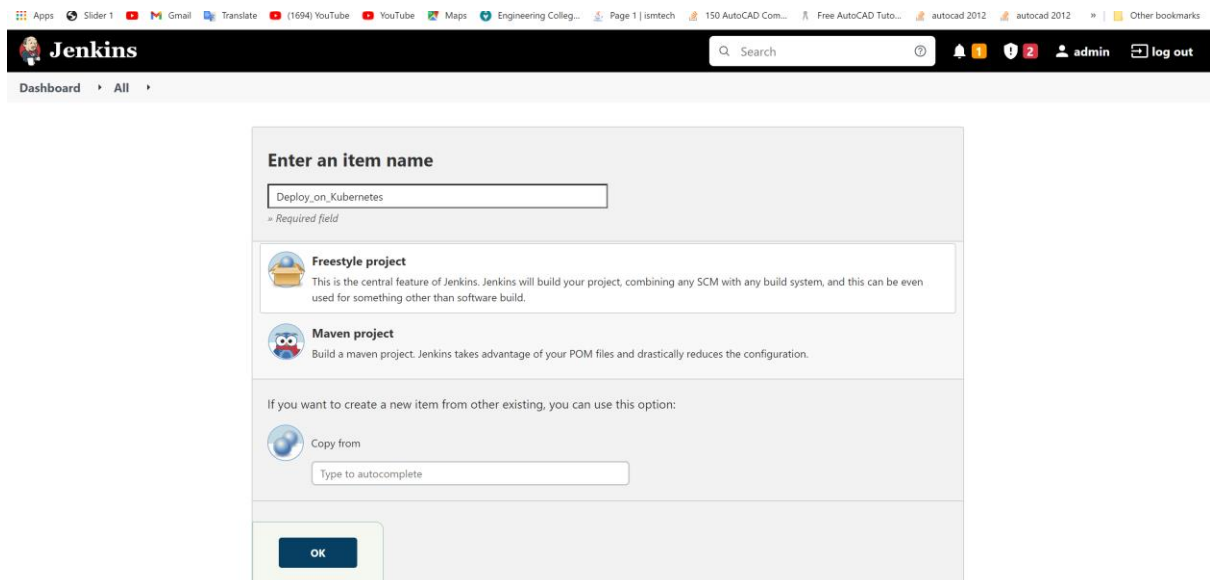


Fig. Deploy_on_Kubernetes

[ansadmin@Ansible_Server docker]\$ ll

total 28

-rw-rw-r-- 1 ansadmin ansadmin 357 May 13 18:21
create_image_regapp.yml

-rw-rw-r-- 1 ansadmin ansadmin 381 May 14 07:49
docker_deployment_regapp.yml

-rw-rw-r-- 1 ansadmin ansadmin 528 May 13 12:12 Dockerfile

-rw-rw-r-- 1 ansadmin ansadmin 62 May 17 18:42 hosts

-rw-rw-r-- 1 ansadmin ansadmin 154 May 17 19:13 kube_deploy.yml

-rw-rw-r-- 1 ansadmin ansadmin 154 May 17 19:31 kube_service.yml

-rw-rw-r-- 1 ansadmin ansadmin 2913 May 14 08:28 webapp.war

[ansadmin@Ansible_Server docker]\$ ansible-playbook -i /opt/docker/hosts
kube_service.yml^C

[ansadmin@Ansible_Server docker]\$

[root@EKS_Bootstrap_Server ~]# kubectl get all

Kubeconfig user entry is using deprecated API version
client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to
update.

| NAME | READY | STATUS | RESTARTS | AGE |
|--------------------------------------|-------|---------|----------|-----|
| pod/saifshah-regapp-67dc7d6554-9pt6r | 1/1 | Running | 0 | 13h |
| pod/saifshah-regapp-67dc7d6554-dhnqk | 1/1 | Running | 0 | 13h |
| pod/saifshah-regapp-67dc7d6554-nb9rw | 1/1 | Running | 0 | 13h |

| NAME | TYPE | CLUSTER-IP | EXTERNAL-IP |
|--------------------|-----------|------------|-------------|
| service/kubernetes | ClusterIP | 10.100.0.1 | <none> |
| 443/TCP | 45h | | |

service/saifshah-service LoadBalancer 10.100.36.222
a349ca007bb744309aaffed48b239862-152577359.us-east-
1.elb.amazonaws.com 8080:31709/TCP 14h

| NAME | READY | UP-TO-DATE | AVAILABLE | AGE |
|---------------------------------|-------|------------|-----------|-----|
| deployment.apps/saifshah-regapp | 3/3 | 3 | 3 | 14h |

| NAME | DESIRED | CURRENT | READY | AGE |
|--|---------|---------|-------|-----|
| replicaset.apps/saifshah-regapp-67dc7d6554 | 3 | 3 | 3 | 14h |

```
[root@EKS_Bootstrap_Server ~]# kubectl delete deployment.apps/saifshah-  
regapp
```

Kubeconfig user entry is using deprecated API version
client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to
update.

```
deployment.apps "saifshah-regapp" deleted
```

```
[root@EKS_Bootstrap_Server ~]# kubectl delete service/saifshah-service
```

Kubeconfig user entry is using deprecated API version
client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to
update.

```
service "saifshah-service" deleted
```

```
[root@EKS_Bootstrap_Server ~]#
```

```
[root@EKS_Bootstrap_Server ~]# clear
```

```
[root@EKS_Bootstrap_Server ~]# kubectl get all
```

Kubeconfig user entry is using deprecated API version
client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to
update.

| NAME | TYPE | CLUSTER-IP | EXTERNAL-IP | PORT(S) | AGE |
|--------------------|-----------|------------|-------------|---------|-----|
| service/kubernetes | ClusterIP | 10.100.0.1 | <none> | 443/TCP | 45h |

```
[root@EKS_Bootstrap_Server ~]# kubectl get all
```

Kubeconfig user entry is using deprecated API version

client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.

| NAME | READY | STATUS | RESTARTS | AGE |
|--------------------------------------|-------|---------|----------|-----|
| pod/saifshah-regapp-67dc7d6554-m4ck9 | 1/1 | Running | 0 | 27s |
| pod/saifshah-regapp-67dc7d6554-rr58w | 1/1 | Running | 0 | 27s |
| pod/saifshah-regapp-67dc7d6554-x24cx | 1/1 | Running | 0 | 27s |

| NAME | TYPE | CLUSTER-IP | EXTERNAL-IP |
|--------------------|-----------|------------|-------------|
| service/kubernetes | ClusterIP | 10.100.0.1 | <none> |
| 443/TCP | 45h | | |

| | | | |
|--|----------------|---------------|--|
| service/saifshah-service | LoadBalancer | 10.100.156.66 | |
| a5cc75730006140938846b05fc830300-559804141.us-east-1.elb.amazonaws.com | 8080:30620/TCP | 23s | |

| NAME | READY | UP-TO-DATE | AVAILABLE | AGE |
|---------------------------------|-------|------------|-----------|-----|
| deployment.apps/saifshah-regapp | 3/3 | 3 | 3 | 27s |

| NAME | DESIRED | CURRENT | READY | AGE |
|--|---------|---------|-------|-----|
| replicaset.apps/saifshah-regapp-67dc7d6554 | 3 | 3 | 3 | 27s |

```
[root@EKS_Bootstrap_Server ~]#
```

[ansadmin@Ansible_Server docker]\$ vi kube_deploy.yml

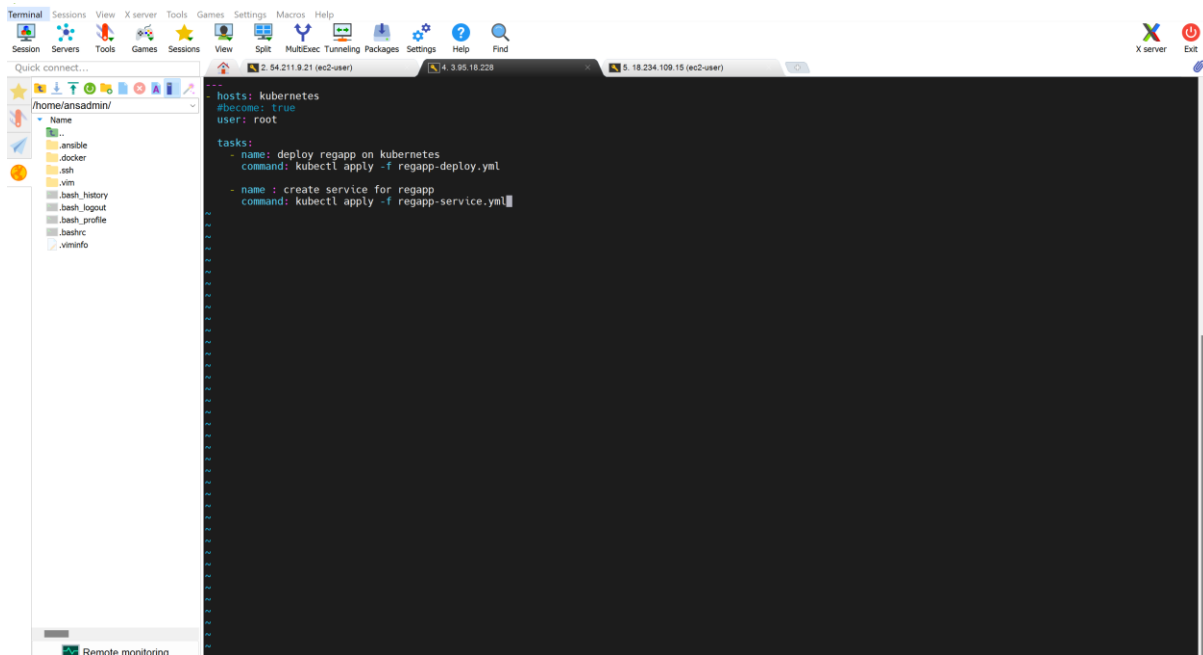


Fig. Merging Service File & Deployment File

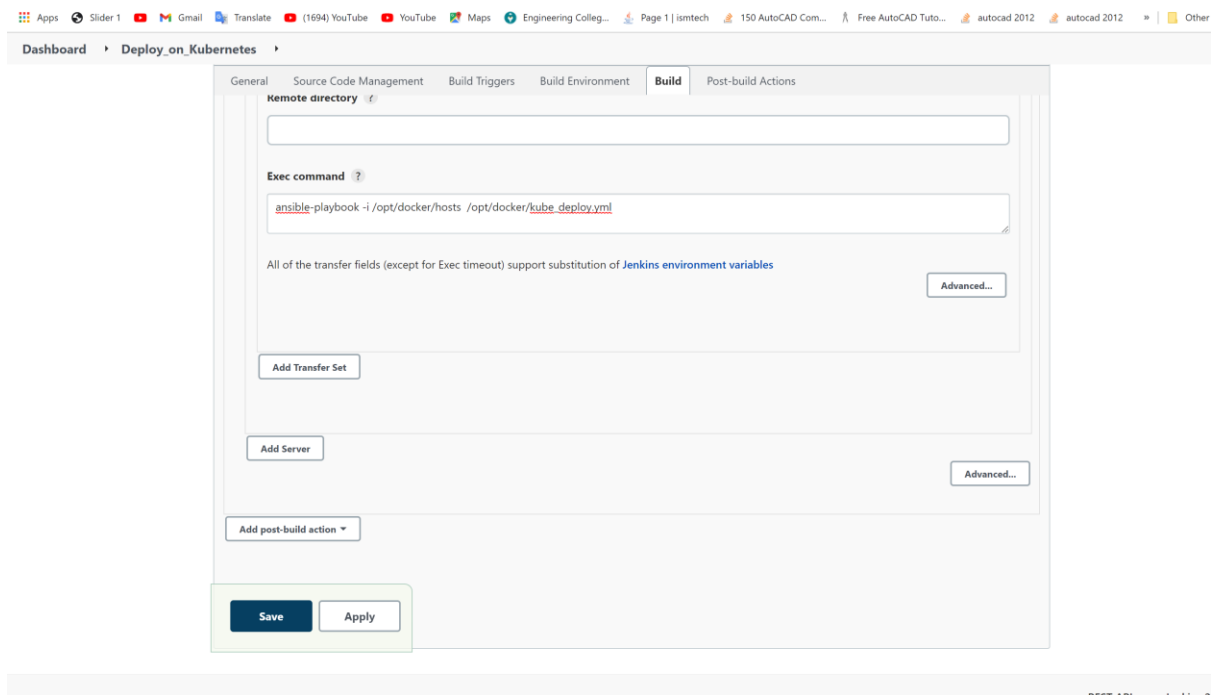


Fig. Exec Command Merge Service File & Deployment File

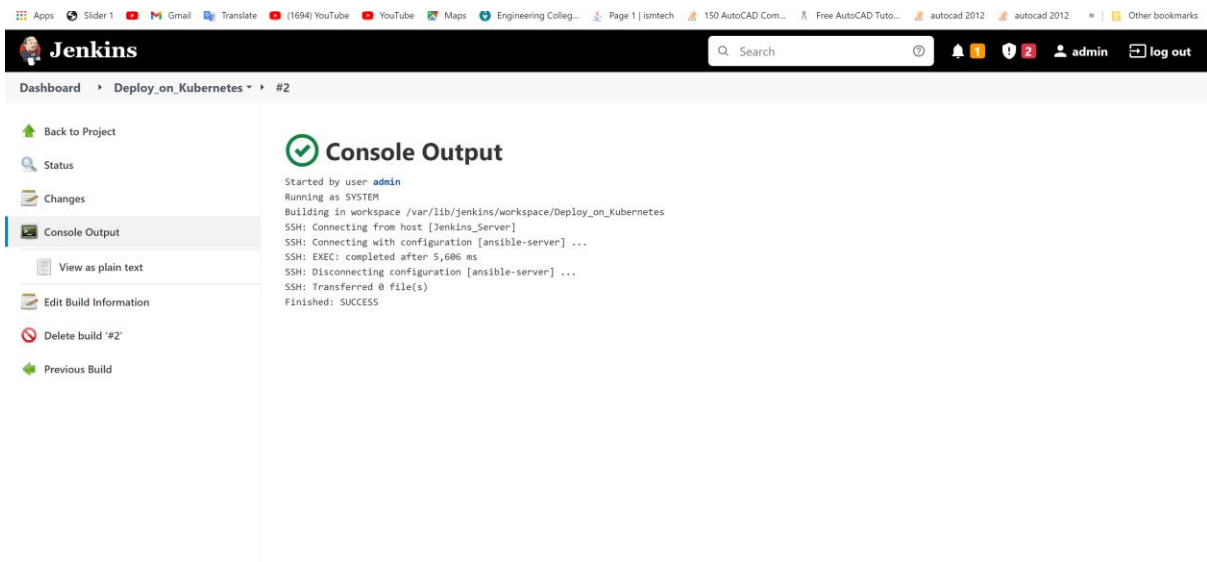


Fig. Build Success

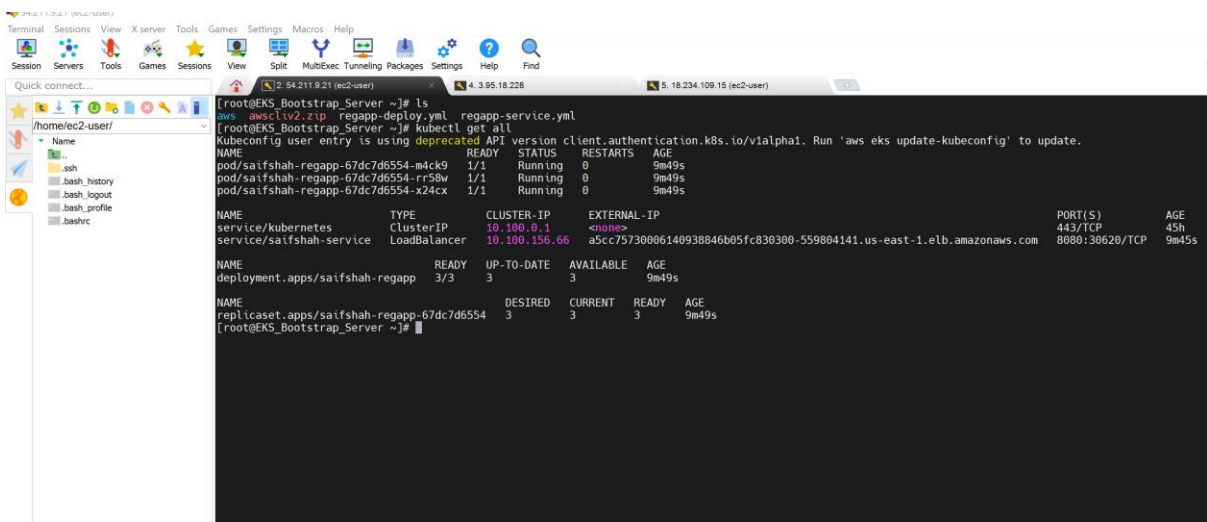




Fig. kubectl get all services & deployment .

CI Job to create Image for Kubernetes:

Enter an item name

» Required field

 **Freestyle project**
This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.

 **Maven project**
Build a maven project. Jenkins takes advantage of your POM files and drastically reduces the configuration.

If you want to create a new item from other existing, you can use this option:


 Copy from

Fig. Creating CI Job

Dashboard > RegApp_CI_Job >

General Source Code Management Build Triggers Build Environment Pre Steps Build Post Steps Build Settings **Post-build Actions**

Remote directory

Exec command

All of the transfer fields (except for Exec timeout) support substitution of [Jenkins environment variables](#)

Fig. Adding Image File

[ansadmin@Ansible_Server docker]\$ ll

total 28


```
-rw-rw-r-- 1 ansadmin ansadmin 357 May 13 18:21 create_image_regapp.yml
```

```
-rw-rw-r-- 1 ansadmin ansadmin 381 May 14 07:49
```

```
docker_deployment_regapp.yml
```

```
-rw-rw-r-- 1 ansadmin ansadmin 528 May 13 12:12 Dockerfile
```

```
-rw-rw-r-- 1 ansadmin ansadmin 62 May 17 18:42 hosts
```

```
-rw-rw-r-- 1 ansadmin ansadmin 245 May 18 09:48 kube_deploy.yml
```

```
-rw-rw-r-- 1 ansadmin ansadmin 154 May 17 19:31 kube_service.yml
```

```
-rw-rw-r-- 1 ansadmin ansadmin 2913 May 14 08:28 webapp.war
```

```
[ansadmin@Ansible_Server docker]$ cat create_image_regapp.yml
```

```
---
```

```
- hosts: ansible
```

```
tasks:
```

```
- name : create docker image
```

```
command : docker build -t regapp:latest .
```

```
args :
```

```
chdir : /opt/docker
```

```
- name : create tag to push image on docker hub
```

```
command : docker tag regapp:latest saifshah/regapp:latest
```

```
- name : push docker image on docker hub
```

```
command : docker push saifshah/regapp:latest
```

```
[ansadmin@Ansible_Server docker]$ ^C
```

```
[ansadmin@Ansible_Server docker]$ docker login
```

Authenticating with existing credentials...

Login did not succeed, error: Cannot connect to the Docker daemon at unix:///var/run/docker.sock. Is the docker daemon running?

Login with your Docker ID to push and pull images from Docker Hub. If you don't have a Docker ID, head over to <https://hub.docker.com> to create one.

Username (saifshah): saifshah

Password:

WARNING! Your password will be stored unencrypted in /home/ansadmin/.docker/config.json.

Configure a credential helper to remove this warning. See

<https://docs.docker.com/engine/reference/commandline/login/#credentials-store>

Login Succeeded

```
[ansadmin@Ansible_Server docker]$ docker images
```

Cannot connect to the Docker daemon at unix:///var/run/docker.sock. Is the docker daemon running?

```
[ansadmin@Ansible_Server docker]$ service docker start
```

Redirecting to /bin/systemctl start docker.service

Failed to start docker.service: The name org.freedesktop.PolicyKit1 was not provided by any .service files

See system logs and 'systemctl status docker.service' for details.

```
[ansadmin@Ansible_Server docker]$ docker images
```

Cannot connect to the Docker daemon at unix:///var/run/docker.sock. Is the docker daemon running?

```
[ansadmin@Ansible_Server docker]$ sudo service docker start
```

Redirecting to /bin/systemctl start docker.service

```
[ansadmin@Ansible_Server docker]$ docker images
```

| REPOSITORY | TAG | IMAGE ID | CREATED | SIZE |
|-----------------|--------|--------------|--------------|-------|
| saifshah/regapp | latest | 15574dfecf93 | 4 days ago | 510MB |
| regapp | latest | 15574dfecf93 | 4 days ago | 510MB |
| regapp | v1 | 15574dfecf93 | 4 days ago | 510MB |
| tomcat | latest | 6a1271dfce51 | 6 days ago | 680MB |
| centos | latest | 5d0da3dc9764 | 8 months ago | 231MB |

[ansadmin@Ansible_Server docker]\$,

The screenshot shows the Jenkins web interface for a job named 'RegApp_CI_Job'. The 'Console Output' tab is active, displaying the following text:

```

Started by user admin
Running as SYSTEM
Building in workspace /var/lib/jenkins/workspace/RegApp_CI_Job
The recommended git tool is: NONE
No credentials specified
> git rev-parse --resolve-git-dir /var/lib/jenkins/workspace/RegApp_CI_Job/.git # timeout=10
Fetching changes from the remote Git repository
> git config remote.origin.url https://github.com/SaifPanjasha/hello-world.git # timeout=10
Fetching upstream changes from https://github.com/SaifPanjasha/hello-world.git
> git --version # timeout=10
> git --version # 'git version 2.32.0'
> git fetch --tags --force --progress -- https://github.com/SaifPanjasha/hello-world.git +refs/heads/*:refs/remotes/origin/* # timeout=10
> git rev-parse refs/remotes/origin/master^{commit} # timeout=10
Checking out Revision 9415bc7b35ecd4582ce4bc6801ed3dc9826395ea (refs/remotes/origin/master)
> git config core.sparsecheckout # timeout=10
> git checkout -f 9415bc7b35ecd4582ce4bc6801ed3dc9826395ea # timeout=10
Commit message: "Update registry in index.jsp"
> git rev-list --no-walk 9415bc7b35ecd4582ce4bc6801ed3dc9826395ea # timeout=10
Parsing POMs
Established TCP socket on 45517
[RegApp_CI_Job] $ /usr/lib/jvm/java-11-openjdk-11.0.13.0-8-1.amzn2.0.3.x86_64/bin/java -cp /var/lib/jenkins/plugins/maven-plugin/WEB-INF/lib/maven3-agent-1.13.jar:/opt/maven/boot/plexus-classworlds-2.6.0.jar:/opt/maven/conf/logging-jenkins.maven3.agent.Maven3Main /opt/maven /var/lib/jenkins/xc/jenkins/war/WEB-INF/lib/remoting-4.13.jar /var/lib/jenkins/plugins/maven-plugin/WEB-INF/lib/maven3-interceptor-1.13.jar /var/lib/jenkins/plugins/maven-plugin/WEB-INF/lib/maven3-interceptor-commons-1.13.jar 45517
====[JENKINS REMOTING CAPACITY]====channel started
Executing Maven: -B -f /var/lib/jenkins/workspace/RegApp_CI_Job/pom.xml clean install
[INFO] Scanning for projects...
[WARNING]
[WARNING] Some problems were encountered while building the effective model for com.example.maven-project:server:jar:1.0-SNAPSHOT
[WARNING] Reporting configuration should be done in <reporting> section, not in maven-site-plugin <configuration> as reportPlugins parameter.
[WARNING]
[WARNING] Some problems were encountered while building the effective model for com.example.maven-project:webapp:war:1.0-SNAPSHOT
[WARNING] Reporting configuration should be done in <reporting> section, not in maven-site-plugin <configuration> as reportPlugins parameter.
[WARNING]
[WARNING] Some problems were encountered while building the effective model for com.example.maven-project:maven-project:com:1.0-SNAPSHOT

```

Fig. Build Success

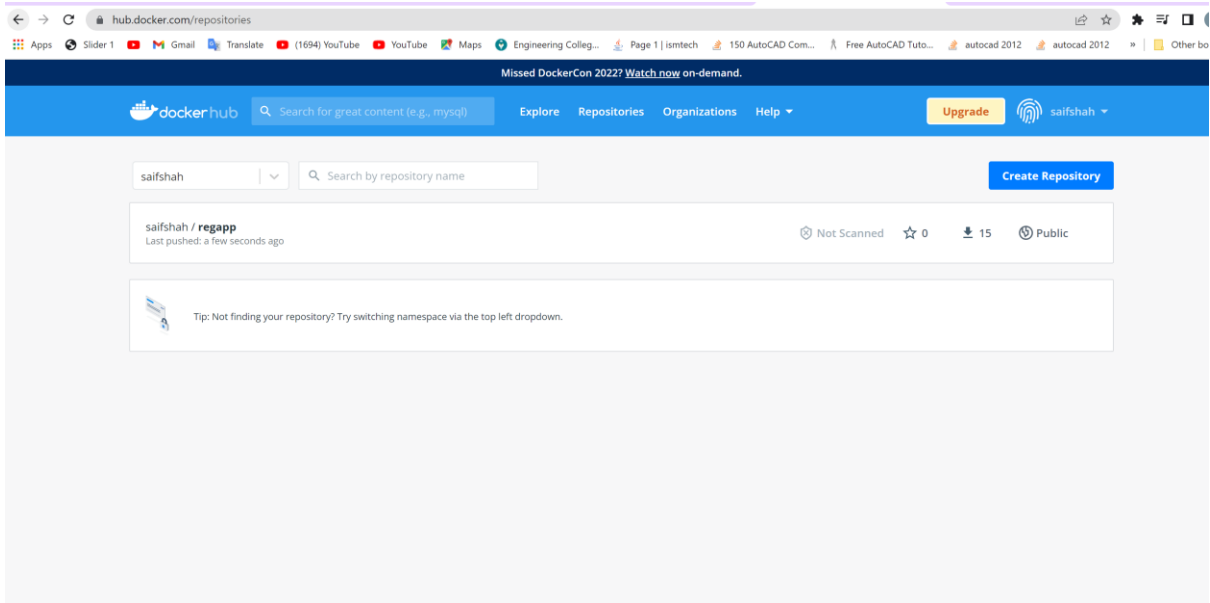


Fig. Image Created on Docker hub

Enable rolling update to create pod from latest docker image:

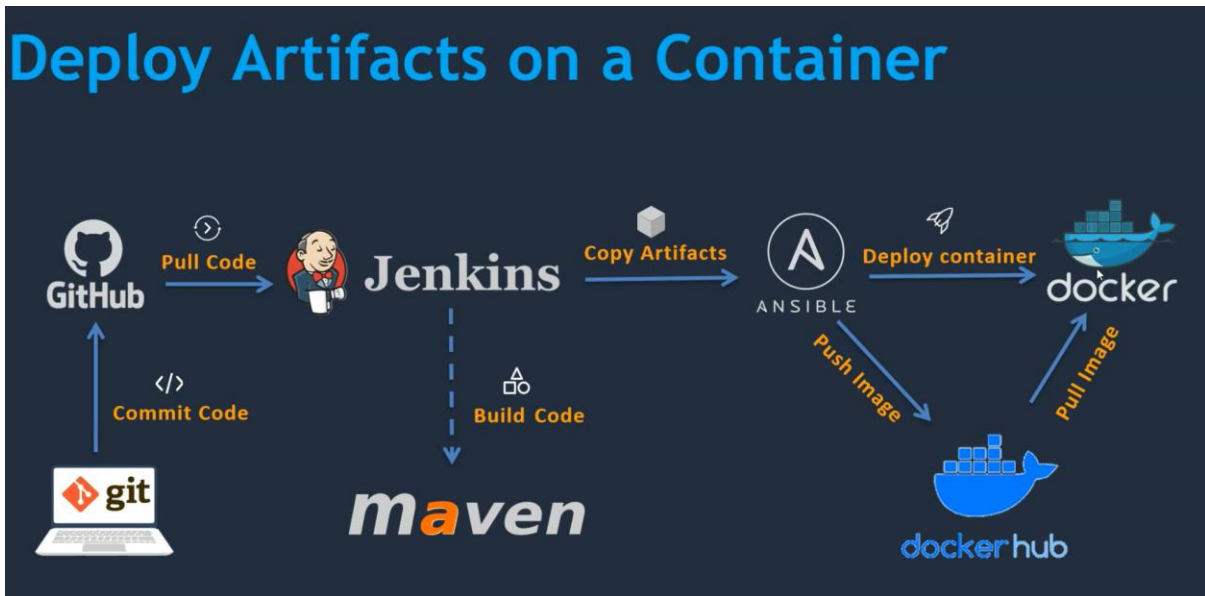


Fig. Deploying on Kubernetes

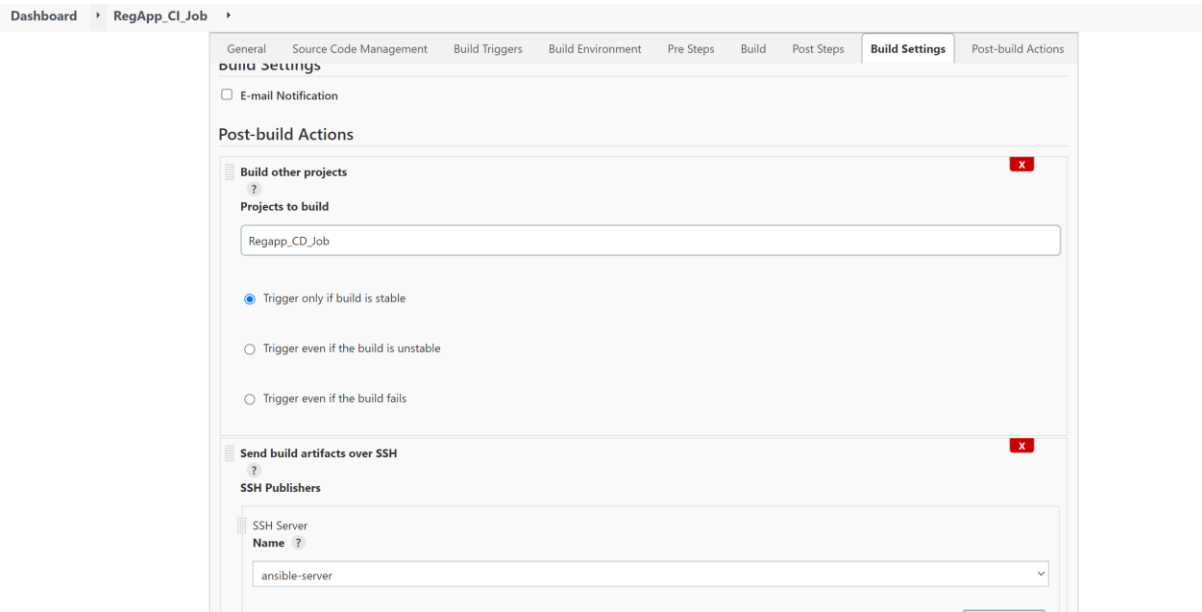
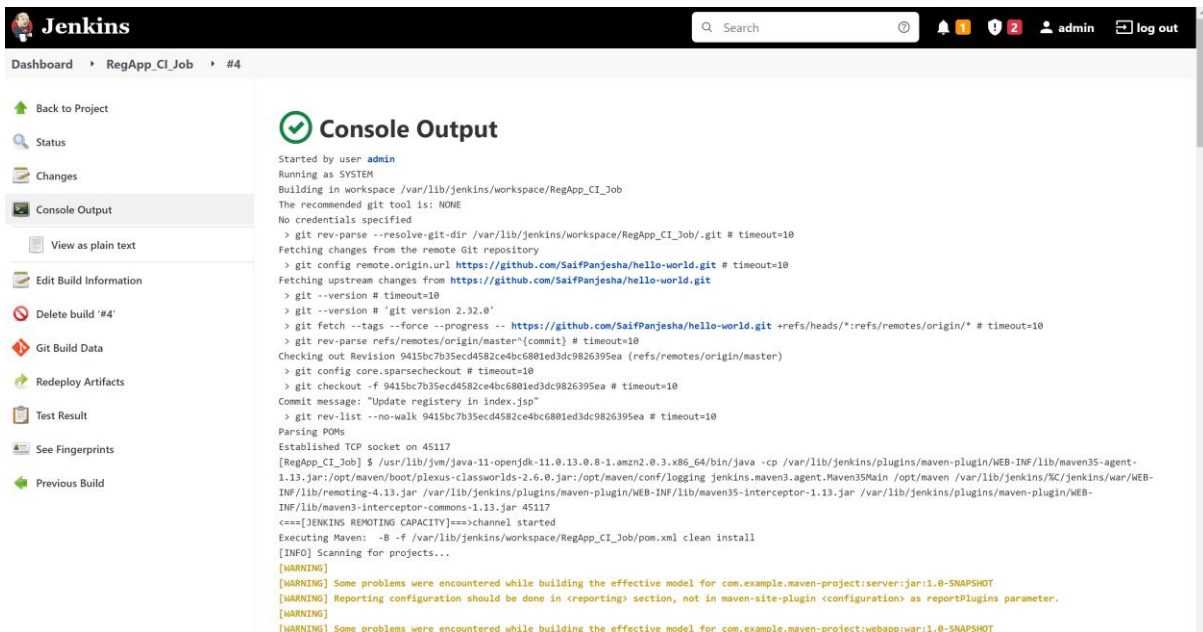


Fig. Rolling update for configuration



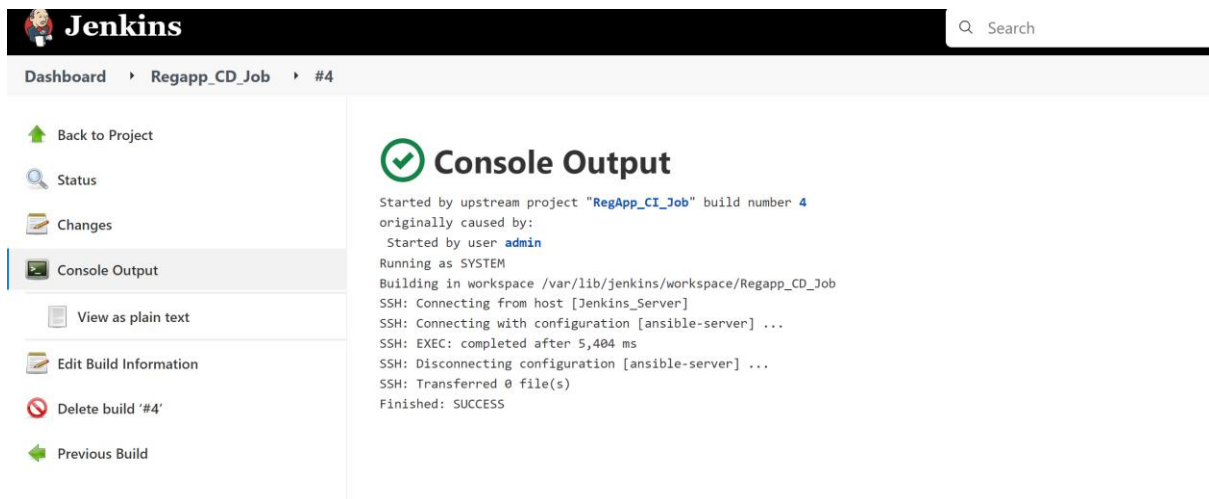


Fig. Build Success

Error : Unable to upload Latest Image

```
[root@EKS_Bootstrap_Server ~]# cd /opt/docker
```

```
-bash: cd: /opt/docker: No such file or directory
```

```
[root@EKS_Bootstrap_Server ~]# kubectl get all
```

```
Kubeconfig user entry is using deprecated API version
client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to
update.
```

```
NAME                                READY STATUS RESTARTS AGE
pod/saifshah-regapp-67dc7d6554-m4ck9 1/1   Running 0      93m
pod/saifshah-regapp-67dc7d6554-rr58w 1/1   Running 0      93m
pod/saifshah-regapp-67dc7d6554-x24cx 1/1   Running 0      93m
```

```
NAME          TYPE          CLUSTER-IP    EXTERNAL-IP
PORT(S)      AGE
service/kubernetes ClusterIP    10.100.0.1    <none>
443/TCP      46h
```

```
service/saifshah-service LoadBalancer 10.100.156.66
a5cc75730006140938846b05fc830300-559804141.us-east-
1.elb.amazonaws.com 8080:30620/TCP 93m
```

```
NAME READY UP-TO-DATE AVAILABLE AGE
deployment.apps/saifshah-regapp 3/3 3 3 93m
```

```
NAME DESIRED CURRENT READY AGE
replicaset.apps/saifshah-regapp-67dc7d6554 3 3 3 93m
```

```
[root@EKS_Bootstrap_Server ~]# ^C
```

```
[root@EKS_Bootstrap_Server ~]#
```

Complete CI and CD job to build and deploy code on Kubernetes:

```
[ansadmin@Ansible_Server docker]$ ll
```

```
total 28
```

```
-rw-rw-r-- 1 ansadmin ansadmin 357 May 13 18:21
create_image_regapp.yml
```

```
-rw-rw-r-- 1 ansadmin ansadmin 381 May 14 07:49
docker_deployment_regapp.yml
```

```
-rw-rw-r-- 1 ansadmin ansadmin 528 May 13 12:12 Dockerfile
```

```
-rw-rw-r-- 1 ansadmin ansadmin 62 May 17 18:42 hosts
```

```
-rw-rw-r-- 1 ansadmin ansadmin 245 May 18 09:48 kube_deploy.yml
```

```
-rw-rw-r-- 1 ansadmin ansadmin 154 May 17 19:31 kube_service.yml
```

```
-rw-rw-r-- 1 ansadmin ansadmin 2913 May 18 11:17 webapp.war
```

```
[ansadmin@Ansible_Server docker]$ vi kube_deploy.yml
```

```
[ansadmin@Ansible_Server docker]$ cat kube_deploy.yml
```

```
---
```

```
- hosts: kubernetes
```

```
#become: true
```

```
user: root
```

```
tasks:
```

```
- name: deploy regapp on kubernetes
```

```
  command: kubectl apply -f regapp-deploy.yml
```

```
- name : create service for regapp
```

```
  command: kubectl apply -f regapp-service.yml
```

```
- name: update deployment with new pods if image updated in docker hub
```

```
  command: kubectl rollout restart deployment.apps/saifshah-regapp
```

```
[ansadmin@Ansible_Server docker]$
```

Output :

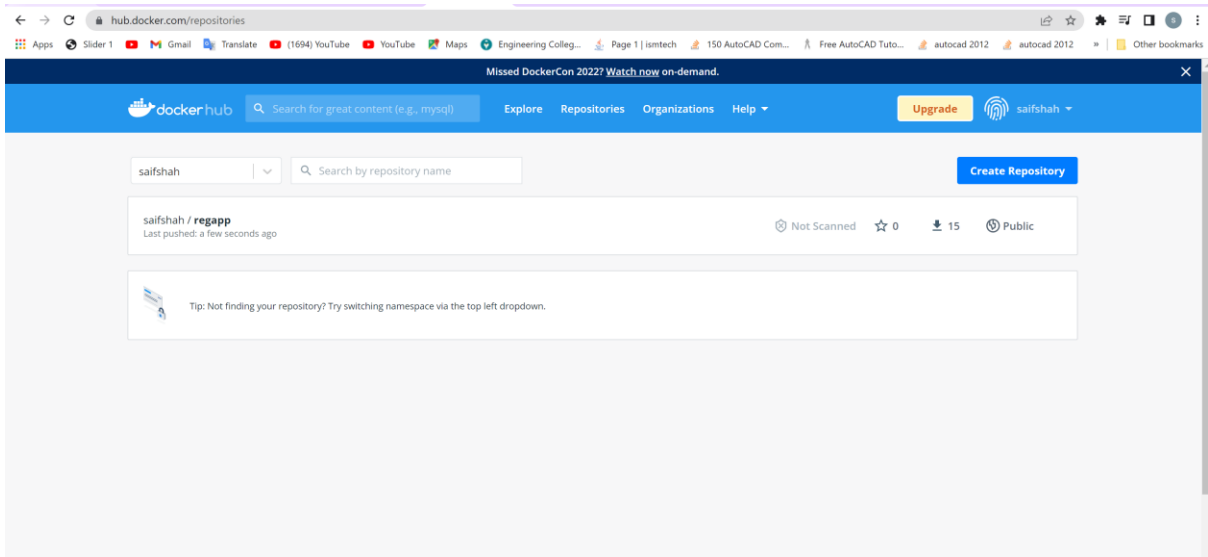


Fig. Docker latest Image

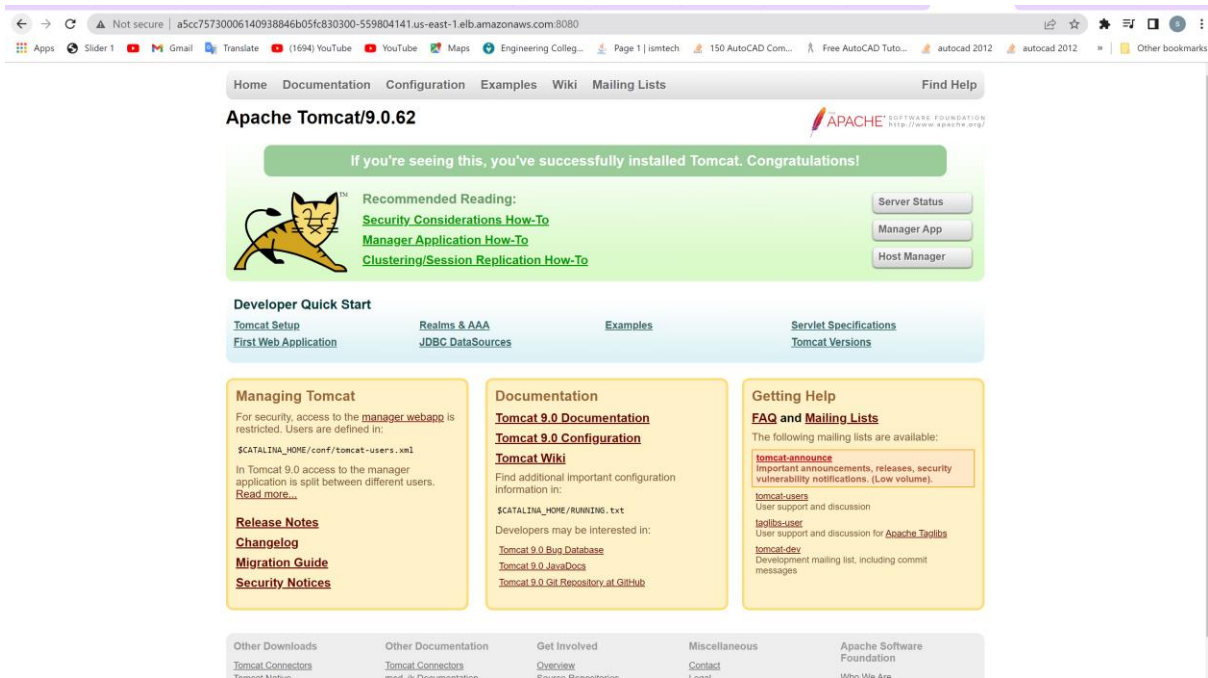


Fig. Access to load balancer on port 8080

Cleaning Setup:

```
[root@EKS_Bootstrap_Server ~]# kubectl delete deployment.apps/saifshah-regapp
```

Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.

```
deployment.apps "saifshah-regapp" deleted
```

```
[root@EKS_Bootstrap_Server ~]# kubectl delete service/saifshah-service
```

Kubeconfig user entry is using deprecated API version client.authentication.k8s.io/v1alpha1. Run 'aws eks update-kubeconfig' to update.

```
service "saifshah-service" deleted
```

```
[root@EKS_Bootstrap_Server ~]#
```

Deleting Cluster:

```
eksctl delete cluster saifshah --region us-east-1
```

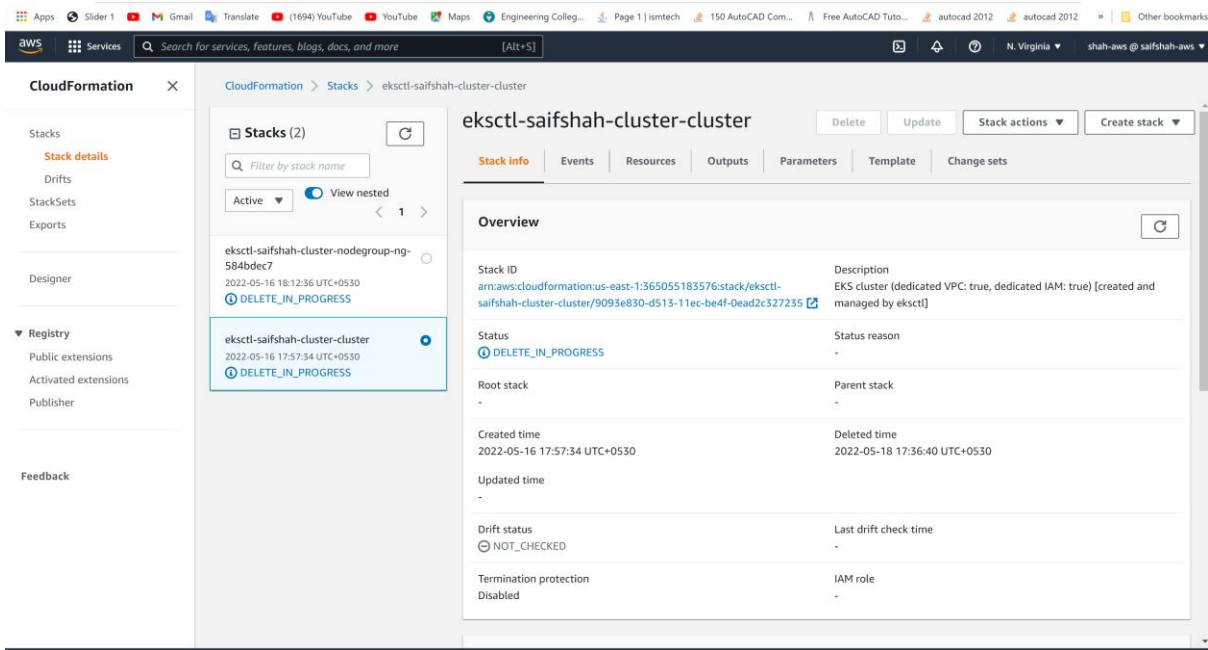


Fig. Cluster Deleted

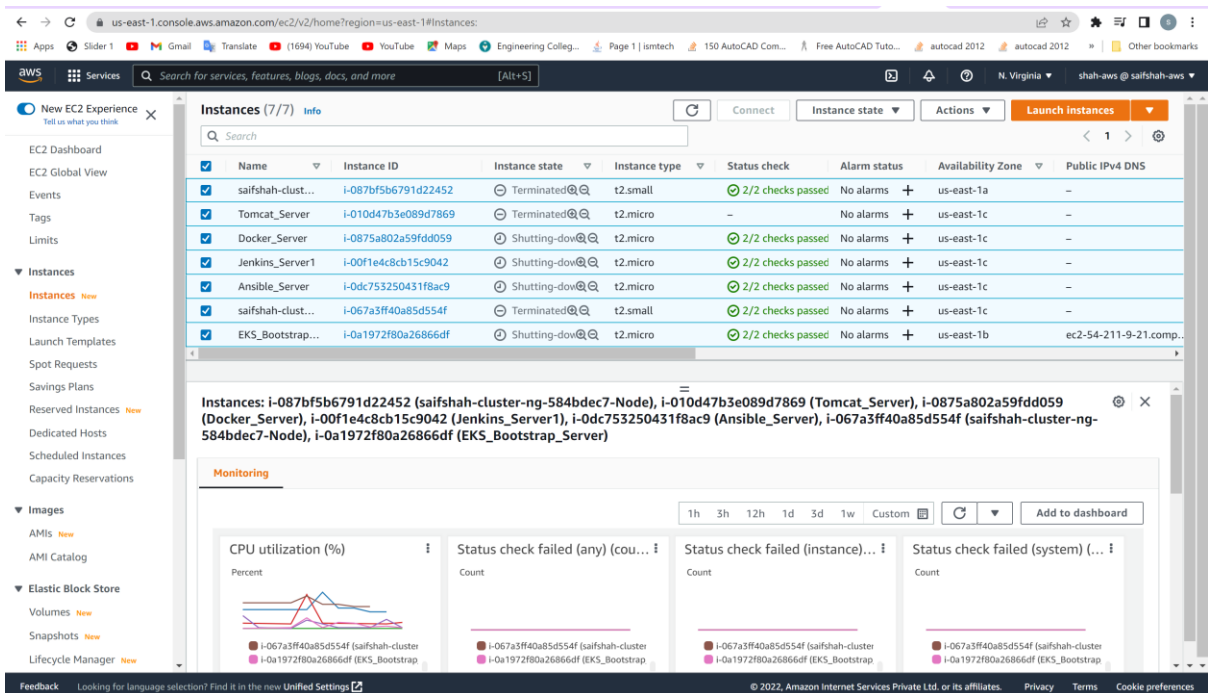


Fig. Terminates all Instances

Other Courses:

Complete DevOps Course:

Ansible For DevOps Beginners And System Admins:

Git and GitHub For DevOps Engineers:

Linux For DevOps Engineers: