

A SIMPLE DEVOPS PROJECT

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

Below video can change the way you look at DevOps and what it takes to build a Successful DevOps career. Building a Successful DevOps career is not just about tools and technology.

Watch these videos in full on what it takes:

Link to 1 minute YouTube shorts -
<https://youtube.com/shorts/k3oOqHoH7cc>

Link to YouTube Mentorship Program LIVE Session- https://youtu.be/mvll63z_bpY

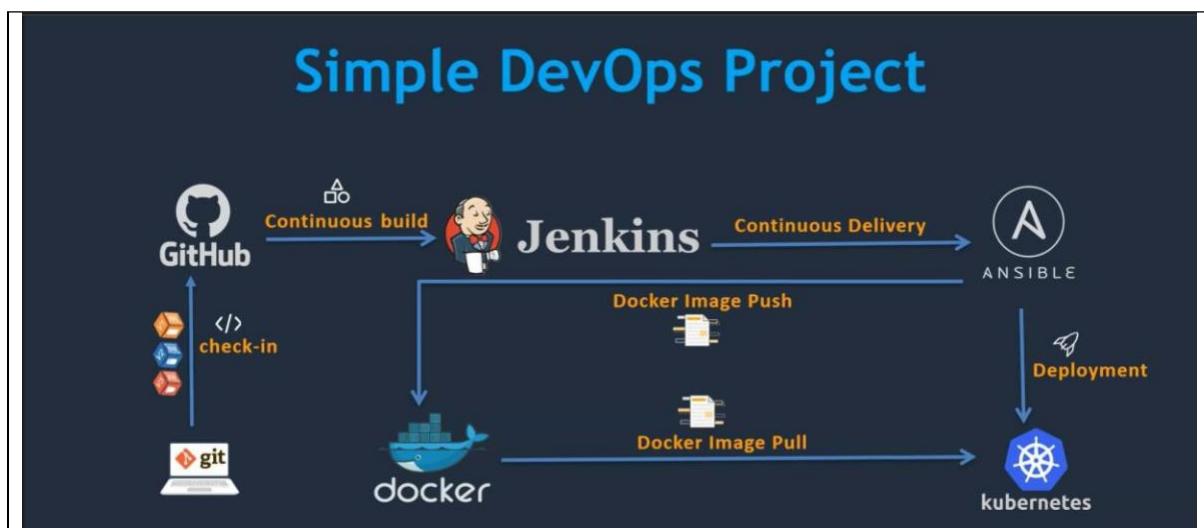
People are seriously working hard towards their career goals with accelerated learning. Hope you are one of them.

Any help needed, reach out to the number given in shorts video.

Booking Link for Mentorship Program <https://topmate.io/cloud/606995>

A Simple Devops Project

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

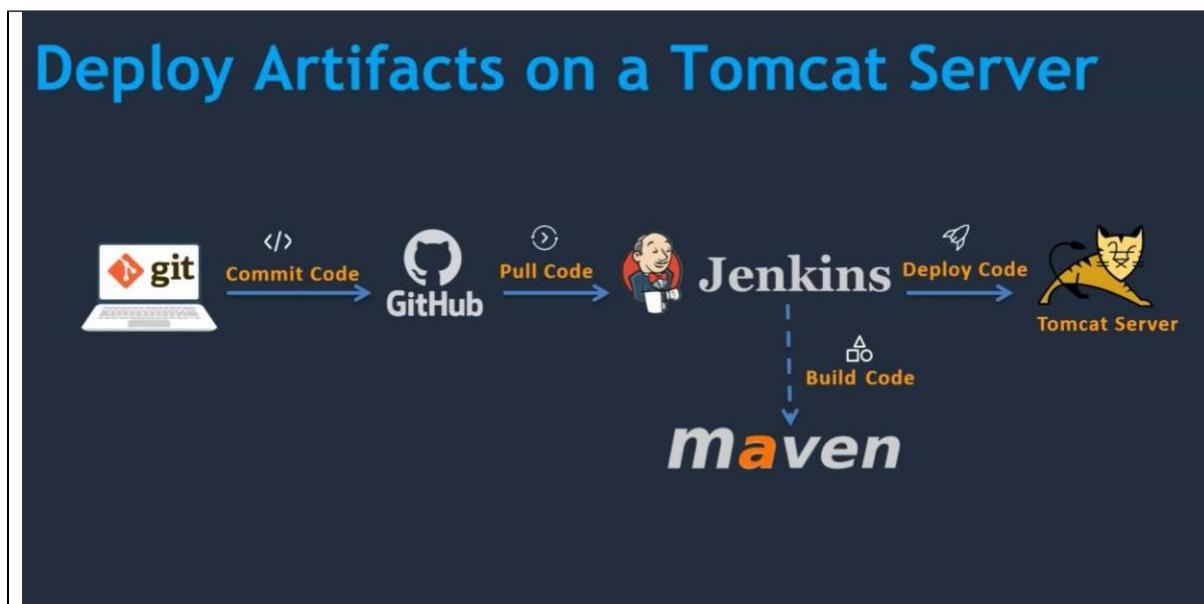


Fig. Deploy Artifacts on a Tomcat Server

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

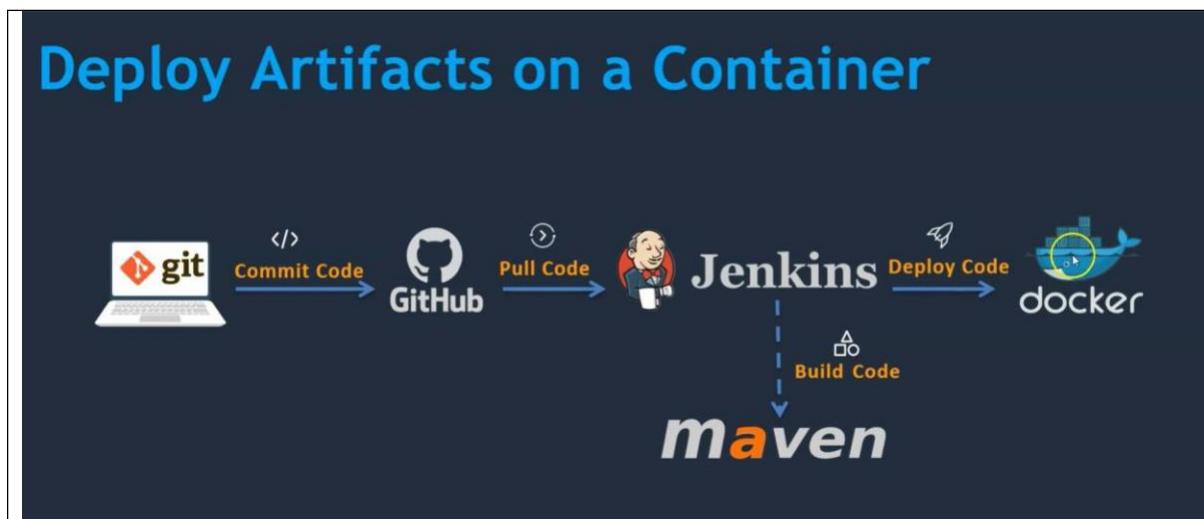


Fig. Deploy Artifacts on a Docker Container

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

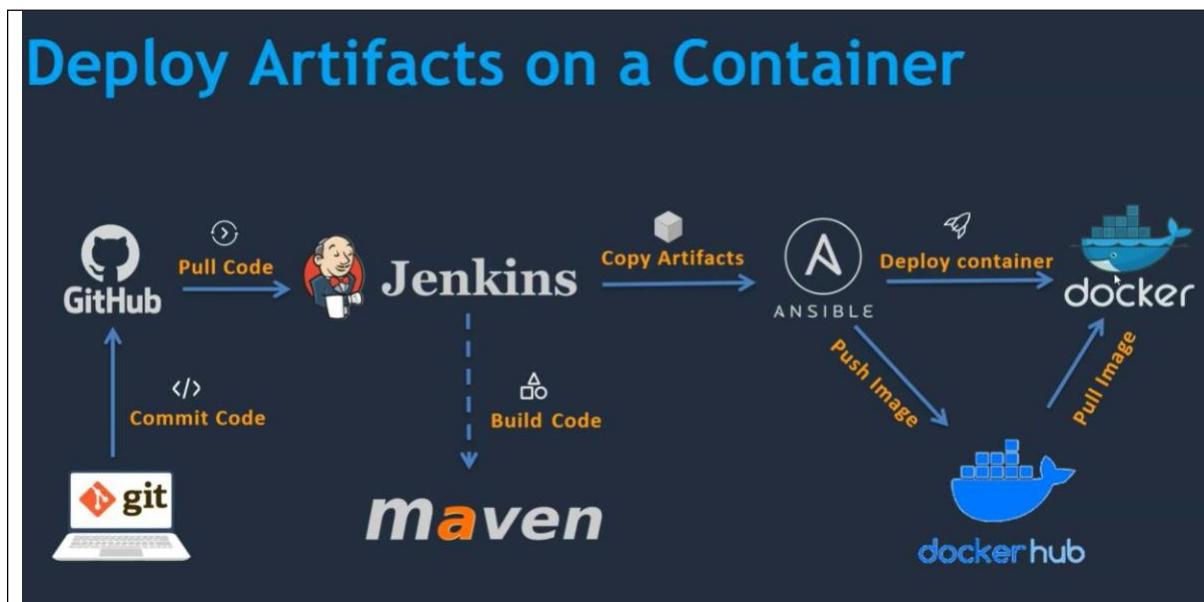


Fig. Deploy Artifacts on a Ansible Container.

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.

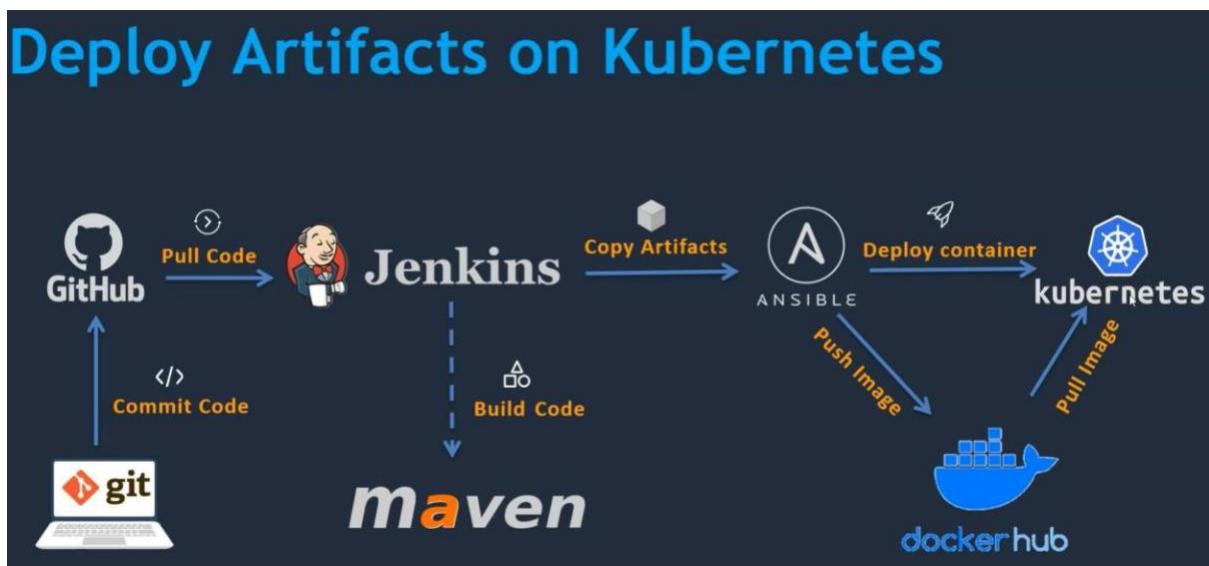


Fig. Deploy Artifacts on Kubernetes.

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?

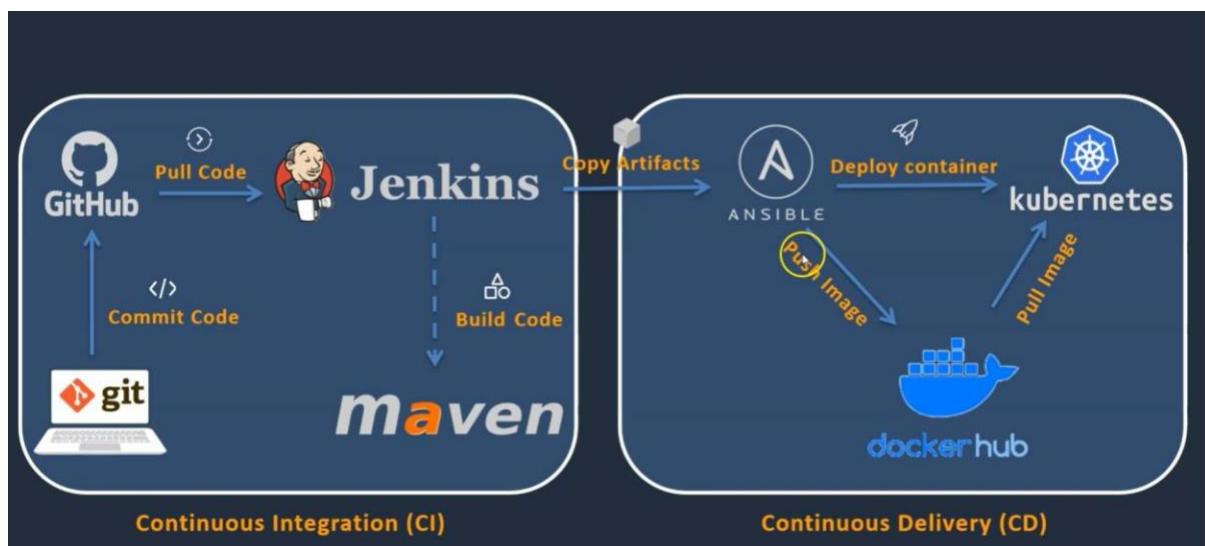


Fig. CI and CD Works on Devops.

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.

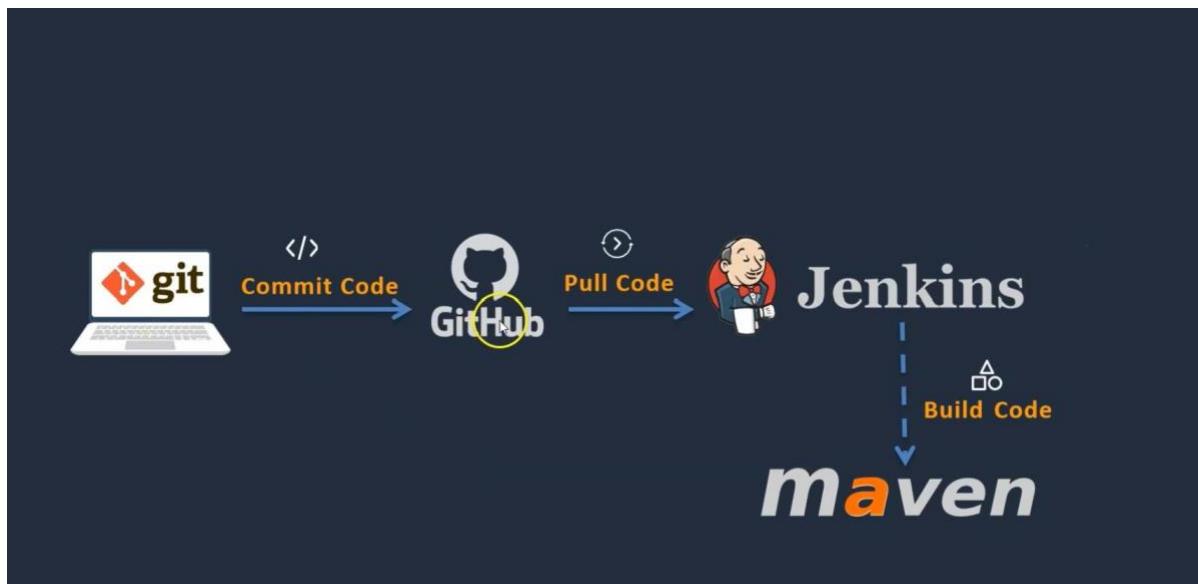


Fig. Build Code Jenkins on Maven

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

The screenshot shows the AWS EC2 Instances page. On the left, there's a sidebar with various navigation options like EC2 Dashboard, EC2 Global View, Events, Tags, Limits, Instances (selected), Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Scheduled Instances, Capacity Reservations, Images, AMIs, and Elastic Block Store Volumes.

The main area displays a table titled "Instances (1/1) Info". It shows one instance named "Jenkins_Server" with the following details:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
Jenkins_Server	i-0956a6b2a7840f540	Running	t2.micro	-	No alarms	us-east-1c	ec2-35-172-185-163.co.

Below the table, there's a detailed view for the instance "i-0956a6b2a7840f540 (Jenkins_Server)". The "Details" tab is selected, showing the following information:

- Instance ID:** i-0956a6b2a7840f540 (Jenkins_Server)
- Public IPv4 address:** 35.172.185.163 | open address
- Private IPv4 addresses:** 172.31.31.201
- IPv6 address:** -
- Instance state:** Running
- Public IPv4 DNS:** ec2-35-172-185-163.compute-1.amazonaws.com | open address
- Hostname type:** IP name: ip-172-31-31-201.ec2.internal
- Private IP DNS name (IPv4 only):** ip-172-31-31-201.ec2.internal
- Answer private resource DNS name (IPv4 A):** ip-172-31-31-201.ec2.internal

Fig.EC2 Instance for Jenkins Server

Installation of Jenkins

First Step:

Connecting MobaXterm

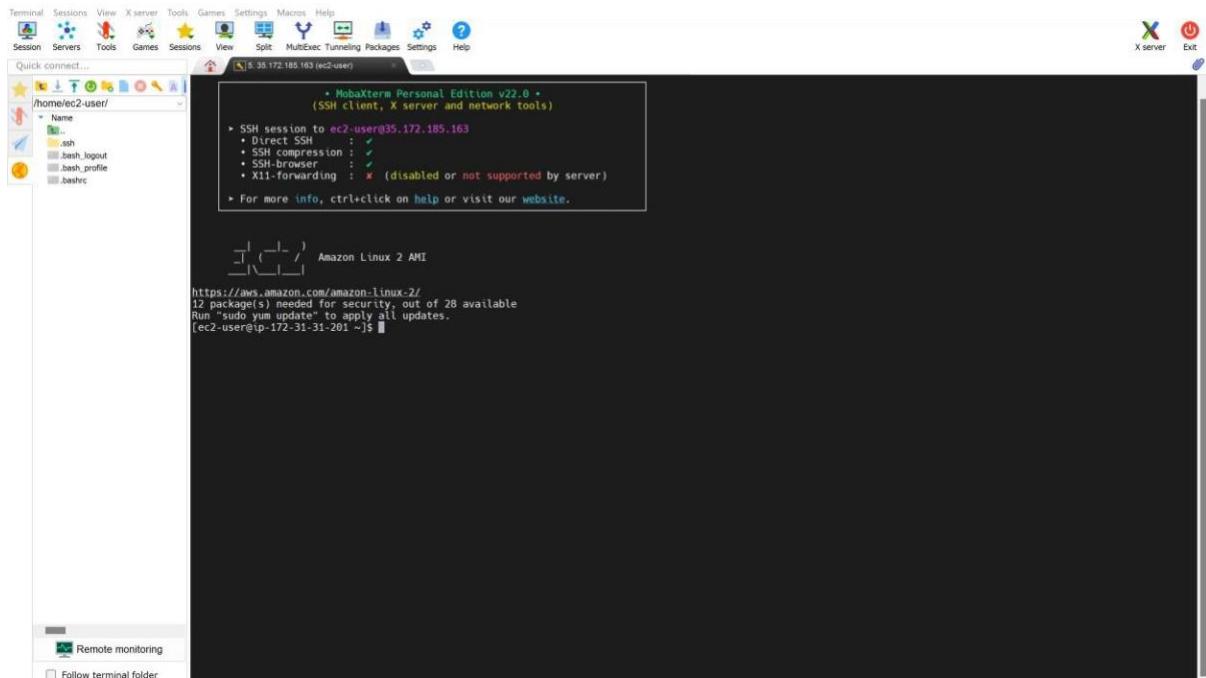


Fig. MobaXterm

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:

The screenshot shows the Jenkins homepage. At the top, there's a navigation bar with icons for search, notifications, and user admin. Below the bar, the title "Jenkins" is displayed next to a logo. A "Dashboard" link is visible. On the left, a sidebar contains links for "New Item", "People", "Build History", "Manage Jenkins", "My Views", and "New View". Under "Build Queue", it says "No builds in the queue". Under "Build Executor Status", it lists "1 Idle" and "2 Idle". The main content area features a "Welcome to Jenkins!" message and a "Start building your software project" section with "Create a job" and "Set up a distributed build" options. There are also links for "Set up an agent", "Configure a cloud", and "Learn more about distributed builds".

Fig. Access Web UI on port 8080

Run First Jenkins Job:

The screenshot shows the Jenkins interface for a specific job. The top navigation bar includes "Dashboard", "Hello World Job", and a build number "#1". The left sidebar has links for "Back to Project", "Status", "Changes", "Console Output" (which is selected and highlighted in blue), "View as plain text", "Edit Build Information", and "Delete build '#1'". The main content area is titled "Console Output" with a green checkmark icon. It displays the following log output:
Started by user admin
Running as SYSTEM
Building in workspace /var/lib/jenkins/workspace/Hello World Job
[Hello World Job] \$ /bin/sh -xe /tmp/jenkins4488807829713898388.sh
+ echo 'Hello World'
Hello World
+ uptime
19:17:39 up 45 min, 3 users, load average: 0.19, 0.09, 0.08
Finished: SUCCESS

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

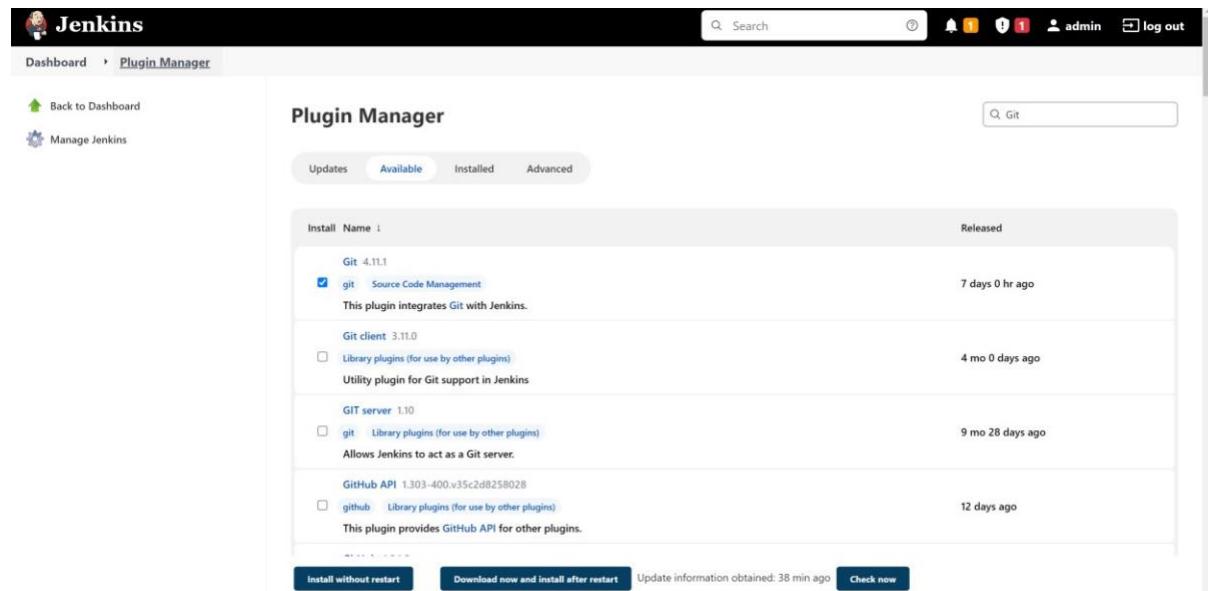


Fig. Plugin Integrates git with Jenkins.

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.

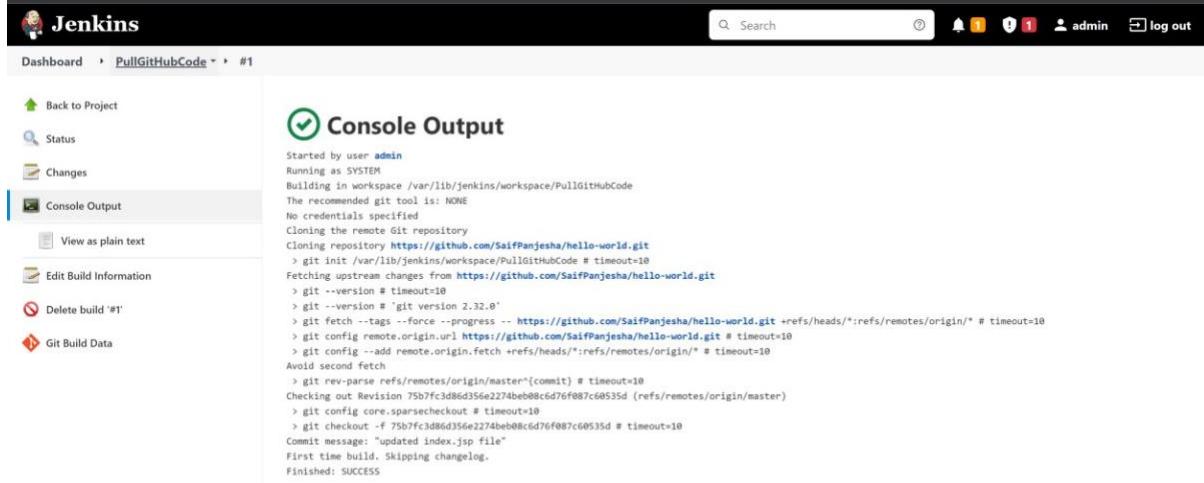
Configure Git on Jenkins GUI

The screenshot shows the Jenkins Global Tool Configuration page under the 'Global Tool Configuration' section. The 'Git' configuration is displayed, allowing users to define a 'Name' (set to 'Git') and the 'Path to Git executable' (set to 'git'). There is also an option to 'Install automatically'. Below the Git configuration, there is a 'Maven' section with a 'Maven installations' table containing one entry ('Add Maven'). At the bottom of the page are 'Save' and 'Apply' buttons.

Git	
Git installations	<input type="text" value="Git"/> <input type="text" value="git"/> <input type="checkbox"/> Install automatically
Add Git	<input type="button" value="Delete Git"/>
Maven	
Maven installations	<input type="button" value="Add Maven"/> <small>List of Maven installations on this system</small>
<input type="button" value="Save"/> <input type="button" value="Apply"/>	

Fig. Configure Git on Jenkins GUI

Run Jenkins Job to pull code from GitHub



The screenshot shows the Jenkins interface for a job named "PullGitHubCode". The left sidebar has a "Console Output" tab selected. The main area is titled "Console Output" with a green checkmark icon. It displays the command-line output of a git pull operation. The output shows the repository being cloned from "https://github.com/SaiPanjesha/hello-world.git", fetching upstream changes, and pulling the latest code. The build status is shown as "SUCCESS".

```
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/SaiPanjesha/hello-world.git
> git init /var/lib/jenkins/workspace/PullGitHubCode # timeout=10
Fetching upstream changes from https://github.com/SaiPanjesha/hello-world.git
> git --version # timeout=10
> git -v
> git fetch --tags --force --progress -- https://github.com/SaiPanjesha/hello-world.git +refs/heads/*:refs/remotes/origin/* # timeout=10
> git config remote.origin.url https://github.com/SaiPanjesha/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 75b7fcf3d86d356e2274be08c6d76f087c60535d (refs/remotes/origin/master)
> git config core.sparsecheckout # timeout=10
> git checkout -f 75b7fcf3d86d356e2274be08c6d76f087c60535d # 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)

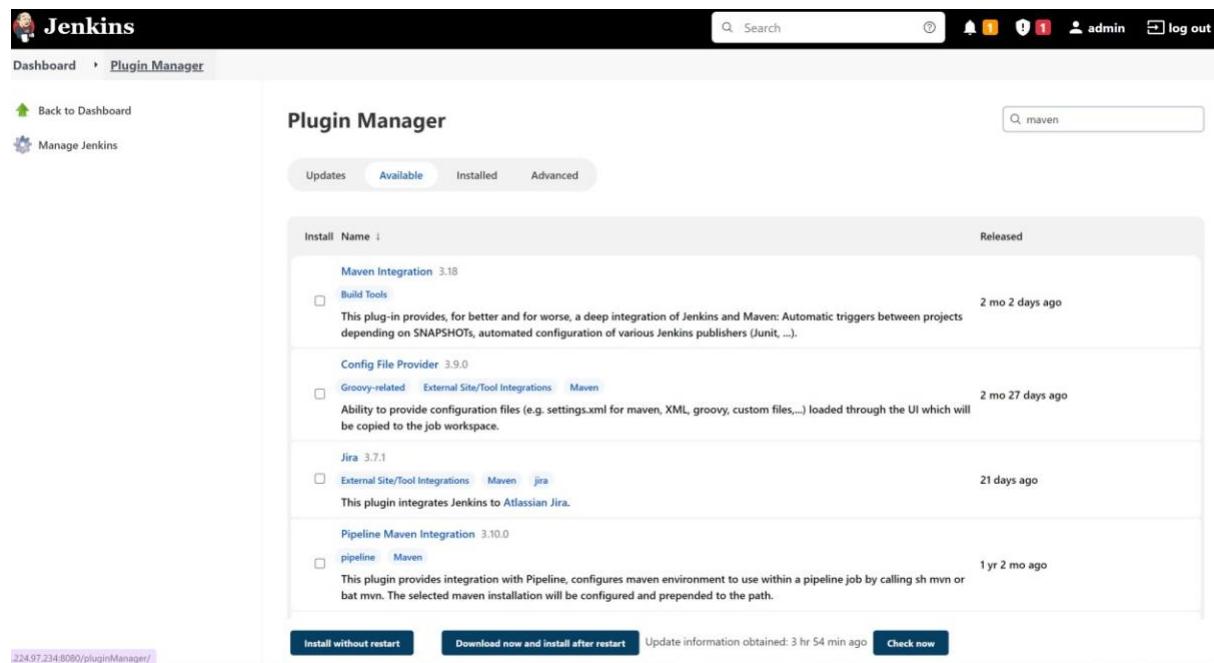
Maven home: /opt/maven

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



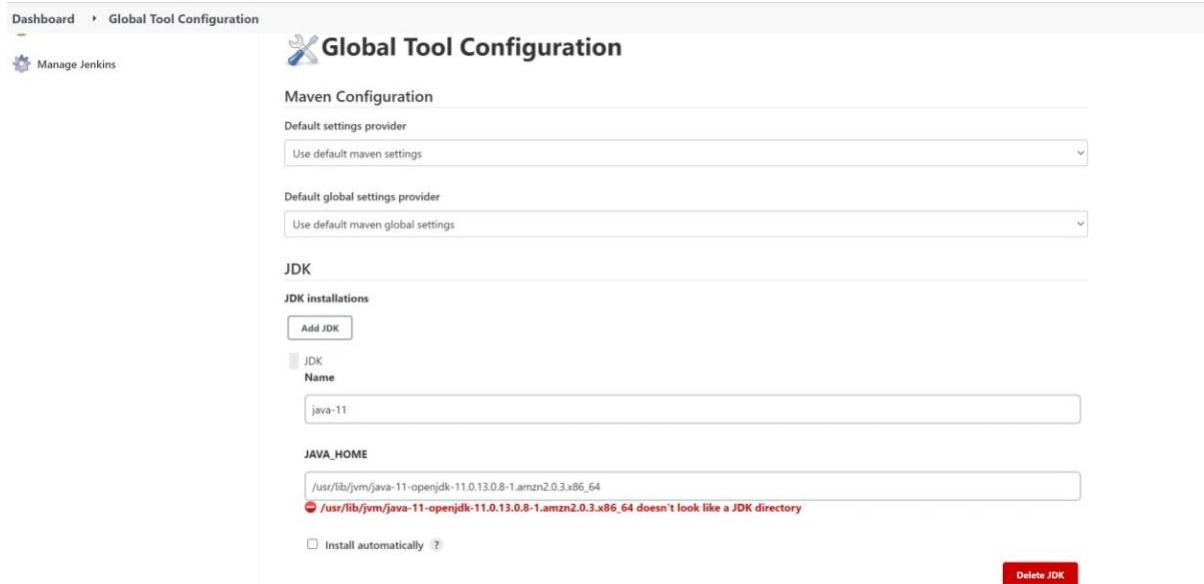
The screenshot shows the Jenkins Plugin Manager interface. At the top, there is a navigation bar with links for 'Dashboard' and 'Plugin Manager'. On the right side of the header, there are icons for search, help, notifications, and user admin. Below the header, there is a search bar with the query 'maven'. The main content area is titled 'Plugin Manager' and has tabs for 'Updates', 'Available', 'Installed', and 'Advanced'. The 'Available' tab is selected. A search bar on the right side of the table also contains the query 'maven'. The table lists four available plugins:

Install	Name	Released
<input type="checkbox"/>	Maven Integration 3.18	2 mo 2 days ago
<input type="checkbox"/>	Config File Provider 3.9.0	2 mo 27 days ago
<input type="checkbox"/>	Jira 3.7.1	21 days ago
<input type="checkbox"/>	Pipeline Maven Integration 3.10.0	1 yr 2 mo ago

Below the table, there are three buttons: 'Install without restart', 'Download now and install after restart', and 'Check now'. A status message indicates 'Update information obtained: 3 hr 54 min ago'.

Fig Maven Plugin

Configure Maven and Java



The screenshot shows the Jenkins Global Tool Configuration page for Java. At the top, there's a breadcrumb navigation: Dashboard > Global Tool Configuration. Below it, a "Manage Jenkins" link. The main title is "Global Tool Configuration" with a gear icon.

Maven Configuration

- Default settings provider: A dropdown menu set to "Use default maven settings".
- Default global settings provider: A dropdown menu set to "Use default maven global settings".

JDK

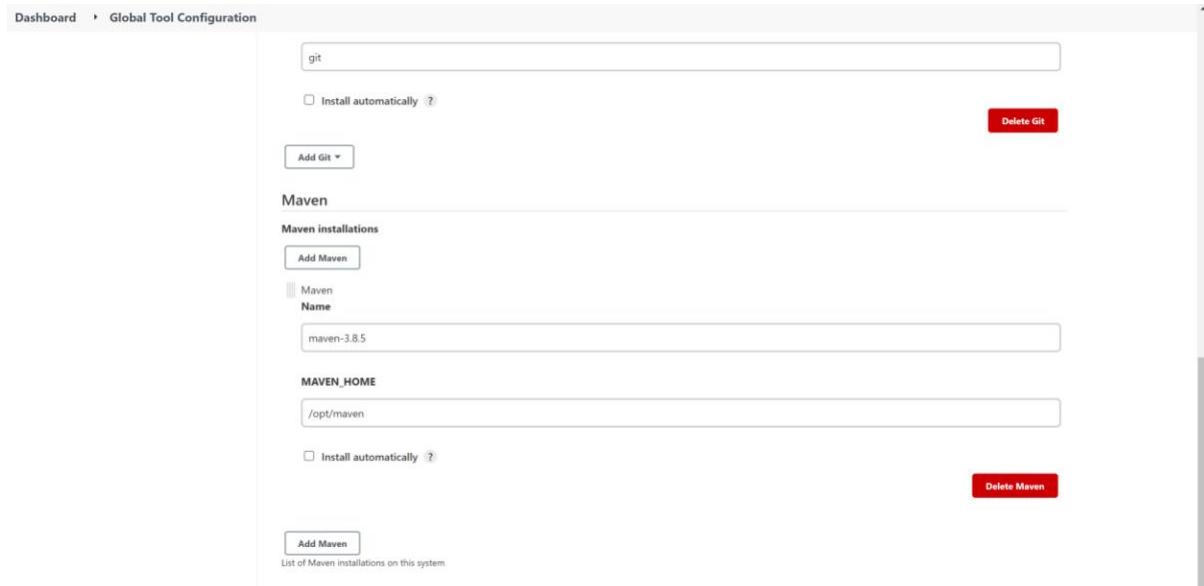
JDK installations

- A "Add JDK" button.
- A table row for "java-11":
 - Name: "java-11".
 - Path: "/usr/lib/jvm/java-11-openjdk-11.0.13.0.8-1.amzn2.0.3.x86_64".
 - A warning message: "⚠ /usr/lib/jvm/java-11-openjdk-11.0.13.0.8-1.amzn2.0.3.x86_64 doesn't look like a JDK directory".
 - Checkboxes for "Install automatically" and "Delete JDK".

JAVA_HOME

- Path: "/usr/lib/jvm/java-11-openjdk-11.0.13.0.8-1.amzn2.0.3.x86_64".
- Checkboxes for "Install automatically" and "Delete JDK".

Fig. Java Global Tool Configuration.



The screenshot shows the Jenkins Global Tool Configuration page for Maven. At the top, there's a breadcrumb navigation: Dashboard > Global Tool Configuration. Below it, a search bar with "git" and a "Delete Git" button. The main title is "Global Tool Configuration" with a gear icon.

Maven

Maven installations

- A "Add Maven" button.
- A table row for "maven-3.8.5":
 - Name: "maven-3.8.5".
 - Path: "/opt/maven".
 - Checkboxes for "Install automatically" and "Delete Maven".

MAVEN_HOME

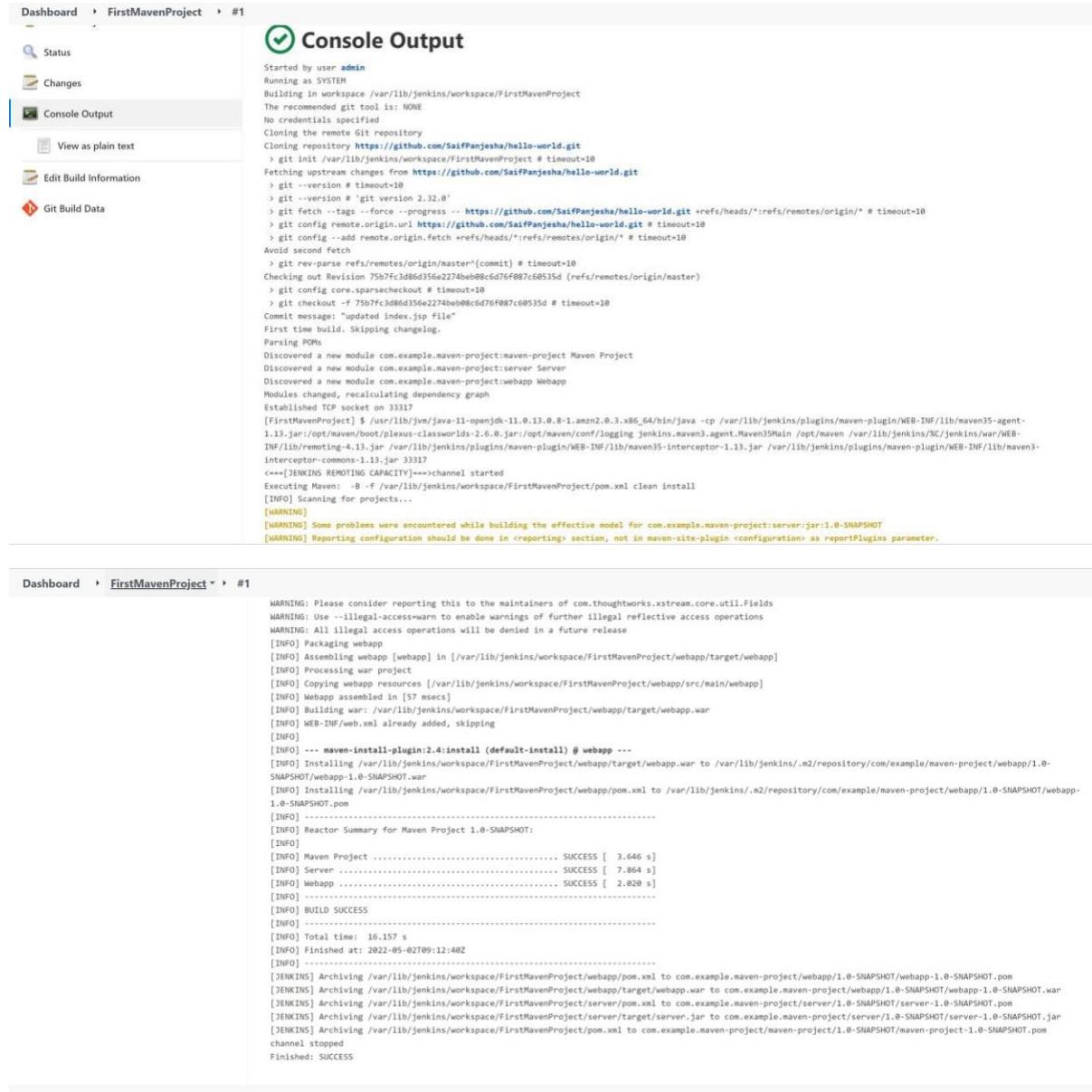
- Path: "/opt/maven".
- Checkboxes for "Install automatically" and "Delete Maven".

Add Maven

List of Maven installations on this system

Fig. Maven Global Tool Configuration

Build a Java project using Jenkins and generate artifacts.



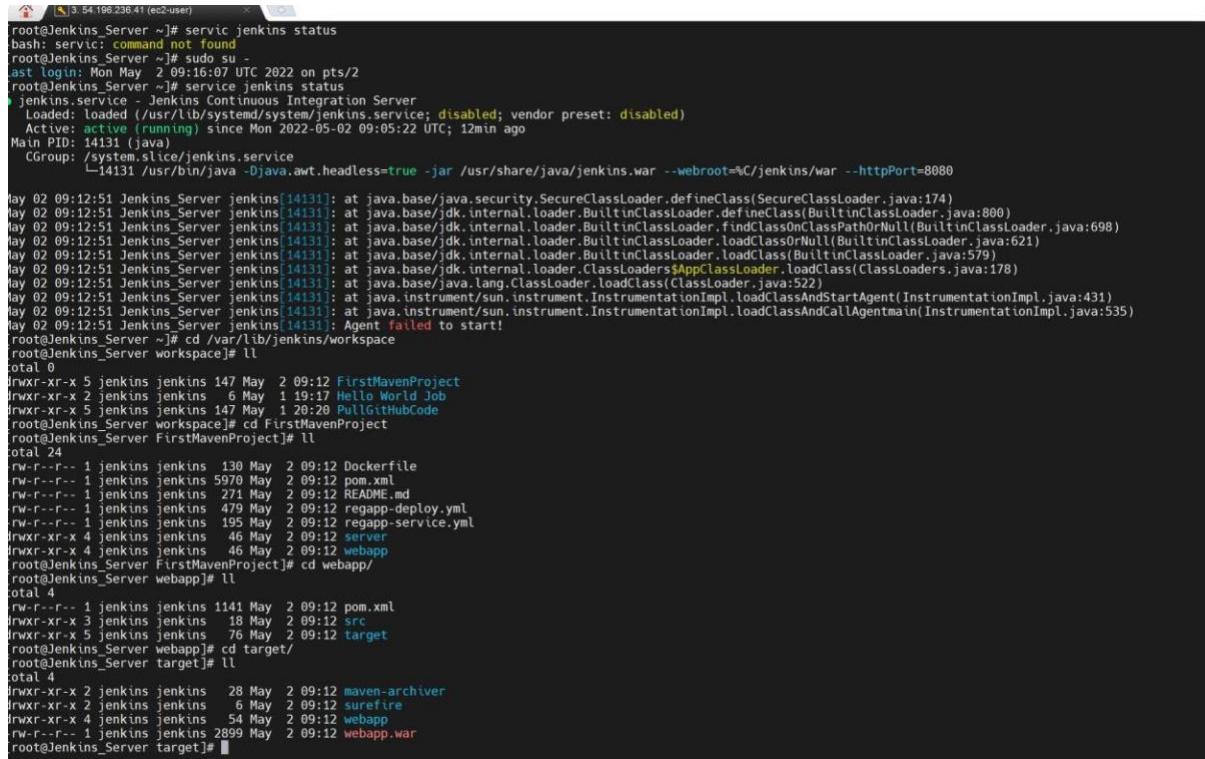
The screenshot shows the Jenkins interface for a 'FirstMavenProject' job. The 'Console Output' tab is selected, displaying the build logs. The logs show a successful Git clone from a GitHub repository, followed by a Maven build process. The output indicates the creation of a 'webapp' directory, the execution of 'mvn clean install', and the generation of a 'WEB-INF/web.xml' file. Finally, the 'maven-install-plugin' is used to install the artifact to the local Maven repository. The build concludes with the archiving of the 'pom.xml' file and the creation of a 'WEB-INF/webapp-1.0-SNAPSHOT.war' archive. The entire process is completed successfully in 16.197 seconds.

```
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 # '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 75b7fc1d88d356e2274b0eb08c6d76f087c68535d (refs/remotes/origin/master)
  > git config core.sparsecheckout # timeout=10
  > git checkout -f 75b7fc1d88d356e2274b0eb08c6d76f087c68535d # timeout=10
Commit message: "Updated index.jsp file"
First time build. Skipping changelog.
Parsing POM...
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 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.Maven3Main /opt/maven /var/lib/jenkins/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.

Dashboard > FirstMavenProject > #1
[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 msec]
[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 [ 2.028 s]
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 16.197 s
[INFO] Finished at: 2022-05-02T09:12:48Z
[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/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 ~# servic jenkins status
bash: service: command not found
root@Jenkins_Server ~# sudo su -
[User] 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)
      Group: /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 479 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

The screenshot shows the AWS Management Console with the EC2 service selected. The left sidebar shows various navigation options like EC2 Dashboard, Events, Tags, Limits, Instances, Images, AMIs, and Elastic Block Store. The main content area displays a table of instances. The table has columns for Name, Instance ID, Instance state, Instance type, Status check, Alarm status, Availability Zone, and Public IPv4 DNS. Two instances are listed: Jenkins_Server (running, t2.micro, 2/2 checks passed) and Tomcat_Server (terminated, t2.micro). The Tomcat_Server instance is selected, indicated by a checked checkbox in the Actions column. Below the table, a detailed view for the Tomcat_Server instance is shown, including its instance ID, public and private IP addresses, instance state (Running), and host name type (IP name: ip-172-31-17-87.ec2.internal).

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

```
-| \_ / Amazon Linux 2 Avi
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 -
[root@tomcat_server ~]# clear
[root@tomcat_server ~]# java --version
Unrecognized option: --versionb
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://dlcdn.apache.org/tomcat/tomcat-9/v9.0.62/bin/apache-tomcat-9.0.62.tar.gz
--2022-05-02 10:42:15-- https://dlcdn.apache.org/tomcat/tomcat-9/v9.0.62/bin/apache-tomcat-9.0.62.tar.gz
Resolving dlcdn.apache.org (dlcdn.apache.org)... 151.101.2.132, 2a04:4e42::644
Connecting to dlcdn.apache.org (dlcdn.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 -xvf 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

```
[root@tomcat_server tomcat]# cd bin
[root@tomcat_server bin]# ll
total 884
-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 6898 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 3788 Mar 31 14:34 setclasspath.sh
-rw-r----- 1 root root 2020 Mar 31 14:34 shutdown.bat
-rwxr-x--- 1 root root 1962 Mar 31 14:34 shutdown.sh
-rw-r----- 1 root root 2022 Mar 31 14:34 startup.bat
-rwxr-x--- 1 root root 1984 Mar 31 14:34 startup.sh
-rw-r----- 1 root root 46897 Mar 31 14:34 tomcat-juli.jar
-rw-r----- 1 root root 42974 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 1968 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

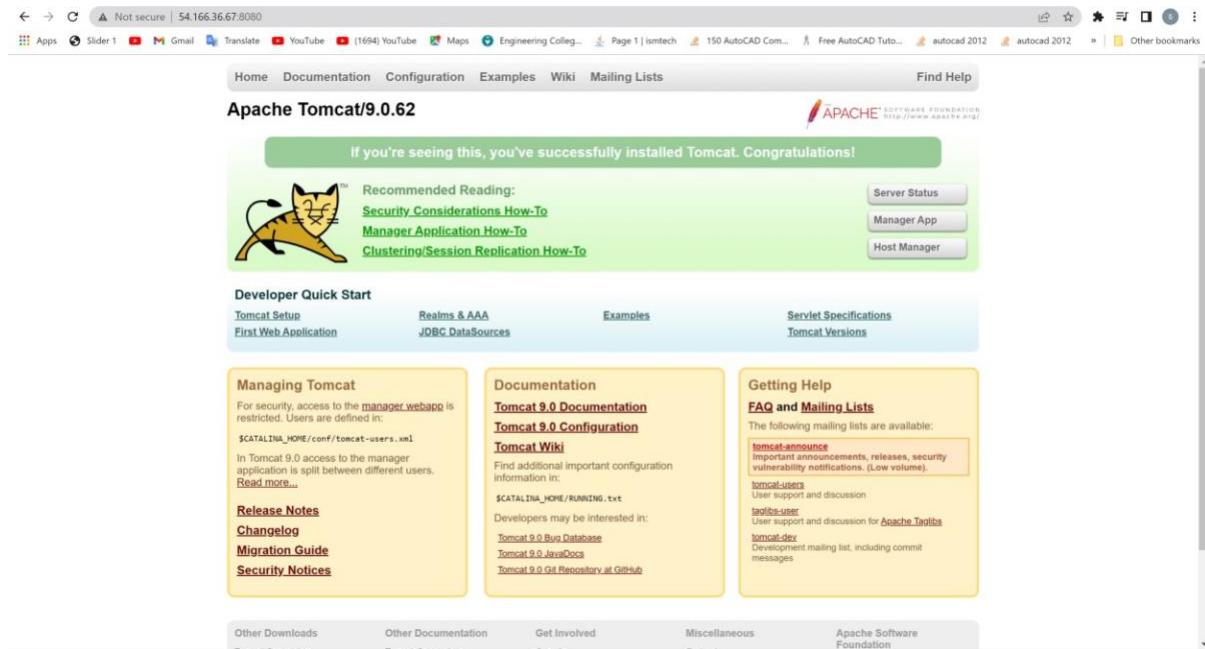


Fig. Access Web UI on port 8080

Edit Manage App Error

You are not authorized to view this page.

By default the Manager is only accessible from a browser running on the same machine as Tomcat. If you wish to modify this restriction, you'll need to edit the Manager's `context.xml` file.

If you have already configured the Manager application to allow access and you have used your browsers back button, used a saved book-mark or similar then you may have triggered the cross-site request forgery (CSRF) protection that has been enabled for the HTML interface of the Manager application. You will need to reset this protection by returning to the [main Manager page](#). Once you return to this page, you will be able to continue using the Manager application's HTML interface normally. If you continue to see this access denied message, check that you have the necessary permission to access this application.

If you have not changed any configuration files, please examine the file `conf/tomcat-users.xml` in your installation. That file must contain the credentials to let you use this webapp.

For example, to add the `manager-gui` role to a user named `tomcat` with a password of `s3cret`, add the following to the config file listed above.

```
<role rolename="manager-gui"/>
<user username="tomcat" password="s3cret" roles="manager-gui"/>
```

Note that for Tomcat 7 onwards, the roles required to use the manager application were changed from the single `manager` role to the following four roles. You will need to assign the role(s) required for the functionality you wish to access.

- `manager-gui` - allows access to the HTML GUI and the status pages
- `manager-script` - allows access to the text interface and the status pages
- `manager-jmx` - allows access to the JMX proxy and the status pages
- `manager-status` - allows access to the status pages only

The HTML interface is protected against CSRF but the text and JMX interfaces are not. To maintain the CSRF protection:

- Users with the `manager-gui` role should not be granted either the `manager-script` or `manager-jmx` roles.
- If the text or jmx interfaces are accessed through a browser (e.g. for testing since these interfaces are intended for tools not humans) then the browser must be closed afterwards to terminate the session.

For more information - please see the [Manager App How-To](#).

```
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"?>
<!--
  Licensed to the Apache Software Foundation (ASF) under one or more
  contributor license agreements. See the NOTICE file distributed with
  this work for additional information regarding copyright ownership.
  The ASF licenses this file to You under the Apache License, Version 2.0
  (the "License"); you may not use this file except in compliance with
  the License. You may obtain a copy of the License at
    http://www.apache.org/licenses/LICENSE-2.0
  Unless required by applicable law or agreed to in writing, software
  distributed under the License is distributed on an "AS IS" BASIS,
  WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
  See the License for the specific language governing permissions and
  limitations under the License.
-->
<Context antiResourceLocking="false" privileged="true" >
  <CookieProcessor className="org.apache.tomcat.util.http.Rfc6265CookieProcessor"
    sameSiteCookies="strict" />
  <!-- <Valve className="org.apache.catalina.valves.RemoteAddrValve"
    allow="127\\.\\d+\\.\\d+::1|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"?>
<!--
  Licensed to the Apache Software Foundation (ASF) under one or more
  contributor license agreements. See the NOTICE file distributed with
  this work for additional information regarding copyright ownership.
  The ASF licenses this file to You under the Apache License, Version 2.0
  (the "License"); you may not use this file except in compliance with
  the License. You may obtain a copy of the License at
    http://www.apache.org/licenses/LICENSE-2.0
  Unless required by applicable law or agreed to in writing, software
  distributed under the License is distributed on an "AS IS" BASIS,
  WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
  See the License for the specific language governing permissions and
  limitations under the License.
-->
<Context antiResourceLocking="false" privileged="true" >
  <CookieProcessor className="org.apache.tomcat.util.http.Rfc6265CookieProcessor"
    sameSiteCookies="strict" />
  <!-- <Valve className="org.apache.catalina.valves.RemoteAddrValve"
    allow="127\\.\\d+\\.\\d+::1|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

Create Tomcat Users

Configure tomcat user's xml file

```
[root@tomcat_server bin]# cd ..
[root@tomcat_server tomcat]# cd conf
[root@tomcat_server conf]# ll
total 232
drwxr-x--- 3 root root    23 May  2 10:44 Catalina
-rw----- 1 root root 12953 Mar 31 14:34 catalina.policy
-rw----- 1 root root  7308 Mar 31 14:34 catalina.properties
-rw----- 1 root root  1400 Mar 31 14:34 context.xml
-rw----- 1 root root 1149 Mar 31 14:34 jaspic-providers.xml
-rw----- 1 root root 2313 Mar 31 14:34 jaspic-providers.xsd
-rw----- 1 root root 4144 Mar 31 14:34 logging.properties
-rw----- 1 root root 7580 Mar 31 14:34 server.xml
-rw----- 1 root root 2756 Mar 31 14:34 tomcat-users.xml
-rw----- 1 root root 2558 Mar 31 14:34 tomcat-users.xsd
-rw----- 1 root root 172359 Mar 31 14:34 web.xml
[root@tomcat_server conf]#
```

Fig. Configure tomcat user's xml file

#.vi tomcat-users.xml

```
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.

->
<tomcat-users xmlns="http://tomcat.apache.org/xml"
               xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
               xsi:schemaLocation="http://tomcat.apache.org/xml tomcat-users.xsd"
               version="1.0">

!<!--
By default, no user is included in the "manager-gui" role required
to operate the "/manager/html" web application. If you wish to use this app,
you must define such a user - the username and password are arbitrary.

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

The users below are wrapped in a comment and are therefore ignored. If you
wish to configure one or more of these users for use with the manager web
application, do not forget to remove the <!-- ... --> that surrounds them. You
will also need to set the passwords to something appropriate.
-->
!<!--
<user username="admin" password=<must-be-changed> roles="manager-gui"/>
<user username="robot" password=<must-be-changed> roles="manager-script"/>
-->
!<!--
The sample user and role entries below are intended for use with the
examples web application. They are wrapped in a comment and thus are ignored
when reading this file. If you wish to configure these users for use with the
examples web application, do not forget to remove the <!... ...> that surrounds
them. You will also need to set the passwords to something appropriate.
-->
!<!--
<role rolename="tomcat"/>
<role rolename="role1"/>
<user username="tomcat" password=<must-be-changed> roles="tomcat"/>
<user username="both" password=<must-be-changed> roles="tomcat,role1"/>
<user username="role1" password=<must-be-changed> roles="role1"/>
-->
<role rolename="manager-gui"/>
<role rolename="manager-script"/>
<role rolename="manager-jmx"/>
<role rolename="manager-status"/>
<user username="admin" password="admin" roles="manager-gui, manager-script, manager-jmx, manager-status"/>
<user username="deployer" password="deployer" roles="manager-script"/>
<user username="tomcat" password="s3cret" roles="manager-gui"/>
-->
```

Fig. Adding Tomcat roles

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`

The screenshot shows the Tomcat Web Application Manager. At the top left is the Apache logo, and at the top right is the Apache Software Foundation logo. Below the header is a message box with 'Message:' and 'OK' buttons. The main area has tabs for 'Manager', 'List Applications', 'HTML Manager Help', 'Manager Help', and 'Server Status'. Under the 'Manager' tab, there's a section titled 'Applications' with a table:

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

Below the applications table is a 'Deploy' section with fields for 'Context Path:' and 'Version (for parallel deployment:)'. A scroll bar is visible on the right side of the page.

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

Available

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

Released 1 yr 6 mo ago

Install without restart Download now and install after restart Check now

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

```

Started by user admin
Running as SYSTEM
Building in workspace /var/lib/jenkins/workspace/BuildandDeployMavenProject
The recommended git tool is: NONE
No credentials specified
> git rev-parse --resolve-git-dir /var/lib/jenkins/workspace/BuildandDeployMavenProject/.git # timeout=10
Fetching changes from the remote Git repository
> git config remote.origin.url https://github.com/SaifPanjesha/hello-world.git # timeout=10
Fetching upstream changes from https://github.com/SaifPanjesha/hello-world.git
> 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 rev-parse refs/remotes/origin/master^{commit} # timeout=10
Checking out Revision 75b7fc3d86d356e2274be08c6d76f087c6a535d (refs/remotes/origin/master)
> git config core.sparsecheckout # timeout=10
> git checkout -f 75b7fc3d86d356e2274be08c6d76f087c6a535d # timeout=10
Commit message: "updated index.jsp file"
> git rev-list --no-walk 75b7fc3d86d356e2274be08c6d76f087c6a535d # timeout=10
Parsing POMs
Established TCP socket on 41823
[BuildandDeployMavenProject] $ /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/MC/jenkins/war/WEB-INF/lib/remoting-4.13.jar /var/lib/jenkins/plugins/maven-plugin/web-INF/lib/maven3-interceptor-commons-1.13.jar /var/lib/jenkins/plugins/maven-plugin/web-INF/lib/maven3-interceptor-1.13.jar 41823
<==[JENKINS REMOTING CAPACITY]==>channel started
Executing Maven: -B -f /var/lib/jenkins/workspace/BuildandDeployMavenProject/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.

```

Fig. Build Maven

New user Register for DevOps Learning

Please fill in this form to create an account.

Enter Full Name	<input type="text"/>
Enter mobile	<input type="text"/>
Enter Email Address	<input type="text"/>
Password	<input type="password"/>
Repeat Password	<input type="password"/>

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

[Register](#)

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/SaifPanjesha/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 'saiffaizalpanjesha -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

```

Started by an SCM change
Running as SYSTEM
Building in workspace /var/lib/jenkins/workspace/BuildandDeployMavenProject
The recommended git tool is: NONE
No credentials specified
> git rev-parse --resolve-git-dir /var/lib/jenkins/workspace/BuildandDeployMavenProject/.git # timeout=10
Fetching changes from the remote Git repository
> git config remote.origin.url https://github.com/SaifPanjesha/hello-world.git # timeout=10
Fetching upstream changes from https://github.com/SaifPanjesha/hello-world.git
> git --version # timeout=10
> git fetch --tags --force --progress -- https://github.com/SaifPanjesha/hello-world.git +refs/heads/*:refs/remotes/origin/* # timeout=10
> git rev-parse refs/remotes/origin/master^{commit} # timeout=10
Checking out Revision 2ca2d0201a61576547a9b53b9df2c98f96f39 (refs/remotes/origin/master)
> git config core.sparsecheckout # timeout=10
> git checkout -f 2ca2d0201a61576547a9b53b9df2c98f96f39 # timeout=10
Commit message: "updated index.jsp file"
> git rev-list --no-walk 9d9ef0d1902a9a0a1c0b35e88d6910f15df1f862 # timeout=10
Parsing POMs
Established TCP socket on 4488
[BuildandDeployMavenProject] $ /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/war/WEB-INF/lib/remoting-4.13.jar /var/lib/jenkins/plugins/maven-plugin/web-INF/lib/maven3-interceptor-commons-1.13.jar 44885
<==[JENKINS REMOTING CAPACITY]==>channel started
Executing Maven: -B -f /var/lib/jenkins/workspace/BuildandDeployMavenProject/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.

```

Thankyou, Happy Learning

Build Amazing Carrer With Devops

I appreciate

Fig. 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

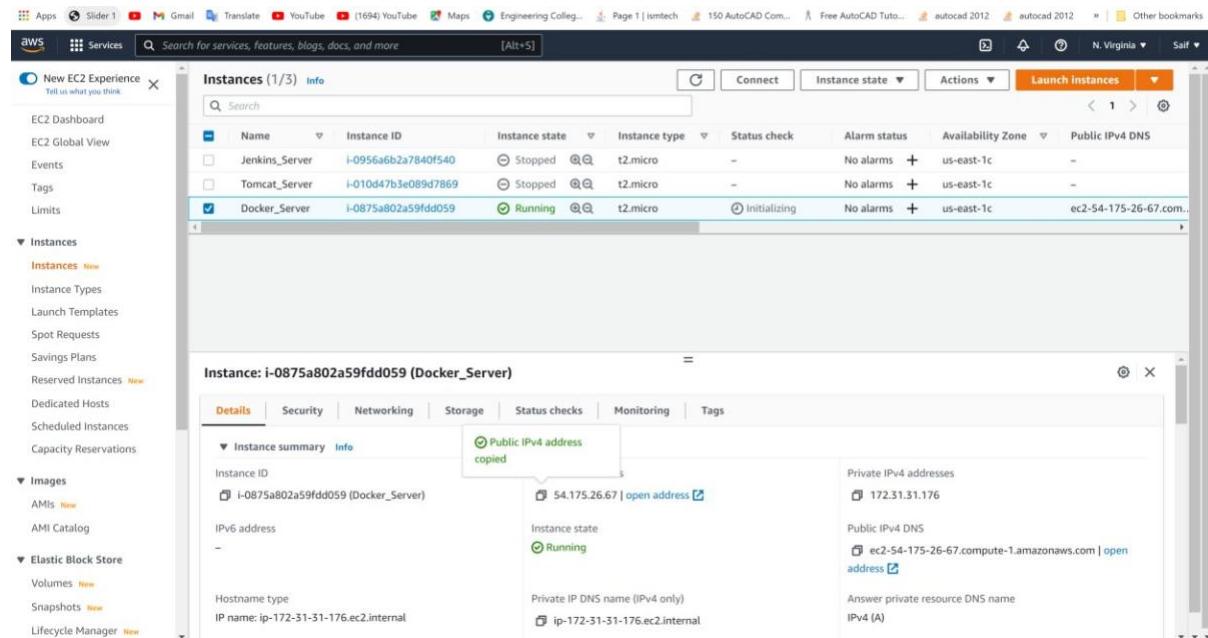


Fig. Docker Server EC2 Instance

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

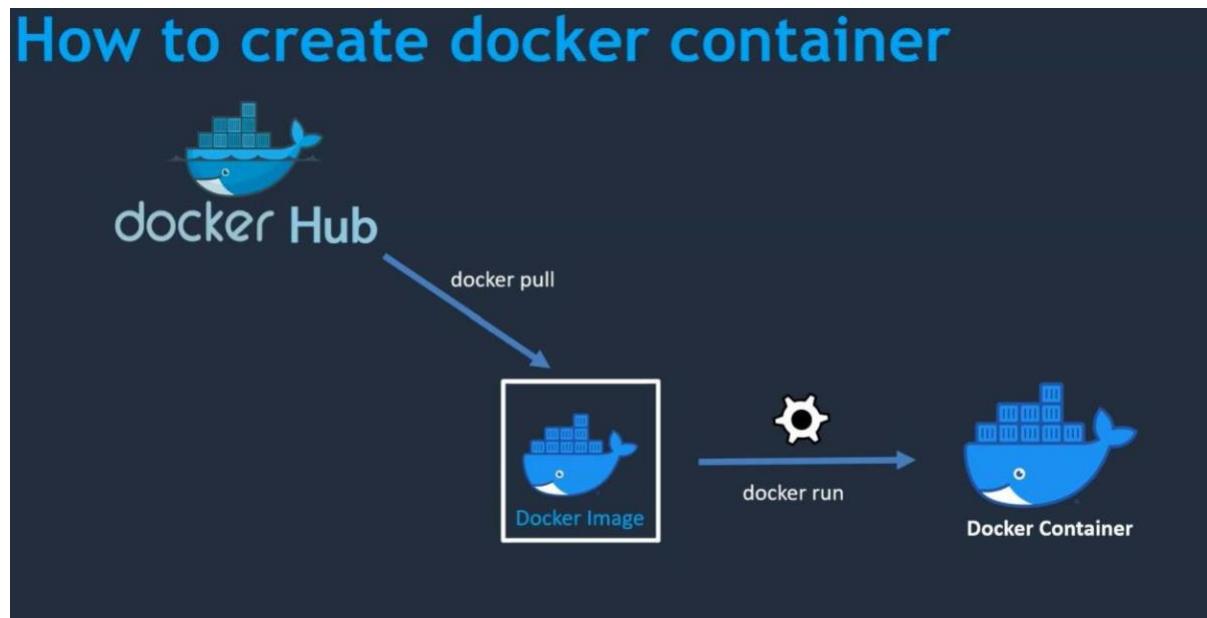


Fig. Creating Docker Container(<https://hub.docker.com/>)

- **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
78e9303c67b9f67ca161776a1321da5cb8bad4b85e64c9753a84bf91359ace21	tomcat	"catalina.sh run"	14 seconds ago	Up 13 seconds	0.0.0.0:8081->8080/tcp, :::8081->8080/tcp	tomcat-container

```
[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 ~]#
```

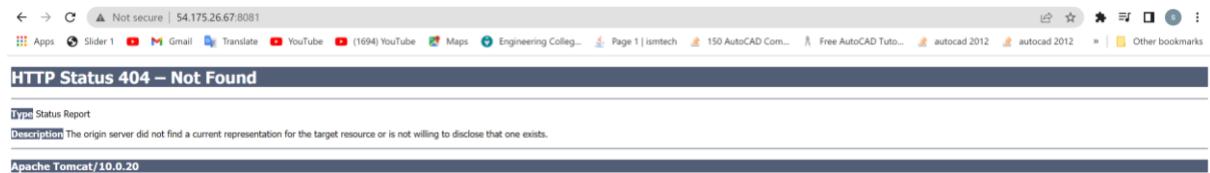


Fig. Tomcat Container

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
```

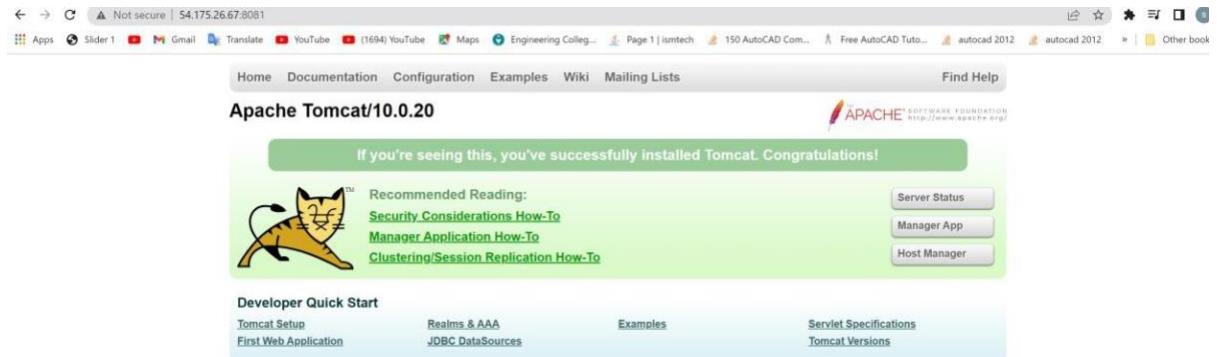


Fig. Fixing Tomcat Container Issue

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

CONTAINER ID IMAGE COMMAND CREATED STATUS
PORTS NAMES

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
PORTS NAMES

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

d4c7db9d910fdceeeef014d3e3fc685e9ef04305627373c5e2df1db43c75c03fb

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

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



Fig. refuse to connect

Create a Docker File

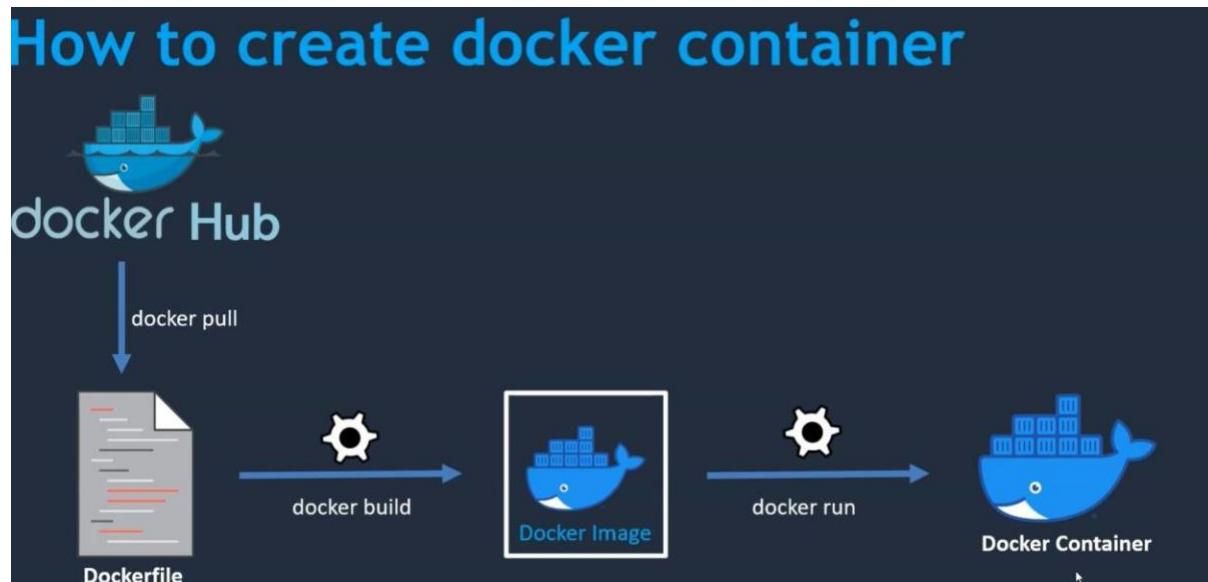


Fig. Create Docker File

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
```

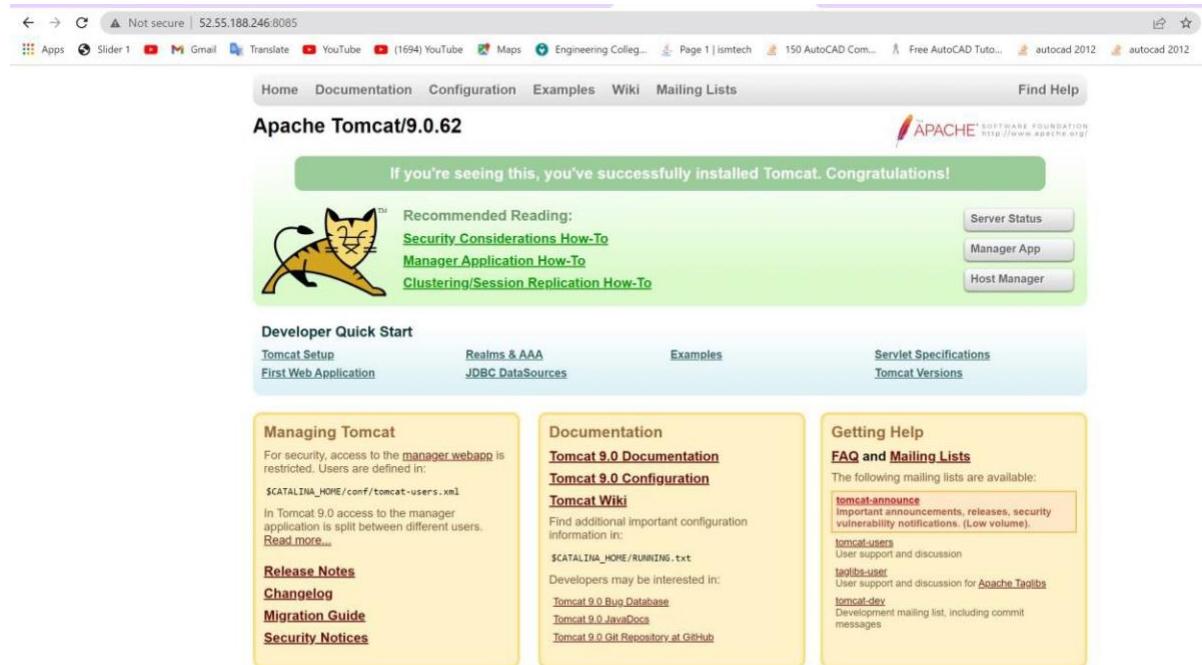


Fig. resolving error for port 8085 Apache Tomcat container

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

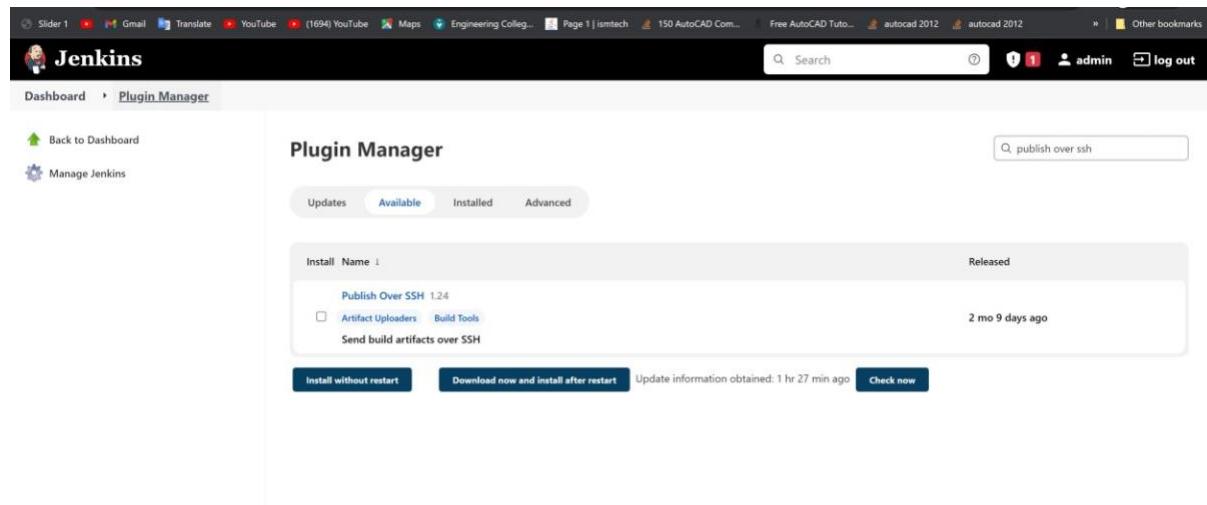


Fig. Publish Over SSH plugin

The screenshot shows the Jenkins Update Center interface. The left sidebar has links for Back to Dashboard, Manage Jenkins, and Manage Plugins (which is selected). The main content area is titled "Installing Plugins/Upgrades". It shows a "Preparation" section with three bullet points: "Checking internet connectivity", "Checking update center connectivity", and "Success". Below this, a table lists four plugins 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 are links to "Go back to the top page" and "Restart Jenkins when installation is complete and no jobs are running".

Fig. Publish Over SSH plugin Success

Add Docker Host to Jenkins “configure systems”

This screenshot shows the Jenkins "Configure Systems" page, specifically the "Publish over SSH" configuration. It includes fields for "Jenkins SSH Key" (with a "Change Password" button), "Passphrase", "Path to key", "Key", and a checkbox for "Disable exec". Below this, the "SSH Servers" section allows adding a new server. A table shows one entry: "Name" (set to "dockerhost").

Fig. Configure System Success

Steps to configure systems:

Login as: dockeradmin

Server refused our key

dockeradmin@54.227.61.230's password:



| • MobaXterm Personal Edition v22.0 • |

| (SSH client, X server and network tools) |

| |

| ► SSH session to dockeradmin@54.227.61.230 |

| • Direct SSH : ✓ |

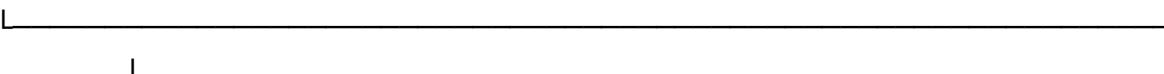
| • SSH compression : ✓ |

| • SSH-browser : ✓ |

| • X11-forwarding : X (disabled or not supported by server) |

| |

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



Last login: Wed May 11 11:24:01 2022 from 152.57.203.204

||_)

_| (/ 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.

[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/uXpcApxGxmukI0Ca3VwRMTOnyww48ZF+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

OK

Fig. BuildandDeployonContainer item Created

Fig. deleting Deploy war/ear on Container item.

Build Artifacts over SSH:

Fig. send build artifacts over SSH

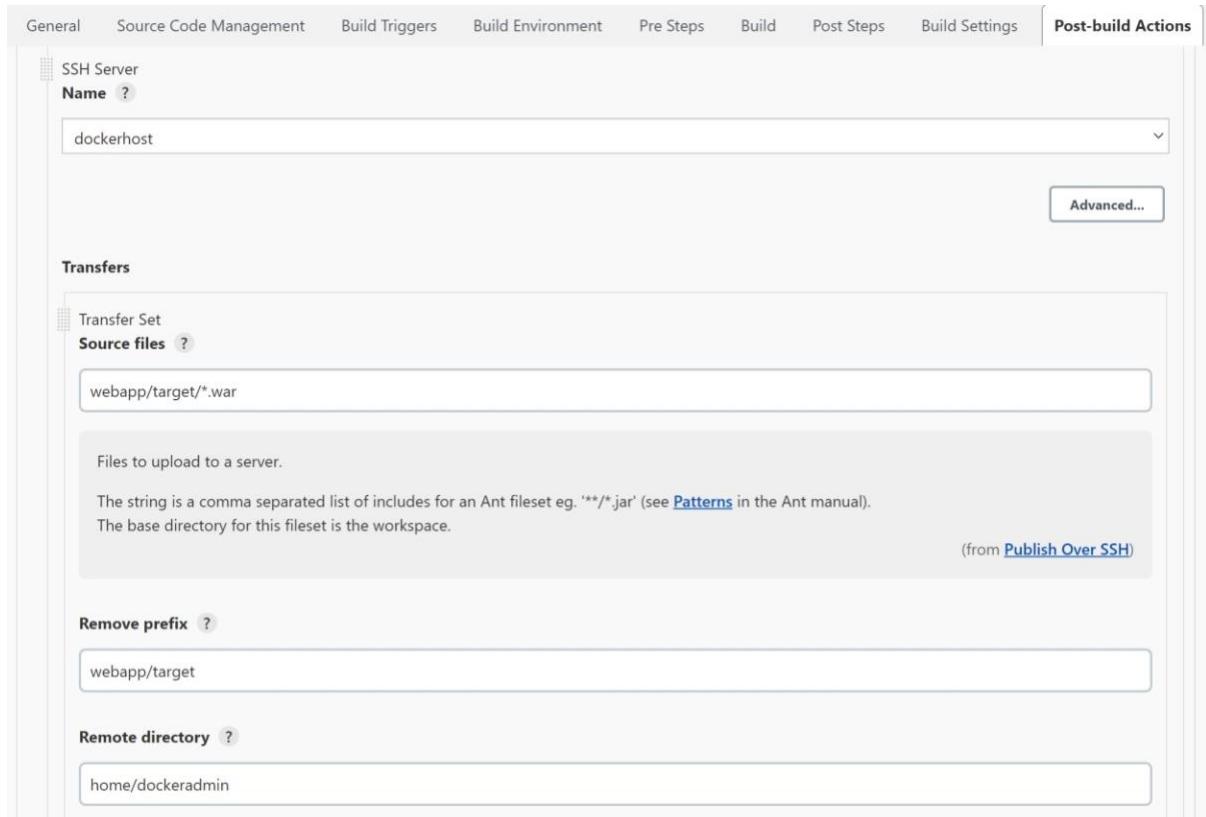


Fig. Configuring SSH Server

Test Case Success:

```

Dashboard > BuildandDeployonContainer > #1
[INFO] Copying webapp resources [/var/lib/jenkins/workspace/BuildandDeployonContainer/webapp/src/main/webapp]
[INFO] Webapp assembled in [35 msec]
[INFO] Building war: /var/lib/jenkins/workspace/BuildandDeployonContainer/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/BuildandDeployonContainer/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/BuildandDeployonContainer/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 [ 1.294 s]
[INFO] Server ..... SUCCESS [ 5.750 s]
[INFO] Webapp ..... SUCCESS [ 1.418 s]
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 11.078 s
[INFO] Finished at: 2022-05-11T12:05:38Z
[INFO] -----
[JENKINS] Archiving /var/lib/jenkins/workspace/BuildandDeployonContainer/webapp/pom.xml to com.example.maven-project/webapp/1.0-SNAPSHOT/webapp-1.0-SNAPSHOT.pom
[JENKINS] Archiving /var/lib/jenkins/workspace/BuildandDeployonContainer/webapp/target/webapp.war to com.example.maven-project/webapp/1.0-SNAPSHOT/webapp-1.0-SNAPSHOT.war
[JENKINS] Archiving /var/lib/jenkins/workspace/BuildandDeployonContainer/server/pom.xml to com.example.maven-project/server/1.0-SNAPSHOT/server-1.0-SNAPSHOT.pom
[JENKINS] Archiving /var/lib/jenkins/workspace/BuildandDeployonContainer/server/target/server.jar to com.example.maven-project/server/1.0-SNAPSHOT/server-1.0-SNAPSHOT.jar
[JENKINS] Archiving /var/lib/jenkins/workspace/BuildandDeployonContainer/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 [dockerhost] ...
SSH: Disconnecting configuration [dockerhost] ...
SSH: Transferred 1 file(s)
Finished: 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 :

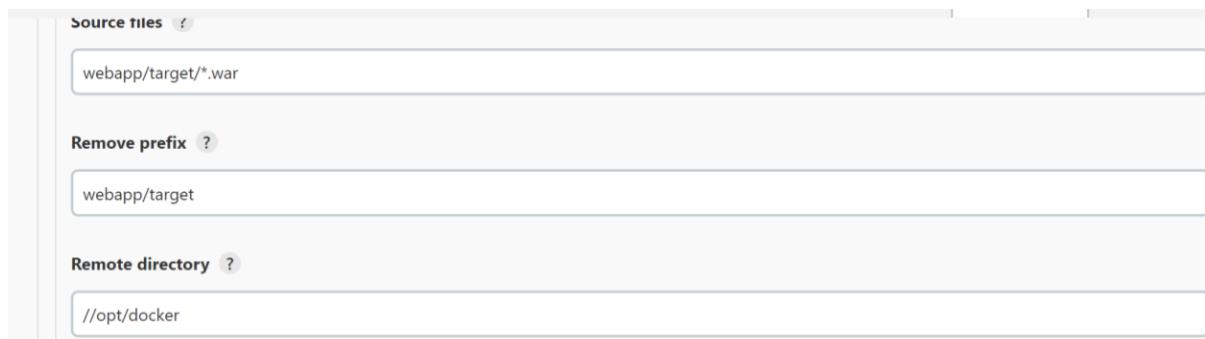


Fig. Remote Directory Path added

```
[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
edef49a560653ec2a7d2c3cb260abdfaacea025654b5bf91e4124a61c18f0e5
[root@dockerhost docker]# docker ps
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS
PORTS		NAMES		
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]#
```

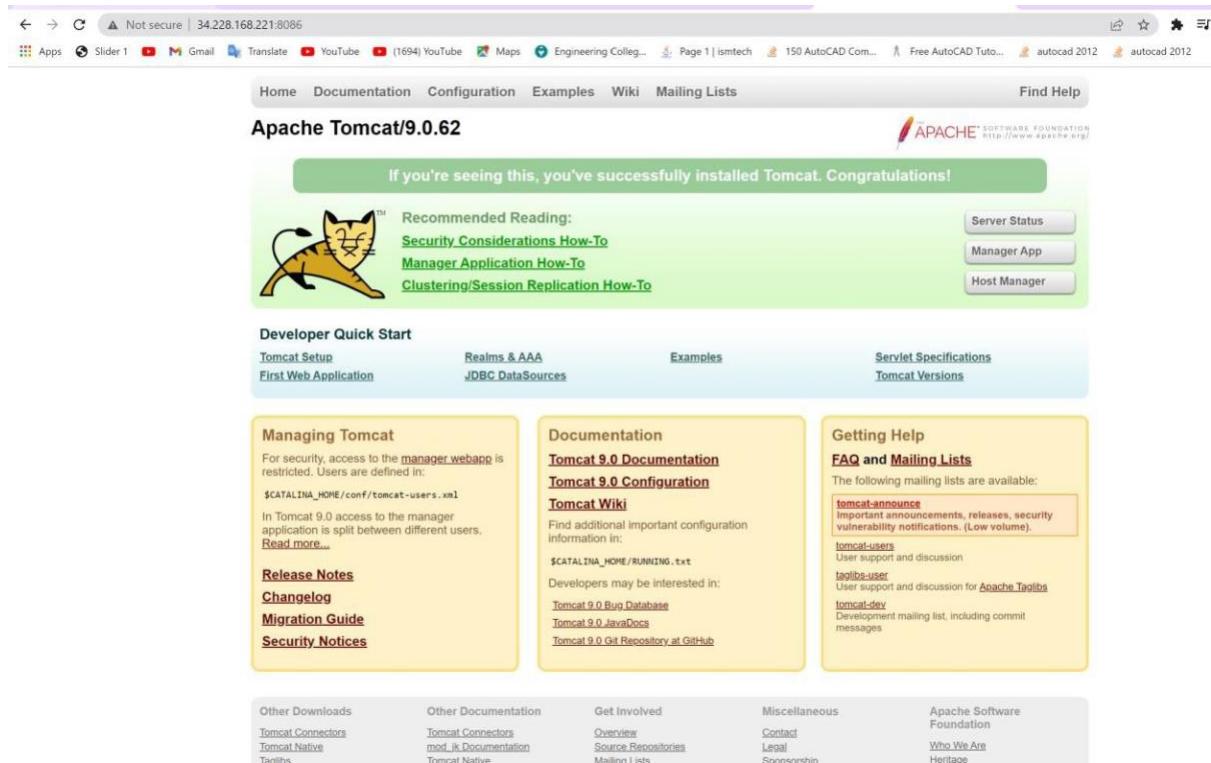


Fig. Tomcat Started

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
```



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
edef149a56065 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 5dd0da3dc9764 "/bin/sh -c 'sudo am..." 8 days ago Exited (127) 8 days ago charming_chatterjee
36d65ecb9a6e 5dd0da3dc9764 "/bin/sh -c 'amazon..." 8 days ago Exited (127) 8 days ago nifty_bell
c6093995c672 5dd0da3dc9764 "/bin/sh -c 'yum ins..." 8 days ago Exited (1) 8 days ago inspiring_franklin
74fcdb513fff 5dd0da3dc9764 "/bin/sh -c 'yum ins..." 8 days ago Exited (1) 8 days ago stoic_rhodes
89d40f0ec25e 5dd0da3dc9764 "/bin/sh -c 'yum ins..." 8 days ago Exited (1) 8 days ago loving_heyrovsky
9ac2c0b28c45 5dd0da3dc9764 "/bin/sh -c 'yum ins..." 8 days ago Exited (1) 8 days ago nifty_thompson
d4c7dbd9d910f 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 edef149a56065
[root@dockerhost ~]# docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
edef149a56065 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 5dd0da3dc9764 "/bin/sh -c 'sudo am..." 8 days ago Exited (127) 8 days ago charming_chatterjee
36d65ecb9a6e 5dd0da3dc9764 "/bin/sh -c 'amazon..." 8 days ago Exited (127) 8 days ago nifty_bell
c6093995c672 5dd0da3dc9764 "/bin/sh -c 'yum ins..." 8 days ago Exited (1) 8 days ago inspiring_franklin
74fcdb513fff 5dd0da3dc9764 "/bin/sh -c 'yum ins..." 8 days ago Exited (1) 8 days ago stoic_rhodes
89d40f0ec25e 5dd0da3dc9764 "/bin/sh -c 'yum ins..." 8 days ago Exited (1) 8 days ago loving_heyrovsky
9ac2c0b28c45 5dd0da3dc9764 "/bin/sh -c 'yum ins..." 8 days ago Exited (1) 8 days ago nifty_thompson
d4c7dbd9d910f 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]
Deleted Containers:
edef149a560653ec2a7d2c3cb266abdfaacea025654b5bf91e4124a61c18f0e5
5251e0ac3ad93d09f1f75f289e597f245643e124693162ffa58b542685b4ea64129d
183307c95d1b91603de52e753f9aa0d1f18ceec32fe7300b129b4c5c9e3486a4
13967cbc8a35d2df2c49041dfad83781246f33973dc1ad7c9f31519e00096122
36d65ecb9a6eaad4c6ca2f7601c2f6994fb04844ec5e8eaaf380f4b21397a0321
c6093995c672959c706618124da022c7a395e0927951b6951009f916265ada3a1
74fcdb513fff436805c9a95eb235af74f20eb41bb524ff00ad5fe699866
89d40f0ec25eb5ee062f477a1e33e5a1614d70eaf30def7eaeaa509498b9a0c
9ac2c0b28c452a9b3fa50fd5023f14e7e1c34cea57e0a618d97655617733a250
d4c7dbd9d910f0dceee0f014d3e3fc685e9ef84305627373c5e2d1db43c75c03fb
78e9303c67b9f67ca161776a1321da5cb8bad4b85e64c9753a84bf91359ace21
```

Fig. Removing all running container

docker images prune -a // remove images

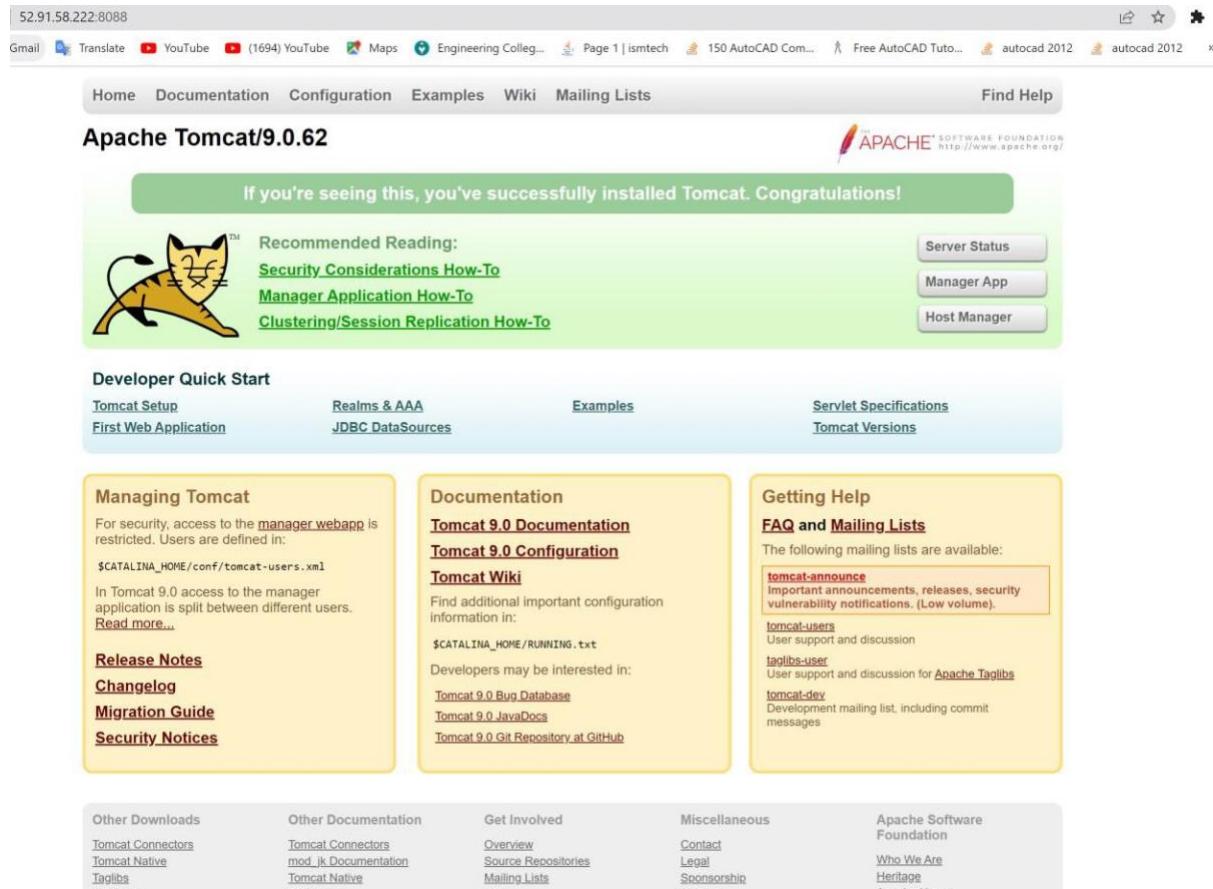


Fig . Tomcat Started on port 8088

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

The screenshot shows the AWS Management Console interface for the EC2 service. The main area displays a table of instances with the following details:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
Tomcat_Server	i-010da4753e089d7869	Stopped	t2.micro	-	No alarms	+ us-east-1c	-
Docker_Server	i-0875a802a59fdd059	Stopped	t2.micro	-	No alarms	+ us-east-1c	-
Jenkins_Server1	i-00f11e4c8cb15c9042	Stopped	t2.micro	-	No alarms	+ us-east-1c	-
Ansible_Server	i-0dc753250431fbac9	Running	t2.micro	-	No alarms	+ us-east-1c	ec2-3-90-12-179.comp..

The sidebar on the left shows navigation links for EC2 Dashboard, EC2 Global View, Events, Tags, Limits, Instances (selected), Instances Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Scheduled Instances, Capacity Reservations, Images, AMIs, and Elastic Block Store.

Fig.EC2 Instance Setup For Ansible

Setup hostname

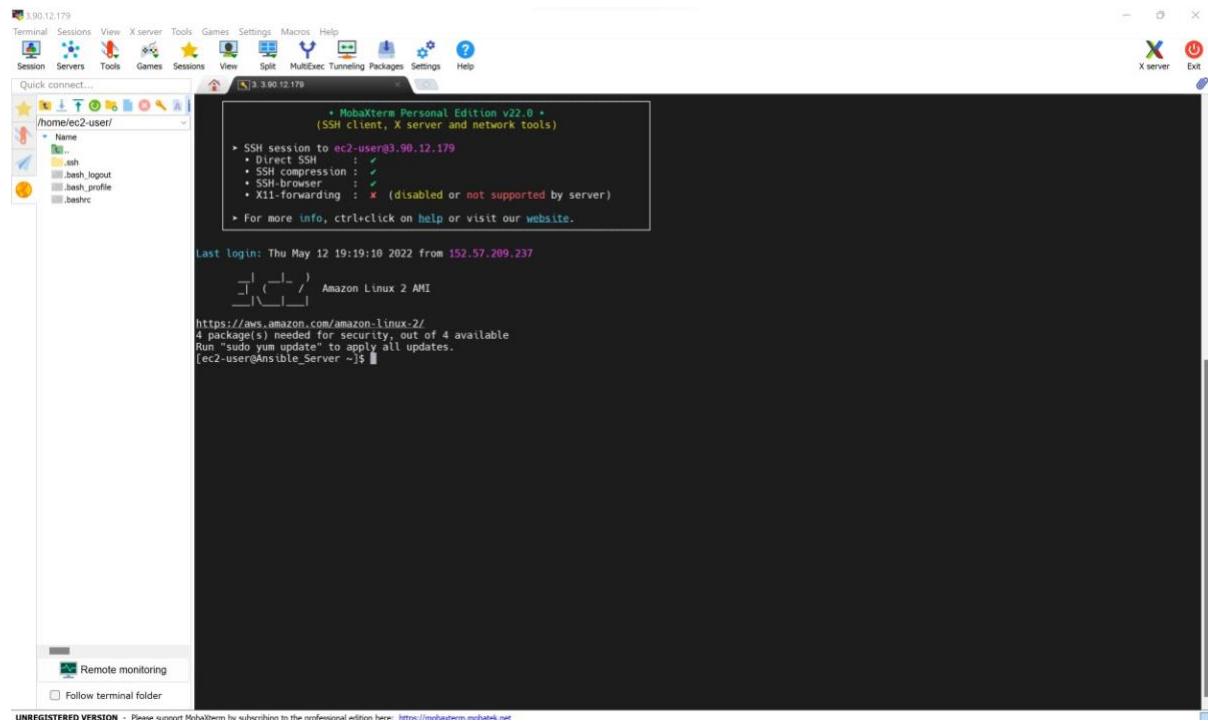


Fig.EC2 Setup hostname For Ansible

Create ansadmin users

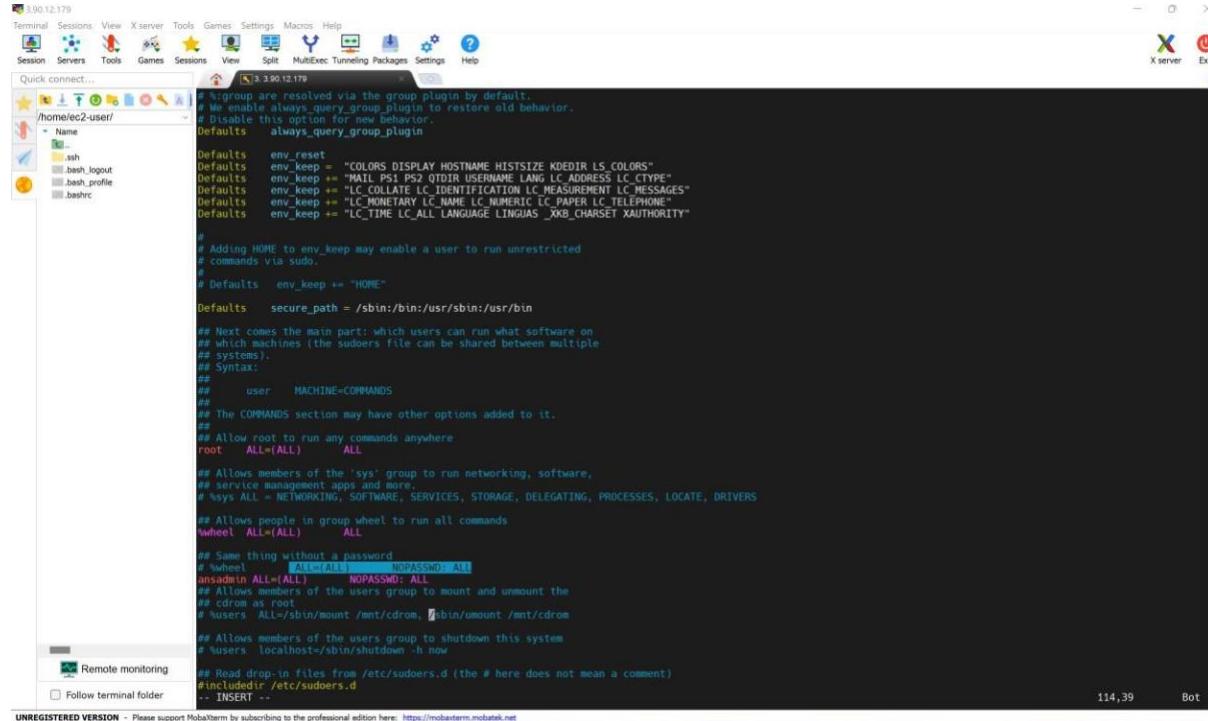
```
[root@Ansible_Server ~]# useradd ansadmin
[root@Ansible_Server ~]# passwd ansadmin
Changing password for user ansadmin.
New password:
BAD PASSWORD: The password contains the user name in some form
Retype new password:
passwd: all authentication tokens updated successfully.
[root@Ansible_Server ~]#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

Fig. ansadmin users is created

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**



The screenshot shows a terminal window titled "3.90.12.179" displaying the contents of the /etc/sudoers file. The file contains various configuration options and command definitions. At the bottom of the file, there is a section starting with "# Read drop-in files from /etc/sudoers.d (the # here does not mean a comment)". A cursor is positioned at the start of the line "#includedir /etc/sudoers.d". To the right of the cursor, there is a small red box highlighting the text "NOPASSWD: ALL". The terminal window has a dark background with light-colored text. The top bar includes icons for Session, Servers, Tools, Games, Settings, Macros, Help, and X server. The bottom status bar shows "114,39 Bot".

```
# %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
#userin  ALL=(ALL)      NOPASSWD: ALL
## Allows members of the users group to mount and umount 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 ...
```

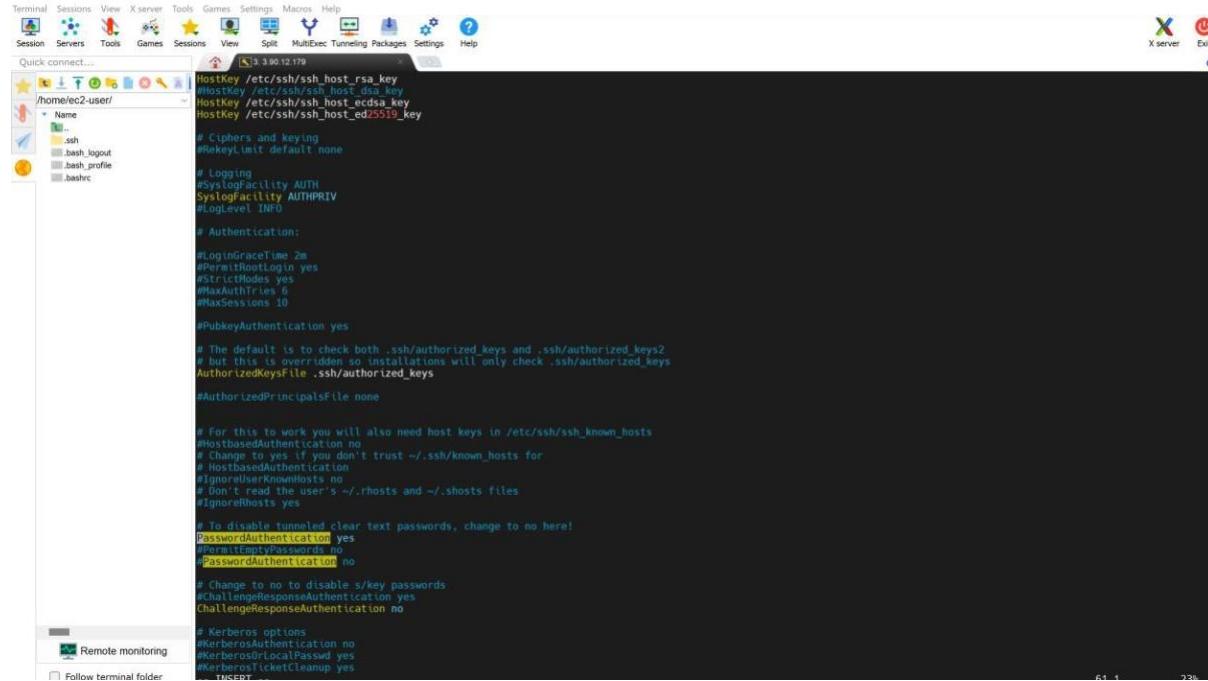
Fig. Add Users to sudoers file

- Note: Shift +g to end of line

Configuring SSH

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

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



The screenshot shows a terminal window with the following content:

```
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
#KerberosOrLocalPasswd yes
#KerberosTicketCleanup yes
```

Fig. Configuring Passwd

Enable Password Based Login

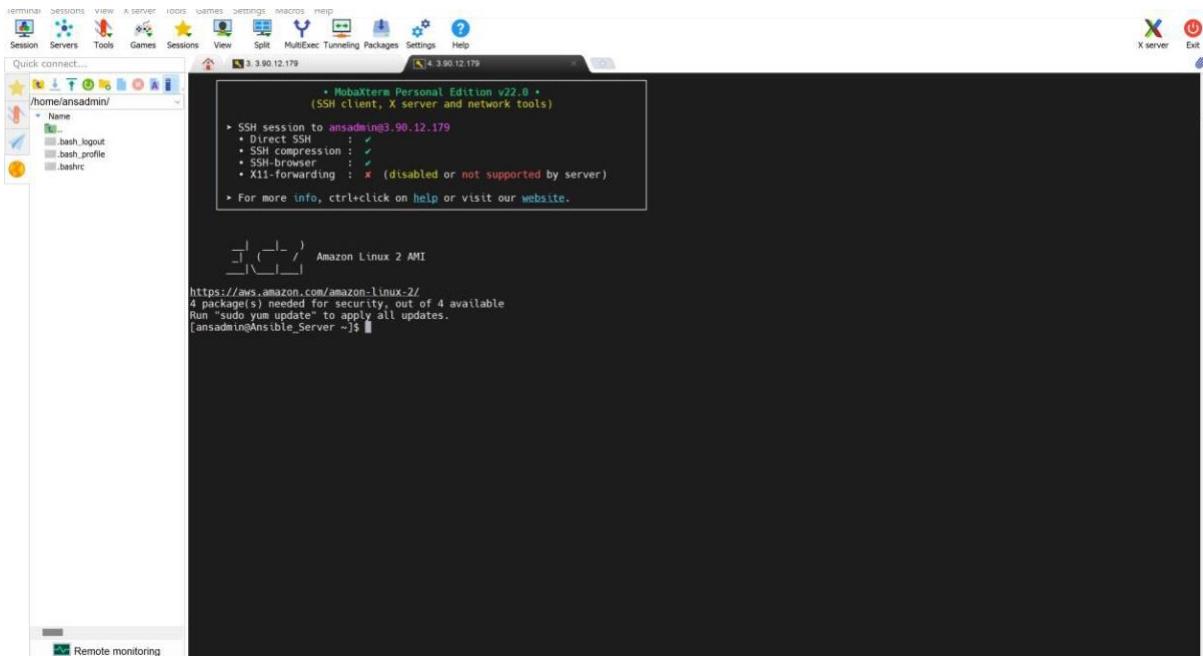


Fig. Login as ansadmin

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

The screenshot shows a terminal window titled 'Amazon Linux 2 AMI' running on a desktop environment. The terminal content is as follows:

```
https://aws.amazon.com/amazon-linux-2/
4 packages(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'.
Created 'id_rsa'.
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:+dEhKncZC04uVh08BYqwn/bZwLbV+Cl3010dUDJmLE ansadmin@Ansible_Server
The key's randomart image is:
+---[RSA 2048]---+
| . ..o. .=Eo |
| o..+ o o o|
| o. o o ..|
| . .........|
| .. oS+.. |
| 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 ~]# rpm -q 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
```

The terminal shows the user generating an RSA key pair, updating the system, and then attempting to install Ansible via RPM. The user then installs the Ansible2 package from the Amazon Linux Extras repository.

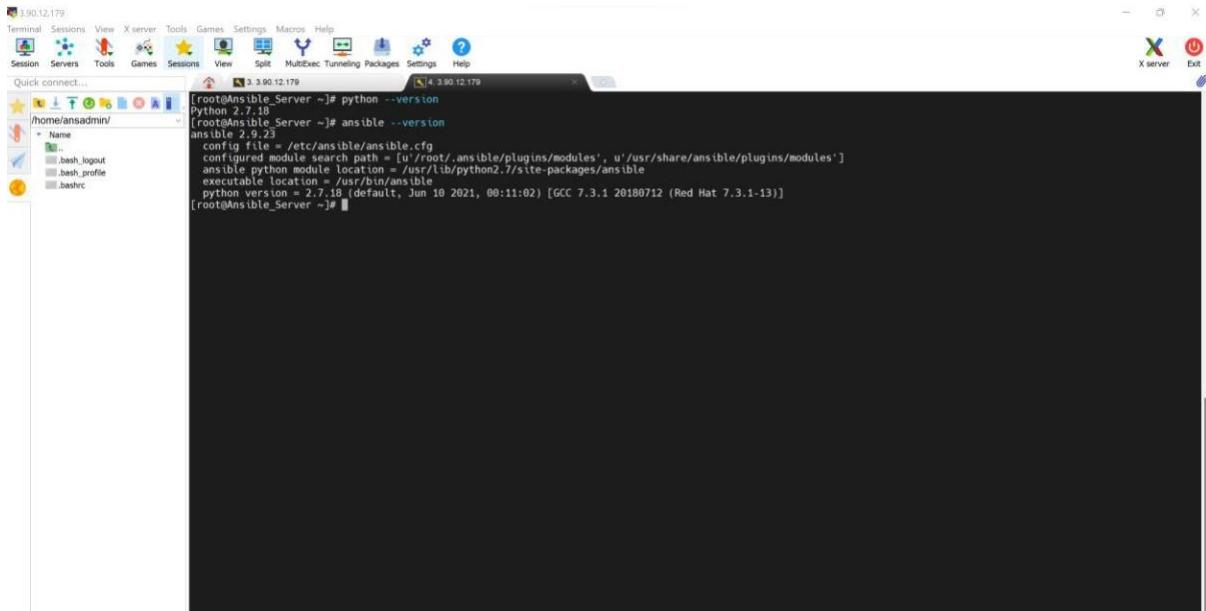


Fig. Installing Ansible

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

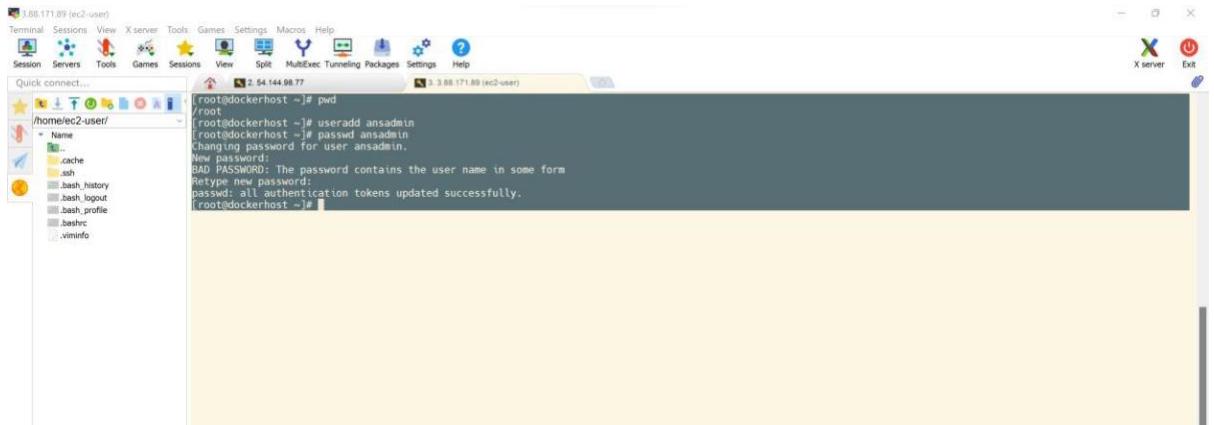


Fig. Created ansadmin for docker

Add ansadmin to sudoers file

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

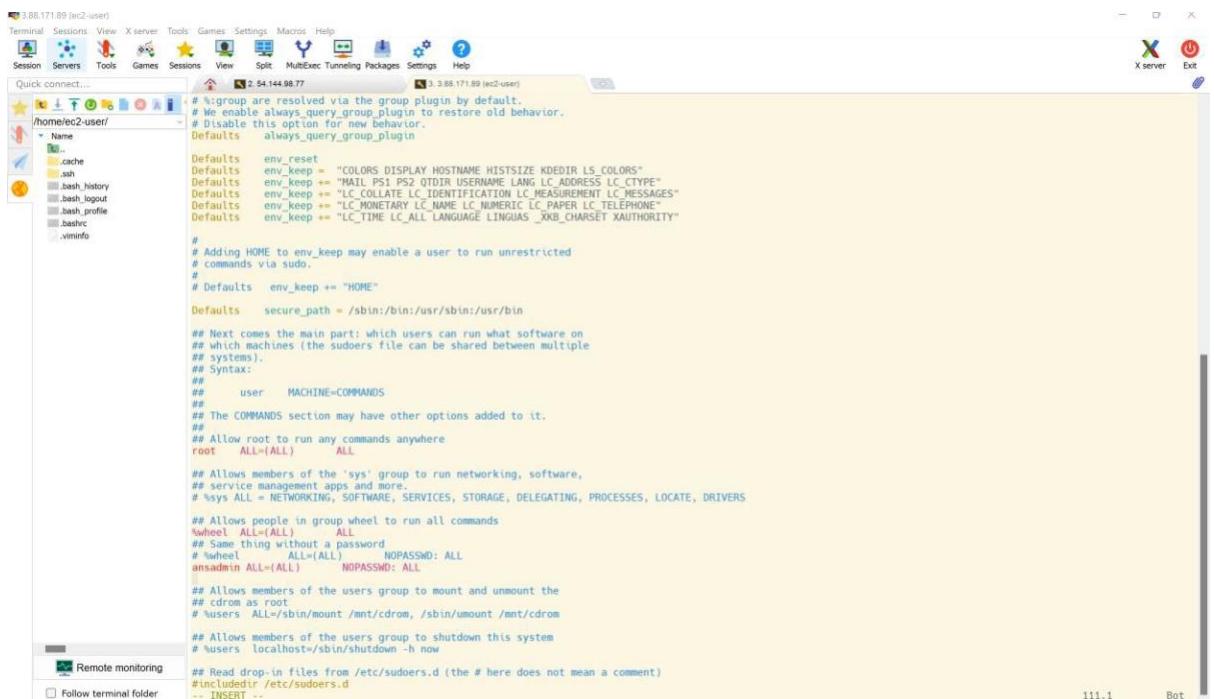


Fig. Created ansadmin added to sudoers file

Enable Password Based Login

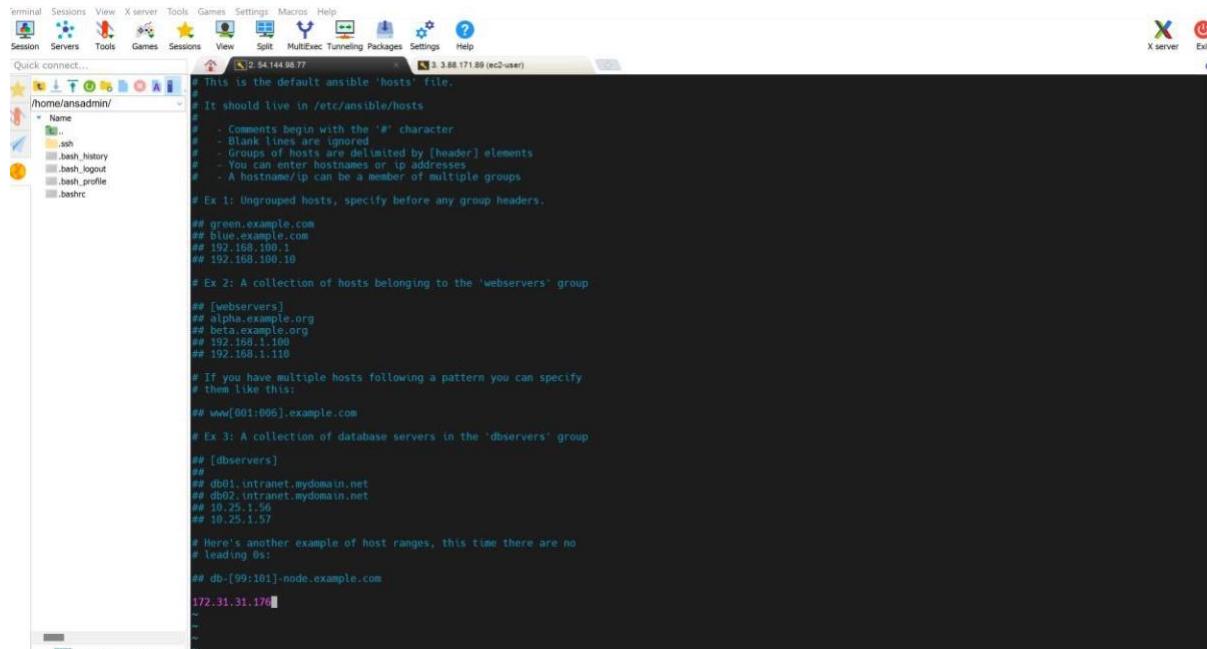
```
[root@dockerhost ~]# vi /etc/ssh/sshd_config
[root@dockerhost ~]# grep Password /etc/ssh/sshd_config
PasswordAuthentication yes
#PermitEmptyPasswords no
#PasswordAuthentication no
# PasswordAuthentication. Depending on your PAM configuration,
# PAM authentication, then enable this but set PasswordAuthentication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

Fig. Enable Password Based Login

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

Add to host file

```
[root@Ansible_Server ~]# vi /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
## 192.168.1.10
## 192.168.1.10

# Ex 2: A collection of hosts belonging to the 'webservers' group

## [webservers]
## alpha.example.org
## beta.example.org
## 192.168.1.10
## 192.168.1.10

# 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
172.31.31.170
```

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 .tcsshrc
-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.
ED25519 key fingerprint is SHA256:gflrciph6tjqGxbdpGkoplLgs9XK24wJvpF3IgHX3s.
ED25519 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 ~]$
```

```
2.54.144.68.77 3.388.171.89 (ec2-user)

  • 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@dockerhost ~]$ sudo - ansadmin
sudo: -: command not found
[ec2-user@dockerhost ~]$ sudo su -ansadmin
su: invalid option -- 'a'
Try 'su --help' for more information.
[ec2-user@dockerhost ~]$ sudo su - ansadmin
[ansadmin@dockerhost ~]$ ls
[ansadmin@dockerhost ~]$ ll
total 0
[ansadmin@dockerhost ~]$ 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 ansadmin 18 Jul 15 2020 .bash_logout
-rw-r--r-- 1 ansadmin ansadmin 193 Jul 15 2020 .bash_profile
-rw-r--r-- 1 ansadmin ansadmin 231 Jul 15 2020 .bashrc
drwx----- 2 ansadmin ansadmin 29 May 12 23:21 .ssh
[ansadmin@dockerhost ~]$ cd .ssh
[ansadmin@dockerhost .ssh]$ ll
total 4
-rw----- 1 ansadmin ansadmin 405 May 12 23:21 authorized_keys
[ansadmin@dockerhost .ssh]$ date
Thu May 12 23:27:09 UTC 2022
[ansadmin@dockerhost .ssh]$
```

Fig. Copying sshkey to docker host.

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

ssh-rsa

```
AAAAB3NzaC1yc2EAAAQABAAQCbCHrU93Nngsu3VtGfMvQktI1pktg  
GWyd9z8iyiak0Dizs8AiIPGEEwoP4ihhsx8l9loSU5i1D9/rGG2KtpQh95SXUzgfvu  
tnA/UEuEiPV1oTYpeteltG868/qsCLUME8b9nJU57g782QvnNBS4OBmNUHTQ6  
egxxpwtOzl/O1Oq8eNe84QODGyuOk7EJqjLxOh17B/BeRG07sKLvA/n183pep6  
dM+5OwdTe+c1wuoJ2V9mdD/fbIfKkC789LofxNuZPuvOF5sn9KeuJ65pOuUn6t  
/L6Ev2vUw2YXe8FCQrBgY6Ab02Rlc2VufjfJ+nUXwaGoV67p/2VGcyQwXdvdcb  
ansadmin@Ansible_Server
```

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

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

ssh-rsa

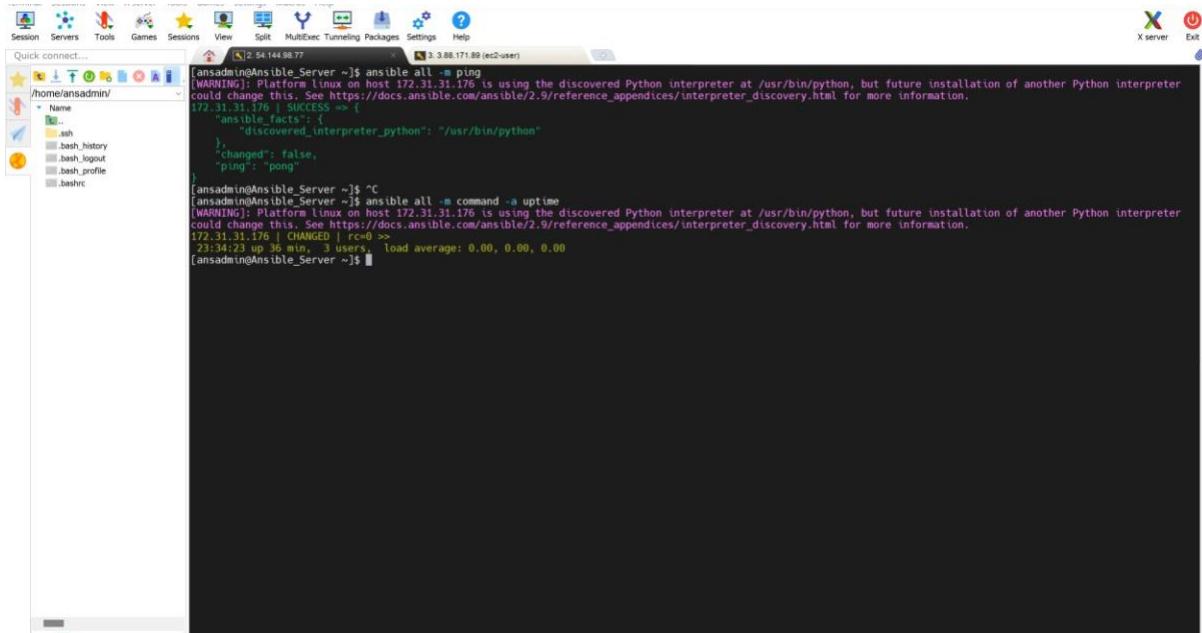
```
AAAAB3NzaC1yc2EAAAQABAAQCbCHrU93Nngsu3VtGfMvQktI1pktg  
GWyd9z8iyiak0Dizs8AiIPGEEwoP4ihhsx8l9loSU5i1D9/rGG2KtpQh95SXUzgfvu  
tnA/UEuEiPV1oTYpeteltG868/qsCLUME8b9nJU57g782QvnNBS4OBmNUHTQ6  
egxxpwtOzl/O1Oq8eNe84QODGyuOk7EJqjLxOh17B/BeRG07sKLvA/n183pep6  
dM+5OwdTe+c1wuoJ2V9mdD/fbIfKkC789LofxNuZPuvOF5sn9KeuJ65pOuUn6t  
/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
```



The screenshot shows the WinSCP graphical interface. On the left is a file browser window titled 'Quick connect...', showing a directory structure under '/home/ansadmin/'. The main area is a terminal window titled '2: 54:44.98.77' with the IP '3.38.171.89 (ec2-user)'. It displays two commands run on the Ansible Server:

```
[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 => [output redacted]
{
  "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,  2 users,  load average: 0.00, 0.00, 0.00
[ansadmin@Ansible_Server ~]$
```

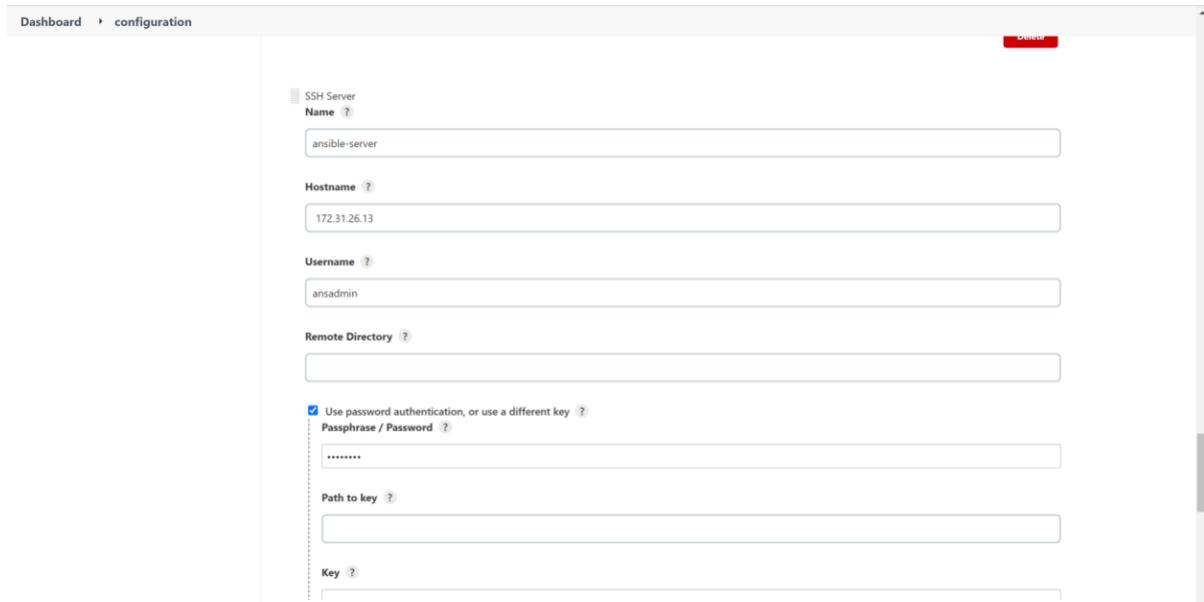


The screenshot shows a terminal window with the following command and its output:

```
[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]$
```

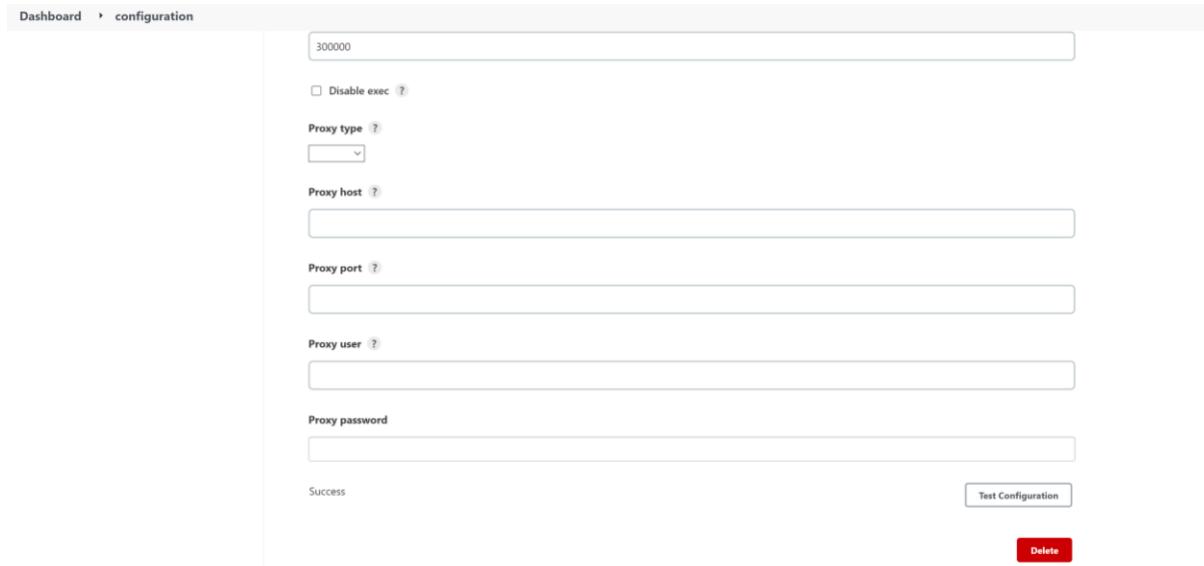
Fig. Connection Success

Integrate Ansible with Jenkins:



The screenshot shows the Jenkins configuration interface for an SSH Server. The 'Name' field is set to 'ansible-server'. The 'Hostname' field contains '172.31.26.13'. The 'Username' field is 'ansadmin'. The 'Remote Directory' field is empty. A checkbox for 'Use password authentication, or use a different key' is checked, and the 'Passphrase / Password' field contains '*****'. The 'Path to key' and 'Key' fields are also empty.

Fig. Configuring Ansible with Jenkins



The screenshot shows the Jenkins configuration interface for proxy settings. The 'Proxy port' field is set to '300000'. The 'Proxy user' and 'Proxy password' fields are empty. The 'Proxy host' and 'Proxy type' dropdown are also empty. A 'Disable exec' checkbox is unchecked. At the bottom, there is a 'Success' message, a 'Test Configuration' button, and a 'Delete' button.

Fig. Testing Success and save it.

Creating Item:

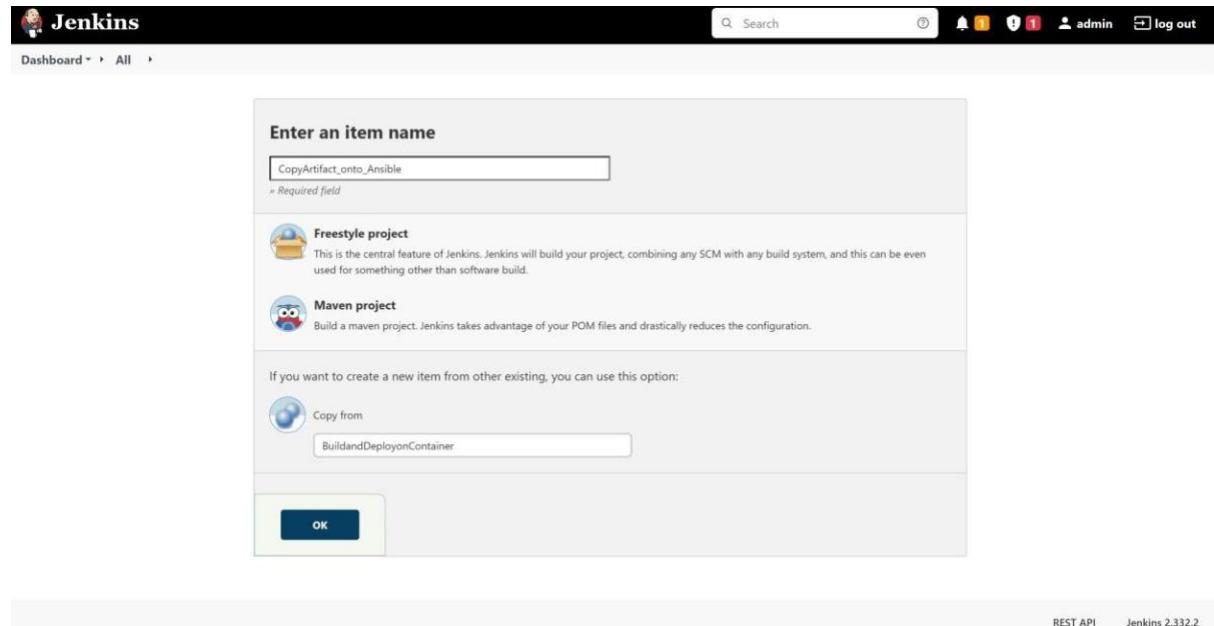


Fig. CopyArtifact_onto_Ansible

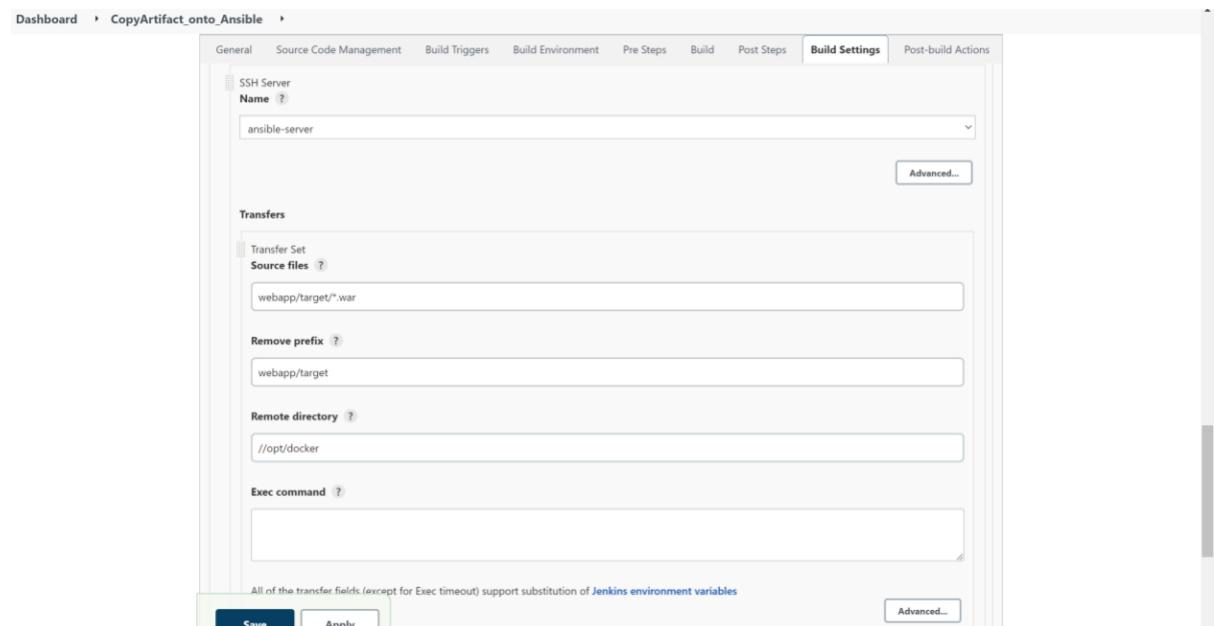


Fig. Configuring SSH Server with ansible-server

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:

The screenshot shows a Jenkins console output page. The title bar indicates the URL is 174.129.60.235:8080/job/CopyArtifact_onto_Ansible/1/console. The main content area is titled 'Console Output' with a green checkmark icon. It displays the command-line logs of the build process, which includes cloning a GitHub repository, checking out a specific revision, and executing Maven commands to clean and install the project. The build status is shown as 'Success'.

```
Started by an SCM change
Running as SYSTEM
Building in workspace /var/lib/jenkins/workspace/CopyArtifact_onto_Ansible
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/CopyArtifact_onto_Ansible # timeout=10
Fetching upstream changes from https://github.com/SaifPanjeha/hello-world.git
> git -v --version # timeout=10
> 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 976d4e8008216109bebe1a6b7000b500272c2f05a (refs/remotes/origin/master)
> git config core.sparsecheckout # timeout=10
> git checkout -f 976d4e8008216109bebe1a6b7000b500272c2f05a # timeout=10
Commit message: "updated index.jsp"
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 46465
[CopyArtifact_onto_Ansible] $ /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/.m2/jenkins/war/WEB-INF/lib/remoting-4.13.jar /var/lib/jenkins/plugins/maven-plugin/WEB-INF/lib/maven3-interceptor-commons-1.13.jar /var/lib/jenkins/plugins/maven-plugin/WEB-INF/lib/maven3-interceptor-commons-1.13.jar 46465
<===[JENKIN REMOTING CAPACITY]==>channel started
Executing Maven: -B -f /var/lib/jenkins/workspace/CopyArtifact_onto_Ansible/pom.xml clean install
```

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
```

The screenshot shows a terminal window with a dark background and light-colored text. On the left, there are two small gray boxes: one labeled 'remote monitoring' and another labeled 'w terminal folder'. The main terminal area displays the following text:

```
chrony: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]#
```

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 sc...dule=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:///ru...dule=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... address"

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:

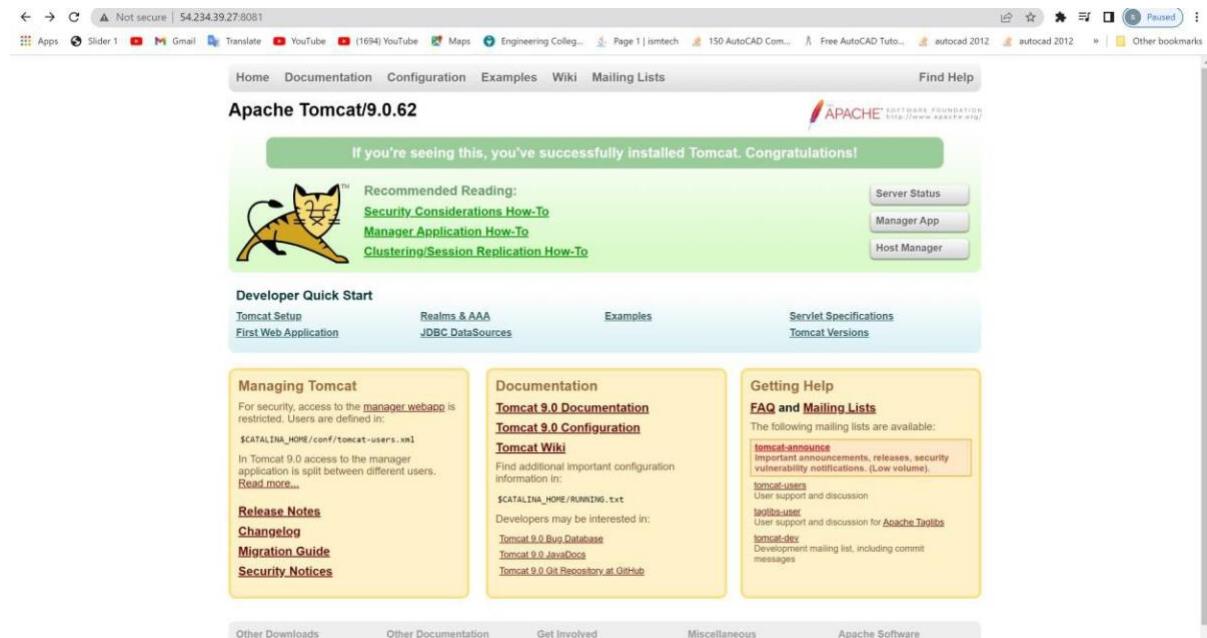


Fig.Tomcat Started

Ansible Playbook to create image and container

```
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
/home/ansadmin/
[ansadmin@Ansible_Server opt]$ cd docker
[ansadmin@Ansible_Server docker]$ ll
total 8
-rw-r--r-- 1 ansadmin ansadmin 528 May 13 12:12 Dockerfile
-rw-r--r-- 1 ansadmin ansadmin 2907 May 13 09:41 webapp.war
[ansadmin@Ansible_Server docker]$ cat /etc/ansible/hosts
# This is the default Ansible's 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
## 192.168.108.1
## 192.168.108.10

# 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
## 10.25.1.54
## 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
```

The screenshot shows a terminal window with the title 'Session 2: 50.19.28.190'. The terminal content displays various examples of Ansible host definitions in YAML format:

```
# It should live in /etc/ansible/hosts
/home/ansadmin/
  - Name
  - ...
  - ansible
  - ssh
  - bash_history
  - bash_logout
  - bash_profile
  - bashrc
  - viminfo

# 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

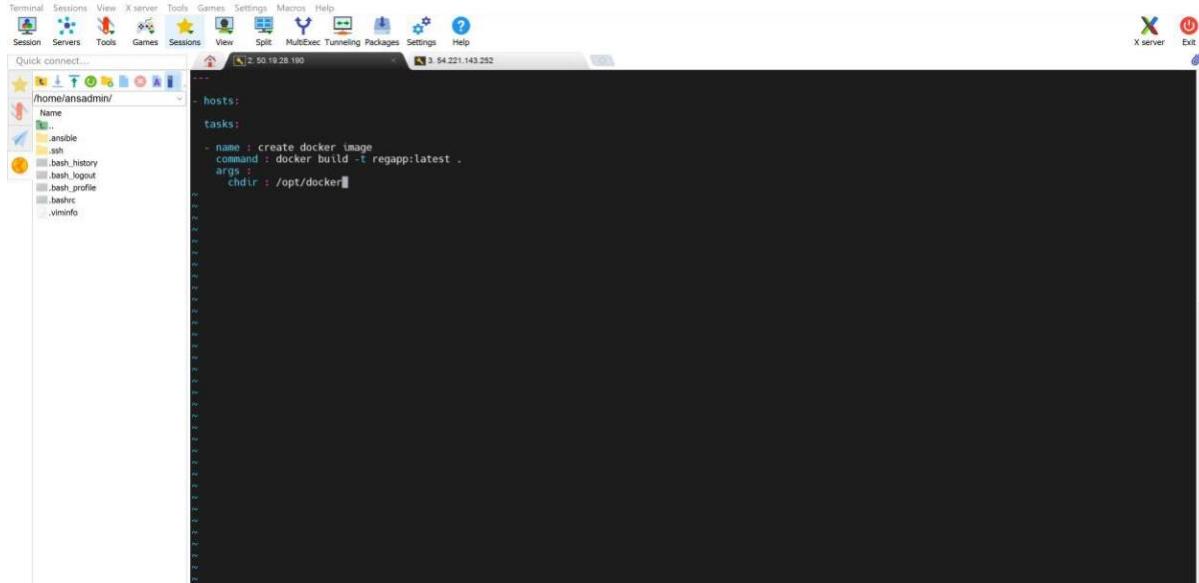
https://docs.ansible.com/ansible/2.9/reference_appendices/interpreter_discovery.html for more information.

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

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

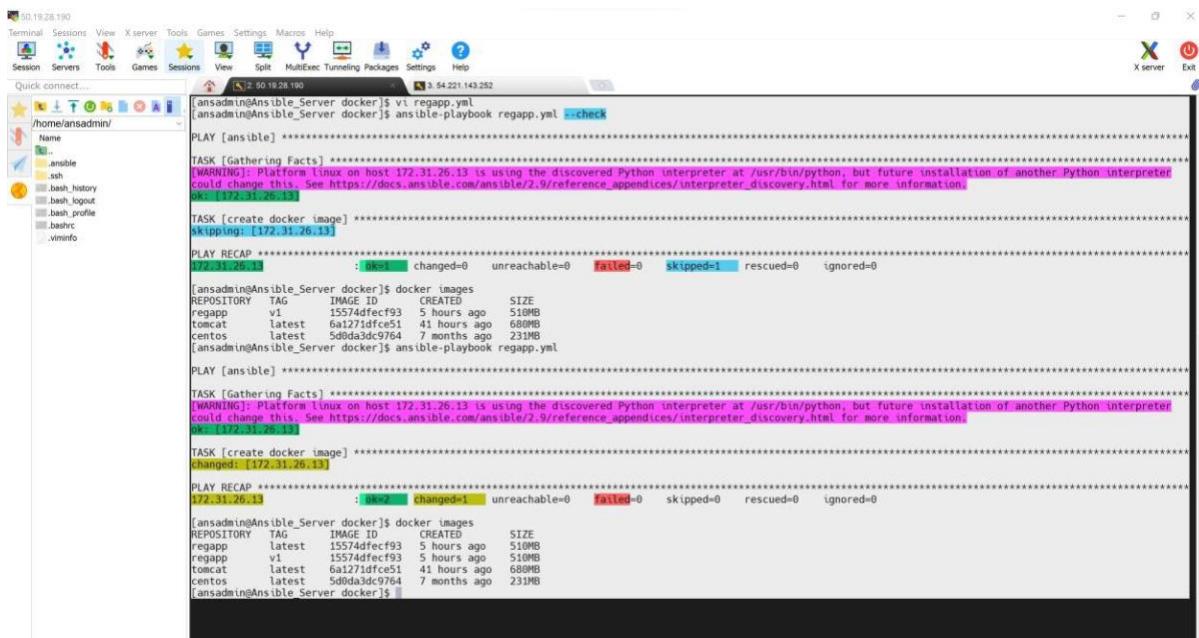
```
[ansadmin@Ansible_Server docker]$
```

Creating playbook:



```
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect... 2.50.19.28.190 3.54.221.143.252
/home/ansadmin/
Name .. ansible .ssh bash_history bash_logout bash_profile bashrc .viminfo
hosts:
tasks:
- name : create docker image
  command : docker build -t regapp:latest .
  args :
    chdir : /opt/docker
```

Fig. regapp.yml is created for ansible playbook



```
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect... 2.50.19.28.190 3.54.221.143.252
/home/ansadmin/
Name .. ansible .ssh bash_history bash_logout bash_profile bashrc .viminfo
[ansadmin@Ansible_Server docker]$ vi regapp.yml
[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]

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

[ansadmin@Ansible_Server docker]$ docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
regapp v1 15574dfecf93 5 hours ago 510MB
tomcat latest 6a1271dfcfe51 41 hours ago 680MB
centos latest 5ddda3dc9764 7 months ago 231MB
[ansadmin@Ansible_Server docker]$ ansible-playbook regapp.yml
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] ****
changed: [172.31.26.13]

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

[ansadmin@Ansible_Server docker]$ docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
regapp latest 15574dfecf93 5 hours ago 510MB
regapp v1 15574dfecf93 5 hours ago 510MB
tomcat latest 6a1271dfcfe51 41 hours ago 680MB
centos latest 5ddda3dc9764 7 months ago 231MB
[ansadmin@Ansible_Server docker]$
```

Fig. Successful docker Image is Created

Copying Images on dockerhub:

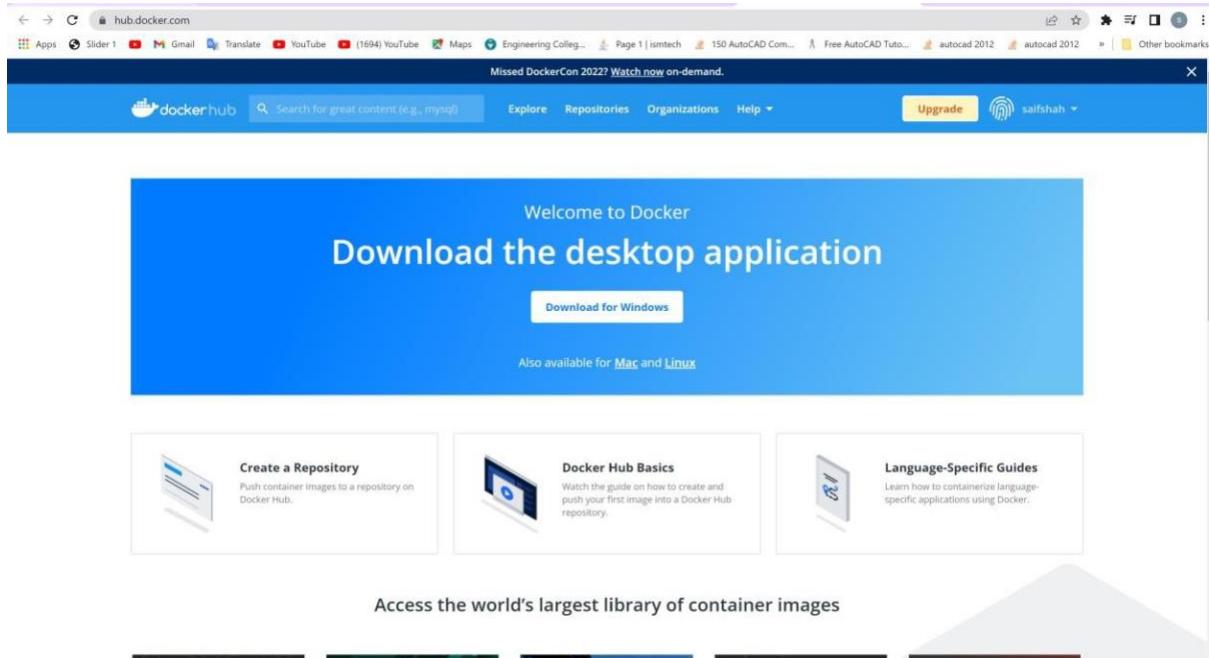


Fig .Dockerhub account

```
https://aws.amazon.com/amazon-linux-2/
4 packages needed for security fix of 4 available
Run "sudo yum update" to apply all updates.
[ansadmin@Ansible_Server ~]$ cd /opt/docker
[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 151 May 13 16:47 regapp.yml
-rw-rw-r-- 1 ansadmin ansadmin 2907 May 13 09:41 webapp.war
[ansadmin@Ansible_Server docker]$ docker images
[ansadmin@Ansible_Server docker]$ sudo docker start
[ansadmin@Ansible_Server docker]$ docker start
Redirecting to /bin/systemctl start docker.service
[ansadmin@Ansible_Server docker]$ docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
regapp latest 15574dfecf93 6 hours ago 510MB
regapp v1 15574dfecf93 6 hours ago 510MB
tomcat latest 6a1271dfce51 42 hours ago 680MB
centos latest 5d0da3dc9764 8 months ago 231MB
[ansadmin@Ansible_Server docker]$ docker login
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
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 tag 15574dfecf93 saifshah/regapp:latest
[ansadmin@Ansible_Server docker]$ docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
regapp latest 15574dfecf93 6 hours ago 510MB
regapp v1 15574dfecf93 6 hours ago 510MB
saifshah/regapp latest 15574dfecf93 6 hours ago 510MB
tomcat latest 6a1271dfce51 42 hours ago 680MB
centos latest 5d0da3dc9764 8 months ago 231MB
[ansadmin@Ansible_Server docker]$ docker push saifshah/regapp
Using default tag: latest
The push refers to repository [docke.../regapp]
ce5cfdb80a72: Pushed
edb4f71f2d30: Pushed
f33a455e00c0: Pushed
eef335edb771: Pushed
3196624add0: Pushed
a1a94560885: Pushed
ab2876b2f091: Pushed
74dd0dec08fa: Mounted from library/centos
latest: digest: sha256:4c9bf05e487fee2c74107743cb246f6945c278bf5f4b2d7cea0246518cd19881 size: 2000
[ansadmin@Ansible_Server docker]$
```

Fig. Added Images to Docker Hub

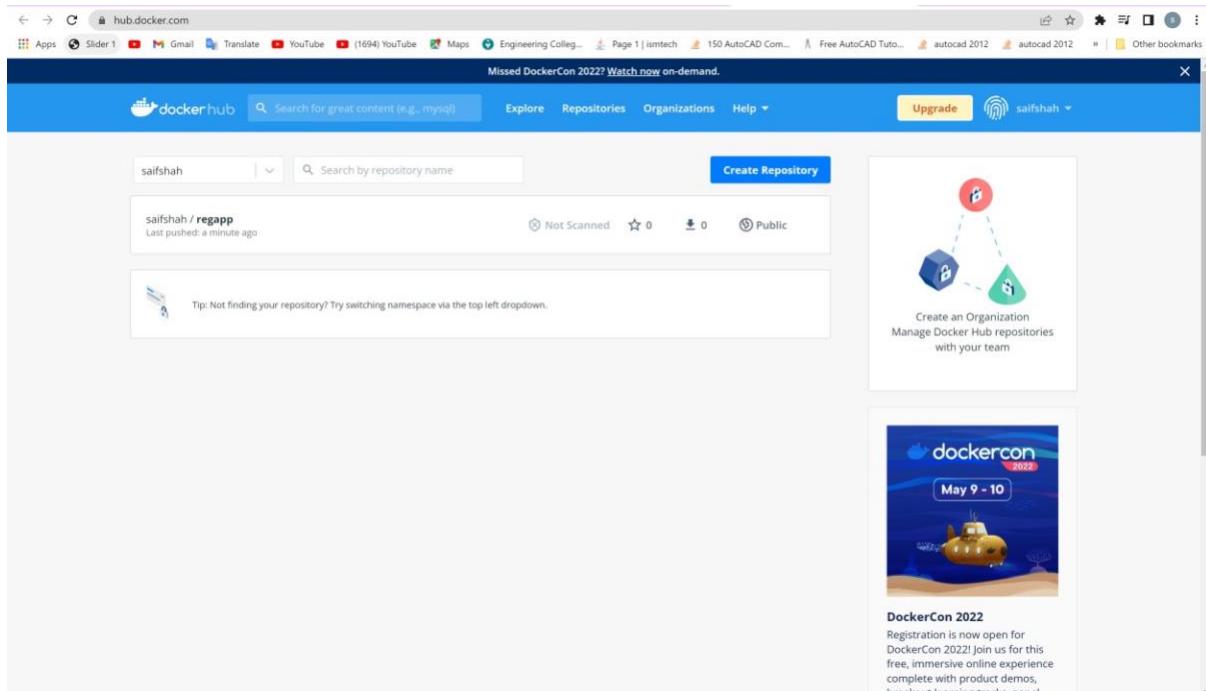


Fig. Successful Copying Images on Docker Hub

Jenkins Job to build an image on ansible:

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

```

[54.202.229.203]
terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect...
2 34.202.229.203
/home/ansadmin/
  - Name
    - .. 
    - ansible
    - ssh
    - .ssh
    - bash.history
    - bash.logout
    - bash.profile
    - bashrc
    - .viminfo

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

```

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]\$

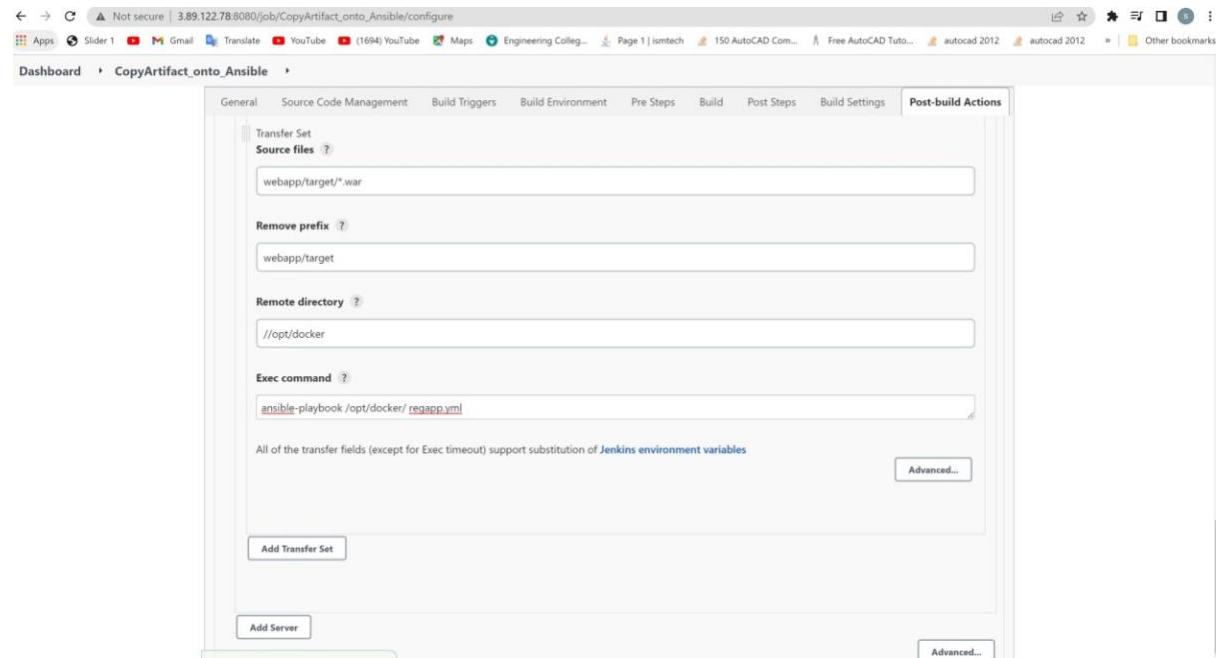


Fig. Configuring Artifact onto Ansible

ansible-playbook /opt/docker/regapp.yml

```

MINGW64:/c/Users/saitt/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>
<br>
<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 mobile 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>
<br>
<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

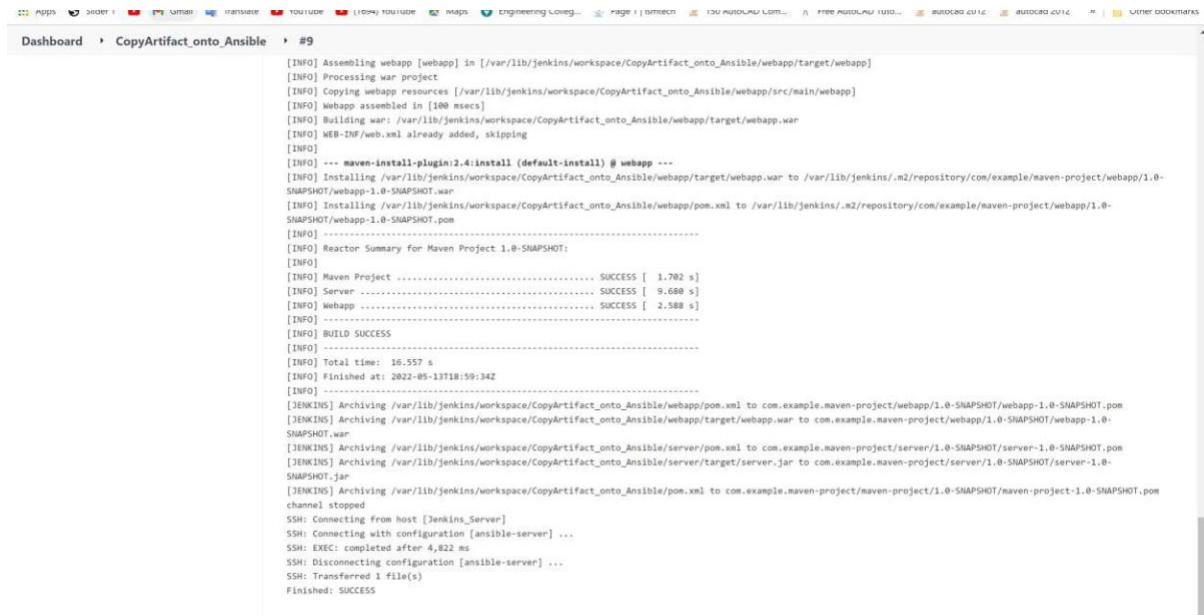
REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
regapp	latest	15574dfecf93	7 hours ago	510MB

```

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

```

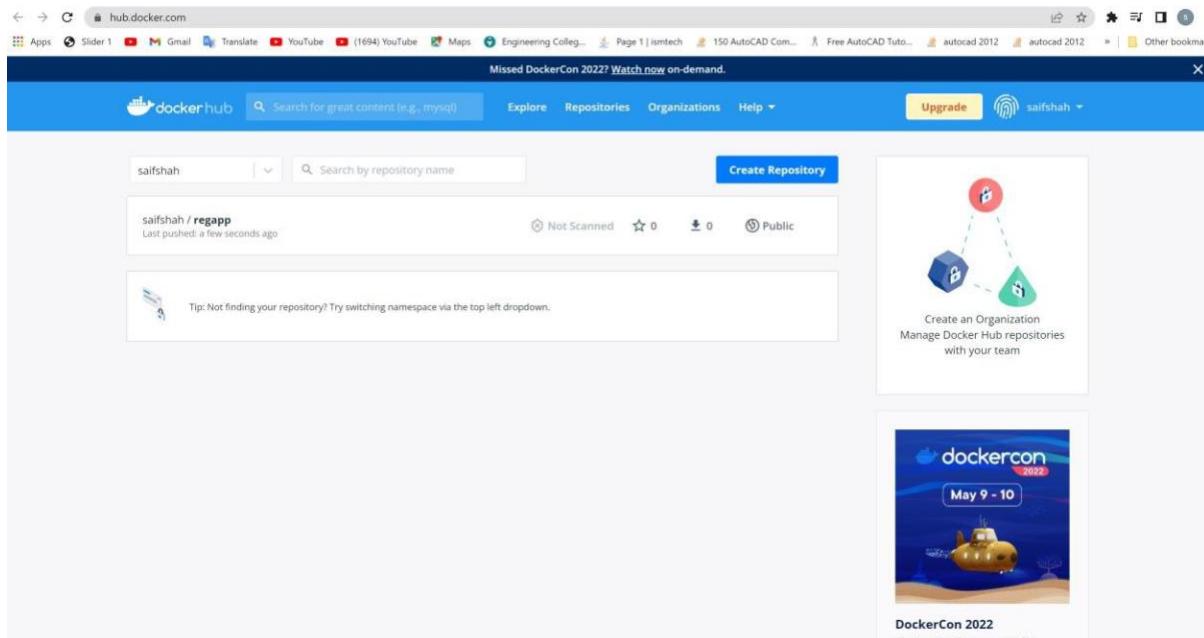
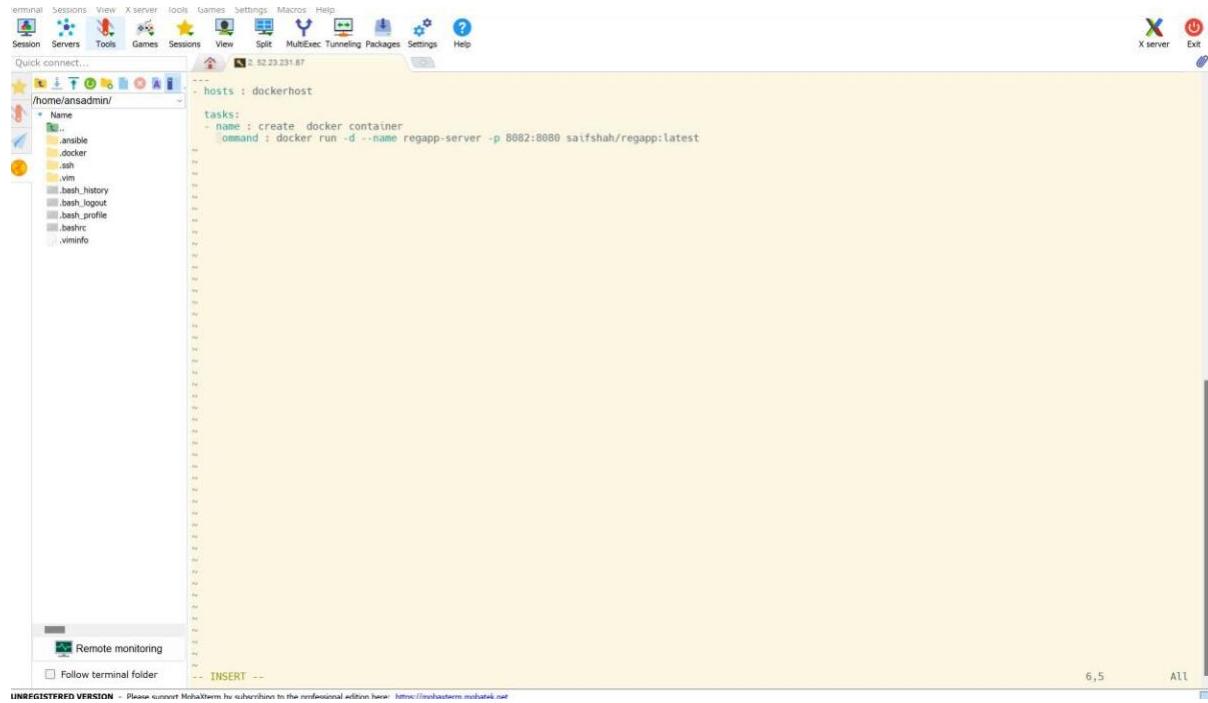


Fig. Success Build an image on ansible

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

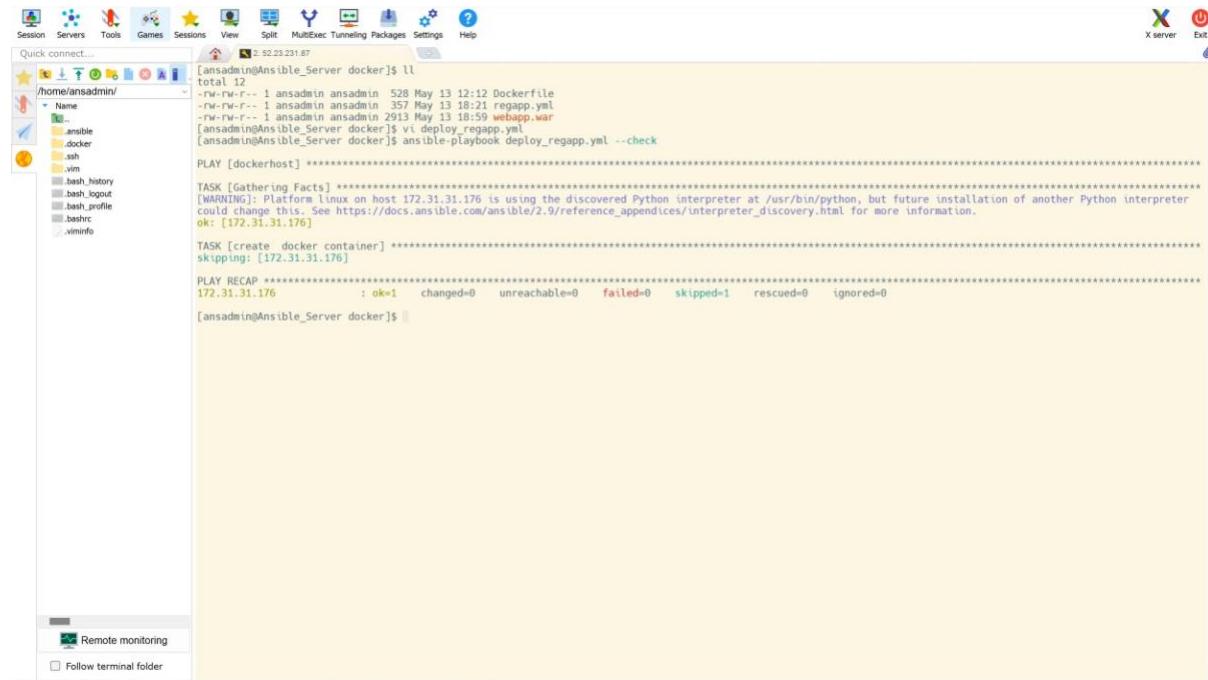


The screenshot shows the MobakTerm interface. The terminal window displays the following Ansible playbook code:

```
hosts: dockerhost
tasks:
- name : create docker container
  command: docker run -d --name regapp-server -p 8082:8080 saifshah/regapp:latest
```

The terminal window title is "2. 82.23.231.87". The file path is "/home/ansadmin/hosts: dockerhost". The terminal output shows the command being run.

Fig. Create new dockerhosts playbook for ansible



The screenshot shows the MobakTerm interface. The terminal window displays the output of the Ansible playbook execution:

```
[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 12:21 regapp.yml
-rw-rw-r-- 1 ansadmin ansadmin 2833 May 13 18:59 webapp.war
[ansadmin@Ansible_Server docker]$ vi deploy_regapp.yml
[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 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] ****
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]$
```

The terminal window title is "2. 82.23.231.87". The file path is "/home/ansadmin/hosts: dockerhost". The terminal output shows the playbook running and checking the tasks.

Fig. Successful Check

```

[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 permission 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/createegapp-server\": dial unix /var/run/docker.sock: connect: permission denied.\nSee 'docker run --help'.", "stderr_lines": ["\"docker: Got permission 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?name=regapp-server\": dial unix /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@dockernode ~]# chmod 777 /var/run/docker.sock
chmod: cannot access '/var/run/docker.sock': No such file or directory
[root@dockernode ~]# chmod 777 /var/run/docker.sock
[root@dockernode ~]# 

```

Fig. Fixed Permission Error



Fig. ansible-playbook deploy-regapp.yml success

Fig. Images and Container are running

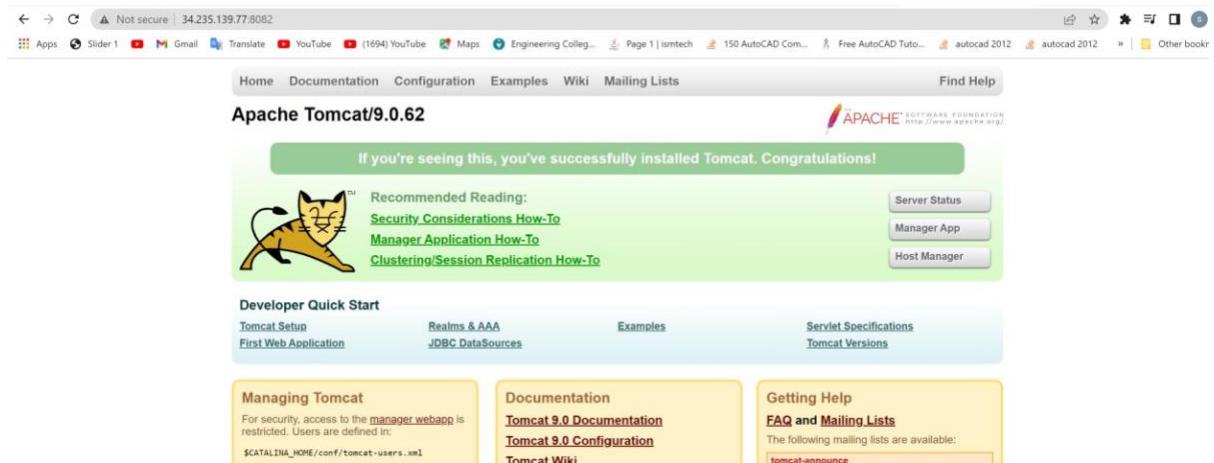


Fig. Access to the port 8082 on server

Continous deployment of docker container using ansible playbook

Deploy ansible playbook

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

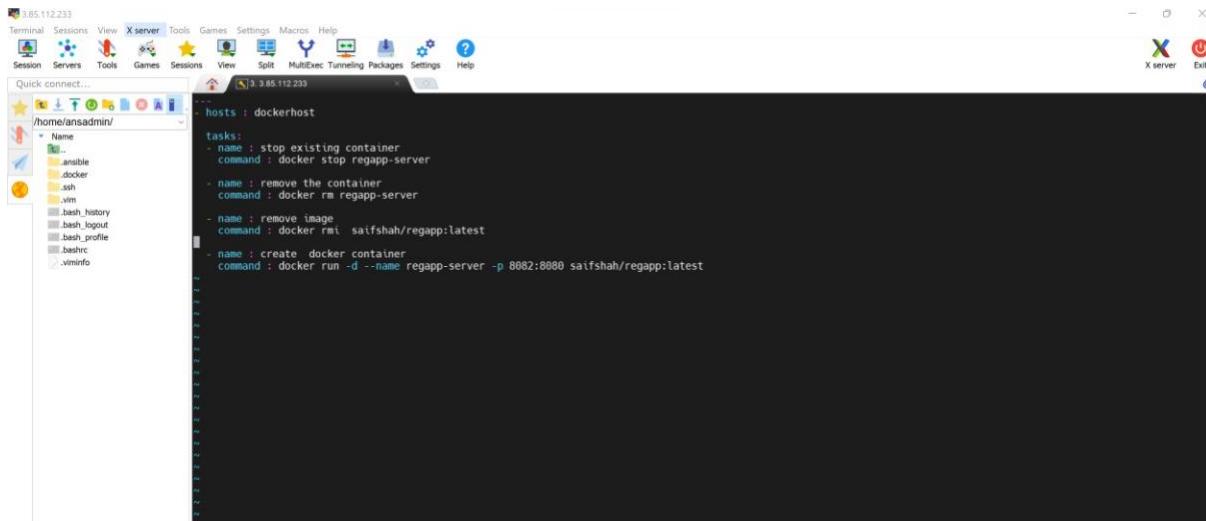


Fig. Creating ansible playbook

Note : ignore_errors : yes // ignoring the tasks

```
[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 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] ****
skipping: [172.31.31.176]

TASK [remove the container] ****
skipping: [172.31.31.176]

TASK [remove image] ****
skipping: [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=4    rescued=0    ignored=0
[ansadmin@Ansible_Server docker]$
```

Fig . Check Successful

```
Last login: Fri May 13 20:02:14 2022 from 152.57.216.141
[ec2-user@dockerhost ~]$ ls
[ec2-user@dockerhost ~]$ cd /opt/docker
[ec2-user@dockerhost docker]$ service docker start
Redirecting to /bin/systemctl start docker.service
[ec2-user@dockerhost docker]$ docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
aae5d8afe509 saifshah/regapp:latest "/opt/tomcat/bin/cat..." 12 hours ago Exited (143) 11 hours ago
[ec2-user@dockerhost docker]$ docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
saifshah/regapp latest 15574dfecf93 20 hours ago 510MB
[ec2-user@dockerhost docker]$
```

Fig . Docker Images and Container

```
[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 [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. Succesful ansible playbook created

```
root@dockerhost docker]# docker images
REPOSITORY      TAG      IMAGE ID      CREATED      SIZE
saifshah/regapp      latest      15574dfcef93  20 hours ago    510MB
root@dockerhost docker]# docker ps -a
CONTAINER ID      IMAGE      COMMAND      CREATED      STATUS      PORTS      NAMES
47675a7cd2a      saifshah/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

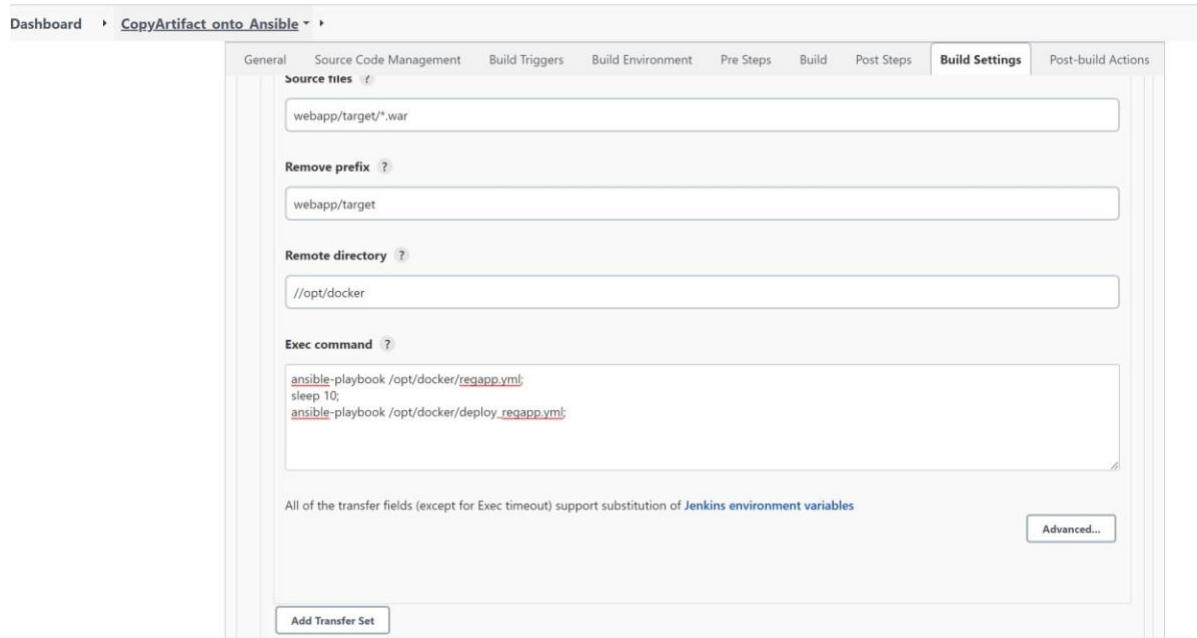


Fig. Configuring deploy_regapp.yml

The screenshot shows the Jenkins interface with the project 'CopyArtifact_onto_Ansible' selected. The 'Console Output' tab is active, displaying the build logs. The logs show a successful build process, starting with an SCM change and ending with a Maven clean install command. There are several warning messages related to reporting configuration.

```

Started by an SCM change
Running as SYSTEM
Building in workspace /var/lib/jenkins/workspace/CopyArtifact_onto_Ansible
The recommended git tool is: NONE
No credentials specified
> git rev-parse --resolve-git-dir /var/lib/jenkins/workspace/CopyArtifact_onto_Ansible/.git # timeout=10
Fetching changes from the remote Git repository
> git config remote.origin.url https://github.com/SaifPanjesha/hello-world.git # timeout=10
Fetching upstream changes from https://github.com/SaifPanjesha/hello-world.git
> git -v
> git --version # 'git version 2.32.0'
> git fetch --tags --force --progress -- https://github.com/SaifPanjesha/hello-world.git +refs/heads/*:refs/remotes/origin/*
> git rev-parse refs/remotes/origin/master{commit} # timeout=10
Checking out Revision 9419bc7b35ecd4582ce4bc6801ed3dc9826395ea (refs/remotes/origin/master)
> git config core.sparsecheckout # timeout=10
> git checkout -f 9419bc7b35ecd4582ce4bc6801ed3dc9826395ea # timeout=10
Commit message: "Update registry in index.jsp"
> git rev-list --no-walk 999ae174811d78a550c0221eae64938f162a6f14 # timeout=10
Parsing POM...
Established TCP socket on 35713
[CopyArtifact_onto_Ansible] $ /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/plugins/maven-plugin/WEB-INF/lib/maven3-interceptor-commons-1.13.jar 35713
<==[JENKINSLISTENINGCAPACITY]==>channel started
Executing Maven: -B -f /var/lib/jenkins/workspace/CopyArtifact_onto_Ansible/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.

```

Fig. Build Success

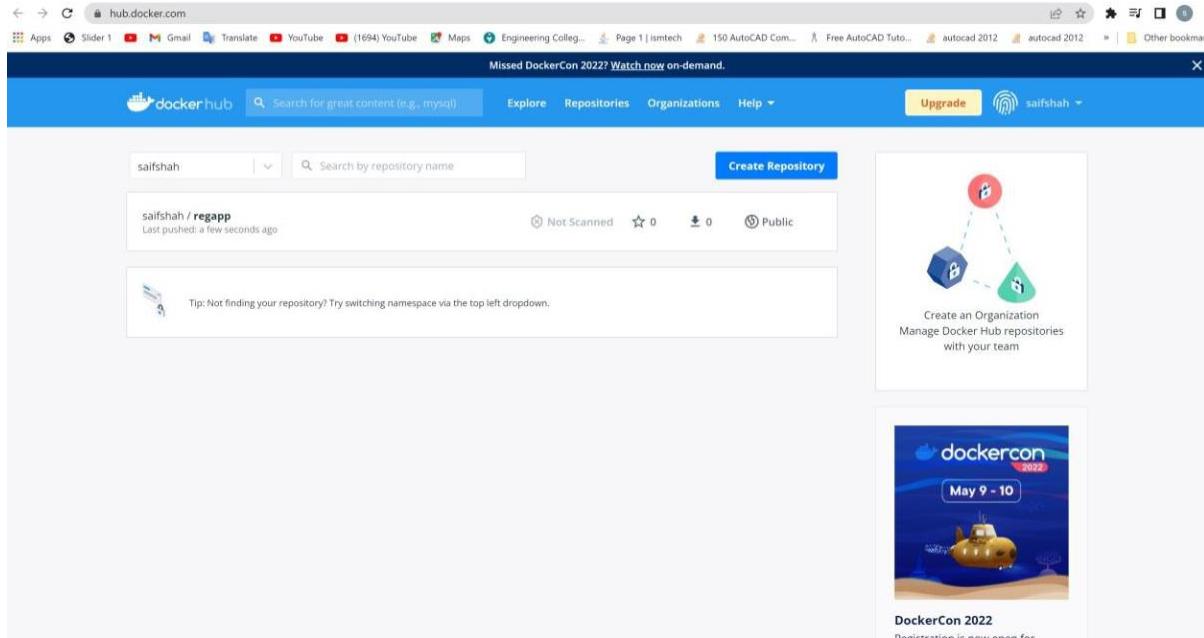


Fig. Success Build an image on ansible

Kubernetes:

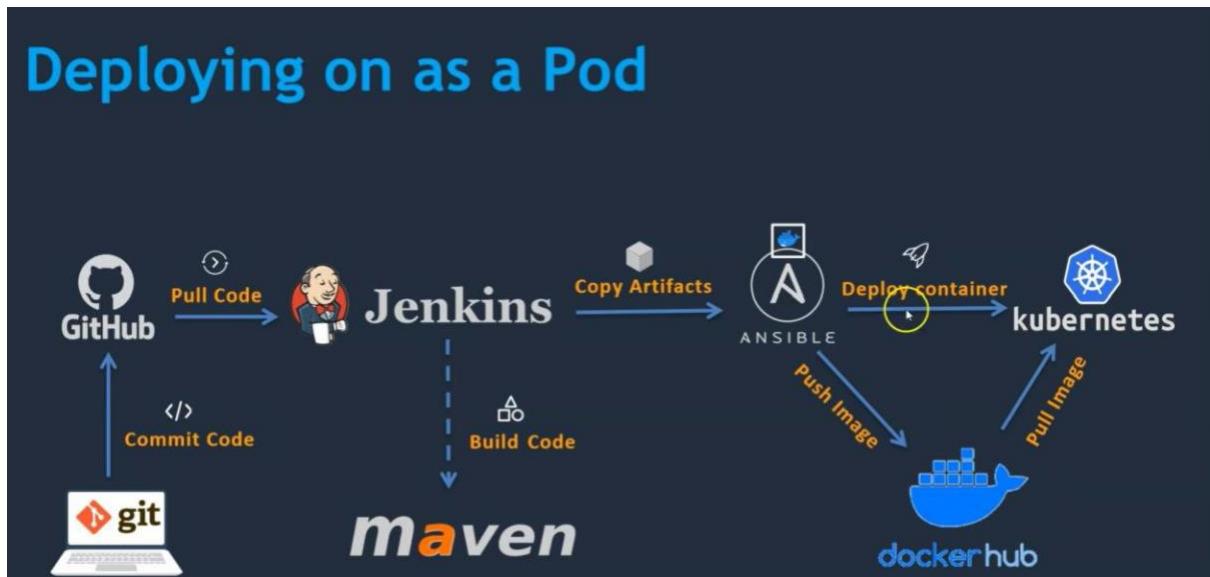


Fig. Kubernetes

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

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
Tomcat_Server	i-010d47b3e089d7869	Stopped	t2.micro	-	No alarms	us-east-1c	-
Docker_Server	i-0875a802a59fdd059	Stopped	t2.micro	-	No alarms	us-east-1c	-
Jenkins_Server1	i-00f1e4c8cb15c9042	Stopped	t2.micro	-	No alarms	us-east-1c	-
Ansible_Server	i-0dc753250431fbac9	Stopped	t2.micro	-	No alarms	us-east-1c	-
EKS_Bootstrap...	i-041ecac16552d6db6	Running	t2.micro	Initializing	No alarms	us-east-1c	ec2-54-87-119-198.co...

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
```

The screenshot shows a terminal window titled '3.3.83.88.183 (ec2-user)'. The terminal output is as follows:

```
[ec2-user@ip-172-31-85-40 ~]$ sudo su -
Last login: Sun May 15 11:51:19 UTC 2022 on pts/0
[root@ip-172-31-85-40 ~]# aws --version
aws-cli/2.7.0 Python/3.9.11 Linux/4.14.275-207.503.amzn2.x86_64 exe/x86_64.amzn.2 prompt/off
[root@ip-172-31-85-40 ~]#
```

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`

The screenshot shows a terminal window titled '3.3.83.88.183 (ec2-user)'. The terminal output is as follows:

```
[root@ip-172-31-85-40 ~]# curl -o kubectl https://s3.us-west-2.amazonaws.com/amazon-eks/1.22.6/2022-03-09/bin/linux/amd64/kubectl
% Total % Received % Xferd Average Speed Time Time Current
Dload Upload Total Spent Left Speed
100 44.7M 100 44.7M 0 0 14.5M 0 0:00:03 0:00:03 --:-- 14.5M
[root@ip-172-31-85-40 ~]# ll
total 91716
drwxr-xr-x 3 root root 78 May 13 16:19 aws
-rw-r--r-- 1 root root 46995027 May 15 11:51 awscli.v2.zip
-rw-r--r-- 1 root root 46919680 May 15 11:55 kubectl
[root@ip-172-31-85-40 ~]#
```

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
```

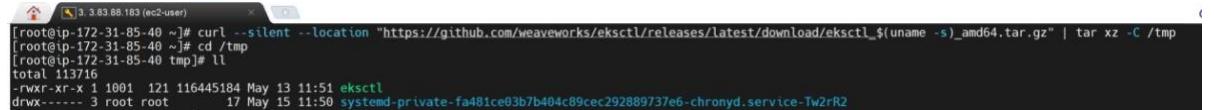
```
Client Version: version.Info{Major:"1", Minor:"22+", GitVersion:"v1.22.6-eks-7d68063",
GitCommit:"f24e667e49fb137336f7b064dba897beed639bad",
GitTreeState:"clean", BuildDate:"2022-02-23T19:32:14Z",
GoVersion:"go1.16.12", Compiler:"gc", Platform:"linux/amd64"}
```

```
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
```



A terminal window titled '3.38.88.183 (ec2-user)' showing the command to download and extract the eksctl binary. The command is: curl --silent --location "https://github.com/weaveworks/eksctl/releases/latest/download/eksctl_\$(uname -s)_amd64.tar.gz" | tar xz -C /tmp. The output shows the file has been downloaded and extracted successfully.

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](#)

The screenshot shows the AWS IAM Roles page. On the left, the navigation menu includes 'Identity and Access Management (IAM)', 'Access management' (with 'Roles' selected), 'Policies', 'Identity providers', and 'Account settings'. Under 'Access reports', there are 'Access analyzer', 'Archive rules', 'Analyzers', 'Settings', 'Credential report', 'Organization activity', and 'Service control policies (SCPs)'. The main content area displays the 'Permissions' tab for the 'eksctl_role'. It shows the ARN: arn:aws:iam::365055183576:role/eksctl_role, a maximum session duration of 1 hour, and an instance profile ARN: arn:aws:iam::365055183576:instance-profile/eksctl_role. Below this, a table lists four managed policies: AmazonEC2FullAccess, IAMFullAccess, AdministratorAccess, and AWSCloudFormationFullAccess. A note at the bottom states 'Permissions boundary - (not set)'.

Fig. Created IAM role

The screenshot shows the 'Modify IAM role' dialog box for an EC2 instance. The instance ID is i-0a1972f80a26866df (EKS_Bootstrap_Server). The 'IAM role' dropdown is set to 'eksctl_role'. At the bottom, there are 'Cancel' and 'Save' buttons.

Fig. Role Save to EC2 Instance

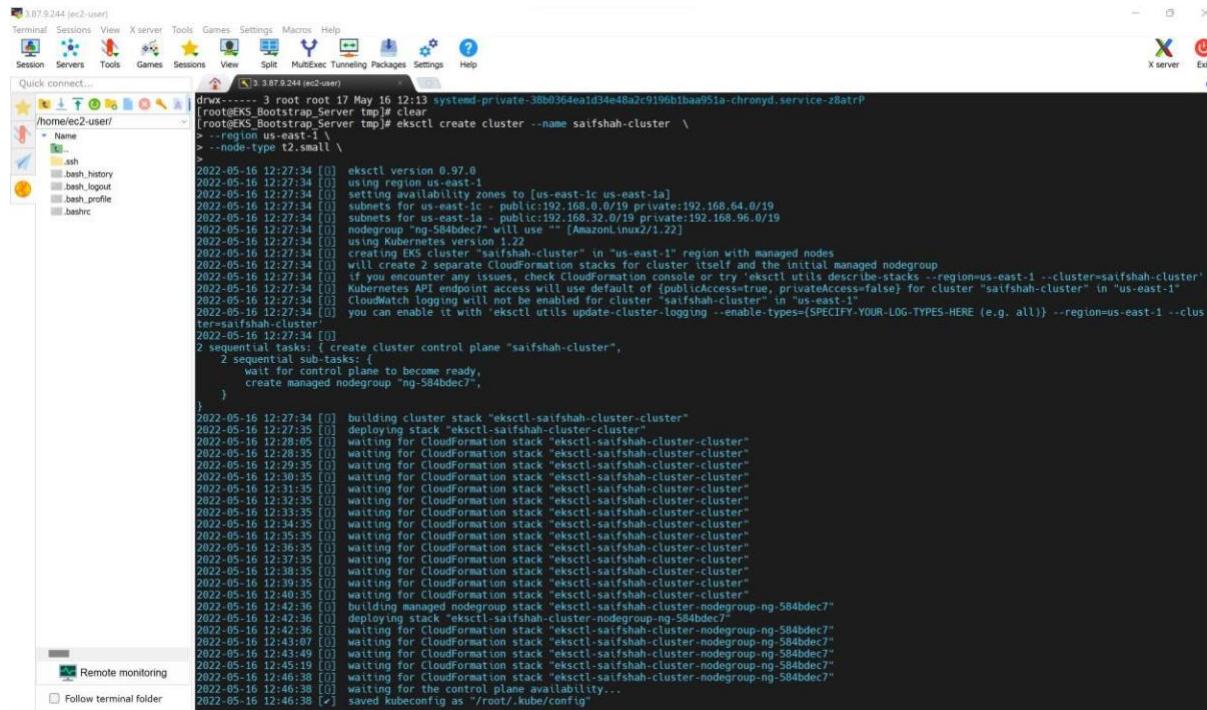
4. Create your cluster and nodes

```
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:



The screenshot shows a terminal window titled "3.87.9.244 (ec2-user)" running on an Amazon Linux 2 session. The terminal displays the command "eksctl create cluster --name saifshah-cluster" being run, followed by its execution log. The log shows the creation of a cluster stack, deployment of CloudFormation stacks for the cluster, and the creation of managed nodegroups. The terminal also shows the user navigating through their home directory and viewing a file named "bashrc".

```
[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 [o] eksctl version 0.97.0
2022-05-16 12:27:34 [o] using region us-east-1
2022-05-16 12:27:34 [o] setting availability zones to [us-east-1c us-east-1a]
2022-05-16 12:27:34 [o] subnets for us-east-1c - public:192.168.0.0/19 private:192.168.64.0/19
2022-05-16 12:27:34 [o] subnets for us-east-1a - public:192.168.32.0/19 private:192.168.96.0/19
2022-05-16 12:27:34 [o] nodegroup "ng-584bdec7" will use "" [AmazonLinux2/1.22]
2022-05-16 12:27:34 [o] using Kubernetes version 1.22
2022-05-16 12:27:34 [o] creating CloudFormation stack "eksctl-saifshah-cluster" in "us-east-1" region with managed nodes
2022-05-16 12:27:34 [o] will create 2 separate CloudFormation stacks for cluster itself and the initial managed nodegroup
2022-05-16 12:27:34 [o] 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 [o] 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 [o] CloudWatch logging will not be enabled for cluster "saifshah-cluster" in "us-east-1"
2022-05-16 12:27:34 [o] 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 [o]
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 [o] building cluster stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:27:35 [o] deploying stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:28:05 [o] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:28:35 [o] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:29:30 [o] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:30:35 [o] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:31:35 [o] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:32:35 [o] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:33:35 [o] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:34:35 [o] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:35:30 [o] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:36:35 [o] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:37:35 [o] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:38:35 [o] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:39:35 [o] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:40:35 [o] waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:42:36 [o] building managed nodegroup stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"
2022-05-16 12:42:36 [o] deploying stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"
2022-05-16 12:42:36 [o] waiting for CloudFormation stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"
2022-05-16 12:43:07 [o] waiting for CloudFormation stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"
2022-05-16 12:43:49 [o] waiting for CloudFormation stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"
2022-05-16 12:45:19 [o] waiting for CloudFormation stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"
2022-05-16 12:46:30 [o] waiting for CloudFormation stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"
2022-05-16 12:46:30 [o] waiting for the control plane availability...
2022-05-16 12:46:30 [o] saved kubeconfig as "/root/.kube/config"
```

```
3.3.87.9.244 (ec2-user)
2022-05-16 12:27:34 [ ] using Kubernetes version 1.22
2022-05-16 12:27:34 [ ] creating EKS cluster "saifshah-cluster" in "us-east-1" region with managed nodes
2022-05-16 12:27:34 [ ] will create 2 separate Cloudformation stacks for the cluster itself and the initial managed nodegroup
2022-05-16 12:27:34 [ ] if you want to use CloudWatch Metrics for your cluster, make sure to run eksctl describe-stacks --region=us-east-1 --cluster=saifshah-cluster
2022-05-16 12:27:34 [ ] 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 [ ] CloudWatch logging will not be enabled for cluster "saifshah-cluster" in "us-east-1"
2022-05-16 12:27:34 [ ] 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 [ ] 
2022-05-16 12:27:34 [ ]     2 sequential sub-tasks: {
2022-05-16 12:27:34 [ ]         1. create cluster control plane "saifshah-cluster",
2022-05-16 12:27:34 [ ]             2. sequential sub-tasks: {
2022-05-16 12:27:34 [ ]                 1. wait for control plane to become ready,
2022-05-16 12:27:34 [ ]                 2. create managed nodegroup "ng-584bdec7",
2022-05-16 12:27:34 [ ]             }
2022-05-16 12:27:34 [ ]         }
2022-05-16 12:27:34 [ ]     }
2022-05-16 12:27:34 [ ]     building cluster stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:27:34 [ ]     deploying stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:28:05 [ ]     waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:28:35 [ ]     waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:29:35 [ ]     waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:30:35 [ ]     waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:31:35 [ ]     waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:32:35 [ ]     waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:33:35 [ ]     waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:34:35 [ ]     waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:35:35 [ ]     waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:36:35 [ ]     waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:37:35 [ ]     waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:38:35 [ ]     waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:39:35 [ ]     waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:40:35 [ ]     waiting for CloudFormation stack "eksctl-saifshah-cluster-cluster"
2022-05-16 12:40:36 [ ]     building managed nodegroup stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"
2022-05-16 12:42:36 [ ]     deploying stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"
2022-05-16 12:42:36 [ ]     waiting for CloudFormation stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"
2022-05-16 12:42:36 [ ]     waiting for CloudFormation stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"
2022-05-16 12:43:49 [ ]     waiting for CloudFormation stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"
2022-05-16 12:45:19 [ ]     waiting for CloudFormation stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"
2022-05-16 12:46:38 [ ]     waiting for CloudFormation stack "eksctl-saifshah-cluster-nodegroup-ng-584bdec7"
2022-05-16 12:46:38 [ ]     waiting for the control plane availability...
2022-05-16 12:46:38 [x] saved kubeconfig as "/root/.kube/config"
2022-05-16 12:46:38 [ ] 
2022-05-16 12:46:38 [x] all EKS Cluster resources for "saifshah-cluster" have been created
2022-05-16 12:46:38 [ ] nodegroup "ng-584bdec7" has 2 node(s)
2022-05-16 12:46:38 [ ] node "ip-192-168-60-68.ec2.internal" is ready
2022-05-16 12:46:38 [ ] node "ip-192-168-7-5.ec2.internal" is ready
2022-05-16 12:46:38 [ ] waiting for at least 2 node(s) to become ready in "ng-584bdec7"
2022-05-16 12:46:38 [ ] nodegroup "ng-584bdec7" has 2 node(s)
2022-05-16 12:46:38 [ ] node "ip-192-168-60-68.ec2.internal" is ready
2022-05-16 12:46:38 [ ] node "ip-192-168-7-5.ec2.internal" is ready
2022-05-16 12:46:41 [ ] kubelet command should work with "/root/.kube/config", try "kubectl get nodes"
2022-05-16 12:46:41 [x] EKS cluster "saifshah-cluster" in "us-east-1" region is ready
[root@EKS Bootstrap_Server tmp]#
```

Fig. Cluster Created

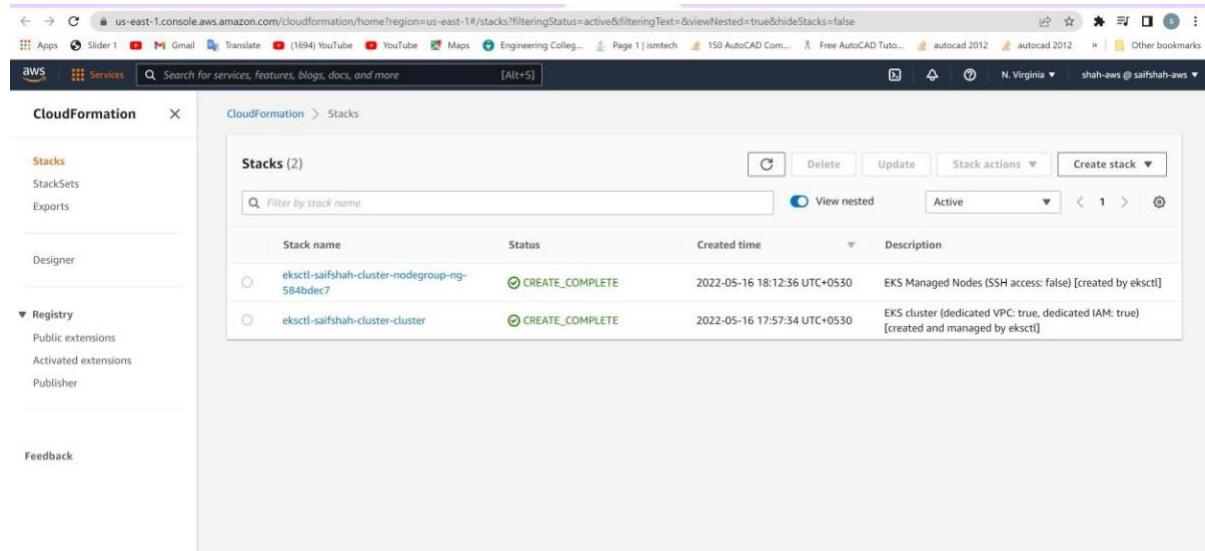
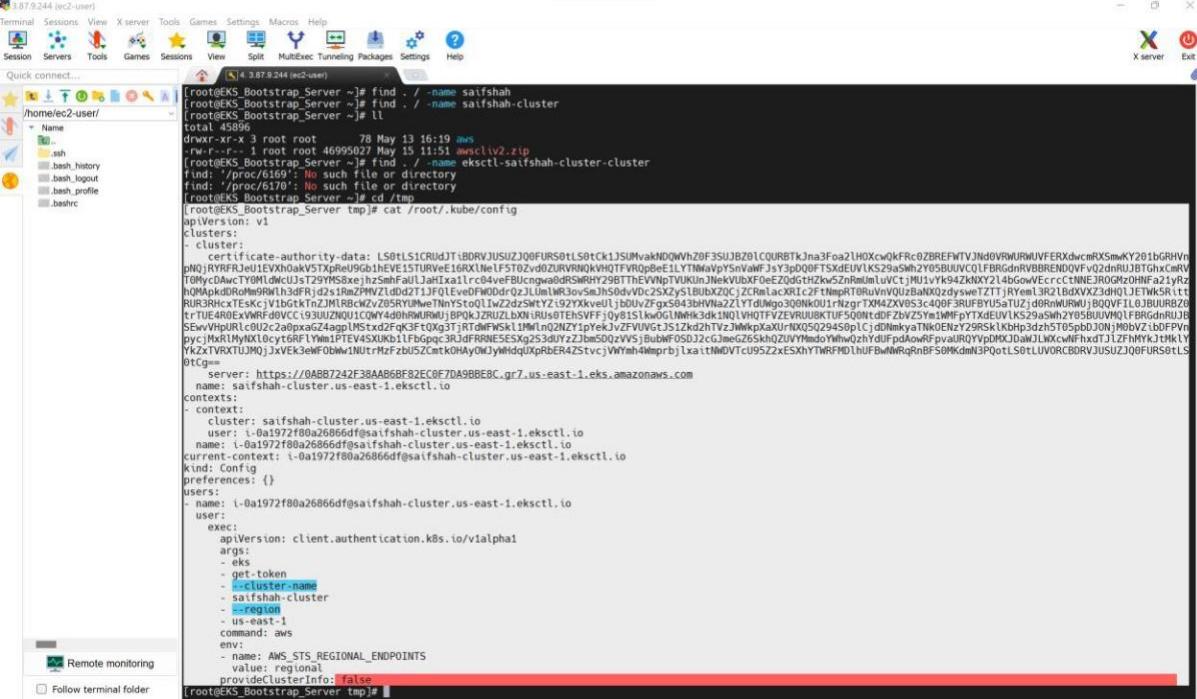


Fig. Stacks in CloudFormation

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

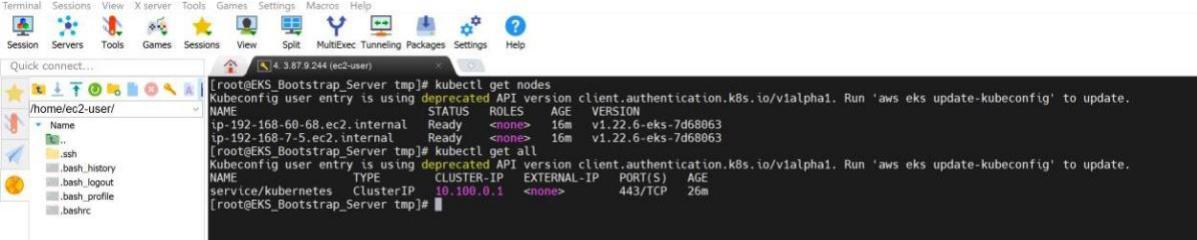


```
[root@EKS_Bootstrap_Server ~]# find . -name saifshah
[root@EKS_Bootstrap_Server ~]# find . -name saifshah-cluster
[root@EKS_Bootstrap_Server ~]# ll
total 45896
drwxr-xr-x 3 root root    78 May 13 16:19 aws
-rw-r--r-- 1 root root 46995027 May 15 11:51 awscli-v2.zip
[root@EKS_Bootstrap_Server ~]# find . -name eksctl-saifshah-cluster-cluster
find: '.'/proc: Is a directory or directory
find: '.'/proc/1707: 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: LS0tLS1CRUdTb0lVRVJUSUJ00FURS0tLS0tCk1JSU1MvaKND0Wh20F3SJU2Z01COURBTkJna2f0a21HOXcwOkFRc0ZBREFWtVJNld0V0R0tUrnUjVFERXvcmRKSxwKY20bGRHvn
pNUjRYERUfjElEVXh0ak57XpReI9GblhVE151URVe16RX11eLf5102vdZURVRN0KVHOTFVRQp8E11YTmWaVpSnVaMFjY3p00FTSXdeUVjKS29uSmh2Y05BUlUIC01FRBRgdnrVBRBREMD0VVFv02dnRUJ8TGHxOrV
T0MyC4wCYMlDUUcU3t29YMS8xejhSmhFaUJahIxallr>c4veFBUCnqwaDrSMgHY29BTTHeVVNpTVKUnJNeVubxFoEz0dtgZh2w52nRmlmUvc1Mu1vYk42kNXY214bgowVecrcTnNEjR0Gmz0HFa21yRz
hQMApkDRm9Rflh3dFRjd2s1RmZMVZLd0d21JF0Ev0FW0d0r02JLUm1W3o5vSmh50dVdC25XzysLBjUbzCjZCrhlaacXRic2fNmRRT0RuVnVu0UzBaN0x2dysweTZTjRYem13R21bdXvZ3dH0lJEtWkrSitt
RUR3RhcxtEskcV1B6g1KTn2JMRBckZvZBSRYUhlWeNySto01Lw2dz5MtyZ192YXkev1jb0UvZFxg5843bHVnA2Z1YtdMgj30Nk0U11NzgrTXH42XV053c4Q0F3RUFBYU5aTUZjD9RnWURUjBQVFT10JBURBZ
pVpCjXKs1MjY0d1Lcyc76RF1Ym1PTE4vSXUk011FbGpqc3RJdfRRNESESXg253dU5m50zVVSjBuWf0SD12GjmeGZ65khQ2UVYmedoYwhwQzhYdUfpdKowRfpvalRQYvp0MXJDawJLWXcwlfhxdtJ1ZFNMVkjTMk1Y
YkZxTVRtUjM0jJxVEK3eF0bWn1NUtMf2bzUSZcatk0Hay0WjyMdqUxpbeR4ZstvcjWYmh4Wmprbj1xa:tN0VtUcU9522xESXhYTNRFH0lhUFbwNpRqRnBF50Mkdml3P0otL50tLUv0RCBDRVjUSUZj0fRUs0tL5
0tGw
server: https://AAB8724F38A86BF82EC0fD0A98BEBC.gr7.us-east-1.eks.amazonaws.com
  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
  name: 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:
  args:
  - eks
  - get-token
  - --cluster-name
  - saifshah-cluster
  - --region
  - us-east-1
  command: aws
  env:
  - name: AWS_STS_REGIONAL_ENDPOINTS
    value: regional
    provideClusterInfo: false
[root@EKS_Bootstrap_Server tmp]#
```

Remote monitoring

Follow terminal folder

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
[root@EKS_Bootstrap_Server tmp]#
```

Fig. Created nodes and check all service/Kubernetes

Creating a pod:

```
[root@EKS_Bootstrap_Server tmp]# kubectl run webapp --image=httpd;
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        READY   STATUS    RESTARTS   AGE
pod/webapp  0/1     ImagePullBackOff  0          51s
NAME        TYPE        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=saifshah/regapp --replicas=2 --  
port=8080
```

```
kubectl get all
```

```
kubectl get pod
```

```

[4.211.230.181 (ec2-user)]
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_history
      - bash_logout
      - bash_profile
      - bashrc
[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 --replicas=2 --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
  NAME           READY   STATUS    RESTARTS   AGE
pod/demo-nginx-848d469579-pc7mc   1/1    Running   0          40s
pod/demo-nginx-848d469579-wljzj   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           40s

  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          70s
demo-nginx-848d469579-wljzj   1/1    Running   0          70s
[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-wljzj   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     2         2         2         2m53s
[root@EKS_Bootstrap_Server tmp]#

```

Fig. Deploying Ngnix 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

```

```

[4.211.230.181 (ec2-user)]
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_history
      - bash_logout
      - bash_profile
      - bashrc
[root@EKS_Bootstrap_Server tmp]# kubectl expose deployment demo-nginx --port=8000 --type=LoadBalancer
Error from server (NotFound): pods "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
  NAME           READY   STATUS    RESTARTS   AGE
pod/demo-nginx-848d469579-pc7mc   1/1    Running   0          11m
pod/demo-nginx-848d469579-wljzj   2/1    Running   0          11m

  NAME              TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)   AGE
service/demo-nginx   LoadBalancer 10.100.41.107  a5e7c80d74c5746029e7050delead81d-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

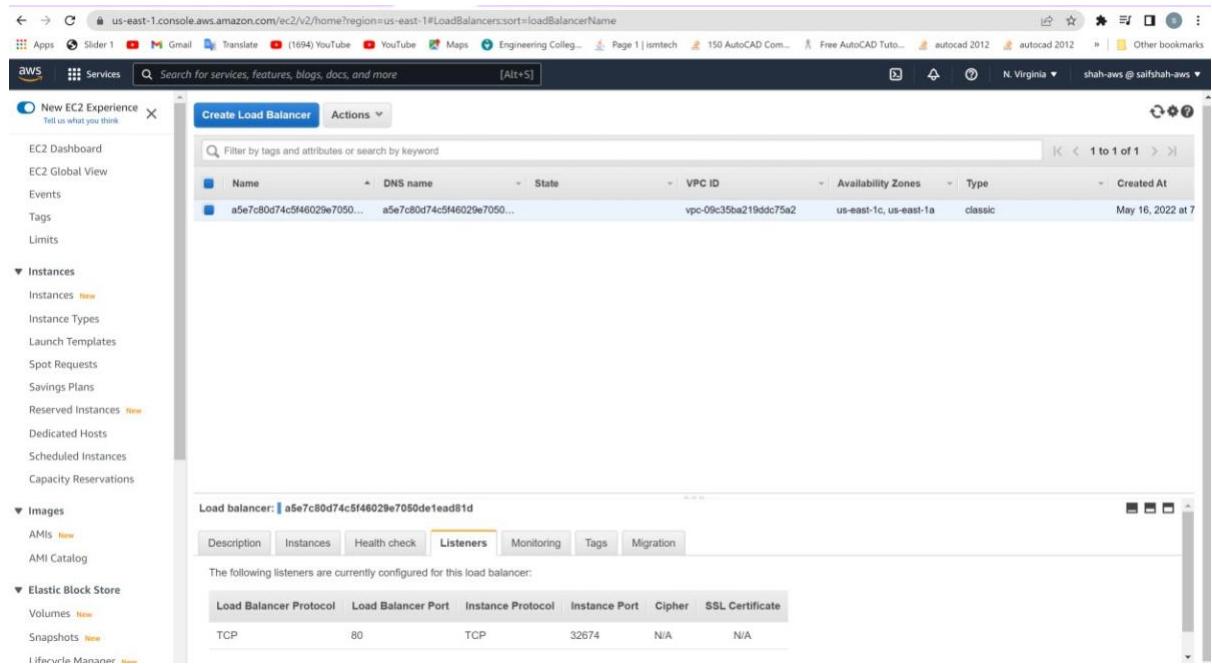


Fig. Created load balancer after deployment.

kubectl get services -o wide

```
root@EKSBootstrapServer:~# kubectl get services --wide
NAME          TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)        AGE
lemo-nginx    LoadBalancer 10.100.41.107  a5e7c0d74c5f46029e7050de1ead81d-921720739.us-east-1.elb.amazonaws.com  80:32764/TCP   7m6s
kubernetes   ClusterIP   10.100.0.1   <none>        443/TCP      90m
root@EKSBootstrapServer:~#
```

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-wlljj           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                                         READY   STATUS    RESTARTS   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

```

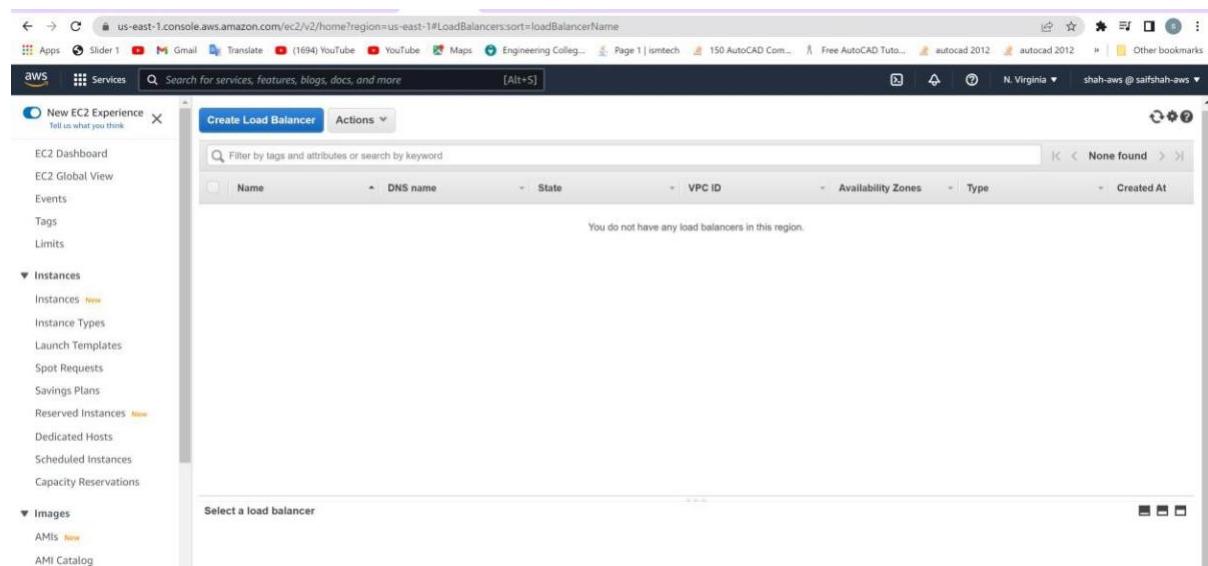


Fig. Deleted earlier configuration

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.
```

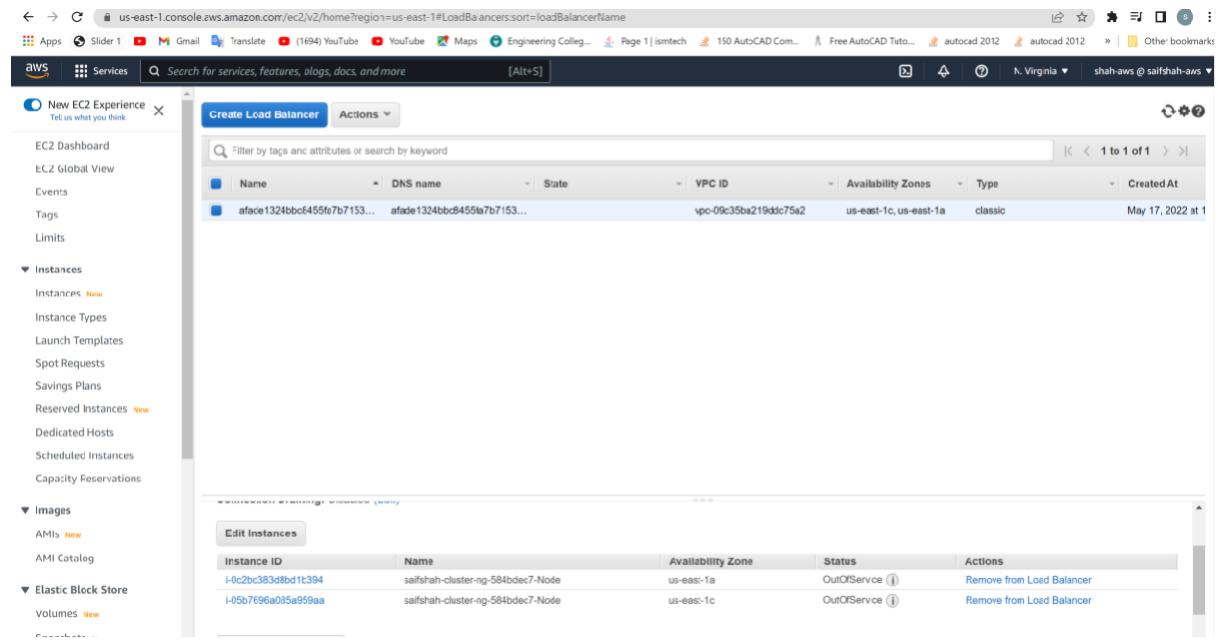
NAME	READY	STATUS	RESTARTS	AGE
pod/nginx-pod	1/1	Running	0	5m32s

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]#



The screenshot shows the AWS EC2 Load Balancer console. On the left, there's a sidebar with navigation links like EC2 Dashboard, EC2 Global View, Events, Tags, Limits, Instances, Images, and Elastic Block Store. The main area has a search bar at the top. Below it, there are two tables. The first table, titled 'Create Load Balancer Actions', shows a single row for a load balancer named 'afade1324bbc8455fa7b7153...'. The second table, titled 'Edit Instances', shows two instances: 'i-0c2b383d8bd1t394' and 'i-05b7696a05a959aa', both of which are marked as 'OutOfService'.

Fig. LoadBalancer is created.

Setup Pod and Service:

```

terminal Sessions View X server Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help Find
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help Find
Quick connect...
/home/ec2-user/
Name
ash
bash_history
bash_logout
bash_profile
bashrc

[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
drwxr-xr-x 3 root root 17 May 16 19:39 .
[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

```

terminal Sessions View X server Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help Find
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help Find
Quick connect...
/home/ec2-user/
Name
ash
bash_history
bash_logout
bash_profile
bashrc

[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.
[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 --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 --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   NODE   NOMINATED-NODE  READINESS   GATES
nginx-pod     1/1     Running   0          26m  ip-192-168-2-165.ec2.internal  <none>    <none>
[root@EKS_Bootstrap_Server tmp]# ^C
[root@EKS_Bootstrap_Server tmp]#

```

Fig. Using Labels & Selector



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 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.
```

```
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
---	---	---	---	---

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
NOMINATED NODE	READINESS	GATES				
saifshah-regapp-67dc7d6554-5gdbh	1/1	Running	0	5m38s		
192.168.0.41	ip-192-168-0-77.ec2.internal	<none>			<none>	
saifshah-regapp-67dc7d6554-n8vfm	1/1	Running	0	5m38s		
192.168.33.84	ip-192-168-48-13.ec2.internal	<none>			<none>	
saifshah-regapp-67dc7d6554-q4bnf	1/1	Running	0	5m38s		
192.168.27.33	ip-192-168-0-77.ec2.internal	<none>			<none>	

[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 ~]#
```

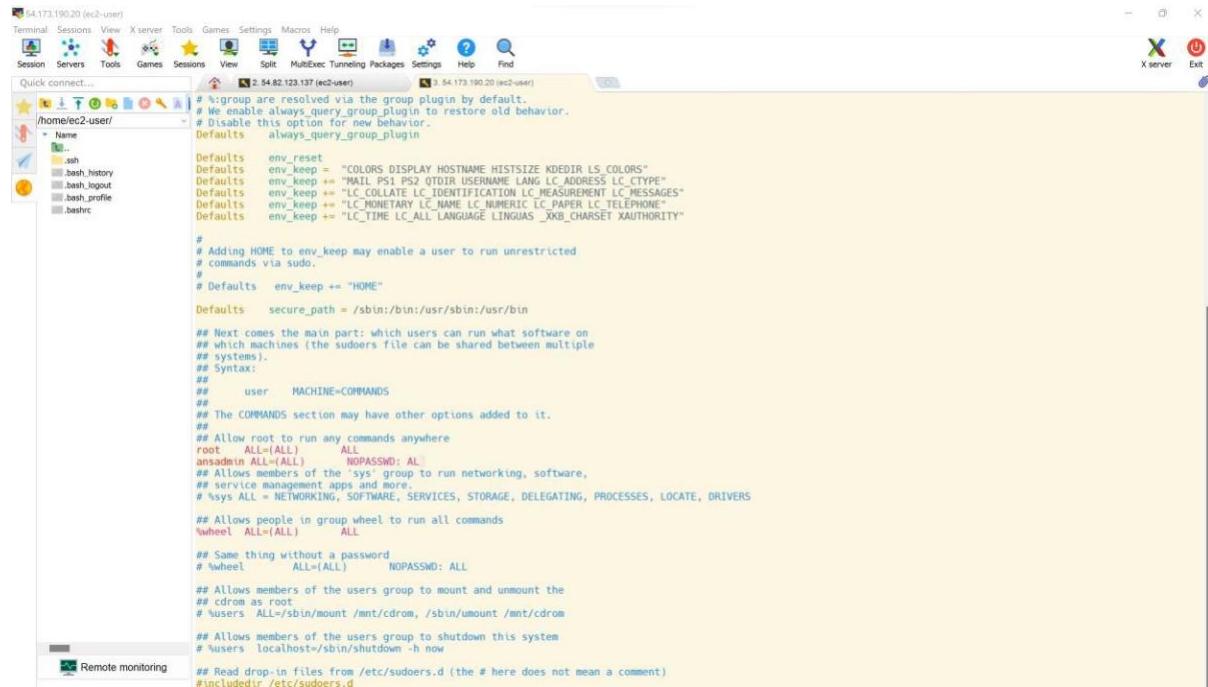
Integrate Kubernetes Bootstrap Server with Ansible:

On Bootstrap Server:

- Create ansadmin

```
[root@EKS_Bootstrap_Server ~]# useradd ansadmin  
[root@EKS_Bootstrap_Server ~]# visudo
```

- Add ansadmin to sudoers file



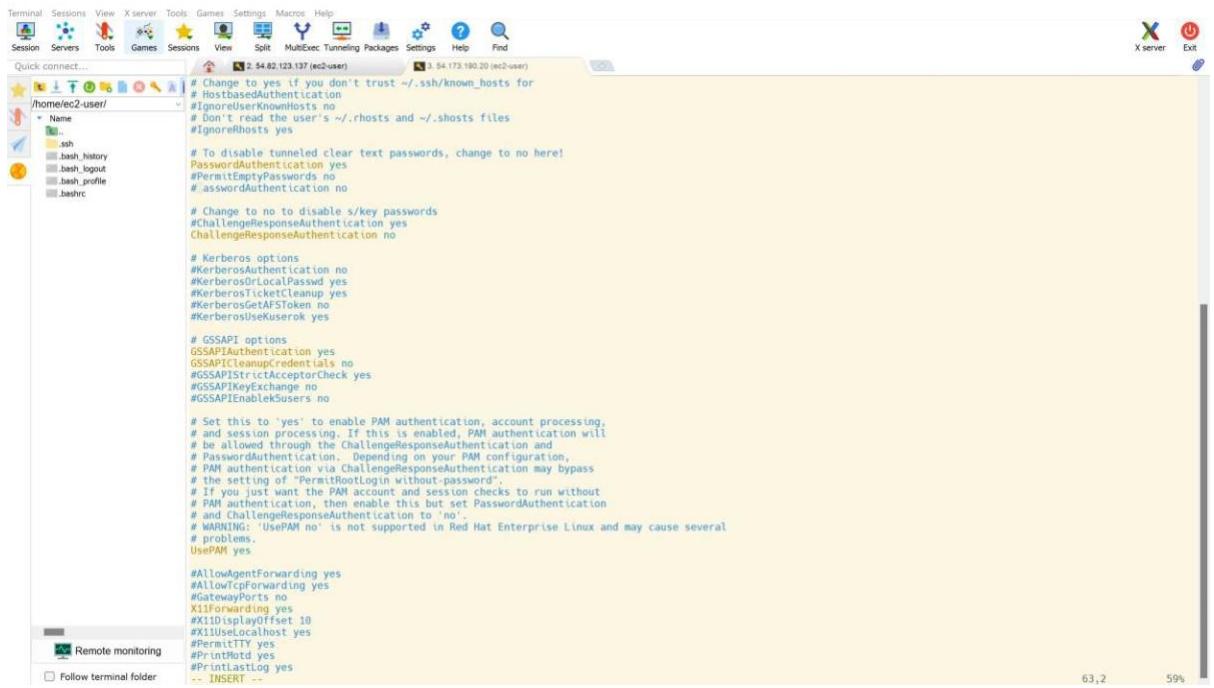
The screenshot shows a Linux desktop interface with a terminal window open. The terminal window displays the contents of the sudoers file. The file includes standard configuration options like Defaults env_reset and various command grants for root and other users. It also includes specific grants for the 'ansadmin' user, such as allowing them to run all commands on all hosts (ALL=(ALL) ALL) and granting NOPASSWD access to certain services.

```
# %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 umount 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
```

Fig. Add ansadmin to sudoers file

- Enable Password based login

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



```
# 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
# PermitRootLogin no

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

# Kerberos options
#KerberosTicketCleanup no
#KerberosGetAFSToken yes
#KerberosUseKuserok yes

# GSSAPI options
#GSSAPIAuthentication yes
#GSSAPICleanupCredentials no
#GSSAPIStrictAcceptorCheck yes
#GSSAPIKeyExchange no
#GSSAPIEnableUsers no

# Set this to 'yes' to enable PAM authentication, account processing,
# and session processing. If this is enabled, PAM authentication will
# be allowed through the ChallengeResponseAuthentication and
# PasswordAuthentication. Depending on your PAM configuration,
# PAM authentication via ChallengeResponseAuthentication may bypass
# the setting of "ChallengeResponseAuthentication"!
# If you just want the PAM account and session checks to run without
# PAM authentication, then enable this but set PasswordAuthentication
# and ChallengeResponseAuthentication to 'no'.
# WARNING: 'UsePAM no' is not supported in Red Hat Enterprise Linux and may cause several
# problems.
#UsePAM yes

#AllowAgentForwarding yes
#AllowTcpForwarding yes
#GatewayPorts no
#X11Forwarding yes
#X11UseLocalhost 10
#X11UseLocalhost yes
#PermitTTY yes
#PrintMIME yes
#PrintLastLog yes
-- INSERT --
```

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
```

The screenshot shows a terminal window with a dark background. The terminal title bar indicates two sessions: [2. 54.82.123.137 (ec2-user)] and [3. 54.173.190.20 (ec2-user)]. The main pane displays the following Ansible YAML code:

```
hosts: kubernetes
become: true

tasks:
- name: deploy regapp on kubernetes
  command: kubectl apply -f /root/regapp-deploy.yml
```

The left sidebar shows a file tree for the user's home directory, including files like .ssh, .bash_history, .bash_logout, .bash_profile, .bashrc, and .viminfo. A status bar at the bottom shows "Remote monitoring" and "Follow terminal folder".

Fig. Kubernetes deploy file created

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

The screenshot shows a terminal window with a dark background. The terminal title bar indicates two sessions: [2. 54.82.123.137 (ec2User)] and [3. 54.173.190.20 (ec2User)]. The main pane displays the same Ansible YAML code as the previous figure:

```
hosts: kubernetes
become: true

tasks:
- name: deploy regapp on kubernetes
  command: kubectl apply -f /root/regapp-service.yml
```

The left sidebar shows a file tree for the user's home directory, including files like .ssh, .bash_history, .bash_logout, .bash_profile, .bashrc, and .viminfo. A status bar at the bottom shows "Remote monitoring" and "Follow terminal folder".

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,psword).", "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]\$

```

root@EKS_Bootstrap_Server:~# 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
saifshah-regapp-67dc7d6554-4w9w3  1/1     Running   0          12m
saifshah-regapp-67dc7d6554-ccbkk  1/1     Running   0          12m
saifshah-regapp-67dc7d6554-tktpf  1/1     Running   0          12m
[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
service/kubernetes                         ClusterIP   <none>
service/saifshah-service                   LoadBalancer 19.109.0.1
pod/saifshah-regapp-67dc7d6554-ccbkk    1/1     Running   0          12m
pod/saifshah-regapp-67dc7d6554-tktpf    1/1     Running   0          12m
pod/saifshah-regapp-67dc7d6554-4w9w3   1/1     Running   0          12m
deployment.apps/saifshah-regapp           3/3      UP-TO-DATE   3          12m
replicaset.apps/saifshah-regapp-67dc7d6554 3          3          3          12m
[root@EKS_Bootstrap_Server:~# 

```

Fig. Ansible Deploy and Service playbook

Create Jenkins Deployment Job for Kubernetes:

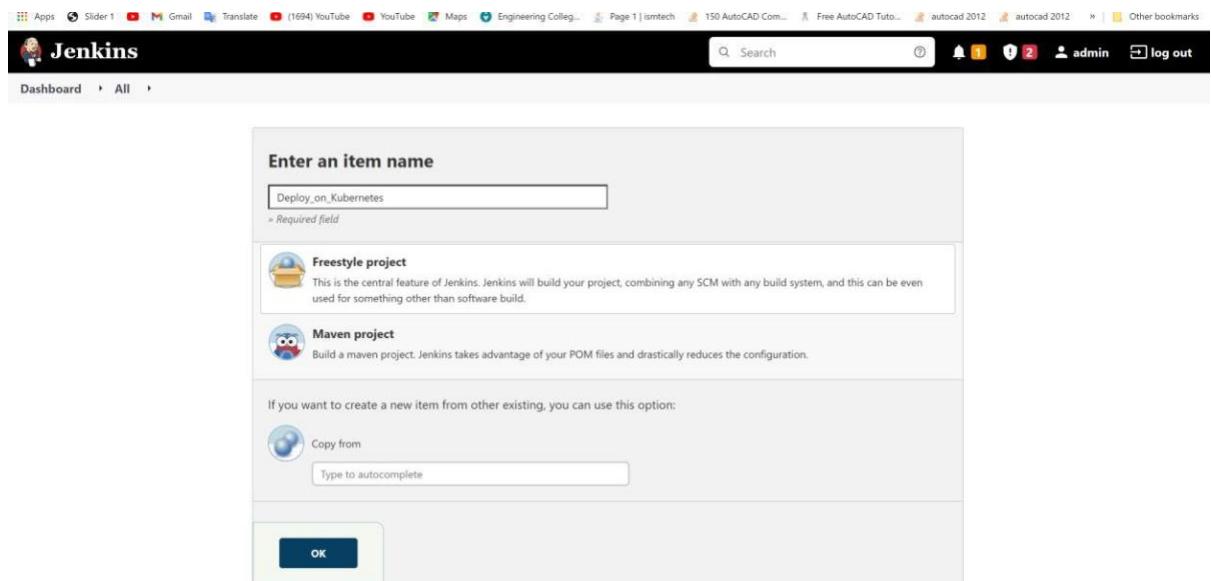


Fig. Deploy_on_Kubernetes

[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
PORT(S)	AGE		
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

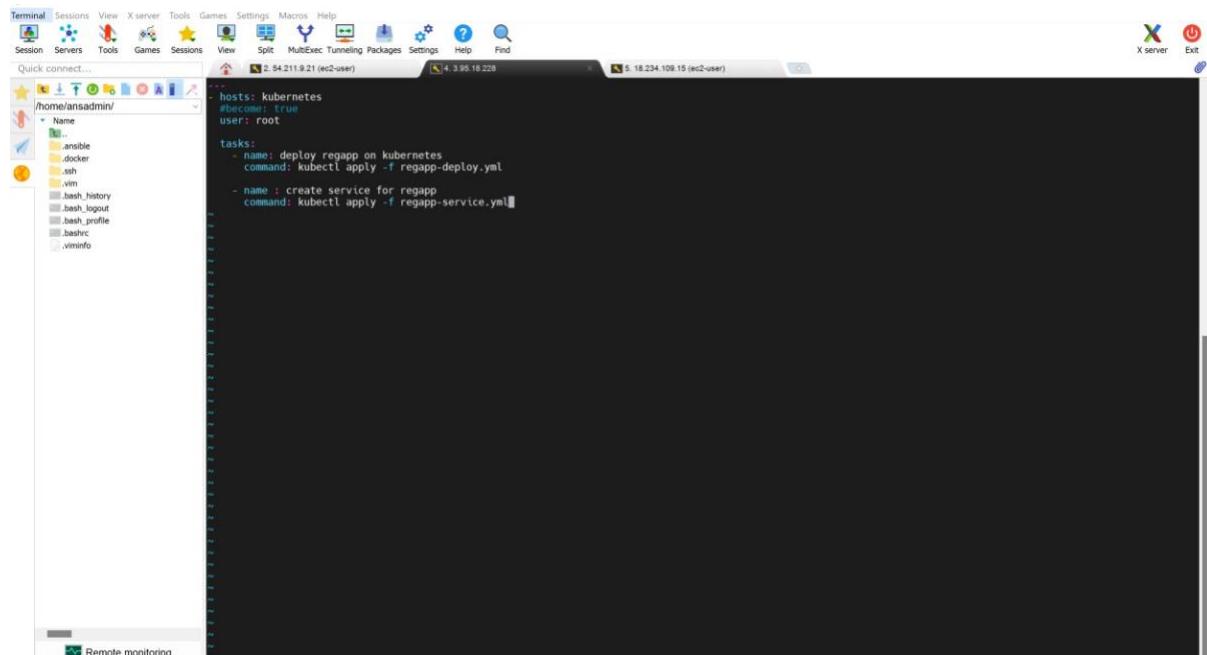
NAME	TYPE	CLUSTER-IP	EXTERNAL-IP
PORT(S)	AGE		
service/kubernetes	ClusterIP	10.100.0.1	<none>
443/TCP	45h		
service/saifshah-service	LoadBalancer	10.100.156.66	
a5cc75730006140938846b05fc830300-559804141.us-east-1.elb.amazonaws.com	8080:30620/TCP	23s	

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
```



The screenshot shows a terminal window with two tabs open. The left tab shows the file structure under /home/ansadmin, including .ansible, .docker, .ssh, .vim, .bash_history, .bash_logout, .bash_profile, .bashrc, and .viminfo. The right tab displays the contents of the kube_deploy.yml file:

```
hosts: kubernetes
  become: true
  user: root

  tasks:
    - name: deploy regapp on kubernetes
      command: kubectl apply -f regapp-deploy.yaml

    - name: create service for regapp
      command: kubectl apply -f regapp-service.yaml
```

Fig. Merging Service File & Deployment File

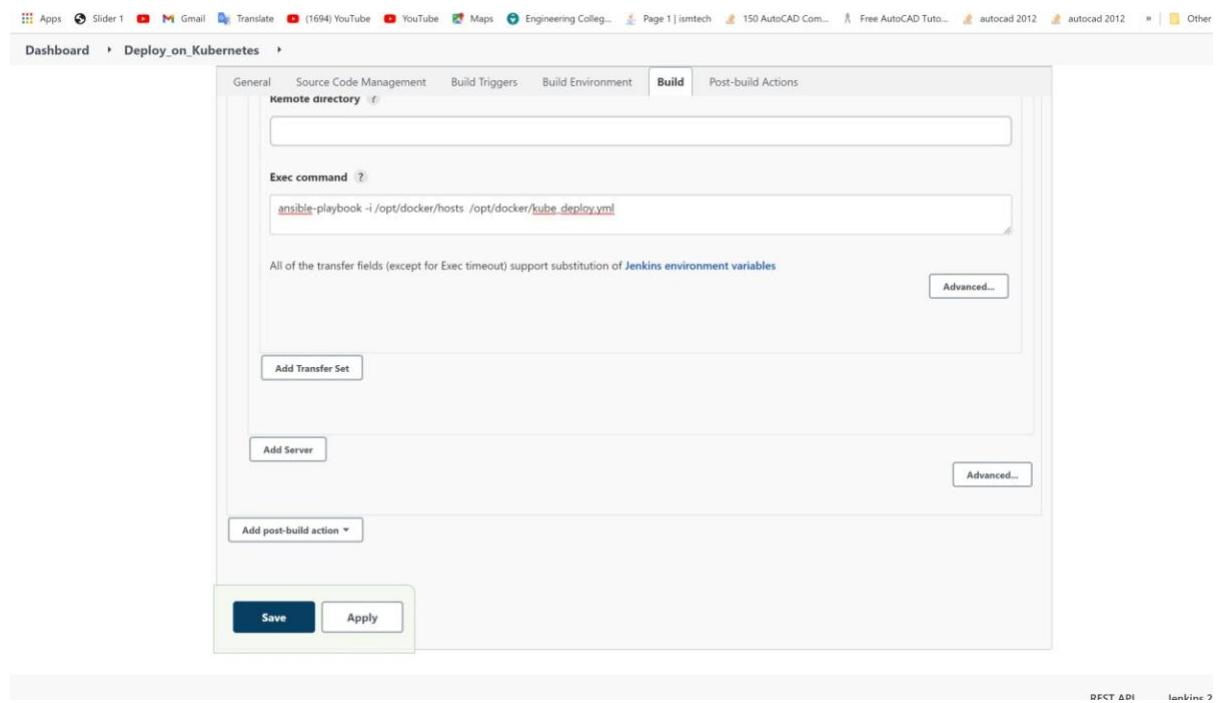


Fig. Exec Command Merge Service File & Deployment File

The screenshot shows the Jenkins interface. On the left, there's a sidebar with links like 'Dashboard', 'Deploy_on_Kubernetes #2', 'Back to Project', 'Status', 'Changes', 'Console Output' (which is selected), 'View as plain text', 'Edit Build Information', 'Delete build #2', and 'Previous Build'. The main area has a green checkmark icon and the title 'Console Output'. Below it, the log output is displayed:

```

Started by user admin
Running as SYSTEM
Building in workspace /var/lib/jenkins/workspace/Deploy_on_Kubernetes
SSH: Connecting from host [Jenkins_Server]
SSH: Connecting with configuration [ansible-server] ...
SSH: EXEC: completed after 5,606 ms
SSH: Disconnecting configuration [ansible-server] ...
SSH: Transferred 0 file(s)
Finished: SUCCESS

```

Fig. Build Success

The screenshot shows a terminal window with several tabs. The active tab shows the command 'aws eks --region us-east-1 update-kubeconfig' being run. Below it, the output of 'kubectl get all' is shown:

```

[ aws eks --region us-east-1 update-kubeconfig ]
[ root@EKS_Bootstrap_Server ~]# ls
[ aws eks --region us-east-1 update-kubeconfig ]
[ 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-mck9  1/1     Running   0          9m49s
[ pod/saifshah-regapp-67dc7d6554-rr58w  1/1     Running   0          9m49s
[ pod/saifshah-regapp-67dc7d6554-x24cx  1/1     Running   0          9m49s
[ NAME           TYPE        CLUSTER-IP      EXTERNAL-IP   PORT(S)          AGE
[ service/kubernetes   ClusterIP   10.100.0.1   <none>        443/TCP         45h
[ service/saifshah-service   LoadBalancer  10.100.156.66  a5c75730006140938846b05fc830300-559804141.us-east-1.elb.amazonaws.com  8080:30620/TCP  9m45s
[ deployment.apps/saifshah-regapp  3/3     3           3           9m49s
[ replicaset.apps/saifshah-regapp-67dc7d6554  3       3           3           9m49s
[ root@EKS_Bootstrap_Server ~]#

```

Fig. kubectl get all services & deployment .

CI Job to create Image for Kubernetes:

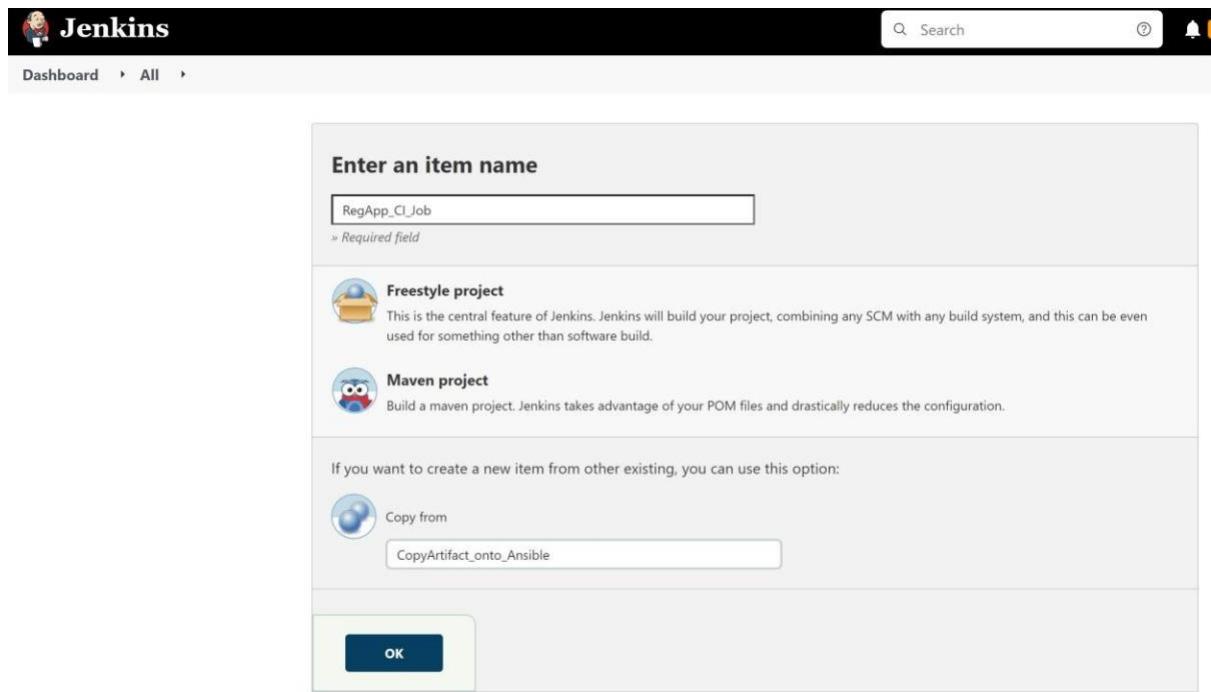


Fig. Creating CI Job

A screenshot of the Jenkins 'RegApp_CI_Job' configuration page, specifically the 'Post-build Actions' tab. The tabs at the top include General, Source Code Management, Build Triggers, Build Environment, Pre Steps, Build, Post Steps, Build Settings, and Post-build Actions. The Post-build Actions tab is selected. It contains several configuration sections: 'Remote directory' (set to '//opt/docker'), 'Exec command' (containing 'ansible-playbook /opt/docker/create_image_reqapp.yml'), 'Add Transfer Set' (button), 'Add Server' (button), 'Advanced...' (button), 'Add post-build action' (dropdown), and 'Advanced...' (button). At the bottom are 'Save' and 'Apply' buttons.

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 interface with the following details:

- Project Path:** Dashboard > RegApp_CI_Job > #2
- Job Status:** Success (indicated by a green checkmark icon)
- User:** admin
- Console Output:**
 - Started by user admin
 - Running as SYSTEM
 - Building in workspace /var/lib/jenkins/workspace/RegApp_CI_Job
 - The recommended git tool is: NONE
 - The 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/SaifPanjehsa/hello-world.git # timeout=10
 - Fetching upstream changes from https://github.com/SaifPanjehsa/hello-world.git
 - > git --version # timeout=10
 - > git fetch --tags --force --progress -- https://github.com/SaifPanjehsa/hello-world.git +refs/heads/*:refs/remotes/origin/* # timeout=10
 - > git rev-parse refs/remotes/origin/master^{commit} # timeout=10
 - Checking out Revision 9415bc7b35ecd4582c240cc801ed3dc9826395ea (refs/remotes/origin/master)
 - > git config core.sparsecheckout # timeout=10
 - > git checkout -f 9415bc7b35ecd4582c240cc801ed3dc9826395ea # timeout=10
 - Commit message: "Update registry in index.jsp"
 - > git rev-list --no-walk 9415bc7b35ecd4582c240cc801ed3dc9826395ea # 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/plugs... [REDACTED]
 - Reporting configuration should be done in <reporting> section, not in maven-site-plugin <configuration> as reportPlugins parameter.
 - Some problems were encountered while building the effective model for com.example.maven-project:server:jar:1.0-SNAPSHOT
 - Reporting configuration should be done in <reporting> section, not in maven-site-plugin <configuration> as reportPlugins parameter.
 - Some problems were encountered while building the effective model for com.example.maven-project:webapp:war:1.0-SNAPSHOT
 - Reporting configuration should be done in <reporting> section, not in maven-site-plugin <configuration> as reportPlugins parameter.
 - Some problems were encountered while building the effective model for com.example.maven-project:com:1.0-SNAPSHOT

Fig. Build Success

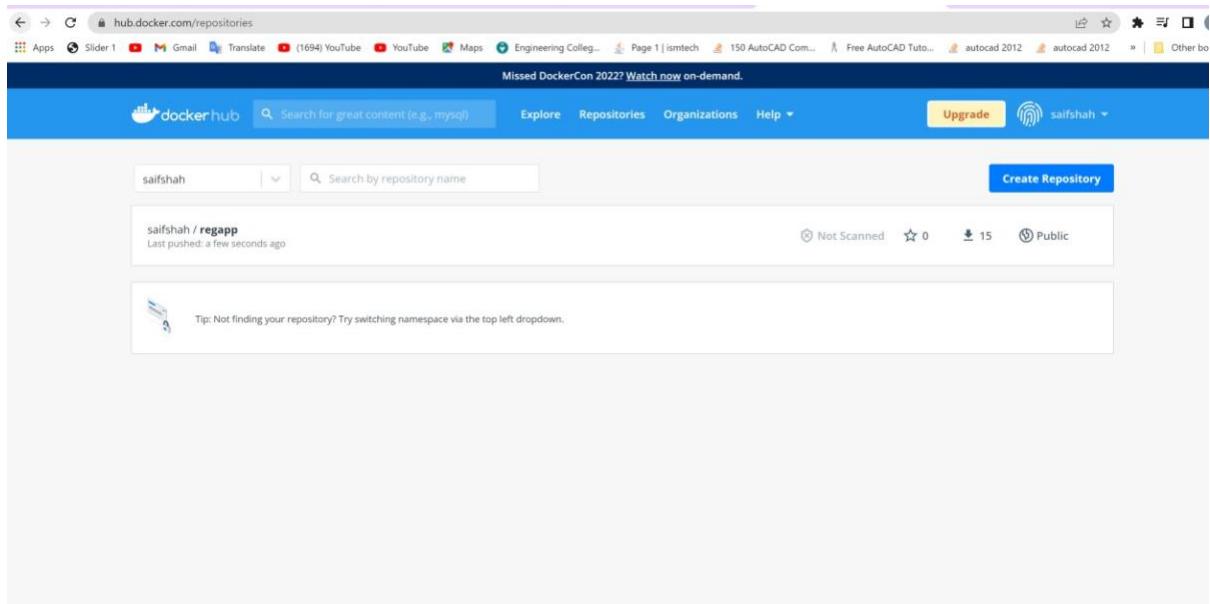


Fig. Image Created on Docker hub

Enable rolling update to create pod from latest docker image:

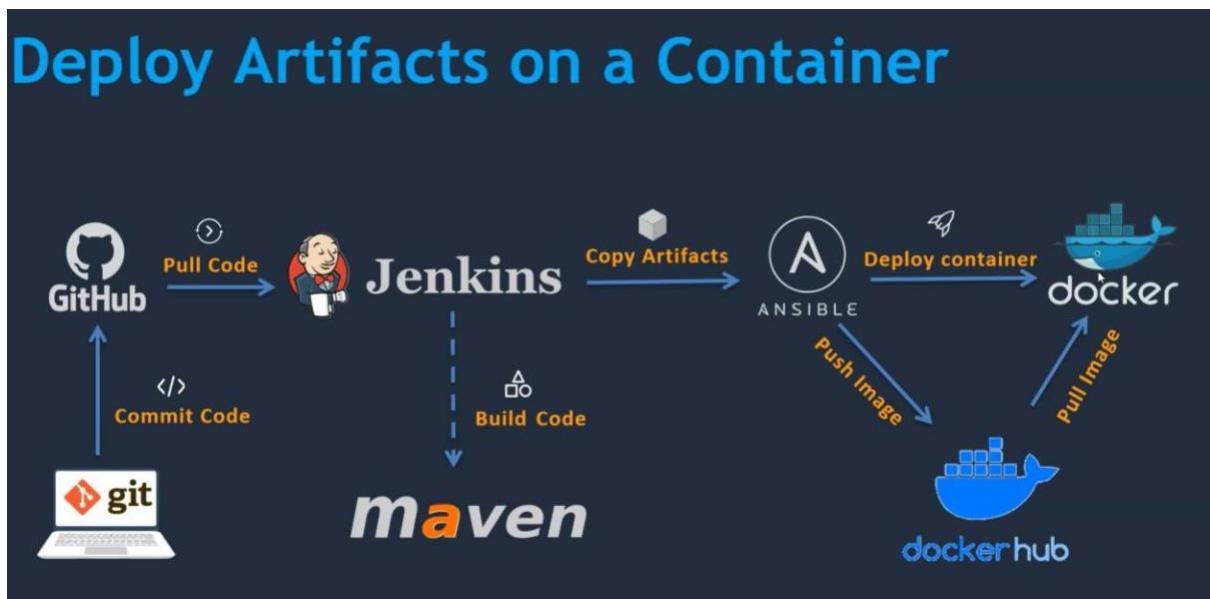


Fig. Deploying on Kubernetes

The screenshot shows the Jenkins 'Build Settings' page for the 'RegApp_CI_Job'. The 'Build Settings' tab is selected. Under 'Post-build Actions', there are two sections: 'Build other projects' and 'Send build artifacts over SSH'. In 'Build other projects', the 'Projects to build' field contains 'Regapp_CD_Job'. The 'Trigger only if build is stable' radio button is selected. In 'Send build artifacts over SSH', the 'SSH Publishers' section shows a single entry for 'ansible-server' under 'Name'.

Fig. Rolling update for configuration

The screenshot shows the Jenkins 'Console Output' page for build #4 of the 'RegApp_CI_Job'. The page title is 'Console Output'. The output shows the Jenkins environment, git fetch operations, and Maven execution. Key logs include:

```

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/SaifPanjehsa/hello-world.git # timeout=10
Fetching upstream changes from https://github.com/SaifPanjehsa/hello-world.git
> git --version # timeout=10
> git --version # 'git version 2.32.0'
> git fetch --tags --force --progress -- https://github.com/SaifPanjehsa/hello-world.git +refs/heads/*:refs/remotes/origin/* # timeout=10
> git rev-parse refs/remotes/origin/master^{commit} # timeout=10
Checking out Revision 9415bc7035ecd4582ce4bc6881ed3dc9826395ea (refs/remotes/origin/master)
> git config core.sparsecheckout # timeout=10
> git checkout -f 9415bc7035ecd4582ce4bc6881ed3dc9826395ea # timeout=10
Commit message: "Update registry in index.jsp"
> git rev-list --no-walk 9415bc7035ecd4582ce4bc6881ed3dc9826395ea # timeout=10
Parsing POMs
Established TCP socket on 45117
[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.Maven35Main /opt/maven /var/lib/jenkins/.m2/jenkins /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 45117
<==[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

```

The screenshot shows the Jenkins interface for a job named 'Regapp_CD_Job'. The build number is #4. The 'Console Output' tab is selected. The output shows a successful execution of an Ansible script via SSH, with no errors or warnings.

```

Started by upstream project "RegApp_CI_Job" build number 4
originally caused by:
Started by user admin
Running as SYSTEM
Building in workspace /var/lib/jenkins/workspace/Regapp_CD_Job
SSH: Connecting from host [Jenkins_Server]
SSH: Connecting with configuration [ansible-server] ...
SSH: EXEC: completed after 5,404 ms
SSH: Disconnecting configuration [ansible-server] ...
SSH: Transferred 0 file(s)
Finished: SUCCESS

```

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 :

```

/home/ec2-user/
└── Name
    └── .ssh
        └── bash_history
        └── bash_logout
        └── bash_profile
        └── bashrc

Last login: Wed May 18 11:12:52 2022 from 152.57.222.50
[ec2-user@K5_Bootstrap_Server ~]$ ls
[ec2-user@K5_Bootstrap_Server ~]$ sudo su -
[ec2-user@K5_Bootstrap_Server ~]$ lastlog -u ec2-user -t 2022-05-18 07 UTC+0222 from ip-172-31-26-13.ec2.internal on pts/4
Last failed login: Wed May 18 11:40:43 UTC 2022 from 43.154.190.190 on ssh:notty
There were 50 failed login attempts since the last successful login.
[root@K5_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          119m
pod/saifshah-regapp-67dc7d6554-rr50w   1/1    Running   0          119m
pod/saifshah-regapp-67dc7d6554-x24cx   1/1    Running   0          119m

NAME           TYPE        CLUSTER-IP      EXTERNAL-IP
service/kubernetes   ClusterIP   <none>
service/saifshah-service   LoadBalancer   10.100.156.66   a5cc75730006140938846b05fc830300-559804141.us-east-1.elb.amazonaws.com   8080:30620/TCP   119m

NAME           READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/saifshah-regapp   3/3     3           3           119m

NAME           DESIRED  CURRENT  READY   AGE
replicaset.apps/saifshah-regapp-67dc7d6554   3       3       3       119m
[root@K5_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-85c95fc496-254ft   1/1    Running   0          3s
pod/saifshah-regapp-85c95fc496-8j72    1/1    Running   0          4s
pod/saifshah-regapp-85c95fc496-r5pg2   0/1    ContainerCreating   0          2s

NAME           TYPE        CLUSTER-IP      EXTERNAL-IP
service/kubernetes   ClusterIP   <none>
service/saifshah-service   LoadBalancer   10.100.156.66   a5cc75730006140938846b05fc830300-559804141.us-east-1.elb.amazonaws.com   8080:30620/TCP   120m

NAME           READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/saifshah-regapp   2/3     3           2           120m

NAME           DESIRED  CURRENT  READY   AGE
replicaset.apps/saifshah-regapp-67dc7d6554   0       0       0       120m
replicaset.apps/saifshah-regapp-85c95fc496   3       3       2       4s
[root@K5_Bootstrap_Server ~]# exit

```

Fig. Bootstrap Server Running

```

/home/ansadmin/
└── Name
    └── .ansible
    └── .dockercfg
    └── .ssh
    └── .vim
    └── .bash_history
    └── .bash_logout
    └── .bash_profile
    └── .basic
    └── .venvinfo

Last login: Wed May 18 11:20:17 2022 from 152.57.222.50
[ec2-user@K5_Bootstrap_Server ~]$ ./nobaXterm Personal Edition v22.0 *
SSH session to ansadmin@3.95.18.228
  • 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.

[ec2-user@K5_Bootstrap_Server ~]$ 

Last login: Wed May 18 11:20:17 2022 from 152.57.222.50
[ec2-user@K5_Bootstrap_Server ~]$ 
[ec2-user@K5_Bootstrap_Server ~]$ cd /opt/docker
[ec2-user@K5_Bootstrap_Server docker]$ sudo service docker start
Redirecting to /bin/systemctl start docker.service
[ec2-user@K5_Bootstrap_Server docker]$ ls
create_image regapp.yml docker_deployment_regapp.yml Dockerfile hosts kube_deploy.yml kube_service.yml webapp.war
[ec2-user@K5_Bootstrap_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 209 May 17 19:31 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
[ec2-user@K5_Bootstrap_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 392 May 18 11:24 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 11:41 webapp.war
[ec2-user@K5_Bootstrap_Server docker]$ 

```

Fig. Ansible Server Webapp.war time change after success

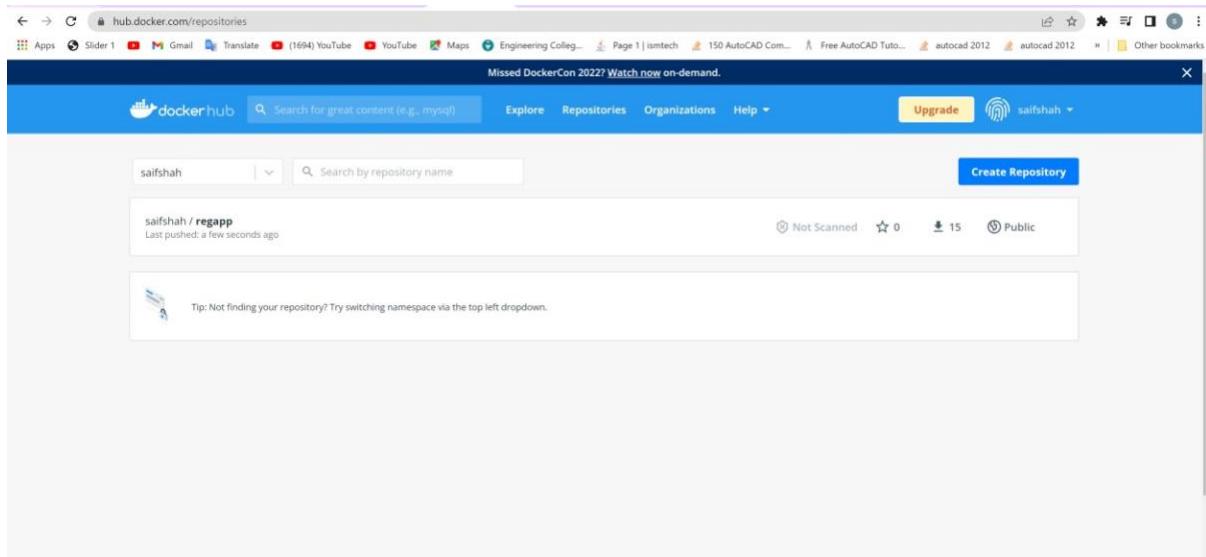


Fig. Docker latest Image

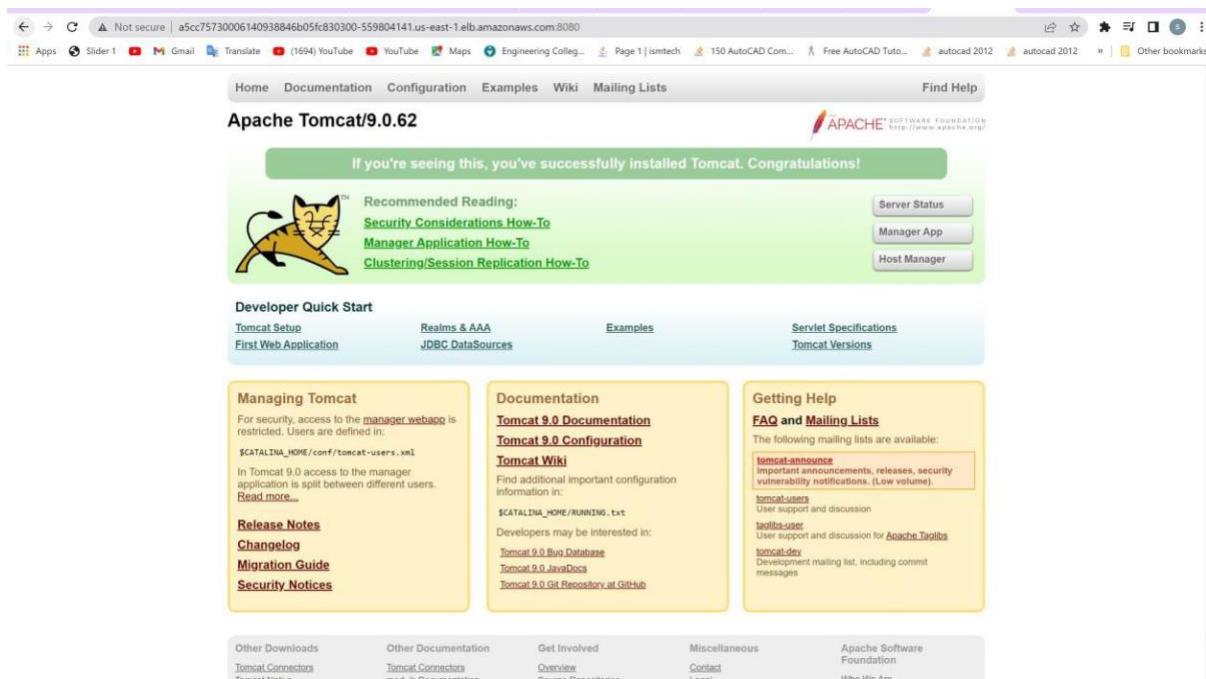


Fig. Access to load balancer on port 8080

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
```

The screenshot shows the AWS CloudFormation console. On the left, the navigation pane includes 'CloudFormation', 'Stacks', 'Drifts', 'StackSets', 'Exports', 'Designer', 'Registry' (with 'Public extensions', 'Activated extensions', and 'Publisher' listed), and 'Feedback'. The main area displays a 'Stacks (2)' list with two entries:

- eksctl-saifshah-cluster-nodegroup-584bdec7**: Status: **DELETE_IN_PROGRESS**. Stack ID: am:aws:cloudformation:us-east-1:365055183576:stack/eksctl-saifshah-cluster-cluster/9095e830-d513-11ec-be4f-0ead2c327235.
- eksctl-saifshah-cluster-cluster**: Status: **DELETE_IN_PROGRESS**. Stack ID: am:aws:cloudformation:us-east-1:365055183576:stack/eksctl-saifshah-cluster-cluster/9095e830-d513-11ec-be4f-0ead2c327235.

The right side shows the details for the **eksctl-saifshah-cluster-cluster** stack in the 'Overview' tab. The status is **DELETE_IN_PROGRESS**. Other details include:

- Description: EKS cluster (dedicated VPC: true, dedicated IAM: true) [created and managed by eksctl]
- Status reason: -
- Root stack: -
- Parent stack: -
- Created time: 2022-05-16 17:57:34 UTC+0530
- Deleted time: 2022-05-18 17:36:40 UTC+0530
- Updated time: -
- Drift status: **NOT_CHECKED**
- Last drift check time: -
- Termination protection: Disabled
- IAM role: -

Fig . Cluster Deleted

The screenshot shows the AWS EC2 Instances page. The left sidebar includes 'New EC2 Experience', 'EC2 Dashboard', 'EC2 Global View', 'Events', 'Tags', 'Limits', 'Instances' (selected), 'Images', 'Elastic Block Store', and 'Feedback'. The main area displays a table of instances:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
saifshah-clust...	i-087bf5b6791d22452	Terminated	t2.small	2/2 checks passed	No alarms	us-east-1a	-
Tomcat_Server	i-010d47b3e089d7869	Terminated	t2.micro	-	No alarms	us-east-1c	-
Docker_Server	i-0875a802a59fdd059	Shutting-down	t2.micro	2/2 checks passed	No alarms	us-east-1c	-
Jenkins_Server1	i-00f1e4c8cb15c9042	Shutting-down	t2.micro	2/2 checks passed	No alarms	us-east-1c	-
Ansible_Server	i-0dc753250431f8ac9	Shutting-down	t2.micro	2/2 checks passed	No alarms	us-east-1c	-
saifshah-clust...	i-067a3ff40a85d554f	Terminated	t2.small	2/2 checks passed	No alarms	us-east-1c	-
EKS_Bootstrap...	i-0a1972f80a26866df	Shutting-down	t2.micro	2/2 checks passed	No alarms	us-east-1b	ec2-54-211-9-21.comp...

A message at the bottom states: "Instances: i-087bf5b6791d22452 (saifshah-cluster-584bdec7-Node), i-010d47b3e089d7869 (Tomcat_Server), i-0875a802a59fdd059 (Docker_Server), i-00f1e4c8cb15c9042 (Jenkins_Server1), i-0dc753250431f8ac9 (Ansible_Server), i-067a3ff40a85d554f (saifshah-cluster-584bdec7-Node), i-0a1972f80a26866df (EKS_Bootstrap_Server)".

Fig. Terminates all Instances

HOPE You successfully completed the Project.

Subscribe to our YouTube channel: <https://www.youtube.com/@devops-cloud>

The mentorship program that we offer covers 10 important points. This is unique and not offered by anyone else in the Industry:

- 1.) DevOps and Cloud Bootcamp - where we tell you about 10-12 different Devops tool stack like Git, Jenkins, artifactory, Docker , Kubernetes , Terraform, AWS and more.
- 2 .) Advanced AWS Bootcamp - We teach you advanced AWS upto professional level
- 3 .) PROJECTS We conduct enterprise grade projects where you learn practical implementation of projects and embed all your learnings from step 1 and 2 into the projects. This ogives you hands-on experience on it.
- 4.) CV - We re-build your cv to include your learnings obtained in bootcamps and projects in a practical way and how you can demonstrate your knowledge in interviews.
- 5.) Knowledge Sharing - We provide a platform for knowledge sharing and presentations where you dramatically improve your technical presentation skills which help you a lot in interviews
6.) Domain Implementations - We bring in wealth of knowledge regarding practical implementations of DevOps and Cloud around many domains like Banking, Insurance, Automobiles, Retail ,Telecom and how implementations around Security, performance, cost optimisation is done in them.
- 7.) Experts - We bring in other industry experts working in Top tier organisations who will speak to you regarding their experiences, their knowledge and you ask questions
- 8.) LIVE - We have weekly LIVE zoom sessions where you can learn and ask any questions. We offer collaborative Slack channel for resolving technical challenges and communications.
- 9.) Interviews - If you have any upcoming interviews we discuss with you beforehand on types of expected questions and prepare you for answers for it.
- 10.) Forever - We stay with you for as long as it takes. We are super confident that you will achieve your goals within a few months, but your membership remains lifetime. In this program you are automatically included as a part of our past, present and even future offerings without any additional costs.

Booking Link for Mentorship Program <https://topmate.io/cloud/606995>

💚 Join Our WhatsApp Group: <https://chat.whatsapp.com/KdLU9U4zFXfDqFT7g4PYo1>

💚 Join Our Telegram Group: <https://t.me/+xjZA3ZS-OQkxZTk1>

💚 Subscribe to the Channel:
http://www.youtube.com/channel/UCYDIBuxE7BEtYR5r4q3WRrQ?sub_confirmation=1

💚 **Follow our community page on LinkedIn:**
<https://www.linkedin.com/company/devops-and-cloud-labs>