

Industry Grade Project - I

Task 1

Objective : Clone the project from the GitHub link shared in resources to your local machine. Build the code using Maven commands.

Solution :

New repository on GitHub with name 'abc_technologies'

Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere? [Import a repository](#).

Owner * Repository name *

 ashokdevatwal / abc_technologies
 abc_technologies is available.

Great repository names are short and memorable. Need inspiration? How about [super-octo-tribble](#)?

Description (optional)
Industry Grade Project |

 Public
Anyone on the internet can see this repository. You choose who can commit.

 Private
You choose who can see and commit to this repository.

Initialize this repository with:

Add a README file
This is where you can write a long description for your project. [Learn more about READMEs](#).

Add .gitignore

.gitignore template: [None](#) ▾
Choose which files not to track from a list of templates. [Learn more about ignoring files](#).

Choose a license

License: [None](#) ▾
A license tells others what they can and can't do with your code. [Learn more about licenses](#).

 You are creating a public repository in your personal account.

[Create repository](#)

Print ssh key

```
$ cat ~/.ssh/id_rsa.pub
```

Copy ssh key and add on GitHub

Profile > settings > SSH and GPG keys > New SSH key

The screenshot shows the GitHub 'SSH keys' settings page for the user 'ashokdevatwal'. On the left, there's a sidebar with various account management links like Public profile, Account, Appearance, Accessibility, Notifications, Access, Billing and plans, Emails, Password and authentication, Sessions, SSH and GPG keys (which is selected), Organizations, Moderation, Code, planning, and automation, Repositories, Codespaces, Packages, Copilot, Pages, and Saved replies. The main content area is titled 'SSH keys' and contains a list of three keys:

- devops-server**: SHA256:MSCk... jCH0ag. Added on Nov 26, 2022. Last used within the last 2 weeks — Read/write. Delete button.
- game-server**: SHA256:87X... FLz6Ryw. Added on Jan 29, 2023. Last used within the last week — Read/write. Delete button.
- ashok-mac**: SHA256:Ehg... lK7UVFc. Added on Feb 17, 2023. Last used within the last week — Read/write. Delete button.

Below the keys, there's a note: 'Check out our guide to [generating SSH keys](#) or troubleshoot [common SSH problems](#).'

At the bottom, there's a 'New SSH key' button.

Download project from LMS to local system then open terminal in project dir in local system then run following

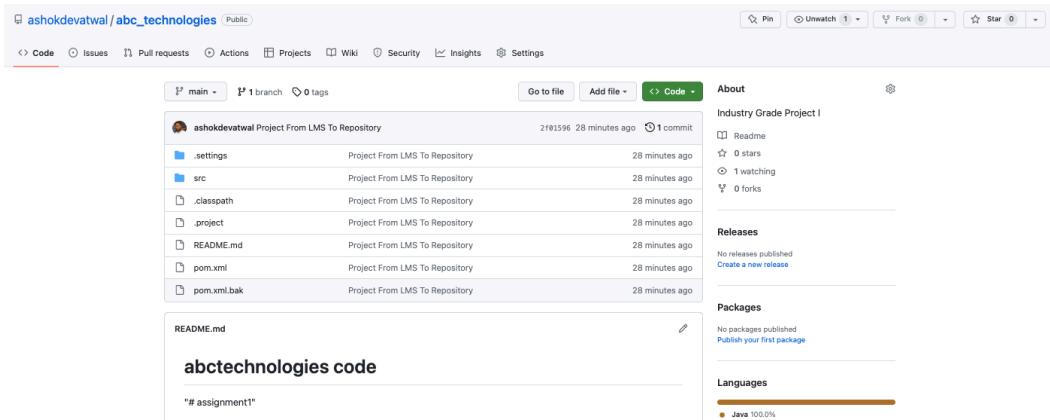
```
$ git init
$ git add .
$ git commit -m "Project From LMS To Repository"
$ git branch -M main
$ git remote add origin git@github.com:ashokdevatwal/abc_technologies.git
$ git push -u origin main
```

```

ABC Technologies -- zsh -- 94x34
ars@Ashoks-MacBook-Air ABC Technologies % git init
Initialized empty Git repository in /Users/ars/Downloads/IGP/Industry Grade Project I - Java P
[project/ABC Technologies/.git/
ars@Ashoks-MacBook-Air ABC Technologies % git add .
[main (root-commit) 2f01596] Project From LMS To Repository
[ 13 files changed, 313 insertions(+)
create mode 100755 .classpath
create mode 100755 .project
create mode 100755 .settings/org.eclipse.jdt.core.prefs
create mode 100755 .settings/org.eclipse.m2e.core.prefs
create mode 100755 README.md
create mode 100755 pom.xml
create mode 100755 pom.xml.bak
create mode 100755 src/main/java/com/abc/RetailModule.java
create mode 100755 src/main/java/com/abc/dataAccessObject/RetailAccessObject.java
create mode 100755 src/main/java/com/abc/dataAccessObject/RetailDataImp.java
create mode 100755 src/main/webapp/WEB-INF/web.xml
create mode 100755 src/main/webapp/index.jsp
create mode 100755 src/test/java/com/abc/dataAccessObject/ProductImpTest.java
ars@Ashoks-MacBook-Air ABC Technologies % git branch -M main
ars@Ashoks-MacBook-Air ABC Technologies % git remote add origin git@github.com:ashokdevatwal/a
bc_technologies.git
ars@Ashoks-MacBook-Air ABC Technologies % git push -u origin main
Enumerating objects: 29, done.
Counting objects: 100% (29/29), done.
Delta compression using up to 4 threads
Compressing objects: 100% (20/20), done.
Writing objects: 100% (29/29), 4.50 KiB | 576.00 KiB/s, done.
Total 29 (delta 0), reused 0 (delta 0), pack-reused 0
To github.com:ashokdevatwal/abc_technologies.git
 * [new branch]      main -> main
branch 'main' set up to track 'origin/main'.
ars@Ashoks-MacBook-Air ABC Technologies %

```

Code successfully pushed to remote repository



Clone project on EC2 machine

\$ git clone git@github.com:ashokdevatwal/abc_technologies.git

```

ubuntu@ip-172-31-29-137:~$ git clone git@github.com:ashokdevatwal/abc_technologies.git
Cloning into 'abc_technologies'...
The authenticity of host 'github.com (140.82.114.4)' can't be established.
ECDSA key fingerprint is SHA256:p2QAMXNIC1TJYWeI0ttrVc98/R1BUFWu3/LiyKgUfQM.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'github.com,140.82.114.4' (ECDSA) to the list of known hosts.
remote: Enumerating objects: 29, done.
remote: Counting objects: 100% (29/29), done.
remote: Compressing objects: 100% (20/20), done.
remote: Total 29 (delta 0), reused 29 (delta 0), pack-reused 0
Receiving objects: 100% (29/29), 4.50 KiB | 1.50 MiB/s, done.
ubuntu@ip-172-31-29-137:~$

```

Build the code using Maven

\$ mvn clean install

```
ubuntu@ip-172-31-29-137:~/abc_technologies$ mvn clean install
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by com.google.inject.internal.cglib.core.$ReflectUtils$1 (file
:/usr/share/maven/lib/guice.jar) to method java.lang.ClassLoader.defineClass(java.lang.String,byt
e[],int,int,java.security.ProtectionDomain)
WARNING: Please consider reporting this to the maintainers of com.google.inject.internal.cglib.co
re.$ReflectUtils$1
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access oper
ations
WARNING: All illegal access operations will be denied in a future release
[INFO] Scanning for projects...
[INFO]
[INFO] -----< com.abc:ABCtechnologies >-----
[INFO] Building RetailModule 1.0
[INFO] -----[ war ]-----
Downloading from central: https://repo.maven.apache.org/maven2/org/jacoco/jacoco-maven-plugin/0.8
.6/jacoco-maven-plugin-0.8.6.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/jacoco/jacoco-maven-plugin/0.8
.6/jacoco-maven-plugin-0.8.6.pom (4.4 kB at 7.1 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/jacoco/org.jacoco.build/0.8.6/
org.jacoco.build-0.8.6.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/jacoco/org.jacoco.build/0.8.6/o
rg.jacoco.build-0.8.6.pom (42 kB at 584 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/jacoco/jacoco-maven-plugin/0.8
.6/jacoco-maven-plugin-0.8.6.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/jacoco/jacoco-maven-plugin/0.8
.6/jacoco-maven-plugin-0.8.6.jar (53 kB at 955 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-cle
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  21.025 s
[INFO] Finished at: 2023-06-06T16:01:52Z
[INFO] ------------------------------------------------------------------------
ubuntu@ip-172-31-29-137:~/abc_technologies$ ll
```

```
total 44
drwxrwxr-x  6 ubuntu ubuntu 4096 Jun  6 16:01 .
drwxr-xr-x  6 ubuntu ubuntu 4096 Jun  6 16:01 ..
-rw-rwxr-x  1 ubuntu ubuntu 1066 Jun  6 15:41 .classpath*
drwxrwxr-x  8 ubuntu ubuntu 4096 Jun  6 15:41 .git/
-rw-rwxr-x  1 ubuntu ubuntu  568 Jun  6 15:41 .project*
drwxrwxr-x  2 ubuntu ubuntu 4096 Jun  6 15:41 .settings/
-rw-rwxr-x  1 ubuntu ubuntu    42 Jun  6 15:41 README.md*
-rw-rwxr-x  1 ubuntu ubuntu 2083 Jun  6 15:41 pom.xml*
-rw-rwxr-x  1 ubuntu ubuntu   794 Jun  6 15:41 pom.xml.bak*
drwxrwxr-x  4 ubuntu ubuntu 4096 Jun  6 15:41 src/
drwxrwxr-x 11 ubuntu ubuntu 4096 Jun  6 16:01 target/
ubuntu@ip-172-31-29-137:~/abc_technologies$
```

\$ mvn clean compile

```
ubuntu@ip-172-31-29-137:~/abc_technologies$ mvn clean compile
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by com.google.inject.internal.cglib.core.$ReflectUtils$1 (file:/usr/share/maven/lib/guice.jar) to method java.lang.ClassLoader.defineClass(java.lang.String,byte[],int,int,java.security.ProtectionDomain)
WARNING: Please consider reporting this to the maintainers of com.google.inject.internal.cglib.core.$ReflectUtils$1
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
[INFO] Scanning for projects...
[INFO]
[INFO] -----< com.abc:ABCtechnologies >-----
[INFO] Building RetailModule 1.0
[INFO] -----[ war ]-----
[INFO]
[INFO] --- maven-clean-plugin:2.5:clean (default-clean) @ ABCtechnologies ---
[INFO] Deleting /home/ubuntu/abc_technologies/target
[INFO]
[INFO] --- jacoco-maven-plugin:0.8.6:prepare-agent (jacoco-initialize) @ ABCtechnologies ---
[INFO] argLine set to -javaagent:/home/ubuntu/.m2/repository/org/jacoco/org.jacoco.agent/0.8.6/org.jacoco.agent-0.8.6-runtime.jar=destfile=/home/ubuntu/abc_technologies/target/jacoco.exec
[INFO]
[INFO] --- maven-resources-plugin:2.6:resources (default-resources) @ ABCtechnologies ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory /home/ubuntu/abc_technologies/src/main/resources
[INFO]
[INFO] --- maven-compiler-plugin:3.1:compile (default-compile) @ ABCtechnologies ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 3 source files to /home/ubuntu/abc_technologies/target/classes
[INFO]
[INFO] -----BUILD SUCCESS
[INFO]
[INFO] Total time:  4.390 s
[INFO] Finished at: 2023-07-15T20:12:40+05:30
[INFO]
ubuntu@ip-172-31-29-137:~/abc_technologies$
```

\$ mvn test

```
ubuntu@ip-172-31-29-137:~/abc_technologies$ mvn test
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by com.google.inject.internal.cglib.core.$ReflectUtils$1 (file:/usr/share/maven/lib/guice.jar) to method java.lang.ClassLoader.defineClass(java.lang.String,byte[],int,int,java.security.ProtectionDomain)
WARNING: Please consider reporting this to the maintainers of com.google.inject.internal.cglib.core.$ReflectUtils$1
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
[INFO] Scanning for projects...
[INFO]
[INFO] -----< com.abc:ABCtechnologies >-----
[INFO] Building RetailModule 1.0
[INFO] -----[ war ]-----
[INFO]
[INFO] --- jacoco-maven-plugin:0.8.6:prepare-agent (jacoco-initialize) @ ABCtechnologies ---
[INFO] argLine set to -javaagent:/home/ubuntu/.m2/repository/org/jacoco/org.jacoco.agent/0.8.6/org.jacoco.agent-0.8.6-runtime.jar=destfile=/home/ubuntu/abc_technologies/target/jacoco.exec
[INFO]
[INFO] --- maven-resources-plugin:2.6:resources (default-resources) @ ABCtechnologies ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory /home/ubuntu/abc_technologies/src/main/resources
[INFO]
[INFO] --- maven-compiler-plugin:3.1:compile (default-compile) @ ABCtechnologies ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- maven-resources-plugin:2.6:testResources (default-testResources) @ ABCtechnologies ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory /home/ubuntu/abc_technologies/src/test/resources
[INFO]
[INFO] --- maven-compiler-plugin:3.1:testCompile (default-testCompile) @ ABCtechnologies ---
[INFO] Changes detected - recompling the module!
[INFO] Compiling 1 source file to /home/ubuntu/abc_technologies/target/test-classes
[INFO]
[INFO] --- maven-surefire-plugin:2.12.4:test (default-test) @ ABCtechnologies ---
[INFO] Surefire report directory: /home/ubuntu/abc_technologies/target/surefire-reports

-----T E S T S-----
Running com.abc.dataAccessObject.ProductImplTest
Tests run: 4, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.194 sec

Results :

Tests run: 4, Failures: 0, Errors: 0, Skipped: 0

[INFO] -----BUILD SUCCESS
[INFO] -----Total time: 6.384 s
[INFO] Finished at: 2023-07-15T20:16:35+05:30
[INFO]
ubuntu@ip-172-31-29-137:~/abc_technologies$
```

\$ mvn package

```
ubuntu@ip-172-31-29-137:~/abc_technologies$ mvn package
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by com.google.inject.internal.cglib.core.$ReflectUtils$1 (file:/usr/share/maven/lib/guice.jar) to method java.lang.ClassLoader.defineClass(java.lang.String,byte[],int,int,java.security.ProtectionDomain)
WARNING: Please consider reporting this to the maintainers of com.google.inject.internal.cglib.core.$ReflectUtils$1
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
[INFO] Scanning for projects...
[INFO]
[INFO] -----< com.abc:ABCtechnologies >-----
[INFO] Building RetailModule 1.0
[INFO] ----- [ war ] -----
[INFO]
[INFO] --- jacoco-maven-plugin:0.8.6:prepare-agent (jacoco-initialize) @ ABCtechnologies ---
[INFO] argLine set to -javaagent:/home/ubuntu/.m2/repository/org/jacoco/org.jacoco.agent/0.8.6/org.jacoco.agent-0.8.6-runtime.jar=destfile=/home/ubuntu/abc_technologies/target/jacoco.exec
[INFO]
[INFO] --- maven-resources-plugin:2.6:resources (default-resources) @ ABCtechnologies ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory /home/ubuntu/abc_technologies/src/main/resources
[INFO]
[INFO] --- maven-compiler-plugin:3.1:compile (default-compile) @ ABCtechnologies ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- maven-resources-plugin:2.6:testResources (default-testResources) @ ABCtechnologies ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory /home/ubuntu/abc_technologies/src/test/resources
[INFO]
[INFO] --- maven-compiler-plugin:3.1:testCompile (default-testCompile) @ ABCtechnologies ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- maven-surefire-plugin:2.12.4:test (default-test) @ ABCtechnologies ---
[INFO] Surefire report directory: /home/ubuntu/abc_technologies/target/surefire-reports

-----
T E S T S
-----
Running com.abc.dataAccessObject.ProductImpTest
Tests run: 4, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.156 sec
Results :

Tests run: 4, Failures: 0, Errors: 0, Skipped: 0

[INFO]
[INFO] --- maven-war-plugin:3.2.2:war (default-war) @ ABCtechnologies ---
[INFO] Packaging webapp
[INFO] Assembling webapp [ABCtechnologies] in [/home/ubuntu/abc_technologies/target/ABCtechnologies-1.0]
[INFO] Processing war project
[INFO] Copying webapp resources [/home/ubuntu/abc_technologies/src/main/webapp]
[INFO] Webapp assembled in [207 msec]
[INFO] Building war: /home/ubuntu/abc_technologies/target/ABCtechnologies-1.0.war
[INFO]
[INFO] --- jacoco-maven-plugin:0.8.6:report (jacoco-site) @ ABCtechnologies ---
[INFO] Loading execution data file /home/ubuntu/abc_technologies/target/jacoco.exec
[INFO] Analyzed bundle 'RetailModule' with 2 classes
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 6.992 s
[INFO] Finished at: 2023-07-15T20:49:01+05:30
[INFO] -----
```

Build Success

Task 2

Objective : Set up the Git repository and push the source code. Then, log in to Jenkins.

1. Create a build pipeline containing a job for each
 - One for compiling source code
 - Second for testing source code
 - Third for packing the code
2. Execute the CI/CD pipeline to execute the jobs created in step1
3. Set up a master - slave node to distribute the tasks in the pipeline.

Solution :

Build created in task 1 now push that build to remote repository

```
$ git add .
$ git commit -m "build using maven"
$ git push
```

Login to Jenkins server

Got to **Manage Jenkins > credentials > Global**

Add Credentials

kind “**username with password**”

Add GitHub username and in password “github access token”

The screenshot shows the Jenkins 'New credentials' configuration page. The 'Kind' dropdown is set to 'Username with password'. The 'Scope' dropdown is set to 'Global (Jenkins, nodes, items, all child items, etc.)'. The 'Username' field contains 'ashokdevatwal'. The 'Password' field is filled with a redacted string. A checkbox 'Treat username as secret' is unchecked. A 'Create' button is at the bottom.

Credentials added successfully.

The screenshot shows the Jenkins 'Credentials' page under 'Manage Jenkins'. It lists a single credential entry:

T	P	Store ↓	Domain	ID	Name
		System	(global)	41f64d14-1941-4b62-9af7-8d78b8aae345	ashokdevatwal/********

Below this, there's a section titled 'Stores scoped to Jenkins' which shows a single entry for 'System' with '(global)' domain.

Note **credentials id** will use in pipeline script

Lets Create a pipeline which have jobs to compile , test , package application code

Go to dashboard and click on **New item**. Name pipeline and select type **pipeline**

The screenshot shows the Jenkins 'New Item' creation dialog. The 'Item name' field contains 'IGP-Build'. The 'Type' dropdown is set to 'Pipeline'.

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.

Pipeline: Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.

Multi-configuration project: Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc.

Folder: Creates a container that stores nested items in it. Useful for grouping things together. Unlike view, which is just a filter, a folder is a separate namespace, so you can have multiple things of the same name as long as they are in different folders.

On configuration screen lets configure our pipeline

General section check on “**discard old builds**”

Add Script and Save.

Pipeline script which will pull code from **GitHub** and checkout , compile , test and package application code and generate war file which can be used for deployment .

Pipeline Script

```

pipeline {
    agent any

    stages {
        stage('Checkout') {
            steps {
                // Checkout the Java project from GitHub with authentication
                git branch: 'main',credentialsId: '41f64d14-1941-4b62-9af7-8d78b8aae345', url: 'https://github.com/ashokdevatwal/abc_technologies.git'
            }
        }

        stage('Compile Source Code') {
            steps {
                // Compile the source code
                sh 'mvn clean compile'
            }
        }

        stage('Test Source Code') {
            steps {
                // Run tests
                sh 'mvn test'
            }
        }

        stage('Package Code') {
            steps {
                // Package the code
                sh 'mvn package'
            }
        }
    }
}

```

Script link : <https://github.com/ashokdevatwal/igp-first-files/blob/main/build-pipeline>

Build Pipeline is ready now, click on build now to execute pipeline

The screenshot shows the Jenkins Pipeline configuration interface. On the left, there's a sidebar with various options like Changes, Build Now, Configure, Delete Pipeline, Full Stage View, Rename, Pipeline Syntax, Build History (which is selected), and Filter builds... A trend dropdown is also present. Below the sidebar, a build history section shows a single build (#1) from July 13, 2023, at 12:06 AM, with no changes and a status of "No Changes". The main area is titled "Stage View" and displays four stages: Checkout, Compile Source Code, Test Source Code, and Package Code. Each stage has a progress bar indicating its duration: Checkout (2s), Compile Source Code (9s), Test Source Code (9s), and Package Code (10s). Below the Stage View, there's a "Permalinks" section with a list of links related to the build.

Stage	Time
Checkout	2s
Compile Source Code	9s
Test Source Code	9s
Package Code	10s

Average stage times:
(Average full run time: ~37s)

#1 Jul 13 24:06 No Changes

Permalinks

- Last build (#1), 45 sec ago
- Last stable build (#1), 45 sec ago
- Last successful build (#1), 45 sec ago
- Last completed build (#1), 45 sec ago

Pipeline run successfully.

Pipeline output :

<https://raw.githubusercontent.com/ashokdevatwal/igp-first-files/main/pipeline-output>

Jenkins master slave

We already up and running master server so just need to setup slave server.

Install **Java** and **Maven** with same version as on master node on slave node

```
$ sudo apt install openjdk-11-jre
$ sudo apt install maven
```

Generate SSH keys on slave node

```
$ ssh-keygen -t rsa
```

```
ubuntu@ip-172-31-29-34:~/.ssh$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/ubuntu/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/ubuntu/.ssh/id_rsa
Your public key has been saved in /home/ubuntu/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:Yvlj7hkg1LY+Woqjj3YI03Zz07erL+p+Y3HY+74IWY ubuntu@ip-172-31-29-34
The key's randomart image is:
+---[RSA 3072]----+
| |
| . |
| . o |
| . . o |
| . . * S |
|o . + +
|= = E. *
|o.=o+X X==|
|o++=X=XOO. |
+---[SHA256]----+
```

Will use SSH key for authentication to slave node so lets add slave credentials on Jenkins master node

Got to **Manage Jenkins > Credentials > global > new credentials**

Select kind “**SSH Username with private key**”

The screenshot shows the Jenkins 'New credentials' configuration page. The 'Kind' dropdown is set to 'SSH Username with private key'. The 'Scope' dropdown is set to 'Global (Jenkins, nodes, items, all child items, etc)'. The 'ID' and 'Description' fields are empty. The 'Username' field is empty. Below these fields is a 'Private key' section with a 'Create' button. At the bottom right of the form is a 'Create' button.

Set username as “ubuntu”

In Private Key Section check on **Enter Directly** then click on **Add**

And paste your ssh private key of slave machine (cat ~/.ssh/id_rsa).

Dashboard > Manage Jenkins > Credentials > System > Global credentials (unrestricted) >

Username
ubuntu

Treat username as secret ?

Private Key
 Enter directly

Key

```
-----  
8dF5b3N1sgMxtw1M/ObX8uzM8TzVaGR6LYM2EXvDcGwUJKwK63y/AMxLjGKscyoSTHw  
wv/IV3f1K1d1A1JWY5Wv0Ro699Wrt4CZ1j3Soc5mDm88IV901DHQmjneyU18v1OBOnV0  
eAMMER80RN151a3cE5kE7AN+RqMgcMkw18Zped1jFkA11/uCxiXN/QPpyseOxsYoc44K  
-----
```

Enter New Secret Below

Passphrase

Create

Slave node credentials (SSH) added successfully we will use this in node configuration.

Lets add slave node on Jenkins master node to execute pipeline on slave machine.

Go to **manage Jenkins > nodes and clouds > new node**

Give name to node and select type “**permanent agent**” then click on create

Dashboard > Manage Jenkins > Nodes > New node

New node

Node name
Slave Node

Type
 Permanent Agent

Adds a plain, permanent agent to Jenkins. This is called "permanent" because Jenkins doesn't provide higher level of integration with these agents, such as dynamic provisioning. Select this type if no other agent types apply — for example such as when you are adding a physical computer, virtual machines managed outside Jenkins, etc.

Create

Add remote root directory “**/home/ubuntu/Jenkins**”

Name ?
Slave Node

Description ?
[Plain text] [Preview](#)

Number of executors ?
1

Remote root directory ?
/home/ubuntu/Jenkins

Labels ?

Save

Launch method “**Launch agents via SSH**”

Add Host (Slave Node Public Ip) and select ubuntu (already added in Jenkins credentials) in credentials . Select Host Key Verification Strategy as “**Non verifying Verification Strategy**”

Launch method ?
Launch agents via SSH

Host ?
54.146.217.139

Credentials ?
ubuntu
[Add](#)

Host Key Verification Strategy ?
Non verifying Verification Strategy

Advanced [Edit](#)

Availability ?
Keep this agent online as much as possible

Save

The screenshot shows the Jenkins Nodes page. On the left, there are sections for Build Queue (empty) and Build Executor Status (Slave Node). The main area displays a table of nodes:

S	Name	Architecture	Clock Difference	Free Disk Space	Free Swap Space	Free Temp Space	Response Time
	Built-In Node	Linux (amd64)	In sync	9.33 GB	! 0 B	9.33 GB	0ms
	Slave Node	Linux (amd64)	In sync	11.29 GB	! 0 B	11.29 GB	21ms
	Data obtained	18 sec	18 sec	18 sec	18 sec	18 sec	18 sec

At the bottom right, it says REST API Jenkins 2.401.1.

Slave Node added successfully

Set Number of executors on master node to 0

The screenshot shows the Jenkins Built-In Node Configure page. The Number of executors field is set to 0. The Usage dropdown is set to "Use this node as much as possible". Under Node Properties, the checkboxes for "Disable deferred wipeout on this node" and "Environment variables" are unchecked. A Save button is at the bottom.

Run Pipeline

The screenshot shows the 'Pipeline IGP-Build' status page. On the left, there's a sidebar with options like Status, Changes, Build Now, Configure, Delete Pipeline, Full Stage View, Rename, and Pipeline Syntax. Below that is the 'Build History' section, which lists three builds: #11 (Jul 15, 19:01), #10 (Jul 15, 18:58), and #9 (Jul 15, 17:05). Each build entry shows 'No Changes'. To the right is the 'Stage View' table, which details the average stage times for four stages: Checkout (1s), Compile Source Code (7s), Test Source Code (3min 13s), and Package Code (2min 46s). The table shows data for three builds (#11, #10, #9) across these stages.

	Checkout	Compile Source Code	Test Source Code	Package Code
Average stage times: (Average full run time: ~30s)	1s	7s	3min 13s	2min 46s
#11 Jul 15 19:01 No Changes	447ms	7s	8s	9s
#10 Jul 15 18:58 No Changes	509ms	7s	8s	9s
#9 Jul 15 17:05 No Changes	586ms	7s	8s	9s

Pipeline output :

<https://raw.githubusercontent.com/ashokdevatwal/igp-first-files/main/slave-pipeline-output>

Pipeline run successfully on remote slave node.

Task 3

Objective : Write a Docket file. Create an Image and container on the Docker host. Integrate docker host with Jenkins. Create CI/CD job on Jenkins to build and deploy on a container.

1. Enhance the package job created in step 1 of task 2 to create a docker image.
2. In the Docker image, add code to move the war file to the Tomcat server and build the image.

Solution :

Create a new file named Dockerfile in the root directory of project.

\$ touch Dockerfile

Dockerfile : <https://raw.githubusercontent.com/ashokdevatwal/igp-first-files/main/Dockerfile>

Build the Docker image and run a Docker container

\$ sudo docker build -t abc-technologies .

\$ sudo docker run -d --name abc-technologies-container -p 8081:8080 abc-technologies

Check Container is running

\$ sudo docker ps -a

```
ubuntu@ip-172-31-29-137:~/abc_technologies$ sudo docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED            STATUS              PORTS
0a7dfee3a8e        3382ec7a5ee9    "catalina.sh run"   8 minutes ago     Up 7 minutes      0.0.0.0:8081->8080/tcp, :::8081->8080/tcp
NAMES
abc-technologies-container
ubuntu@ip-172-31-29-137:~/abc_technologies$
```

ABC Technologies Application in browser

Not Secure | 54.146.145.65:8081/ABCtechnologies-1.0/

SQL CareerDec electron Server

Welcome to ABC technologies

This is retail portal

Add Product View Product

Integrate the Docker host with Jenkins

Open Jenkins and go to "**Manage Jenkins**" > "**Plugins**".

In the "**Available**" tab, search for "Docker" and install the "Docker" plugin.

The screenshot shows the Jenkins Plugins management interface. The top navigation bar includes the Jenkins logo, a search bar, and user information for 'Ashok Devatwal'. Below the header, the 'Available plugins' tab is selected, indicated by a blue background. A search bar contains the query 'docker'. The main list displays the 'Docker' plugin, version 1.4, which is checked for installation. The plugin details show it integrates Jenkins with Docker and is up for adoption. Other listed plugins include 'Docker Commons' and 'Docker Pipeline'. At the bottom, there are buttons for 'Install without restart' and 'Download now and install after restart'.

Add Jenkins user into docker group

\$ sudo usermod -a -G docker jenkins

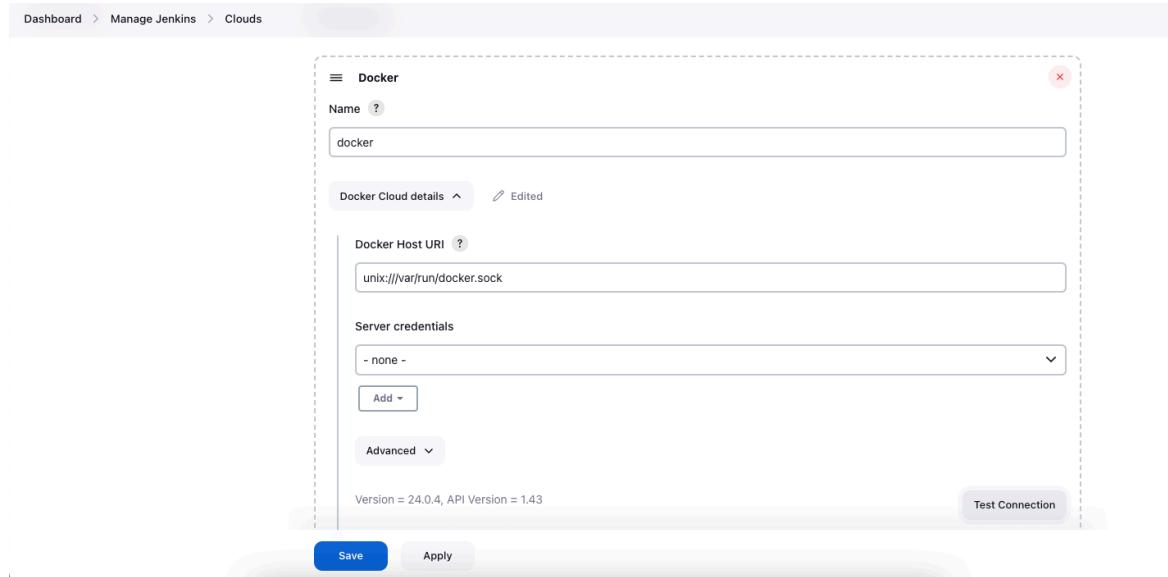
Go to "**Manage Jenkins**" -> "**Configure System**".

Scroll down to the "Cloud" section and click on the "Add a new cloud" dropdown. Select "Docker" from the list.

Docker Host URI : unix:///var/run/docker.sock

Provide the Docker server details (such as Docker Host URI) and click "Test Connection" to verify the connection to the Docker host.

Save the configuration.



Update Pipeline Script

Pipeline Script :

<https://raw.githubusercontent.com/ashokdevatwal/igp-first-files/main/build-pipeline-docker>

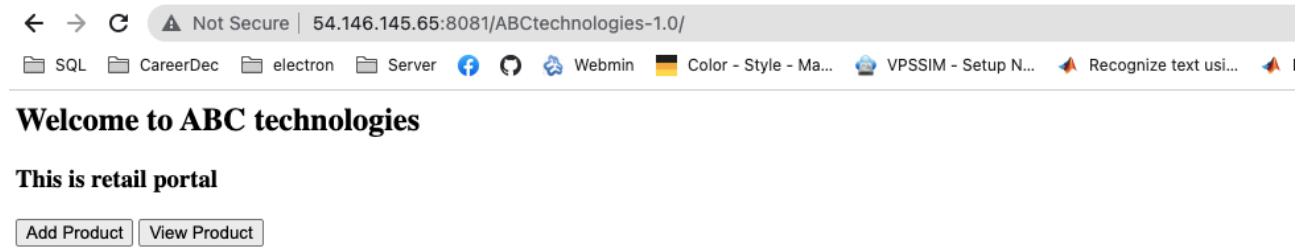
Run Pipeline

	Checkout	Compile Source Code	Test Source Code	Package Code	Deploy
#20	1s	8s	9s	13s	462ms
#19	928ms	8s	8s	10s	2s
#18	4s	7s	8s	10s	2s

Pipeline Output :

<https://raw.githubusercontent.com/ashokdevatwal/igp-first-files/main/pipeline-docker-output>

ABC Technologies Application in browser after pipeline



Application successfully run after pipeline build and deploy.

Task 4

Objective : Integrate the Docker host with Ansible. Write an Ansible playbook to create an image and create a continuer. Integrate Ansible with Jenkins. Deploy Ansible-playbook. CI/CD job to build code on ansible and deploy it on docker container.

1. Deploy Artifacts on Kubernetes
2. Write pod, service, and deployment manifest file
3. Integrate Kubernetes with Ansible
4. Ansible playbook to create deployment and service

Solution :

Configure the Ansible Inventory

Inventory File : /etc/ansible/hosts
as our docker and ansible on same host so **no need to set inventory**

Install necessary tools required to proceed

\$ sudo apt install python3-pip

```
ubuntu@ip-172-31-29-137:~/abc_technologies$ sudo apt install python3-pip
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
binutils binutils-common binutils-x86-64-linux-gnu build-essential cpp cpp-9 dpkg-dev fakeroot g++ g++-9 gcc gcc-9 gcc-9-base
libalgorithm-diff-perl libalgorithm-diff-xs-perl libalgorithm-merge-perl libasan5 libatomic1 libbinutils libc-dev-bin libc6-dev
libccl-0 libcrypt-dev libctf-nobfd0 libctf0 libdpkg-perl libexpat1-dev libfakeroot libfile-fcntllock-perl libgcc-9-dev libgomp1
libis122 libitm1 liblsan0 libmpc3 libpython3-dev libpython3.8-dev libquadmath0 libstdc++-9-dev libtsan0 libubsan1 linux-libc-dev
make manpages-dev python-pip-whee python3-dev python3-wheel python3.8-dev zlib1g-dev
Suggested packages:
binutils-doc cpp-doc gcc-9-locales debian-keyring g++-multilib g++-9-multilib gcc-9-doc gcc-multilib autoconf libtool flex
bison gdb gcc-doc gcc-9-multilib glibc-doc bzr libstdc++-9-doc make-doc
The following NEW packages will be installed:
binutils binutils-common binutils-x86-64-linux-gnu build-essential cpp cpp-9 dpkg-dev fakeroot g++ g++-9 gcc gcc-9 gcc-9-base
libalgorithm-diff-perl libalgorithm-diff-xs-perl libalgorithm-merge-perl libasan5 libatomic1 libbinutils libc-dev-bin libc6-dev
libccl-0 libcrypt-dev libctf-nobfd0 libctf0 libdpkg-perl libexpat1-dev libfakeroot libfile-fcntllock-perl libgcc-9-dev libgomp1
libis122 libitm1 liblsan0 libmpc3 libpython3-dev libpython3.8-dev libquadmath0 libstdc++-9-dev libtsan0 libubsan1 linux-libc-dev
make manpages-dev python-pip-whee python3-dev python3-pip python3-wheel python3.8-dev zlib1g-dev
0 upgraded, 50 newly installed, 0 to remove and 30 not upgraded.
Need to get 52.2 MB of archives.
After this operation, 228 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/main amd64 binutils-common amd64 2.34-6ubuntu1.6 [207 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/main amd64 libbinutils amd64 2.34-6ubuntu1.6 [473 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/main amd64 libctf-nobfd0 amd64 2.34-6ubuntu1.6 [47.4 kB]
Get:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/main amd64 libctf0 amd64 2.34-6ubuntu1.6 [46.6 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/main amd64 binutils-x86-64-linux-gnu amd64 2.34-6ubuntu1.6 [1613 kB]
```

\$ pip3 install docker

```
ubuntu@ip-172-31-29-137:~/abc_technologies$ pip3 install docker
Collecting docker
  Downloading docker-6.1.3-py3-none-any.whl (148 kB)
    |██████████| 148 kB 21.9 MB/s
Collecting packaging>=14.0
  Downloading packaging-23.1-py3-none-any.whl (48 kB)
    |██████████| 48 kB 7.0 MB/s
Collecting urllib3>=1.26.0
  Downloading urllib3-2.0.3-py3-none-any.whl (123 kB)
    |██████████| 123 kB 24.8 MB/s
Collecting requests>=2.26.0
  Downloading requests-2.31.0-py3-none-any.whl (62 kB)
    |██████████| 62 kB 1.6 MB/s
Collecting websocket-client>=0.32.0
  Downloading websocket_client-1.6.1-py3-none-any.whl (56 kB)
    |██████████| 56 kB 4.0 MB/s
Collecting charset-normalizer<4,>=2
  Downloading charset_normalizer-3.2.0-cp38-cp38-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (199 kB)
    |██████████| 199 kB 33.0 MB/s
Requirement already satisfied: idna>4,>2.5 in /usr/lib/python3/dist-packages (from requests>=2.26.0->docker) (2.8)
Requirement already satisfied: certifi>=2017.4.17 in /usr/lib/python3/dist-packages (from requests>=2.26.0->docker) (2019.11.28)
Installing collected packages: packaging, urllib3, charset-normalizer, requests, websocket-client, docker
  WARNING: The script normalizer is installed in '/home/ubuntu/.local/bin' which is not on PATH.
  Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
  WARNING: The script wsdump is installed in '/home/ubuntu/.local/bin' which is not on PATH.
  Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
Successfully installed charset-normalizer-3.2.0 docker-6.1.3 packaging-23.1 requests-2.31.0 urllib3-2.0.3 websocket-client-1.6.1
ubuntu@ip-172-31-29-137:~/abc_technologies$
```

Ansible Playbook :

```
ubuntu@ip-172-31-29-137:~/abc_technologies$ cat docker_playbook.yml
---
- name: Build and Run Docker Container
  hosts: localhost
  connection: local
  tasks:
    - name: Build Docker Image
      docker_image:
        name: abc-technologies
        build:
          dockerfile: Dockerfile
          path: .
          source: build

    - name: Run Docker Container
      docker_container:
        name: abc-technologies-container
        image: abc-technologies
        ports:
          - "8081:8080"
ubuntu@ip-172-31-29-137:~/abc_technologies$
```

\$ ansible-playbook docker_playbook.yml

```
ubuntu@ip-172-31-29-137:~/abc_technologies$ ansible-playbook docker_playbook.yml

PLAY [Build and Run Docker Container] ****
TASK [Gathering Facts] ****
ok: [127.0.0.1]

TASK [Build Docker Image] ****
[WARNING]: The default for build.pull is currently 'yes', but will be changed to 'no' in Ansible 2.12. Please set build.pull explicitly to the value you need.
changed: [127.0.0.1]

TASK [Run Docker Container] ****
changed: [127.0.0.1]

PLAY RECAP ****
127.0.0.1 : ok=3    changed=2    unreachable=0   failed=0    skipped=0    rescued=0
              ignored=0

ubuntu@ip-172-31-29-137:~/abc_technologies$
```

\$ sudo docker ps

```
ubuntu@ip-172-31-29-137:~/abc_technologies$ sudo docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED            STATUS              PORTS
NAMES
c33274cb4e87      abc-technologies   "catalina.sh run"   About a minute ago   Up About a minute   0.0.0.0
:8081->8080/tcp   abc-technologies-container
ubuntu@ip-172-31-29-137:~/abc_technologies$
```

Install the "Ansible" plugin in Jenkins

Manage Jenkins > Plugins > Available plugins

The screenshot shows the Jenkins 'Available plugins' page. The search bar at the top contains 'ansible'. Below it, a table lists two plugins:

	Name	Released
<input checked="" type="checkbox"/>	Ansible 240.vc26740a_625c0	29 days ago
<input type="checkbox"/>	Ansible Tower 0.16.0	3 yr 1 mo ago

Below the table are three buttons: 'Install without restart', 'Download now and install after restart', and 'Check now'. The Jenkins footer indicates 'REST API' and 'Jenkins 2.401.1'.

Update Pipeline Script

Pipeline Script :

<https://raw.githubusercontent.com/ashokdevatwal/igp-first-files/main/build-pipeline-ansible>

Run Pipeline

The screenshot shows the Jenkins 'Pipeline IGP-Build' page. On the left, there's a sidebar with options like 'Status', 'Changes', 'Build Now', 'Configure', 'Delete Pipeline', 'Full Stage View', 'Rename', 'Pipeline Syntax', 'Build History' (with a dropdown for 'trend'), 'Filter builds...', and a list of recent builds (#29, #28, #27). The main area is titled 'Stage View' and displays a grid of stages for three builds. The stages are: Checkout, Compile Source Code, Test Source Code, Package Code, Ansible Playbook, and Deploy. The grid shows execution times for each stage across the three builds.

Pipeline output :

<https://raw.githubusercontent.com/ashokdevatwal/igp-first-files/main/ansible-pipeline-output>

Pipeline run successfully and build docker image and run container.

Push Docker Image To Docker Hub

Login to docker hub

\$ sudo docker login

```
ubuntu@ip-172-31-29-137:~$ sudo 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: ashokdevatwal78
Password:
WARNING! Your password will be stored unencrypted in /root/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded
ubuntu@ip-172-31-29-137:~$
```

Tag image and push to docker hub

\$ sudo docker tag abc-technologies:latest ashokdevatwal78/abc-technologies:latest
\$ sudo docker push ashokdevatwal78/abc-technologies:latest

```
ubuntu@ip-172-31-29-137:~$ sudo docker tag abc-technologies:latest ashokdevatwal78/abc-technologies:latest
ubuntu@ip-172-31-29-137:~$ sudo docker push ashokdevatwal78/abc-technologies:latest
The push refers to repository [docker.io/ashokdevatwal78/abc-technologies]
fe79675b7592: Pushed
f8a40093e5ad: Pushed
ac51409341d9: Mounted from library/tomcat
90b111944e2e: Mounted from library/tomcat
34c8455d47c9: Mounted from library/tomcat
f7727b41e5d0: Mounted from library/tomcat
069db55ac9c6: Mounted from library/tomcat
535126407d49: Mounted from library/tomcat
59c56aeefb4: Mounted from library/tomcat
latest: digest: sha256:e775548c4fb2484e3934cb272d11618c250ad248e88572a0e74b45411fe37ebc size: 2212
ubuntu@ip-172-31-29-137:~$
```

Docker Hub Repo :

<https://hub.docker.com/r/ashokdevatwal78/abc-technologies>

Kubernets manifest file : kubernetes_deployment.yaml

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: abc-technologies
  labels:
    app: myapp
spec:
  replicas: 3
  selector:
```

```
matchLabels:  
  app: myapp  
template:  
  metadata:  
    labels:  
      app: myapp  
  spec:  
    containers:  
      - name: c1  
        image: ashokdevatwal78/abc-technologies:latest  
  
---  
apiVersion: v1  
kind: Service  
metadata:  
  name: myapp-svc  
spec:  
  type: NodePort  
  selector:  
    app: myapp  
  ports:  
    - port: 80  
      targetPort: 8080  
  
---  
apiVersion: v1  
kind: Pod  
metadata:  
  name: myapp-pod  
spec:  
  containers:  
    - name: c1  
      image: ashokdevatwal78/abc-technologies:latest
```

\$ kubectl apply -f kubernetes_deployment.yaml

```
ubuntu@ip-172-31-29-137:~/abc_technologies$ kubectl apply -f kubernetes_deployment.yaml  
deployment.apps/abc-technologies created  
service/myapp-svc created  
pod/myapp-pod created  
ubuntu@ip-172-31-29-137:~/abc_technologies$
```

Install Python packages

```
$ sudo pip3 install kubernetes  
$ sudo pip3 install openshift
```

Kubernets with Ansible

kubernetes_playbook.yml

```
- name: Deploy to Kubernetes
  hosts: localhost
  connection: local
  tasks:
    - name: 'Apply Deployment, Service , Pod'
      shell: |
        kubectl apply -f /home/ubuntu/abc_technologies/kubernetes_deployment.yaml
      no_log: false
```

```
ubuntu@ip-172-31-29-137:~/abc_technologies$ ansible-playbook kubernetes_playbook.yml

PLAY [Deploy to Kubernetes] ****
TASK [Gathering Facts] ****
ok: [127.0.0.1]

TASK [Apply Deployment, Service , Pod] ****
changed: [127.0.0.1]

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

ubuntu@ip-172-31-29-137:~/abc_technologies$
```

Artifacts deployed on Kubernetes with **manifest** file and with **ansible playbook** .

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

- Address Bar:** Not Secure | 54.146.145.65:8081/ABCtechnologies-1.0/
- Toolbar:** Back, Forward, Stop, Refresh, Home, etc.
- Menu Bar:** SQL, CareerDec, electron, Server, Facebook, GitHub, Webmin, Color - Style - Ma..., VPSSIM - Setup N..., Recognize text usi..., etc.
- Content Area:**

Welcome to ABC technologies

This is retail portal

Add Product **View Product**

Task 5

Objective : Using Prometheus, monitor the resources like CPU utilisation: Total Usage, Usage per core, usage breakdown, memory, and network on the instance by providing the endpoints on the local host. Install the node exporter and add the URL to the target in Prometheus. Using this data, log in to Grafana and create a dashboard to show the metrics.

Solution :

Install grafana

```
$ sudo apt-get install -y apt-transport-https  
$ sudo apt-get install -y software-properties-common wget  
$ sudo wget -q -O /usr/share/keyrings/grafana.key https://apt.grafana.com/gpg.key  
  
$ echo "deb [signed-by=/usr/share/keyrings/grafana.key] https://apt.grafana.com stable main" | sudo tee -a /etc/apt/sources.list.d/grafana.list  
  
$ echo "deb [signed-by=/usr/share/keyrings/grafana.key] https://apt.grafana.com beta main" | sudo tee -a /etc/apt/sources.list.d/grafana.list
```

```
ubuntu@ip-172-31-29-137:~/dashboard$ sudo apt-get install -y apt-transport-https  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
apt-transport-https is already the newest version (2.0.9).  
0 upgraded, 0 newly installed, 0 to remove and 30 not upgraded.  
ubuntu@ip-172-31-29-137:~/dashboard$ sudo apt-get install -y software-properties-common wget  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
software-properties-common is already the newest version (0.99.9.11).  
wget is already the newest version (1.20.3-1ubuntu2).  
wget set to manually installed.  
0 upgraded, 0 newly installed, 0 to remove and 30 not upgraded.  
ubuntu@ip-172-31-29-137:~/dashboard$ sudo wget -q -O /usr/share/keyrings/grafana.key https://apt.grafana.com/gpg.key  
ubuntu@ip-172-31-29-137:~/dashboard$ echo "deb [signed-by=/usr/share/keyrings/grafana.key] https://apt.grafana.com stable main" | sudo tee -a /etc/apt/sources.list.d/grafana.list  
deb [signed-by=/usr/share/keyrings/grafana.key] https://apt.grafana.com stable main  
ubuntu@ip-172-31-29-137:~/dashboard$ echo "deb [signed-by=/usr/share/keyrings/grafana.key] https://apt.grafana.com beta main" | sudo tee -a /etc/apt/sources.list.d/grafana.list  
deb [signed-by=/usr/share/keyrings/grafana.key] https://apt.grafana.com beta main  
ubuntu@ip-172-31-29-137:~/dashboard$ 
```

Updates the list of available packages

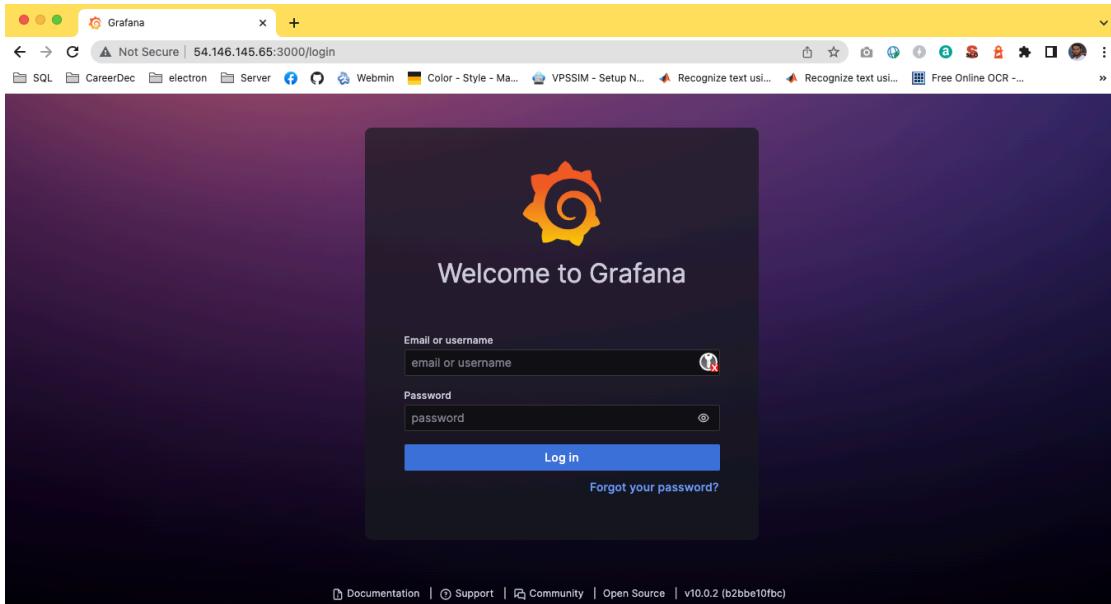
\$ sudo apt-get update

```
ubuntu@ip-172-31-29-137:~/dashboard$ sudo apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Hit:5 https://download.docker.com/linux/ubuntu focal InRelease
Ign:6 https://pkg.jenkins.io/debian-stable binary/ InRelease
Hit:7 https://pkg.jenkins.io/debian-stable binary/ Release
Get:8 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:9 https://apt.grafana.com stable InRelease [5984 B]
Get:10 https://apt.grafana.com beta InRelease [5976 B]
Hit:4 https://packages.cloud.google.com/apt kubernetes-xenial InRelease
Get:11 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [1085 kB]
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/universe Translation-en [259 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/universe amd64 c-n-f Metadata [25.2 kB]
Get:15 https://apt.grafana.com stable/main amd64 Packages [132 kB]
Get:16 https://apt.grafana.com beta/main amd64 Packages [1162 B]
Get:17 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [2304 kB]
Get:18 http://security.ubuntu.com/ubuntu focal-security/main amd64 c-n-f Metadata [13.0 kB]
Get:19 http://security.ubuntu.com/ubuntu focal-security/universe amd64 Packages [857 kB]
Get:20 http://security.ubuntu.com/ubuntu focal-security/universe Translation-en [178 kB]
Get:21 http://security.ubuntu.com/ubuntu focal-security/universe amd64 c-n-f Metadata [18.7 kB]
Fetched 5222 kB in 3s (2012 kB/s)
Reading package lists... Done
ubuntu@ip-172-31-29-137:~/dashboard$
```

\$ sudo apt-get install grafana

```
ubuntu@ip-172-31-29-137:~/dashboard$ sudo apt-get install grafana
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  grafana
0 upgraded, 1 newly installed, 0 to remove and 33 not upgraded.
Need to get 83.5 MB of archives.
After this operation, 306 MB of additional disk space will be used.
Get:1 https://apt.grafana.com stable/main amd64 grafana amd64 10.0.2 [83.5 MB]
Fetched 83.5 MB in 2s (49.7 MB/s)
Selecting previously unselected package grafana.
(Reading database ... 110183 files and directories currently installed.)
Preparing to unpack .../grafana_10.0.2_amd64.deb ...
Unpacking grafana (10.0.2) ...
Setting up grafana (10.0.2) ...
Adding system user `grafana' (UID 115) ...
Adding new user `grafana' (UID 115) with group `grafana' ...
Not creating home directory `/usr/share/grafana'.
### NOT starting on installation, please execute the following statements to configure grafana to start automatically using systemd
  sudo /bin/systemctl daemon-reload
  sudo /bin/systemctl enable grafana-server
### You can start grafana-server by executing
  sudo /bin/systemctl start grafana-server
Processing triggers for systemd (245.4-4ubuntu3.21) ...
ubuntu@ip-172-31-29-137:~/dashboard$
```

Grafana Installed SuccessFully



Install Prometheus

```
$ sudo apt-get install -y prometheus
```

```
ubuntu@ip-172-31-29-137:~$ sudo apt-get install -y prometheus
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  fonts-glyphicons-halflings javascript-common libc-ares2 libio-pty-perl libipc-run-perl libjs-bootstrap
  libjs-bootstrap4 libjs-d3 libjs-eonasdan-bootstrap-datepicker libjs-jquery libjs-jquery-hotkeys
  libjs-moment libjs-moment-timezone libjs-mustache libjs-popper.js libjs-rickshaw libnode64
  libtime-duration-perl libtimedate-perl moreutils node-jquery nodejs nodejs-doc prometheus-node-exporter
  prometheus-node-exporter.Collectors smartmontools
Suggested packages:
  apache2 | lighttpd | httpd npm gsmartcontrol smart-notifier mailx | mailutils
The following NEW packages will be installed:
  fonts-glyphicons-halflings javascript-common libc-ares2 libio-pty-perl libipc-run-perl libjs-bootstrap
  libjs-bootstrap4 libjs-d3 libjs-eonasdan-bootstrap-datepicker libjs-jquery libjs-jquery-hotkeys
  libjs-moment libjs-moment-timezone libjs-mustache libjs-popper.js libjs-rickshaw libnode64
  libtime-duration-perl libtimedate-perl moreutils node-jquery nodejs nodejs-doc prometheus
  prometheus-node-exporter prometheus-node-exporter.Collectors smartmontools
0 upgraded, 27 newly installed, 0 to remove and 33 not upgraded.
Need to get 31.2 MB of archives.
After this operation, 261 MB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal/main amd64 libjs-jquery all 3.3.1~dfsg-3 [329 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal/universe amd64 libjs-jquery-hotkeys all 0~20130707+git2d51e3a9+dfsg-2ubuntu1 [11.4 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal/universe amd64 fonts-glyphicons-halflings all 1.009~3.4.1+dfsg-1 [117 kB]
Get:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal/main amd64 javascript-common all 11 [6066 B]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal/universe amd64 libjs-popper.js all 1.16.0+ds2-1 [52.5 kB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal/universe amd64 libjs-bootstrap4 all 4.4.1+dfsg1-2 [1672 kB]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal/universe amd64 libjs-bootstrap all 3.4.1+dfsg-1 [124 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/universe amd64 libjs-moment all 2.24.0+ds-2ubuntu0.1 [126 kB]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal/universe amd64 libjs-eonasdan-bootstrap-datepicker all 4.17.47-3 [27.5 kB]
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal/universe amd64 libjs-moment-timezone all 0.5.28+dfsg1-1 [670 kB]
```

Configure Grafana

Sidebar > Connections > Data sources > Prometheus

The screenshot shows the 'Data sources' configuration screen for a 'Prometheus' connection. The 'Settings' tab is selected. A prominent message box at the top right says: 'Configure your Prometheus data source below' and 'Or skip the effort and get Prometheus (and Loki) as fully-managed, scalable, and hosted data sources from Grafana Labs with the free-forever Grafana Cloud plan.' Below this, there are fields for 'Name' (set to 'Prometheus'), 'Default' (a toggle switch), and 'HTTP' settings. Under 'HTTP', the 'Prometheus server URL' is set to 'http://localhost:9090'. There are also fields for 'Allowed cookies' and 'Timeout'.

Set

Prometheus server URL : **http://localhost:9090**

Click : **Save & test**

Sidebar > Dashboards > New > Import

The screenshot shows the 'Import dashboard' screen. On the left, there's a sidebar with 'Dashboards' selected. The main area has a title 'Import dashboard' and instructions 'Import dashboard from file or Grafana.com'. It features a large dashed box for 'Upload dashboard JSON file' with the placeholder 'Drag and drop here or click to browse Accepted file types: json, .txt'. Below this is a 'Import via grafana.com' input field containing '11074' and a 'Load' button. At the bottom, there's another section for 'Import via panel.json'.

Import via [grafana.com](#) : 11074

Click on load

Name : IGP

Import dashboard from file or Grafana.com

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Options

Name

Folder

Unique identifier (UID)
The unique identifier (UID) of a dashboard can be used for uniquely identify a dashboard between multiple Grafana installs. The UID allows having consistent URLs for accessing dashboards so changing the title of a dashboard will not break any bookmarked links to that dashboard.

xfpJB9FGz

VictoriaMetrics

Select a Prometheus data source

Select VictoriaMetrics : Prometheus

Click : Import

IP (Link to details)	Hostname	Uptime	Memory	CPU Cores	5m load	CPU used%	Memory used%	Partition used%*	Disk read*	Disk write*	CurrEstab	TCP_tw	Download*	Upload*
localhost:9100	ip-172-31-29-137	4.17 day	954.22 MiB	1	0.11	3.41%	64.60%	66.25%	208.47 kB/s	85.86 kB/s	28	2	12.96 kb/s	58.62 kb/s

Grafana Dashboard To monitor resources.