

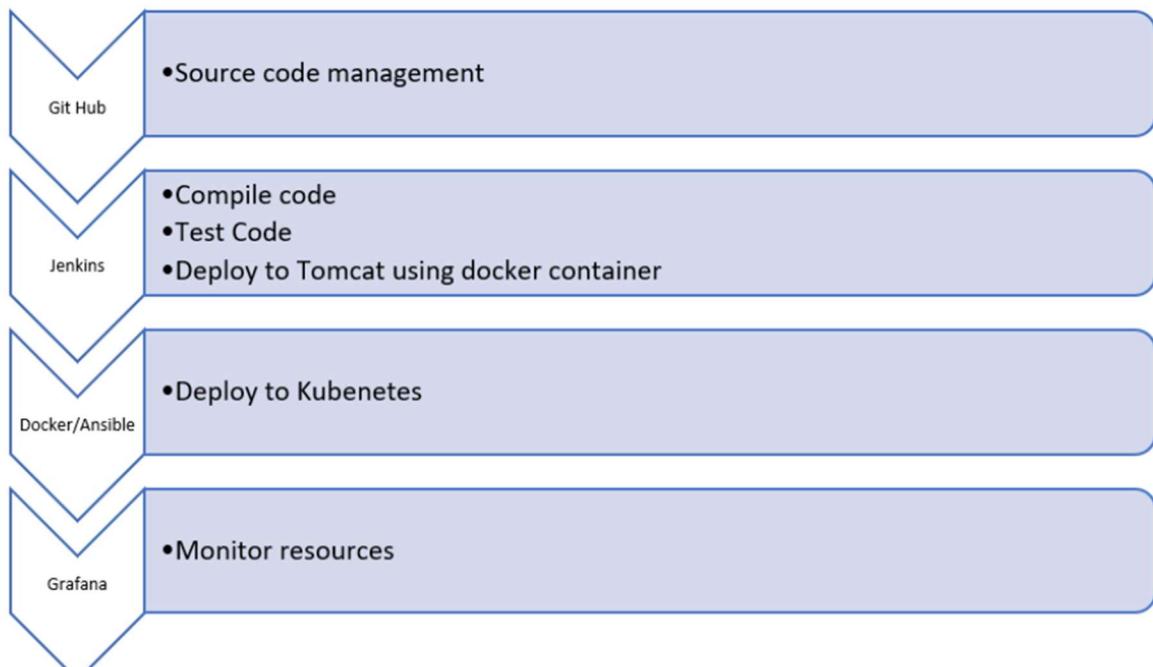
Industry Grade Project – I is selected as part of this exercise.

## Goal of the project

Below are some of the high-level goals of this project:

- Implement CICD such that ABC Company to is able to be
  - 1. Highly available
  - 2. Highly scalable
  - 3. Highly Performant
  - 4. Easily built and maintained
  - 5. Developed and deployed quickly

## Data Architecture Flow/Process Flow



Approach followed to create this project.

- 1) Downloaded the code (IGP Project1) from Edureka course.
- 2) Installed gitbash in local machine
- 3) Created a repository in GitHub with the name purdue-igp-project1

- 4) Published the code into remote (github.com/tgreddy1/purdue-igp-project1)
- 5) Installed Jenkins in Edureka Master node and opened the firewall.
- 6) Configured/Initialized the Jenkins and installed the default plugins.
- 7) Installed Maven plugin.
- 8) Created the pipeline project for pull the code, compile, build, test and packing.
- 9) Installed the docker in Edureka Master node.
- 10) Create user in dockerhub.
- 11) Created dockerfile to install tomcat server.
- 12) Installed the docker plugin in Jenkins and added the docker credentials in Jenkins.
- 13) Updated the Jenkins pipeline to deploy the code as a container.
- 14) Installed K8S cluster in Edureka Master and Slave machines.
- 15) Configured the K8S cluster with Jenkins file by copying config file from K8S Master server to Jenkins home directory.
- 16) Created yaml files to deploy and create services and pushed them into github repository.
- 17) Updated the Jenkins file to create the deployment using K8s.
- 18) Installed node-exporter in Edureka Master node.
- 19) Created the monitoring using Prometheus and Grafana.

Step1:



Initialize the first project in local

```

Ganganjaneya@DESKTOP-MINGW64 ~ /Downloads/industry_grade project1/Industry Grad
$ Project I - Java Project/ABC Technologies
$ git init
Initialized empty Git repository in C:/Users/Ganganjaneya/Downloads/industry_grade project1/Industry Grade Project I - Java Project/ABC Technologies/.git/
Ganganjaneya@DESKTOP-MINGW64 ~ /Downloads/industry_grade project1/Industry Grade Project I - Java Project/ABC Technologies (main)
$ 
  
```

Name	Date modified	Type	Size
.git	27-05-2024 18:29	File folder	
.settings	27-05-2024 18:25	File folder	
src	27-05-2024 18:25	File folder	
.classpath	27-05-2024 18:25	CLASSPATH File	2 KB
.project	27-05-2024 18:25	PROJECT File	1 KB
pom	27-05-2024 18:25	XML Document	3 KB
pom.xml.bak	27-05-2024 18:25	BAK File	1 KB
README	27-05-2024 18:25	Markdown Source ...	1 KB
This PC - Shortcut	27-05-2024 18:32	Shortcut	1 KB

```
$ git status
On branch main
No commits yet
Untracked files:
  (use "git add <file>..." to include in what will be committed)
    .classpath
    .project
    .settings/
    README.md
    This PC - Shortcut.lnk
    pom.xml
    pom.xml.bak
    src/
nothing added to commit but untracked files present (use "git add" to track)
```

```
$ git add .
warning: in the working copy of 'src/main/webapp/WEB-INF/web.xml', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of 'src/main/webapp/index.jsp', LF will be replaced by CRLF the next time Git touches it
```

```
$ git config --global user.mail "tgreddy@yahoo.com"
```

committed locally.

```
$ git commit -m "IGP-Project1-Commit"
[main (root-commit) de176f2] IGP-Project1-Commit
 14 files changed, 313 insertions(+)
 create mode 100644 .classpath
 create mode 100644 .project
 create mode 100644 .settings/org.eclipse.jdt.core.prefs
 create mode 100644 .settings/org.eclipse.m2e.core.prefs
 create mode 100644 README.md
 create mode 100644 This PC - Shortcut.lnk
 create mode 100644 pom.xml
 create mode 100644 pom.xml.bak
 create mode 100644 src/main/java/com/abc/RetailModule.java
 create mode 100644 src/main/java/com/abc/dataAccessObject/RetailAccessObject.java
 create mode 100644 src/main/java/com/abc/dataAccessObject/RetailDataImp.java
 create mode 100644 src/main/webapp/WEB-INF/web.xml
 create mode 100644 src/main/webapp/index.jsp
 create mode 100644 src/test/java/com/abc/dataAccessObject/ProductImpTest.java
```

```
$ git status
On branch main
nothing to commit, working tree clean
```

```
$ git log --oneline
de176f2 (HEAD -> main) IGP-Project1-Commit
```

Place (push) the files into remote.

### Create a new repository

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

Required fields are marked with an asterisk (\*).

Owner *	Repository name *
 tgreddy1	/ purdue-igp-project1
<input checked="" type="checkbox"/> purdue-igp-project1 is available.	

Great repository names are short and memorable. Need inspiration? How about [potential-adventure](#) ?

Description (optional)

Purdue IGP - Project1

**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.](#)

```
git remote add origin https://github.com/tgreddy1/purdue-igp-project1.git
```

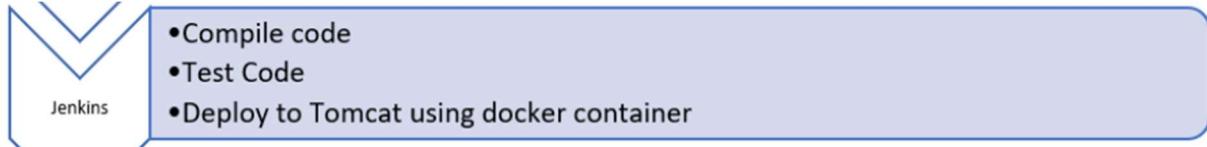
```
git branch -M main
```

```
git push -u origin main
```

```
sanganjaneyal@DESKTOP-1QHJF0A MINGW64 ~/Downloads/industry_grade project1/Industry Grade Project I - Java Project/ABC Technologies (main)
$ git remote add origin https://github.com/tgreddy1/purdue-igp-project1.git
sanganjaneyal@DESKTOP-1QHJF0A MINGW64 ~/Downloads/industry_grade project1/Industry Grade Project I - Java Project/ABC Technologies (main)
$ git branch -M main
sanganjaneyal@DESKTOP-1QHJF0A MINGW64 ~/Downloads/industry_grade project1/Industry Grade Project I - Java Project/ABC Technologies (main)
$ git push -u origin main
info: please complete authentication in your browser...
Enumerating objects: 30, done.
Counting objects: 100% (30/30), done.
Delta compression using up to 4 threads
Compressing objects: 100% (21/21), done.
Writing objects: 100% (30/30), 4.79 KiB | 408.00 KiB/s, done.
Total 30 (delta 0), reused 0 (delta 0), pack-reused 0
To https://github.com/tgreddy1/purdue-igp-project1.git
 * [new branch]      main -> main
branch 'main' set up to track 'origin/main'.
```

.settings	IGP-Project1-Commit
src	IGP-Project1-Commit
.classpath	IGP-Project1-Commit
.project	IGP-Project1-Commit
README.md	IGP-Project1-Commit
This PC - Shortcut.lnk	IGP-Project1-Commit
pom.xml	IGP-Project1-Commit
pom.xml.bak	IGP-Project1-Commit

## Step2:



Install and configure Jenkins.

```
edureka@kmaster:~$ uname -a
Linux kmaster 4.15.0-1021-aws #21-Ubuntu SMP Tue Aug 28 10:23:07 UTC 2018 x86_64
x86_64 x86_64 GNU/Linux
edureka@kmaster:~$ lsb_release -a
No LSB modules are available.
Distributor ID: Ubuntu
Description:    Ubuntu 18.04.3 LTS
Release:        18.04
Codename:       bionic
edureka@kmaster:~$ sudo apt update
Hit:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu bionic InRelease
Get:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu bionic-updates InRelease [102 kB]
Get:4 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu bionic-backports InRelease [102 kB]
Ign:1 https://pkg.jenkins.io/debian-stable binary/ InRelease
Get:5 https://packages.grafana.com/oss/deb stable InRelease [7661 B]
... (remaining output omitted)
```

```
W: Failed to fetch http://dl.google.com/linux/chrome/deb/dists/stable/InRelease  
The following signatures couldn't be verified because the public key is not available: NO_PUBKEY E88979FB9B30ACF2  
W: Failed to fetch https://packages.grafana.com/oss/deb/dists/stable/InRelease  
The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 963FA27710458545  
W: Some index files failed to download. They have been ignored, or old ones used instead.  
edureka@kmaster:~$ java -version  
openjdk version "11.0.16" 2022-07-19  
OpenJDK Runtime Environment (build 11.0.16+8-post-Ubuntu-0ubuntu118.04)  
OpenJDK 64-Bit Server VM (build 11.0.16+8-post-Ubuntu-0ubuntu118.04, mixed mode, sharing)  
edureka@kmaster:~$  
edureka@kmaster:~$ javac -version  
javac 1.8.0_201  
edureka@kmaster:~$
```

**wget [http://ftp.kr.debian.org/debian/pool/main/i/init-system-helpers\\_1.60\\_all.deb](http://ftp.kr.debian.org/debian/pool/main/i/init-system-helpers/init-system-helpers_1.60_all.deb)**

```
helpers/init-system-helpers_1.60_all.deb  
--2024-05-30 04:40:50-- http://ftp.kr.debian.org/debian/pool/main/i/init-system-helpers/init-system-helpers_1.60_all.deb  
Resolving ftp.kr.debian.org (ftp.kr.debian.org)... 103.22.220.133  
Connecting to ftp.kr.debian.org (ftp.kr.debian.org)|103.22.220.133|:80... connected.  
HTTP request sent, awaiting response... Read error (Connection reset by peer) in headers.  
Retrying.  
--2024-05-30 04:40:52-- (try: 2) http://ftp.kr.debian.org/debian/pool/main/i/init-system-helpers/init-system-helpers_1.60_all.deb  
Connecting to ftp.kr.debian.org (ftp.kr.debian.org)|103.22.220.133|:80... connected.  
HTTP request sent, awaiting response... 200 OK  
Length: 47076 (46K) [application/octet-stream]  
Saving to: 'init-system-helpers_1.60_all.deb'  
  
init-system-helpers 100%[=====] 45.97K 177KB/s in 0.3s  
2024-05-30 04:40:52 (177 KB/s) - 'init-system-helpers_1.60_all.deb' saved [47076/47076]
```

**sudo apt install ./init-system-helpers\_1.60\_all.deb**

```
edureka@kmaster:~$ sudo apt install ./init-system-helpers_1.60_all.deb  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
Note, selecting 'init-system-helpers' instead of './init-system-helpers_1.60_all.deb'  
The following packages will be upgraded:  
  init-system-helpers  
1 upgraded, 0 newly installed, 0 to remove and 501 not upgraded.  
Need to get 0 B/47.1 kB of archives.  
After this operation, 2048 B of additional disk space will be used.  
Get:1 /home/edureka/init-system-helpers_1.60_all.deb init-system-helpers all 1.60 [47.1 kB]  
(Reading database ... 189065 files and directories currently installed.)  
Preparing to unpack .../init-system-helpers_1.60_all.deb ...  
Unpacking init-system-helpers (1.60) over (1.51) ...  
Setting up init-system-helpers (1.60) ...  
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
```

```
wget -q -O - https://pkg.jenkins.io/debian-stable/jenkins.io.key | sudo apt-key add -  
  
edureka@kmaster:~$ javac -version  
javac 1.8.0_201  
edureka@kmaster:~$ wget -q -O - https://pkg.jenkins.io/debian-stable/jenkins.io.key | sudo apt-key add -  
OK  
edureka@kmaster:~$ ■  
  
sudo sh -c 'echo deb http://pkg.jenkins.io/debian-stable binary/ > /etc/apt/sources.list.d/jenkins.list'  
  
sudo apt update  
  
edureka@kmaster:~$ sudo apt update  
Hit:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu bionic InRelease  
| edureka@kmaster:~$ sudo sh -c 'echo deb http://pkg.jenkins.io/debian-stable binary/ > /etc/apt/sources.list.d/jenkins.list'  
| edureka@kmaster:~$ sudo apt update  
Hit:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu bionic InRelease  
Hit:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu bionic-updates InRelease  
Hit:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu bionic-backports InRelease  
Get:5 https://packages.grafana.com/oss/deb stable InRelease [7661 B]  
Ign:4 https://pkg.jenkins.io/debian-stable binary/ InRelease  
Hit:6 https://pkg.jenkins.io/debian-stable binary/ Release  
Get:7 http://dl.google.com/linux/chrome/deb stable InRelease [1825 B]  
Hit:8 http://ppa.launchpad.net/ansible/ansible/ubuntu bionic InRelease  
Hit:9 http://security.ubuntu.com/ubuntu bionic-security InRelease  
Hit:10 http://apt.puppetlabs.com bionic InRelease  
Err:5 https://packages.grafana.com/oss/deb stable InRelease  
      The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 963FA27710458545  
Err:7 http://dl.google.com/linux/chrome/deb stable InRelease  
      The following signatures couldn't be verified because the public key is not available: NO_PUBKEY E88979FB9B30ACF2  
Err:7 http://dl.google.com/linux/chrome/deb stable InRelease  
      The following signatures couldn't be verified because the public key is not available: NO_PUBKEY E88979FB9B30ACF2  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
501 packages can be upgraded. Run 'apt list --upgradable' to see them.  
W: An error occurred during the signature verification. The repository is not updated and the previous index files will be used. GPG error: https://packages.grafana.com/oss/deb stable InRelease: The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 963FA27710458545  
W: An error occurred during the signature verification. The repository is not updated and the previous index files will be used. GPG error: http://dl.google.com/linux/chrome/deb stable InRelease: The following signatures couldn't be verified because the public key is not available: NO_PUBKEY E88979FB9B30ACF2  
W: Failed to fetch http://dl.google.com/linux/chrome/deb/dists/stable/InRelease  
      The following signatures couldn't be verified because the public key is not available: NO_PUBKEY E88979FB9B30ACF2  
W: Failed to fetch https://packages.grafana.com/oss/deb/dists/stable/InRelease  
      The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 963FA27710458545  
W: Some index files failed to download. They have been ignored, or old ones used instead.
```

```
sudo apt install jenkins
```

```
edureka@kmaster:~$ sudo apt install jenkins
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages will be upgraded:
  jenkins
1 upgraded, 0 newly installed, 0 to remove and 500 not upgraded.
Need to get 91.4 MB of archives.
After this operation, 33.8 kB disk space will be freed.
Get:1 https://pkg.jenkins.io/debian-stable binary/ jenkins 2.452.1 [91.4 MB]
Fetched 91.4 MB in 5s (16.9 MB/s)
(Reading database ... 189064 files and directories currently installed.)
Preparing to unpack .../jenkins_2.452.1_all.deb ...
Unpacking jenkins (2.452.1) over (2.361.1) ...
Setting up jenkins (2.452.1) ...
Installing new version of config file /etc/init.d/jenkins ...
Processing triggers for systemd (237-3ubuntu10.42) ...
Processing triggers for ureadahead (0.100.0-21) ...
edureka@kmaster:~$ █
```

```
Sudo systemctl start jenkins
```

```
edureka@kmaster:~$ sudo systemctl start jenkins
edureka@kmaster:~$ sudo systemctl status jenkins
● jenkins.service - Jenkins Continuous Integration Server
  Loaded: loaded (/lib/systemd/system/jenkins.service; enabled; vendor preset:
    Active: active (running) since Thu 2024-05-30 04:45:57 UTC; 5min ago
      Main PID: 13133 (java)
        Tasks: 43 (limit: 4915)
       CGroup: /system.slice/jenkins.service
               └─13133 /usr/bin/java -Djava.awt.headless=true -jar /usr/share/java/j

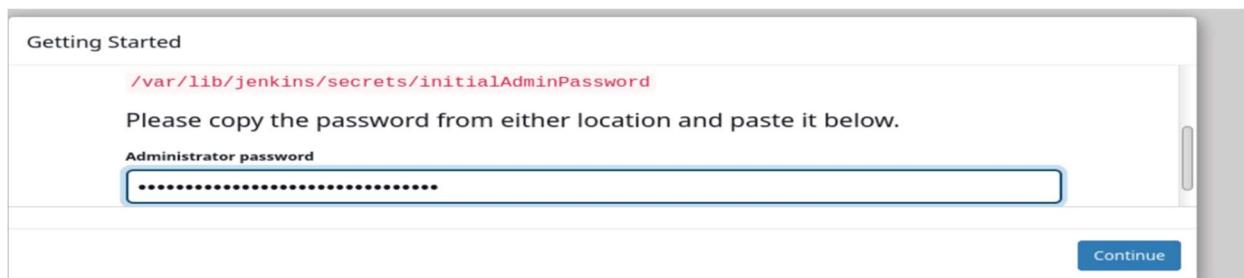
May 30 04:45:36 kmaster jenkins[13133]: This may also be found at: /var/lib/jen
May 30 04:45:36 kmaster jenkins[13133]: ****
May 30 04:45:37 kmaster jenkins[13133]: WARNING: An illegal reflective access op
May 30 04:45:37 kmaster jenkins[13133]: WARNING: Illegal reflective access by or
May 30 04:45:37 kmaster jenkins[13133]: WARNING: Please consider reporting this
May 30 04:45:37 kmaster jenkins[13133]: WARNING: Use --illegal-access=warn to er
May 30 04:45:37 kmaster jenkins[13133]: WARNING: All illegal access operations w
May 30 04:45:57 kmaster jenkins[13133]: 2024-05-30 04:45:57.475+0000 [id=28]
May 30 04:45:57 kmaster jenkins[13133]: 2024-05-30 04:45:57.547+0000 [id=22]
May 30 04:45:57 kmaster systemd[1]: Started Jenkins Continuous Integration Serve
lines 1-18/18 (END)
```

Open the firewall.

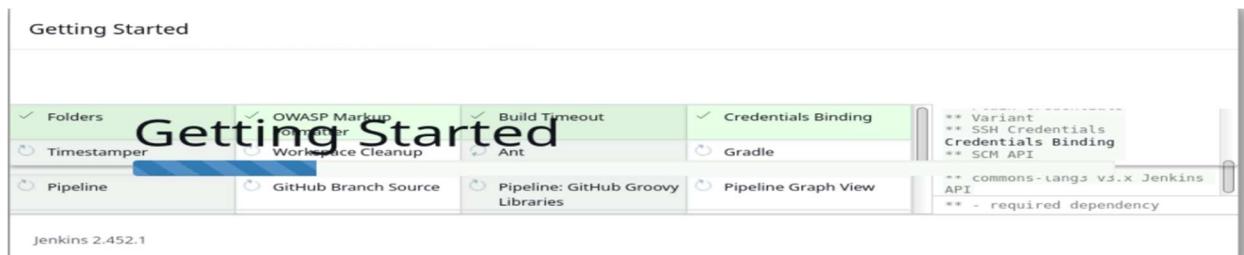
```
edureka@kmaster:~$ sudo ufw status
Status: inactive
edureka@kmaster:~$ sudo ufw allow 8090
Rules updated
edureka@kmaster:~$ sudo ufw status
Status: inactive
edureka@kmaster:~$ sudo ufw allow 8080
Skipping adding existing rule
edureka@kmaster:~$ sudo ufw enable
Firewall is active and enabled on system startup
edureka@kmaster:~$ sudo ufw status
Status: active

To                         Action      From
--                         --          --
8080                       ALLOW      Anywhere
8090                       ALLOW      Anywhere
8080 (v6)                   ALLOW      Anywhere (v6)
8090 (v6)                   ALLOW      Anywhere (v6)
```

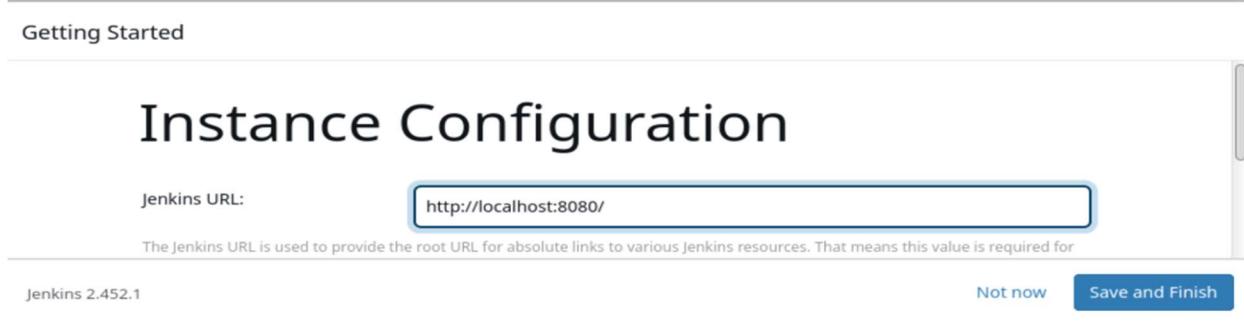
2f9e7f2065cd4d74bfabe64d8d283527 – admin password to unlock Jenkins



### Install the suggested Plugins



### Create the jenkins user



<http://localhost:8080/>

The screenshot shows the Jenkins dashboard at <http://localhost:8080/>. The top navigation bar includes links for 'Dashboard', 'Build History', 'Manage Jenkins', and 'My Views'. A search bar and a 'Create a job' button are also present. The main content area features a 'Welcome to Jenkins!' message, a note about displaying Jenkins jobs, and a 'Start building your software project' button.

## Installation of Maven in Jenkins and Create pipeline project

```
edureka@kmaster:~$ wget https://dlcdn.apache.org/maven/maven-3/3.9.7/binaries/apache-maven-3.9.7-bin.tar.gz
--2024-05-31 03:07:25-- https://dlcdn.apache.org/maven/maven-3/3.9.7/binaries/apache-maven-3.9.7-bin.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: 9581488 (9.1M) [application/x-gzip]
Saving to: 'apache-maven-3.9.7-bin.tar.gz'

apache-maven-3.9.7- 100%[=====] 9.14M ---KB/s in 0.05s

2024-05-31 03:07:25 (191 MB/s) - 'apache-maven-3.9.7-bin.tar.gz' saved [9581488/9581488]
```

```
edureka@kmaster:~$ tar -zvxf apache-maven-3.9.7-bin.tar.gz
apache-maven-3.9.7/README.txt
apache-maven-3.9.7/LICENSE
apache-maven-3.9.7/NOTICE
apache-maven-3.9.7/lib/
apache-maven-3.9.7/lib/aopalliance.license
apache-maven-3.9.7/lib/commons-cli.license
apache-maven-3.9.7/lib/commons-codec.license
apache-maven-3.9.7/lib/commons-lang3.license
apache-maven-3.9.7/lib/failureaccess.license
apache-maven-3.9.7/lib/guava.license
apache-maven-3.9.7/lib/guice.license
apache-maven-3.9.7/lib/httpclient.license
apache-maven-3.9.7/lib/httpcore.license
apache-maven-3.9.7/lib/jansi.license
apache-maven-3.9.7/lib/javax.annotation-api.license
apache-maven-3.9.7/lib/javax.inject.license
apache-maven-3.9.7/lib/jcl-over-slf4j.license
apache-maven-3.9.7/lib/org.eclipse.sisu.inject.license
apache-maven-3.9.7/lib/org.eclipse.sisu.plexus.license
apache-maven-3.9.7/lib/plexus-cipher.license
apache-maven-3.9.7/lib/plexus-component-annotations.license
```

```
apache-maven-3.9.7//lib/maven-shared-utils-3.4.2.jar
apache-maven-3.9.7/lib/org.eclipse.sisu.inject-0.9.0.M2.jar
apache-maven-3.9.7/lib/wagon-file-3.5.3.jar
apache-maven-3.9.7/lib/maven-embedder-3.9.7.jar
apache-maven-3.9.7/lib/maven-resolver-transport-file-1.9.20.jar
apache-maven-3.9.7/lib/plexus-interpolation-1.27.jar
apache-maven-3.9.7/lib/commons-lang3-3.14.0.jar
apache-maven-3.9.7/lib/commons-codec-1.16.1.jar
apache-maven-3.9.7/lib/maven-resolver-provider-3.9.7.jar
apache-maven-3.9.7/lib/maven-resolver-util-1.9.20.jar
apache-maven-3.9.7/lib/guice-5.1.0.jar
apache-maven-3.9.7/lib/guava-33.2.0-jre.jar
apache-maven-3.9.7/lib/javax.inject-1.jar
apache-maven-3.9.7/lib/jansi-2.4.1.jar
apache-maven-3.9.7/lib/maven-repository-metadata-3.9.7.jar
apache-maven-3.9.7/lib/maven-core-3.9.7.jar
apache-maven-3.9.7/lib/wagon-http-shared-3.5.3.jar
apache-maven-3.9.7/lib/httpclient-4.5.14.jar
apache-maven-3.9.7/lib/maven-settings-builder-3.9.7.jar
apache-maven-3.9.7/lib/maven-slf4j-provider-3.9.7.jar
apache-maven-3.9.7/lib/plexus-component-annotations-2.1.0.jar
apache-maven-3.9.7/lib/plexus-utils-3.5.1.jar
```

Dashboard > Manage Jenkins

## Manage Jenkins

Search settings /

+ New Item

Build History

**Manage Jenkins**

My Views

Build Queue

Building on the built-in node can be a security issue. You should set up distributed builds. See [the documentation](#).

**Set up agent** **Set up cloud** **Dismiss**

**Java 11 end of life in Jenkins**

**More Info** **Ignore**

---

**System** Configure global settings and paths.

**Tools** Configure tools, their locations and automatic installers.

---

### Maven installations

Add Maven

**Save** **Apply**

Add Maven

**Maven**

Name:

Install automatically ?

**Install from Apache**

**Install from Apache**

Version:

Add Installer ▾

## Create project in Jenkins

The screenshot shows the Jenkins dashboard with a search bar at the top. A new project named "purdue-igp-project" is being created. Below the search bar, there are two project types listed: "Freestyle project" and "Pipeline". The "Freestyle project" is selected.

Dashboard > All Enter an item name

purdue-igp-project » Required field

**Freestyle project**  
Classic, general-purpose job type that checks out from up to one SCM, executes build steps serially, followed by post-build steps like archiving artifacts and sending email notifications.

**Pipeline**  
Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as)

Dashboard > purdue-igp-project > Configuration

**General** Enabled

**Configure**

**General** Description: Purdue - igp - project 1

Plain text Preview

## Configure github URL

The screenshot shows the Jenkins pipeline configuration for the "purdue-igp-project". The "General" tab is selected. The "GitHub project" checkbox is checked, and the "Project url" is set to "https://github.com/tgreddy1/purdue-igp-project1.git".

**Configure**

**General** GitHub project  
Project url: https://github.com/tgreddy1/purdue-igp-project1.git

**Script**

```
1 pipeline
2 {
3     agent any
4     stages
5     {
6         stage('igp-proj1 code checkout')
7         {
8             steps
9                 [
10                    // Get code from a GitHub repository
11                    git 'https://github.com/tgreddy1/purdue-igp-project1.git'
12                ]
13            }
14        stage('igp-proj1 code compile')
15        {
16            steps
17            [
18                sh 'mvn compile'
19            ]
20        }
21    }
22 }
23
24 stage('igp-proj1 code test')
25 {
26     steps
27         [
28             sh 'mvn test'
29         ]
30     }
31
32 stage('igp-proj1 code build')
33 {
34     steps
35         [
36             sh 'mvn package'
37         ]
38 }
```

GitHub + Maven

Dashboard > purdue-igp-project > Configuration

**Configure**

**General**

**Advanced Project Options**

**Pipeline**

**Script**

```
19
20
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```

GitHub + Maven

Save Apply

Created the build with that configuration but build got failed. Failed because of mismatch in default branch. In my github, default branch is defined as "main" where as jenkins is looking for default branch for master. So changed the jenkins pipeline code to force branch as main.

```

stage('igp-proj1 code checkout')
{
    steps
    {
        // Get code from a GitHub repository
        git branch: 'main',
        url: 'https://github.com/tgreddy1/purdue-igp-project1.git'
    }
}
stage('igp-proj1 code compile')
{

```

Successful creation of build.

The screenshot shows the Jenkins interface for Build #5. At the top, there are buttons for Rebuild, Overview, Configure, and more. Below that, a message says "Success 3 min 8 sec ago in 1 min 4 sec". Under the "igp-proj1 code" stage, it shows "Started 2 min 21 sec ago" and "Queued 0 ms". The "igp-proj1 code" stage is highlighted with a yellow bar. Below this, a table lists the project details:

S	W	Name ↓	Last Success	Last Failure	Last Duration
		purdue-igp-project	1 min 46 sec #5	10 min #4	1 min 4 sec

In Jenkins server “WAR” file got created after build is successful.

```

edureka@kmaster:/var/lib/jenkins$ cd /var/lib/jenkins/workspace/purdue-igp-project/target
edureka@kmaster:/var/lib/jenkins/workspace/purdue-igp-project/target$ ls
ABCtechnologies-1.0      generated-test-sources  site
ABCtechnologies-1.0.war   jacoco.exec            surefire-reports
classes                   maven-archiver         test-classes
generated-sources         maven-status
edureka@kmaster:/var/lib/jenkins/workspace/purdue-igp-project/target$ 

```

Step3:



Used docker to deploy in Kubernetes.

Installed docker in Edureka Master node.

sudo apt-get update

```

edureka@kmaster:~$ sudo apt-get update
Hit:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu bionic InRelease
Get:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu bionic-updates InRelease [102 kB]
Get:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu bionic-backports InRelease [102 kB]
Get:5 https://packages.grafana.com/oss/deb stable InRelease [7660 B]
Ign:4 https://pkg.jenkins.io/debian-stable binary/ InRelease
Hit:6 https://pkg.jenkins.io/debian-stable binary/ Release
Get:7 http://dl.google.com/linux/chrome/deb stable InRelease [1825 B]
Hit:8 http://ppa.launchpad.net/ansible/ubuntu bionic InRelease
Get:9 http://apt.puppetlabs.com bionic InRelease [157 kB]
Get:10 http://security.ubuntu.com/ubuntu bionic-security InRelease [102 kB]
Get:11 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu bionic-updates/main amd64
  DEP-11 Metadata [297 kB]
Get:12 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu bionic-updates/restricted

```

```

Get:22 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 DEP-11 M
  etadata [62.5 kB]
Get:23 http://security.ubuntu.com/ubuntu bionic-security/multiverse amd64 DEP-11
    Metadata [2464 B]
Fetched 1235 kB in 3s (465 kB/s)
Reading package lists... Done
W: An error occurred during the signature verification. The repository is not up
  dated and the previous index files will be used. GPG error: https://packages.gra
  fana.com/oss/deb stable InRelease: The following signatures couldn't be verified
  because the public key is not available: NO_PUBKEY 963FA27710458545
W: An error occurred during the signature verification. The repository is not up
  dated and the previous index files will be used. GPG error: http://dl.google.com
  /linux/chrome/deb stable InRelease: The following signatures couldn't be verified
  because the public key is not available: NO_PUBKEY E88979FB9B30ACF2
W: Failed to fetch http://dl.google.com/linux/chrome/deb/dists/stable/InRelease
  The following signatures couldn't be verified because the public key is not ava
  ilable: NO_PUBKEY E88979FB9B30ACF2
W: Failed to fetch https://packages.grafana.com/oss/deb/dists/stable/InRelease
  The following signatures couldn't be verified because the public key is not avai
  lable: NO_PUBKEY 963FA27710458545
W: Some index files failed to download. They have been ignored, or old ones used
  instead.

```

sudo apt-get install ca-certificates curl

```

edureka@kmaster:~$ sudo apt-get install ca-certificates curl
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libcurl4
The following packages will be upgraded:
  ca-certificates curl libcurl4
3 upgraded, 0 newly installed, 0 to remove and 497 not upgraded.
Need to get 530 kB of archives.
After this operation, 34.8 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y■

(Reading database ... 189065 files and directories currently installed.)
Preparing to unpack .../ca-certificates_20230311ubuntu0.18.04.1_all.deb ...
Unpacking ca-certificates (20230311ubuntu0.18.04.1) over (20211016-18.04.1) ...
Preparing to unpack .../curl_7.58.0-2ubuntu3.24_amd64.deb ...
Unpacking curl (7.58.0-2ubuntu3.24) over (7.58.0-2ubuntu3.10) ...
Preparing to unpack .../libcurl4_7.58.0-2ubuntu3.24_amd64.deb ...
Unpacking libcurl4:amd64 (7.58.0-2ubuntu3.24) over (7.58.0-2ubuntu3.10) ...
Setting up libcurl4:amd64 (7.58.0-2ubuntu3.24) ...
Setting up ca-certificates (20230311ubuntu0.18.04.1) ...
Updating certificates in /etc/ssl/certs...
rehash: warning: skipping ca-certificates.crt, it does not contain exactly one ce
rtificate or CRL
19 added, 9 removed; done.
Setting up curl (7.58.0-2ubuntu3.24) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
Processing triggers for libc-bin (2.27-3ubuntu1.2) ...
Processing triggers for ca-certificates (20230311ubuntu0.18.04.1) ...
Updating certificates in /etc/ssl/certs...
0 added, 0 removed; done.
Running hooks in /etc/ca-certificates/update.d...

done.
done.

```

sudo install -m 0755 -d /etc/apt/keyrings

sudo curl -fsSL <https://download.docker.com/linux/ubuntu/gpg> -o /etc/apt/keyrings/docker.asc

sudo chmod a+r /etc/apt/keyrings/docker.asc

```

edureka@kmaster:~$ sudo install -m 0755 -d /etc/apt/keyrings
edureka@kmaster:~$ sudo curl -fsSL https://download.docker.com/linux/ubuntu/gpg
-o
curl: option -o: requires parameter
curl: try 'curl --help' or 'curl --manual' for more information
edureka@kmaster:~$ sudo curl -fsSL https://download.docker.com/linux/ubuntu/gpg
-o /etc/apt/keyrings/docker.asc
edureka@kmaster:~$ sudo chmod a+r /etc/apt/keyrings/docker.asc

```

echo \

"deb [arch=\$(dpkg --print-architecture) signed-by=/etc/apt/keyrings/docker.asc]

```

https://download.docker.com/linux/ubuntu \
$(./etc/os-release && echo "$VERSION_CODENAME") stable" | \
sudo tee /etc/apt/sources.list.d/docker.list > /dev/null

edureka@kmaster:~$ sudo chmod a+r /etc/apt/keyrings/docker.asc
edureka@kmaster:~$ echo \
> "deb [arch=$(dpkg --print-architecture) signed-by=/etc/apt/keyrings/docker.asc] https://download.docker.com/linux/ubuntu \
> $(./etc/os-release && echo "$VERSION_CODENAME") stable" | \
> sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
edureka@kmaster:~$ sudo apt-get update

The following signatures couldn't be verified because the public key is not available: NO_PUBKEY E88979FB9B30ACF2
Err:9 https://packages.grafana.com/oss/deb stable InRelease
  The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 963FA27710458545
Fetched 103 kB in 1s (87.9 kB/s)
Reading package lists... Done
V: An error occurred during the signature verification. The repository is not updated and the previous index files will be used. GPG error: http://dl.google.com/linux/chrome/deb stable InRelease: The following signatures couldn't be verified because the public key is not available: NO_PUBKEY E88979FB9B30ACF2
V: An error occurred during the signature verification. The repository is not updated and the previous index files will be used. GPG error: https://packages.grafana.com/oss/deb stable InRelease: The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 963FA27710458545
V: Failed to fetch http://dl.google.com/linux/chrome/deb/dists/stable/InRelease
  The following signatures couldn't be verified because the public key is not available: NO_PUBKEY E88979FB9B30ACF2
V: Failed to fetch https://packages.grafana.com/oss/deb/dists/stable/InRelease
  The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 963FA27710458545
V: Some index files failed to download. They have been ignored, or old ones used instead.

sudo apt-get install docker-ce docker-ce-cli containerd.io docker-buildx-plugin docker-compose-plugin

--2023-07-10 14:45:42--  Unpacking docker-ce (5:24.0.2-1~ubuntu.18.04-bionic) ...
Selecting previously unselected package docker-ce-rootless-extras.
Preparing to unpack .../4-docker-ce-rootless-extras_5%3a24.0.2-1~ubuntu.18.04-bionic_amd64.deb ...
Unpacking docker-ce-rootless-extras (5:24.0.2-1~ubuntu.18.04-bionic) ...
Selecting previously unselected package docker-compose-plugin.
Preparing to unpack .../5-docker-compose-plugin_2.18.1-1~ubuntu.18.04_amd64.deb ...
Unpacking docker-compose-plugin (2.18.1-1~ubuntu.18.04-bionic) ...
Setting up containerd.io (1.6.21-1) ...
Installing new version of config file /etc/containerd/config.toml ...
Setting up docker-ce-rootless-extras (5:24.0.2-1~ubuntu.18.04-bionic) ...
Setting up docker-buildx-plugin (0.10.5-1~ubuntu.18.04-bionic) ...
Setting up docker-compose-plugin (2.18.1-1~ubuntu.18.04-bionic) ...
Setting up docker-ce-cli (5:24.0.2-1~ubuntu.18.04-bionic) ...
Setting up docker-ce (5:24.0.2-1~ubuntu.18.04-bionic) ...
Created symlink /etc/systemd/system/multi-user.target.wants/docker.service → /lib/systemd/system/docker.service.
Processing triggers for libc-bin (2.27-3ubuntu1.2) ...
Processing triggers for systemd (237-3ubuntu10.42) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
Processing triggers_for_ureadahead (0.100.0-21) ...

edureka@kmaster:~$ sudo docker run hello-world
Unable to find image 'hello-world:latest' locally
Latest: Pulling from library/hello-world
:1ec31eb5944: Pull complete
Digest: sha256:266b191e926f65542fa8daaec01a192c4d292bfff79426f47300a046e1bc576fd
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
 1. The Docker client contacted the Docker daemon.
 2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
    (amd64)
 3. The Docker daemon created a new container from that image which runs the
    executable that produces the output you are currently reading.
 4. The Docker daemon streamed that output to the Docker client, which sent it
    to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
$ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
https://hub.docker.com/

```

```

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
1. The Docker client contacted the Docker daemon.
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   (amd64)
3. The Docker daemon created a new container from that image which runs the
   executable that produces the output you are currently reading.
4. The Docker daemon streamed that output to the Docker client, which sent it
   to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
$ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
https://hub.docker.com/

Or more examples and ideas, visit:
https://docs.docker.com/get-started/

```

dureka@kmaster:~\$ █

Start the docker service

```
sudo service docker start
```

```
sudo docker run hello-world
```

```
dureka@kmaster:~$ sudo usermod -aG docker jenkins
dureka@kmaster:~$
```

Create the docker file and move the dockerfile into git. (dockerfile is available in gibhub)

```

ganganjaneyal@DESKTOP-97C2D7F: MINGW64 ~/Downloads/industry_grade_project1/Industry Grade Project I - Java Project/ABC Technologies (main)
$ git status
On branch main
Your branch is up to date with 'origin/main'.

Untracked files:
  (use "git add <file>..." to include in what will be committed)
    Dockerfile

nothing added to commit but untracked files present (use "git add" to track)

```

```

ganganjaneyal@DESKTOP-97C2D7F: MINGW64 ~/Downloads/industry_grade_project1/Industry Grade Project I - Java Project/ABC Technologies (main)
$ git status
On branch main
Your branch is up to date with 'origin/main'.

Untracked files:
  (use "git add <file>..." to include in what will be committed)
    Dockerfile

nothing added to commit but untracked files present (use "git add" to track)
ganganjaneyal@DESKTOP-97C2D7F: MINGW64 ~/Downloads/industry_grade_project1/Industry Grade Project I - Java Project/ABC Technologies (main)
$ git add .
ganganjaneyal@DESKTOP-97C2D7F: MINGW64 ~/Downloads/industry_grade_project1/Industry Grade Project I - Java Project/ABC Technologies (main)
$ git commit -m "Dockerfile added"
[main 97c2d7f] dockerfile added
 1 file changed, 1 insertion(+)
 create mode 100644 Dockerfile
ganganjaneyal@DESKTOP-97C2D7F: MINGW64 ~/Downloads/industry_grade_project1/Industry Grade Project I - Java Project/ABC Technologies (main)
$ git push -u origin main
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 4 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 431 bytes | 71.00 KiB/s, done.
Total 3 delta objects, reused 0 delta objects, 0% pack-reused 0
Delta base: 0 bytes, reused: 0 bytes (1/1), completed with 1 local object.
To https://github.com/tgreddy1/purdue-ipr-project.git
  de176f2..97c2d7f main -> main
branch 'main' set up to track 'origin/main'.

```

Add the dockerhub credentials to Jenkins to execute the pipeline.

Dashboard > Manage Jenkins > Credentials

## Credentials

T	P	Store ↓	Domain	ID	Name
			{global}	dockerhub_id	DockerHub Account
█	██	System			

Update the pipeline project in Jenkins to build the docker image, push the docker image and deploy as container.

```
stage('igp-proj1 code build')
{
    steps
    {
        sh 'mvn package'
    }
}
stage('igp-proj1 Build Docker Image')
{
    steps
    {
        sh 'cp /var/lib/jenkins/workspace/$JOB_NAME/target/ABCtechnologies-1.0.war abc_tech.war'
        sh 'docker build -t abc_tech:$BUILD_NUMBER .'
        sh 'docker tag abc_tech:$BUILD_NUMBER tgreddy1/abc_tech:$BUILD_NUMBER'
    }
}
stage('igp-proj1 Push Docker Image')
{
    steps
    {
        withDockerRegistry([ credentialsId: "dockerhub_id", url: "" ])
        {
            sh 'docker push tgreddy1/abc_tech:$BUILD_NUMBER'
        }
    }
}
stage('igp-proj1 Deploy as container')
{
    steps
    {
        sh 'docker run -itd -P tgreddy1/abc_tech:$BUILD_NUMBER'
```

Execute the build now in Jenkins and the build got successful. Build got failed during the process, eventhough the dockerhub id was added because of invalid password. I had entered the wrong password, so updated the password again to have successful build.

```
#7 exporting layers
#7 exporting layers 0.1s done
#7 writing image sha256:75758f69a7c67ed667d4a8576f4929035c7077bc84d5c79901fc526b3a9a5796 done
#7 naming to docker.io/library/abc_tech:8 done
#7 DONE 0.1s
[Pipeline] sh
+ docker tag abc_tech:8 tgreddy1/abc_tech:8
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (igp-proj1 Push Docker Image)
[Pipeline] withDockerRegistry
$ docker login -u tgreddy1 -p *****
WARNING! Using --password via the CLI is insecure. Use --password-stdin.
WARNING! Your password will be stored unencrypted in /var/lib/jenkins/workspace/purdue-igp-
[Pipeline] }

8: digest: sha256:7cae894c2a6aef679dff068d871e4e5128dd5f7a38021fa70b6553d92dc8a875 size: 3265
[Pipeline] }
[Pipeline] // withDockerRegistry
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (igp-proj1 Deploy as container)
[Pipeline] sh
+ docker run -itd -P tgreddy1/abc_tech:8
a950a4b305fd367588111378999572c96f69e55f782309dc885df3f7782463a6
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
```

```
a950a4b305fd367588111378999572c96f69e55f782309dc885df3f7782463a6
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

Docker ps -a

```
edureka@kmaster:~$ docker ps -a
CONTAINER ID   IMAGE               COMMAND                  CREATED             STATUS              PORTS
a950a4b305fd   tgreddy1/abc_tech:8   "catalina.sh run"    2 minutes ago     Up 2 minutes
0.0.0.0:32768->8080/tcp, :::32768->8080/tcp   laughing_shannon
c6cea04127fd   hello-world         "/hello"           2 hours ago      Exited (0) 2 hours ago
42a63ade9441   hello-world         "/hello"           3 hours ago      Exited (0) 3 hours ago
e01181e9a2cb   27f8b8d51985       "/usr/local/bin/kube-...
0-463d-aa54-19128f29df19_7
eea13c5b9f92   c49ccdef0ab0       "/opt/bin/flanneld ...
b48a-9f00-4c83-a40e-c190f04dde96_6
bd67bfe33ade   c49ccdef0ab0       "cp -f /etc/kube-fla...
42a-9f00-4c83-a40e-c190f04dde96_6
726e2cd2f8f   67da37a9a360       "/coredns -conf /etc...
-b20a-4ffc-9fcc-7ffa5a8ad89f_6
ceb97dfb36   1e3c860c213d       "cp -f /flannel /opt...
_6198b48a-9f00-4c83-a40e-c190f04dde96_7
76902362e49   a05a1a79adaa       "kube-scheduler --au...
1886a4cda0424b9879a78869adc51_6
d647d3e49cd   303ce5db0e90       "etcd --advertise-cl...
6827c80cc_6
96bc3ddaa69   e7c545a60706       "kube-controller-man...
er_kube-system 2cf16e7db66397e307ead965fc8a447_6
bacdf9b2213   7d8d2960de69       "kube-apiserver --ad...
971bc0b77f9ff41e087f4691674b6_6
0169c70018d   k8s.gcr.io/pause:3.2  "/pause"
4c83-a40e-c190f04dde96_7
ad9269188ed   k8s.gcr.io/pause:3.2  "/pause"
e971bc0b77f9ff41e087f4691674b6_5
88898492cb11   303ce5db0e90       "etcd --advertise-cl...
56827c80cc_5
e694ec2d8f2b   e7c545a60706       "kube-controller-man...
ter_kube-system 2cf16e7db66397e307ead965fc8a447_5
611e2ffd92cf   a05a1a79adaa       "kube-scheduler --au...
41886a4cda0424b9879a78869adc51_5
713b40b2f67d   k8s.gcr.io/pause:3.2  "/pause"
424b9879a78869adc51_5
710ecdfb6bc3   k8s.gcr.io/pause:3.2  "/pause"
6827c80cc_5
af85155b9616   k8s.gcr.io/pause:3.2  "/pause"
9ff41e087f4691674b6_5
da3c2d200aec   k8s.gcr.io/pause:3.2  "/pause"
16e7db66397e307ead965fc8a447_5
edureka@kmaster:~$
```

After successful build this the web page that came for the IGP project 1.

The screenshot shows a web browser window with the URL 'localhost:32768/abc\_tech/'. The page title is 'Welcome to ABC technologies'. Below the title, a bold heading 'This is retail portal' is displayed. At the bottom of the page are two buttons: 'Add Product' and 'View Product'.

Installing Kubernetes cluster on Master and Slave Node.

During installation of K8S cluster, faced multiple challenges and with the help of Edureka Support and through search from Google, installed K8s Cluster.

Installed the Kubeadm on both the servers (Kmaster & Kslave1)

```
edureka@kslave1:~$ sudo systemctl start docker
edureka@kslave1:~$ curl -s https://packages.cloud.google.com/apt/doc/apt-key.gpg
| sudo apt-key add
DK
edureka@kslave1:~$
```

```
sudo apt-add-repository "deb http://apt.kubernetes.io/ kubernetes-xenial main"
```

```
Hit:12 http://apt.puppetlabs.com bionic InRelease
Ign:9 https://packages.cloud.google.com/kubernetes-xenial InRelease
Err:5 https://packages.grafana.com/oss/deb stable InRelease
  The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 963FA27710458545
Err:13 https://packages.cloud.google.com/apt kubernetes-xenial Release
  404  Not Found [IP: 142.250.199.174 443]
Err:8 http://dl.google.com/linux/chrome/deb stable InRelease
  The following signatures couldn't be verified because the public key is not available: NO_PUBKEY E88979FB9B30ACF2
Reading package lists... Done
W: An error occurred during the signature verification. The repository is not updated and the previous index files will be used. GPG error: https://packages.grafana.com/oss/deb stable InRelease: The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 963FA27710458545
E: The repository 'http://apt.kubernetes.io kubernetes-xenial Release' does not have a Release file.
N: Updating from such a repository can't be done securely, and is therefore disabled by default.
N: See apt-secure(8) manpage for repository creation and user configuration details.
W: An error occurred during the signature verification. The repository is not updated and the previous index files will be used. GPG error: http://dl.google.com/linux/chrome/deb stable InRelease: The following signatures couldn't be verified because the public key is not available: NO_PUBKEY F88979FR0R3A0RF?
```

```
edureka@kslave1:~$ sudo apt-add-repository "deb http://apt.kubernetes.io/ kubernetes-xenial main"
Hit:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu bionic InRelease
Hit:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu bionic-updates InRelease
Hit:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu bionic-backports InRelease
Hit:4 http://dl.google.com/linux/chrome/deb stable InRelease
Hit:5 http://apt.puppetlabs.com bionic InRelease
Hit:6 http://security.ubuntu.com/ubuntu bionic-security InRelease
Hit:7 http://ppa.launchpad.net/ansible/ansible/ubuntu bionic InRelease
Ign:8 https://packages.cloud.google.com/apt kubernetes-xenial InRelease
Err:9 https://packages.cloud.google.com/apt kubernetes-xenial Release
  404  Not Found [IP: 142.251.42.110 443]
Reading package lists... Done
E: The repository 'http://apt.kubernetes.io kubernetes-xenial Release' does not have a Release file.
! E: Updating from such a repository can't be done securely, and is therefore disabled by default.
! E: See apt-secure(8) manpage for repository creation and user configuration details.
```

```
sudo apt-get install kubeadm kubelet kubectl
```

```
edureka@kslave1:~$ sudo apt-get install kubeadm kubelet kubectl
Reading package lists... Done
Building dependency tree
Reading state information... Done
kubelet is already the newest version (1.18.3-00).
kubectl is already the newest version (1.18.3-00).
kubelet set to manually installed.
kubeadm is already the newest version (1.18.3-00).
0 upgraded, 0 newly installed, 0 to remove and 455 not upgraded.
edureka@kslave1:~$ █
```

```
edureka@kmaster:~$ sudo apt-get install kubeadm kubelet kubectl
Reading package lists... Done
Building dependency tree
Reading state information... Done
kubelet is already the newest version (1.18.3-00).
kubectl is already the newest version (1.18.3-00).
kubeadm is already the newest version (1.18.3-00).
The following packages were automatically installed and are no longer required:
  bridge-utils ubuntu-fan
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 492 not upgraded.
edureka@kmaster:~$ █
```

```
sudo apt-mark hold kubeadm kubelet kubectl
```

```
edureka@kslave1:~$ sudo apt-get install kubeadm kubelet kubectl
Reading package lists... Done
Building dependency tree
Reading state information... Done
kubelet is already the newest version (1.18.3-00).
kubectl is already the newest version (1.18.3-00).
kubelet set to manually installed.
kubeadm is already the newest version (1.18.3-00).
0 upgraded, 0 newly installed, 0 to remove and 455 not upgraded.
edureka@kslave1:~$ sudo apt-mark hold kubeadm kubelet kubectl
kubeadm set on hold.
kubelet set on hold.
kubectl set on hold.
edureka@kslave1:~$ kubeadm version
kubeadm version: &version.Info{Major:"1", Minor:"18", GitVersion:"v1.18.3", GitCommit:"2e7996e3e2712684bc73f0dec0200d64eec7fe40", GitTreeState:"clean", BuildDate:"2020-05-20T12:49:29Z", GoVersion:"go1.13.9", Compiler:"gc", Platform:"linux/amd64"}
edureka@kslave1:~$ █
```

```
edureka@kmaster:~$ sudo apt-get install kubeadm kubelet kubectl
Reading package lists... Done
Building dependency tree
Reading state information... Done
kubelet is already the newest version (1.18.3-00).
kubectl is already the newest version (1.18.3-00).
kubeadm is already the newest version (1.18.3-00).
The following packages were automatically installed and are no longer required:
  bridge-utils ubuntu-fan
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 492 not upgraded.
edureka@kmaster:~$ sudo apt-mark hold kubeadm kubelet kubectl
kubeadm set on hold.
kubelet set on hold.
kubectl set on hold.
edureka@kmaster:~$ kubeadm version
kubeadm version: &version.Info{Major:"1", Minor:"18", GitVersion:"v1.18.3", GitCommit:"2e7996e3e2712684bc73f0dec0200d64ec7fe40", GitTreeState:"clean", BuildDate:"2020-05-20T12:49:29Z", GoVersion:"go1.13.9", Compiler:"gc", Platform:"linux/amd64"}
edureka@kmaster:~$
```

```
edureka@kmaster:~$ sudo mkdir -p /etc/apt/keyrings
edureka@kmaster:~$ curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo gpg --dearmor -o /etc/apt/keyrings/docker.gpg
gpg: WARNING: unsafe ownership on homedir '/home/edureka/.gnupg'
edureka@kmaster:~$
```

Executed the following in Master Node

```
edureka@kmaster:~$ sudo apt-get install docker-ce docker-ce-cli containerd.io docker-compose-plugin
Reading package lists... Done
Building dependency tree
Reading state information... Done
containerd.io is already the newest version (1.6.21-1).
docker-ce-cli is already the newest version (5:24.0.2-1~ubuntu.18.04~bionic).
docker-ce is already the newest version (5:24.0.2-1~ubuntu.18.04~bionic).
docker-compose-plugin is already the newest version (2.18.1-1~ubuntu.18.04~bionic).
The following packages were automatically installed and are no longer required:
  bridge-utils ubuntu-fan
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 481 not upgraded.
edureka@kmaster:~$
```

```
Unpacking docker-ce (5:24.0.2-1~ubuntu.18.04~bionic) ...
Selecting previously unselected package docker-ce-rootless-extras.
Preparing to unpack .../4-docker-ce-rootless-extras_5%3a24.0.2-1~ubuntu.18.04~bionic_amd64.deb ...
Unpacking docker-ce-rootless-extras (5:24.0.2-1~ubuntu.18.04~bionic) ...
Selecting previously unselected package docker-compose-plugin.
Preparing to unpack .../5-docker-compose-plugin_2.18.1-1~ubuntu.18.04~bionic_amd64.deb ...
Unpacking docker-compose-plugin (2.18.1-1~ubuntu.18.04~bionic) ...
Setting up containerd.io (1.6.21-1) ...
Installing new version of config file /etc/containerd/config.toml ...
Setting up docker-ce-rootless-extras (5:24.0.2-1~ubuntu.18.04~bionic) ...
Setting up docker-buildx-plugin (0.10.5-1~ubuntu.18.04~bionic) ...
Setting up docker-compose-plugin (2.18.1-1~ubuntu.18.04~bionic) ...
Setting up docker-ce-cli (5:24.0.2-1~ubuntu.18.04~bionic) ...
Setting up docker-ce (5:24.0.2-1~ubuntu.18.04~bionic) ...
Processing triggers for libc-bin (2.27-3ubuntu1.2) ...
Processing triggers for systemd (237-3ubuntu10.42) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
Processing triggers for ureadahead (0.100.0-21) ...
```

```
edureka@kslave1:~$ curl -fsSL https://pkgs.k8s.io/core:/stable:/v1.28/deb/Release.key | sudo gpg --dearmor -o /etc/apt/keyrings/kubernetes-apt-keyring.gpg
gpg: WARNING: unsafe ownership on homedir '/home/edureka/.gnupg'
edureka@kslave1:~$ echo 'deb [signed-by=/etc/apt/keyrings/kubernetes-apt-keyring.gpg] https://pkgs.k8s.io/core:/stable:/v1.28/deb/ /' | sudo tee /etc/apt/sources.list.d/kubernetes.list
deb [signed-by=/etc/apt/keyrings/kubernetes-apt-keyring.gpg] https://pkgs.k8s.io/core:/stable:/v1.28/deb/ /
```

```
edureka@kmaster:~$ curl -fsSL https://pkgs.k8s.io/core:/stable:/v1.28/deb/Release.key | sudo gpg --dearmor -o /etc/apt/keyrings/kubernetes-apt-keyring.gpg
gpg: WARNING: unsafe ownership on homedir '/home/edureka/.gnupg'
edureka@kmaster:~$ echo 'deb [signed-by=/etc/apt/keyrings/kubernetes-apt-keyring.gpg] https://pkgs.k8s.io/core:/stable:/v1.28/deb/ ' | sudo tee /etc/apt/sources.list.d/kubernetes.list
deb [signed-by=/etc/apt/keyrings/kubernetes-apt-keyring.gpg] https://pkgs.k8s.io/core:/stable:/v1.28/deb/
edureka@kmaster:~$
```

```
Get:14 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.28/deb Packages [15.1 kB]
Fetched 16.3 kB in 1s (12.0 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
486 packages can be upgraded. Run 'apt list --upgradable' to see them.
W: An error occurred during the signature verification. The repository is not updated and the previous index files will be used. GPG error: https://packages.grafana.com/oss/deb stable InRelease: The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 963FA27710458545
W: An error occurred during the signature verification. The repository is not updated and the previous index files will be used. GPG error: http://dl.google.com/linux/chrome/deb stable InRelease: The following signatures couldn't be verified because the public key is not available: NO_PUBKEY E88979FB9B30ACF2
W: Failed to fetch http://dl.google.com/linux/chrome/deb/dists/stable/InRelease
The following signatures couldn't be verified because the public key is not available: NO_PUBKEY E88979FB9B30ACF2
W: Failed to fetch https://packages.grafana.com/oss/deb/dists/stable/InRelease
The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 963FA27710458545
W: Some index files failed to download. They have been ignored, or old ones used instead.
edureka@kmaster:~$
```

```
edureka@kslavel:~$ sudo apt update
Hit:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu bionic InRelease
Hit:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu bionic-updates InRelease
Hit:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu bionic-backports InRelease
Hit:4 https://download.docker.com/linux/ubuntu bionic InRelease
Hit:5 http://dl.google.com/linux/chrome/deb stable InRelease
Hit:6 http://security.ubuntu.com/ubuntu bionic-security InRelease
Hit:7 http://ppa.launchpad.net/ansible/ubuntu bionic InRelease
Get:8 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.28/deb InRelease [1189 B]
Hit:10 http://apt.puppetlabs.com bionic InRelease
Ign:9 https://packages.cloud.google.com/apt kubernetes-xenial InRelease
Err:11 https://packages.cloud.google.com/apt kubernetes-xenial Release
  404 Not Found [IP: 142.250.199.142 443]
Get:12 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.28/deb Packages [15.1 kB]
Reading package lists... Done
E: The repository 'http://apt.kubernetes.io kubernetes-xenial Release' does not have a Release file.
N: Updating from such a repository can't be done securely, and is therefore disabled by default.
N: See apt-secure(8) manpage for repository creation and user configuration details.
edureka@kslavel:~$
```

```
edureka@kmaster:~$ sudo apt-get install kubeadm kubelet kubectl -y
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  bridge-utils ubuntu-fan
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  cri-tools kubernetes-cni
The following held packages will be changed:
  kubeadm kubectl kubelet
The following packages will be upgraded:
  cri-tools kubeadm kubectl kubelet kubernetes-cni
5 upgraded, 0 newly installed, 0 to remove and 481 not upgraded.
E: Held packages were changed and -y was used without --allow-change-held-packages.
```

```
edureka@kslave1:~$ sudo apt-get install kubeadm kubelet kubectl -y
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  bridge-utils ubuntu-fan
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  cri-tools kubernetes-cni
The following held packages will be changed:
  kubeadm kubectl kubelet
The following packages will be upgraded:
  cri-tools kubeadm kubectl kubelet kubernetes-cni
5 upgraded, 0 newly installed, 0 to remove and 438 not upgraded.
E: Held packages were changed and -y was used without --allow-change-held-packages.
edureka@kslave1:~$
```

```
| edureka@kslave1:~$ sudo su
| root@kslave1:/home/edureka# swapoff -a
| root@kslave1:/home/edureka#
```

```
| edureka@kmaster:~$ sudo su
| root@kmaster:/home/edureka# swapoff -a
| root@kmaster:/home/edureka#
```

---

```
edureka@kmaster:~$ hostname -i
172.31.0.48
edureka@kmaster:~$
```

```
| edureka@kslave1:~$ hostname -i
| 172.31.15.16
| edureka@kslave1:~$
```

```
sudo kubeadm init --apiserver-advertise-address=172.31.0.48 --pod-network-cidr=192.168.0.0/16 --
ignore-preflight-errors=ALL
```

```
[kubelet-finalize] Updating "/etc/kubernetes/kubelet.conf" to point to a rotatable kubelet client certificate and key
[addons] Applied essential addon: CoreDNS
[addons] Applied essential addon: kube-proxy
```

```
Your Kubernetes control-plane has initialized successfully!
```

```
To start using your cluster, you need to run the following as a regular user:
```

```
mkdir -p $HOME/.kube
sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config
sudo chown $(id -u):$(id -g) $HOME/.kube/config
```

```
You should now deploy a pod network to the cluster.
```

```
Run "kubectl apply -f [podnetwork].yaml" with one of the options listed at:
  https://kubernetes.io/docs/concepts/cluster-administration/addons/
```

```
Then you can join any number of worker nodes by running the following on each as root:
```

```
kubeadm join 172.31.0.48:6443 --token dtamzp.3mi4zrx4j86p45ok \
  --discovery-token-ca-cert-hash sha256:a6aba8a46be427d35cc261a396419db712eb0b
252d0aa309585663f9faf32c0b
edureka@kmaster:~$
```

```
edureka@kmaster:~$ mkdir -p $HOME/.kube
edureka@kmaster:~$ sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config
edureka@kmaster:~$ sudo chown $(id -u):$(id -g) $HOME/.kube/config
edureka@kmaster:~$ kubectl apply -f https://docs.projectcalico.org/manifests/calico.yaml
serviceaccount/calico-kube-controllers created
serviceaccount/calico-node created
configmap/calico-config created
customresourcedefinition.apiextensions.k8s.io/bgpconfigurations.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/bgppeers.crd.projectcalico.org created
```

```

customresourcedefinition.apiextensions.k8s.io/ipamcontigs.crd.projectcalico.org
created
customresourcedefinition.apiextensions.k8s.io/ipamhandles.crd.projectcalico.org
created
customresourcedefinition.apiextensions.k8s.io/ippools.crd.projectcalico.org crea
ted
customresourcedefinition.apiextensions.k8s.io/ipreservations.crd.projectcalico.o
rg created
customresourcedefinition.apiextensions.k8s.io/kubecontrollersconfigurations.crd.
projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/networkpolicies.crd.projectcalico.o
rg created
customresourcedefinition.apiextensions.k8s.io/networksets.crd.projectcalico.org
created
clusterrole.rbac.authorization.k8s.io/calico-kube-controllers created
clusterrole.rbac.authorization.k8s.io/calico-node created
clusterrolebinding.rbac.authorization.k8s.io/calico-kube-controllers created
clusterrolebinding.rbac.authorization.k8s.io/calico-node created
daemonset.apps/calico-node created
deployment.apps/calico-kube-controllers created
error: unable to recognize "https://docs.projectcalico.org/manifests/calico.yaml"
": no matches for kind "PodDisruptionBudget" in version "policy/v1"
edureka@kmaster:~$ █

```

```

edureka@kmaster:~$ kubectl get nodes
NAME      STATUS   ROLES      AGE      VERSION
kmaster   Ready    master     5d19h   v1.18.3
kslave1  Ready    <none>    5d19h   v1.18.3
edureka@kmaster:~$ kubectl get nodes
NAME      STATUS   ROLES      AGE      VERSION
kmaster   Ready    master     5d19h   v1.18.3
kslave1  Ready    <none>    5d19h   v1.18.3
edureka@kmaster:~$ kubectl get nodes
NAME      STATUS   ROLES      AGE      VERSION
kmaster   Ready    master     5d19h   v1.18.3
kslave1  Ready    <none>    5d19h   v1.18.3
edureka@kmaster:~$ kubectl get nodes
NAME      STATUS   ROLES      AGE      VERSION
kmaster   Ready    master     5d19h   v1.18.3
kslave1  Ready    <none>    5d19h   v1.18.3
edureka@kmaster:~$ kubectl get nodes
NAME      STATUS   ROLES      AGE      VERSION
kmaster   Ready    master     5d19h   v1.18.3
kslave1  Ready    <none>    5d19h   v1.18.3
edureka@kmaster:~$ █

```

Copy the config file into Jenkins server.

Few issues observed during this process, after copying the file, required permissions were not there. Provided the required permissions to Jenkins user and it started working.

```

edureka@kmaster:~/.kube$ ls -ltr
total 24
-rw----- 1 edureka edureka 5451 May 28 00:13 admin.conf
-rw----- 1 edureka edureka 5451 Jun  2 20:01 config
drwxr-x--- 3 edureka edureka 4096 Jun  2 20:02 cache
drwxr-x--- 3 edureka edureka 4096 Jun  2 22:12 http-cache
edureka@kmaster:~/.kube$ cd /var/lib/jenkins/.kube
bash: cd: /var/lib/jenkins/.kube: Permission denied
edureka@kmaster:~/.kube$ cd /var/lib/jenkins
edureka@kmaster:/var/lib/jenkins$ cd
edureka@kmaster:~$ cd .kube
edureka@kmaster:~/.kube$ ls
admin.conf  cache  config  http-cache
edureka@kmaster:~/.kube$ sudo cp admin.conf /var/lib/jenkins/.kube/..
edureka@kmaster:~/.kube$ sudo cp config  /var/lib/jenkins/.kube/..
edureka@kmaster:~/.kube$ sudo system restart jenkins
sudo: system: command not found
edureka@kmaster:~/.kube$ cd
edureka@kmaster:~$ sudo systemctl restart jenkins
edureka@kmaster:~$ sudo chmod 544 /var/lib/jenkins/.kube/admin.conf
edureka@kmaster:~$ sudo chmod 544 /var/lib/jenkins/.kube/config
edureka@kmaster:~$ sudo systemctl restart jenkins

```

Build got success for deploying as container.

## **purdue-igp-project**

Purdue - igp - project 1

### Permalinks

- [Last build \(#15\), 6 min 34 sec ago](#)
- [Last stable build \(#15\), 6 min 34 sec ago](#)
- [Last successful build \(#15\), 6 min 34 sec ago](#)
- [Last failed build \(#14\), 12 min ago](#)
- [Last unsuccessful build \(#14\), 12 min ago](#)



The screenshot shows a 'Build History' interface. At the top, there's a cloud icon and the text 'Build History'. Below that is a dropdown menu labeled 'trend' with a downward arrow. A search bar has the placeholder 'Filter...'. Underneath, there are two entries: '#15' with a green checkmark and 'Jun 2, 2024, 10:42 PM', and '#14' with a red X and 'Jun 2, 2024, 10:37 PM'.

```
[Pipeline] { (igp-proj1 Deploy as container)
[Pipeline] sh
+ docker run -itd -P tgreddy1/abc_tech:15
c1a041d11829de5f11da6e360843b3568b0c65e53f1eb148c92febfc2e3cbf94
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Deploy to k8s cluster )
[Pipeline] sh
+ kubectl create -f deploy.yaml
deployment.apps/abc-tech-deploy created
[Pipeline] sh
+ kubectl create -f svc.yaml
service/abc-nodeport-svc created
[Pipeline] }
[Pipeline] // stage

deployment.apps/abc-tech-deploy created
[Pipeline] sh
+ kubectl create -f svc.yaml
service/abc-nodeport-svc created
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

For testing purpose, I tried to rebuild and build got failed because of existing deployment. With the help of support team, deleted the existing build and recreated.

```
edureka@kmaster:~$ kubectl delete service abc-nodeport-svc
service "abc-nodeport-svc" deleted
edureka@kmaster:~$ kubectl delete deploy abc-tech-deploy
deployment.apps "abc_tech-deploy" deleted
```

Dashboard > purdue-igp-project >

- [Configure](#)
- [Delete Pipeline](#)
- [GitHub](#)
- [Stages](#)
- [Rename](#)
- [Pipeline Syntax](#)

### Permalinks

- Last build (#17), 19 min ago
- Last stable build (#15), 1 day 5 hr ago
- Last successful build (#15), 1 day 5 hr ago
- Last failed build (#17), 19 min ago
- Last unsuccessful build (#17), 19 min ago
- Last completed build (#17), 19 min ago

```

2f3d0cf3b97e: Pushed
18: digest: sha256:87bdbce7087ce6c554d75156a9d1e98e56f02009ea7ca36f4df7e3f05f8cac96 size: 3265
[Pipeline] 
[Pipeline] // withDockerRegistry
[Pipeline] 
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (igp-proj1 Deploy as container)
[Pipeline] sh
+ docker run -itd -P tgreddy1/abc_tech:18
741d34c56cdc4e0ea8bdc29613298a911008d06d8ef73d09e5fc084b7f11cde0
[Pipeline] 
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Deploy to k8s cluster )
[Pipeline] sh
-----+
deployment.apps/abc-tech-deploy created
[Pipeline] sh
+ kubectl create -f svc.yaml
service/abc-nodeport-svc created
[Pipeline] 
[Pipeline] // stage
[Pipeline] 
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS

```

**Pipeline**

```

graph LR
    Start((Start)) --> IgpProj1Code1[igp-proj1 code ...]
    IgpProj1Code1 --> IgpProj1Build1[igp-proj1 Build ...]
    IgpProj1Build1 --> IgpProj1Push1[igp-proj1 Push ...]
    IgpProj1Push1 --> IgpProj1Depl1[igp-proj1 Depl...]
    IgpProj1Depl1 --> Deploy[Deploy to k8s c...]
    Deploy --> End((End))

```

But after that, when I checked the status of PODs, PODs did not come and they were there as "0" for most of the time.

```

edureka@kmaster:~$ kubectl describe deployment abc-tech-deploy
Name: abc-tech-deploy
Namespace: default
CreationTimestamp: Tue, 04 Jun 2024 04:25:23 +0000
Labels:
Annotations:
Selector: app=abc_deploy
Replicas: 3 desired | 0 updated | 0 total | 0 available | 0 unavailable
StrategyType: RollingUpdate
MinReadySeconds: 0
RollingUpdateStrategy: 25% max unavailable, 25% max surge
Pod Template:
Labels: app=abc_deploy
Containers:
abc-app:

```

Checked the status of namespaces, during that time kube-controller-manager-kmaster was not running

and it was in “CrashLoopBackoff” and checked the logs, found the issue with cidr ip address.

```
edureka@kmaster:~$ kubectl get pods --all-namespaces
NAMESPACE      NAME          READY   STATUS    RESTARTS   AGE
kube-flannel   kube-flannel-ds-2hbpj   1/1     Running   22        9d
kube-flannel   kube-flannel-ds-nl677   1/1     Running   22        9d
kube-system    coredns-66bfff467f8-6k6lj  1/1     Running   19        9d
kube-system    coredns-66bfff467f8-p4dz9  1/1     Running   19        9d
kube-system    etcd-kmaster          1/1     Running   20        9d
kube-system    kube-apiserver-kmaster  1/1     Running   20        9d
kube-system    kube-controller-manager-kmaster  0/1     CrashLoopBackOff  142      3d8h
kube-system    kube-proxy-8ktfc       1/1     Running   20        9d
kube-system    kube-proxy-cqnxv      1/1     Running   20        9d
kube-system    kube-scheduler-kmaster  1/1     Running   20        9d

edureka@kmaster:~$ kubectl logs kube-controller-manager-kmaster -n kube-system
I0606 04:35:50.775283 1 [serving.go:313] Generated self-signed cert in-memory
I0606 04:35:51.218540 1 [controllermanager.go:161] Version: v1.18.20
I0606 04:35:51.219828 1 [dynamic_cafe_content.go:167] Starting request-header:::/etc/kuber
netes/pki/front_proxy-ca.crt
I0606 04:35:51.220045 1 [dynamic_cafe_content.go:167] Starting client-ca-bundle:::/etc/kub
ernetes/pki/ca.crt
I0606 04:35:51.220554 1 [secure_serving.go:178] Serving securely on 127.0.0.1:10257
I0606 04:35:51.220745 1 [tlsconfig.go:240] Starting DynamicServingCertificateController
I0606 04:35:51.221593 1 [deprecated_insecure_serving.go:53] Serving insecurely on [:]:1025
2
I0606 04:35:51.221673 1 [leadelection.go:242] attempting to acquire leader lease kube-sy
stem/kube-controller-manager...
I0606 04:36:07.446966 1 [leadelection.go:252] successfully acquired lease kube-system/kub
e-controller-manager
I0606 04:36:07.447449 1 [event.go:278] Event{v1.ObjectReference{Kind:"Endpoints", Namespace
:"kube-system", Name:"kube-controller-manager", UID:"51d47cdb-b850-4456-93a0-2c54f52f14b9", APIV
ersion:"v1"}, ResourceVersion:"131178", FieldPath:""}: type: 'Normal' reason: 'LeaderElection' k
master_48b5e0ff-a439-45fe-891a-9fc03adfbcb7b became leader

[0606 04:36:08.496675      1 cleaner.go:82] Starting CSR cleaner controller
[0606 04:36:08.503768      1 node_ipam_controller.go:94] Sending events to api server.
[0606 04:36:09.507365      1 request.go:621] Throttling request took 1.038095367s, request: GET
:https://172.31.0.48:6443/apis/authorization.k8s.io/v1beta1?timeout=32s
[0606 04:36:18.507498      1 range_allocator.go:82] Sending events to api server.
[0606 04:36:18.507605      1 range_allocator.go:116] No Secondary Service CIDR provided. Skippi
ng filtering out secondary service addresses.
[0606 04:36:18.507638      1 controllermanager.go:521] Error starting "nodeipam"
[0606 04:36:18.507649      1 controllermanager.go:235] error starting controllers: failed to ma
rk cidr[10.244.0.0/24] at idx [0] as occupied for node: kmaster: cidr 10.244.0.0/24 is out the r
ange of cluster cidr 192.168.0.0/16
edureka@kmaster:~$ kubectl describe service abc-tech-deploy
```

Changed the cidr ip address from 192.168.0.0/16 to 10.244.0.0/12 and initialized the kubeadm with new ip address range

```
edureka@kmaster:~$ sudo kubeadm init --apiserver-advertise-address=172.31.0.48 --pod-network-cid
r=10.244.0.0/12 --ignore-preflight-errors=ALL
I0606 05:28:00.632555 20010 version.go:252] remote version is much newer: v1.30.1; falling bac
k to: stable-1.18
W0606 05:28:02.613197 20010 configset.go:202] WARNING: kubeadm cannot validate component config
s for API groups [kubelet.config.k8s.io kubeproxy.config.k8s.io]
[init] Using Kubernetes version: v1.18.20
[preflight] Running pre-flight checks
    [WARNING Port-6443]: Port 6443 is in use
    [WARNING Port-10259]: Port 10259 is in use
    [WARNING FileAvailable--etc-kubernetes-manifests-kube-apiserver.yaml]: /etc/kubernetes/m
anifests/kube-apiserver.yaml already exists
    [WARNING FileAvailable--etc-kubernetes-manifests-kube-controller-manager.yaml]: /etc/kub
ernetes/manifets/kube-controller-manager.yaml already exists
    [WARNING FileAvailable--etc-kubernetes-manifests-kube-scheduler.yaml]: /etc/kubernetes/m
anifests/kube-scheduler.yaml already exists
    [WARNING FileAvailable--etc-kubernetes-manifests-etcd.yaml]: /etc/kubernetes/manifets/e
tcetd.yaml already exists
```

Executed the next steps for kubeadm.

```
edureka@kmaster:~$ kubectl get nodes
NAME      STATUS   ROLES   AGE   VERSION
<master>  Ready    master   9d    v1.18.3
<slavel>  Ready    <none>  9d    v1.18.3

edureka@kmaster:~$ kubectl get pods -o wide
NAME           READY   STATUS    RESTARTS   AGE   IP          NODE   N
OMINATED NODE  READINESS GATES
abc-tech-deploy-85bfcd4c88-6nm76  1/1   Running   0      8m11s  10.244.1.3  kslavel  <
none>          <none>
abc-tech-deploy-85bfcd4c88-7wvbn  1/1   Running   0      8m11s  10.244.1.4  kslavel  <
none>          <none>
abc-tech-deploy-85bfcd4c88-xzjg7  1/1   Running   0      8m11s  10.244.1.5  kslavel  <
none>          <none>
```

```
edureka@kmaster:~$ kubectl get deployment -o wide
NAME           READY   UP-TO-DATE   AVAILABLE   AGE   CONTAINERS   IMAGES
ECTOR          abc-tech-deploy 3/3       3           31m   abc-app      tgreddy1/abc_tech:20   app
=abc_deploy
```

With that change, PODs got available; then ran the build from Jenkins and the build got successful without any issue.

The screenshot shows the Jenkins Pipeline interface. On the left, there's a sidebar with GitHub, Stages, Rename, and Pipeline Syntax options. Below it is a 'Build History' section with a filter and a link to '#21'. The main area is titled 'Console Output' and shows the following log:

```

Started by user TGReddy
[Pipeline] Start of Pipeline
[Pipeline] node
[Pipeline] Running on Jenkins in /var/lib/jenkins/workspace/purdue-igp-project
[Pipeline] {
[Pipeline] stage
[Pipeline] { (igp-proj1 code checkout)
[Pipeline]   [Pipeline] init
+ sed -i s/abc_tech:latest/abc_tech:21/g deploy.yaml
[Pipeline] sh
+ kubectl create -f deploy.yaml
deployment.apps/abc-tech-deploy created
[Pipeline] sh
+ kubectl create -f svc.yaml
service/abc-nodeport-svc created
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS

```

With this I have completed the pipeline for code pull to deployment as container with docker & K8S.

Step4:



Installed the node-exporter in Edureka Master server.

```
sudo wget https://github.com/prometheus/node\_exporter/releases/download/v1.7.0/node\_exporter-1.7.0.linux-amd64.tar.gz
```

```

filename%3Dnode_exporter-1.7.0.linux-amd64.tar.gz&response-content-type=application%2Foctet-stream [following]
--2024-06-04 05:12:26-- https://objects.githubusercontent.com/github-production-release-asset-2e65be/9524057/01323270-6ecb-47aa-813f-52a2a89cdc64?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=releaseassetproduction%2F20240604%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20240604T051226Z&X-Amz-Expires=300&X-Amz-Signature=4912bb1266343370555861205b598d739e5ef2c1730d6545169e9353739732ef&X-Amz-SignedHeaders=host&actor_id=0&key_id=0&repo_id=9524057&response-content-disposition=attachment%3Bfilename%3Dnode_exporter-1.7.0.linux-amd64.tar.gz&response-content-type=application%2Foctet-stream
Resolving objects.githubusercontent.com (objects.githubusercontent.com)... 185.199.109.133, 185.199.110.133, 185.199.111.133, ...
Connecting to objects.githubusercontent.com (objects.githubusercontent.com) | 185.199.109.133|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 10419253 (9.9M) [application/octet-stream]
Saving to: 'node_exporter-1.7.0.linux-amd64.tar.gz'

node_exporter-1.7.0 100%[=====] 9.94M ---KB/s in 0.05s
2024-06-04 05:12:27 (201 MB/s) - 'node_exporter-1.7.0.linux-amd64.tar.gz' saved [10419253/10419253]

edureka@kmaster:~$ █

sudo tar xzf node_exporter-1.7.0.linux-amd64.tar.gz

edureka@kmaster:~$ sudo tar xzf node_exporter-1.7.0.linux-amd64.tar.gz
edureka@kmaster:~$ sudo rm -rf node_exporter-1.7.0.linux-amd64.tar.gz
edureka@kmaster:~$ █

sudo mv node_exporter-1.7.0.linux-amd64 /etc/node_exporter
sudo nano /etc/systemd/system/node_exporter.service

edureka@kmaster:~$ sudo tar xzf node_exporter-1.7.0.linux-amd64.tar.gz
edureka@kmaster:~$ sudo rm -rf node_exporter-1.7.0.linux-amd64.tar.gz
edureka@kmaster:~$ sudo mv node_exporter-1.7.0.linux-amd64 /etc/node_exporter
edureka@kmaster:~$ sudo nano /etc/systemd/system/node_exporter.service
edureka@kmaster:~$ sudo nano /etc/systemd/system/node_exporter.service
edureka@kmaster:~$ █

sudo systemctl daemon-reload
sudo systemctl enable node_exporter
sudo systemctl restart node_exporter

sudo systemctl status node_exporter

edureka@kmaster:~$ sudo systemctl enable node_exporter
Created symlink /etc/systemd/system/multi-user.target.wants/node_exporter.service → /etc/systemd/system/node_exporter.service.
edureka@kmaster:~$ sudo systemctl restart node_exporter
edureka@kmaster:~$ sudo systemctl status node_exporter
● node_exporter.service - Node Exporter
   Loaded: loaded (/etc/systemd/system/node_exporter.service; enabled; vendor pr
   Active: active (running) since Tue 2024-06-04 05:19:19 UTC; 32s ago
     Main PID: 28248 (node_exporter)
        Tasks: 4 (limit: 4915)
       CGroup: /system.slice/node_exporter.service
               └─28248 /etc/node_exporter/node_exporter

Jun 04 05:19:19 kmaster node_exporter[28248]: ts=2024-06-04T05:19:19.842Z caller
Jun 04 05:19:19 kmaster node_exporter[28248]: ts=2024-06-04T05:19:19.845Z caller
Jun 04 05:19:19 kmaster node_exporter[28248]: ts=2024-06-04T05:19:19.845Z caller

```

Updated the Prometheus.yml file to collect metrics. (/opt/prometheus-2.27) in Edureka Master node.

```

# my global config
global:
  scrape_interval:      15s # Set the scrape interval to every 15 seconds.
  Default is every 1 minute.
  evaluation_interval: 15s # Evaluate rules every 15 seconds. The default
  is every 1 minute.
  # scrape_timeout is set to the global default (10s).

# Alertmanager configuration
alerting:
  alertmanagers:
    - static_configs:
      - targets:
        # - alertmanager:9093

# Load rules once and periodically evaluate them according to the global
# 'evaluation_interval'.
rule_files:
  # - "first_rules.yml"
  # - "second_rules.yml"

# A scrape configuration containing exactly one endpoint to scrape:
# Here it's Prometheus itself.

# A scrape configuration containing exactly one endpoint to scrape:
# Here it's Prometheus itself.
scrape_configs:
  # The job name is added as a label `job=<job_name>` to any timeseries s
  #爬 from this config.
  # metrics_path defaults to '/metrics'
  # scheme defaults to 'http'.
  - job_name: 'prometheus'
    static_configs:
      - targets: ['localhost:9090']
  - job_name: 'node_exporter'
    scrape_interval: 5s
    static_configs:
      - targets: ['localhost:9100']

```

```

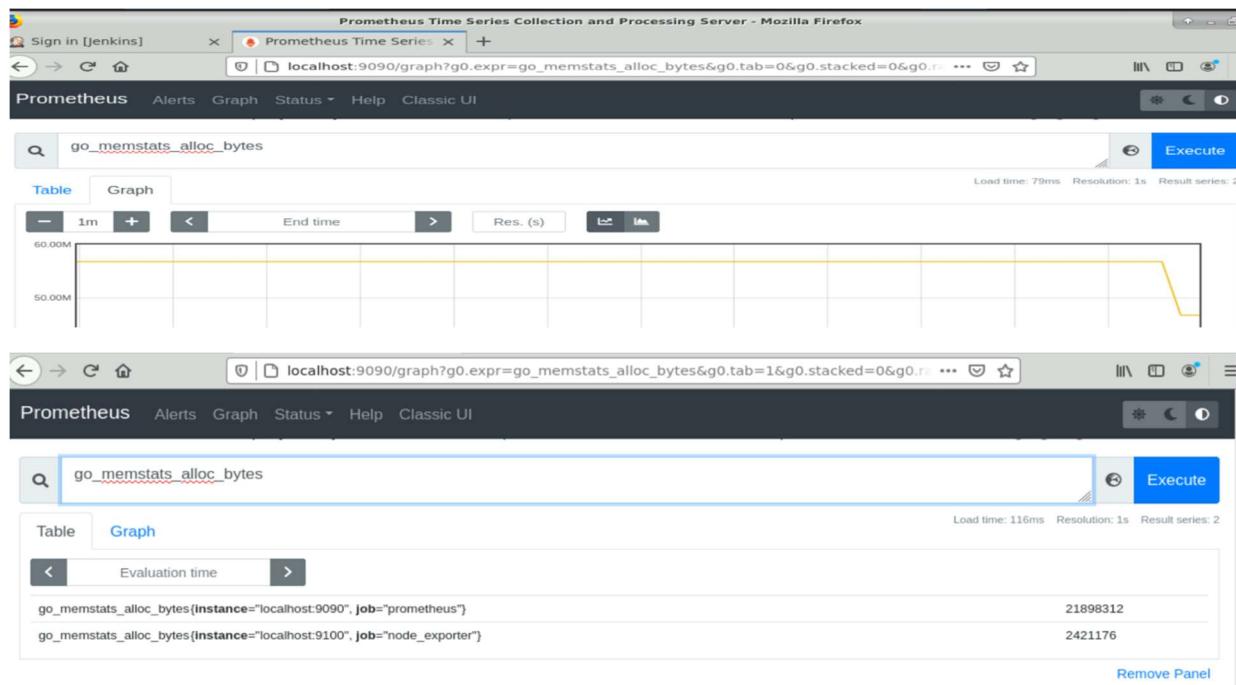
edureka@kmaster:/opt/prometheus-2.27$ vi prometheus.yml
edureka@kmaster:/opt/prometheus-2.27$ sudo /opt/prometheus-2.27/prometheus
--config.file=/opt/prometheus-2.27/prometheus.yml
level=info ts=2024-06-05T05:39:12.635Z caller=main.go:388 msg="No time or
size retention was set so using the default time retention" duration=15d
level=info ts=2024-06-05T05:39:12.635Z caller=main.go:426 msg="Starting P
rometheus" version="(version=2.27.1, branch=HEAD, revision=db7f0bcec27bd8
aeebad6b08ac849516efa9ae02)"
level=info ts=2024-06-05T05:39:12.635Z caller=main.go:431 build_context="
(go=g01.16.4, user=root@fd804fb4f25, date=20210518-14:17:54)"
level=info ts=2024-06-05T05:39:12.635Z caller=main.go:432 host_details="(
Linux 4.15.0-1021-aws #21-Ubuntu SMP Tue Aug 28 10:23:07 UTC 2018 x86_64
kmaster (none))"
level=info ts=2024-06-05T05:39:12.636Z caller=main.go:433 fd_limits="(sof
t=1024 hard=4096)"

```

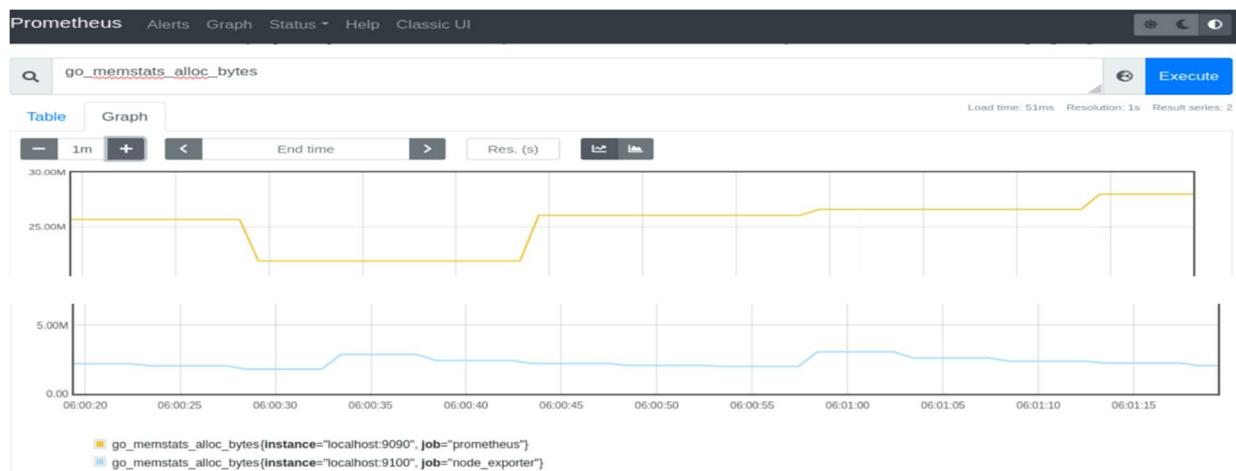
After starting prometheus, this is the page that got displayed.

Resource utilizations can be created in data value as well as for Graph for multiple parameters.

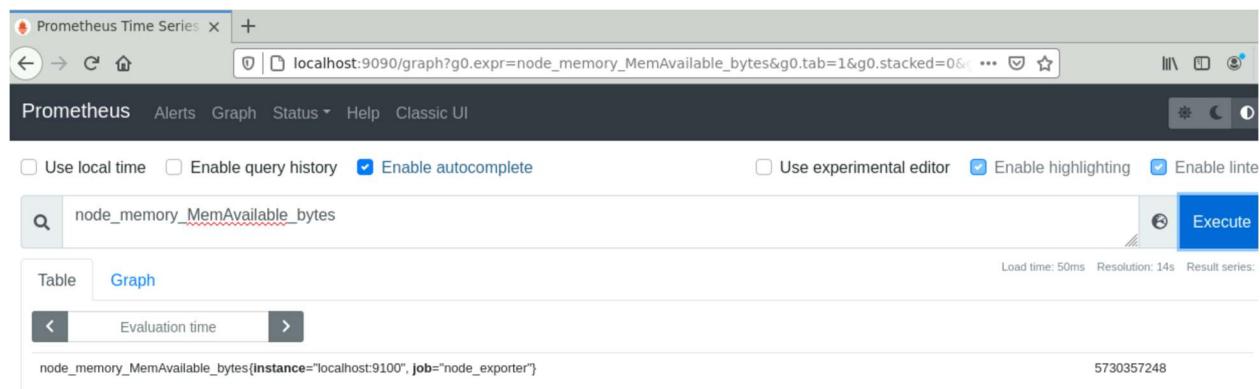
Memory Stats

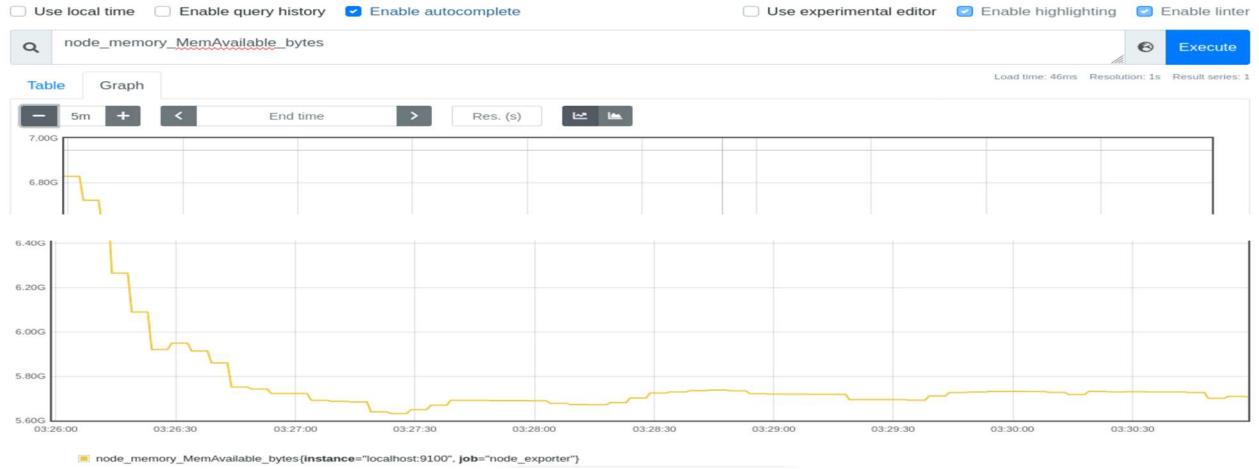


## Memory Stats by Graph

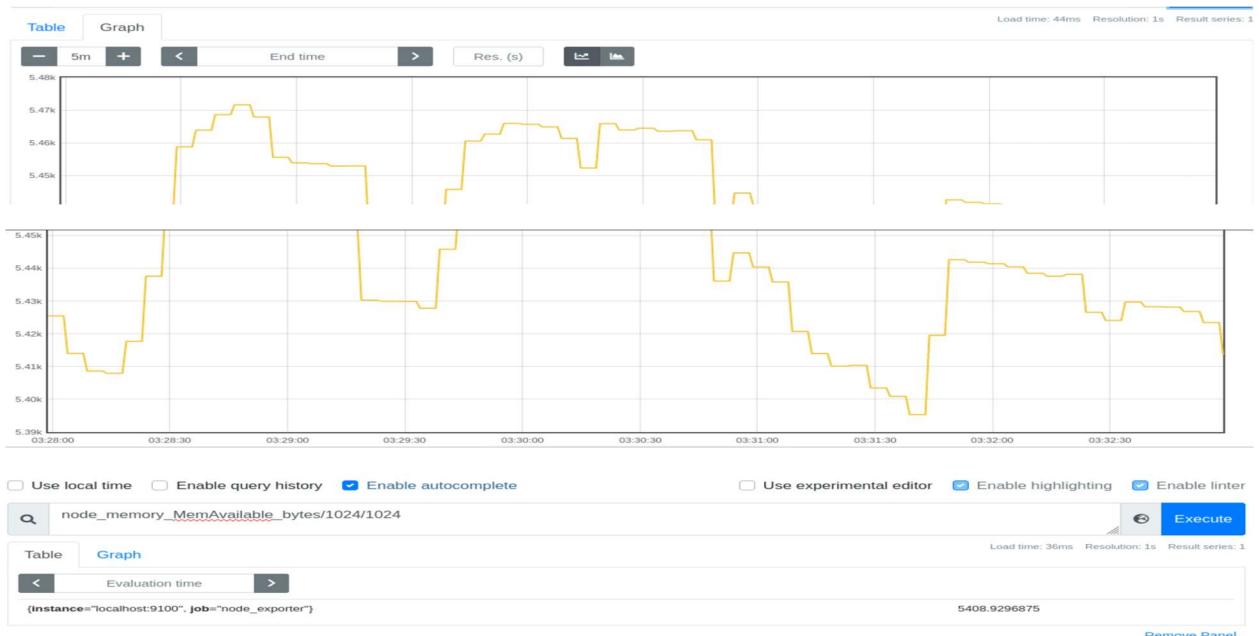


## Available Memory Graph

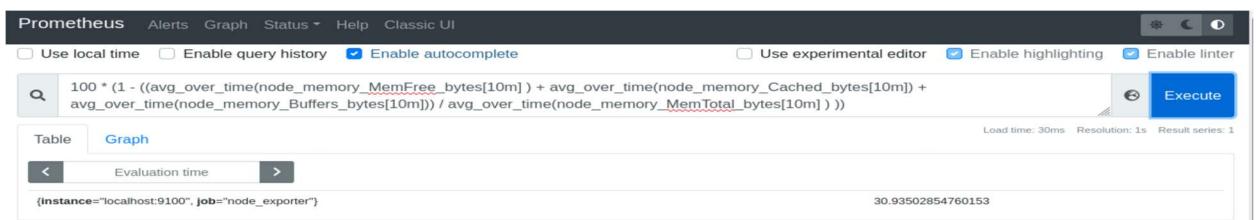




## Memory in MB



## Load Memory %





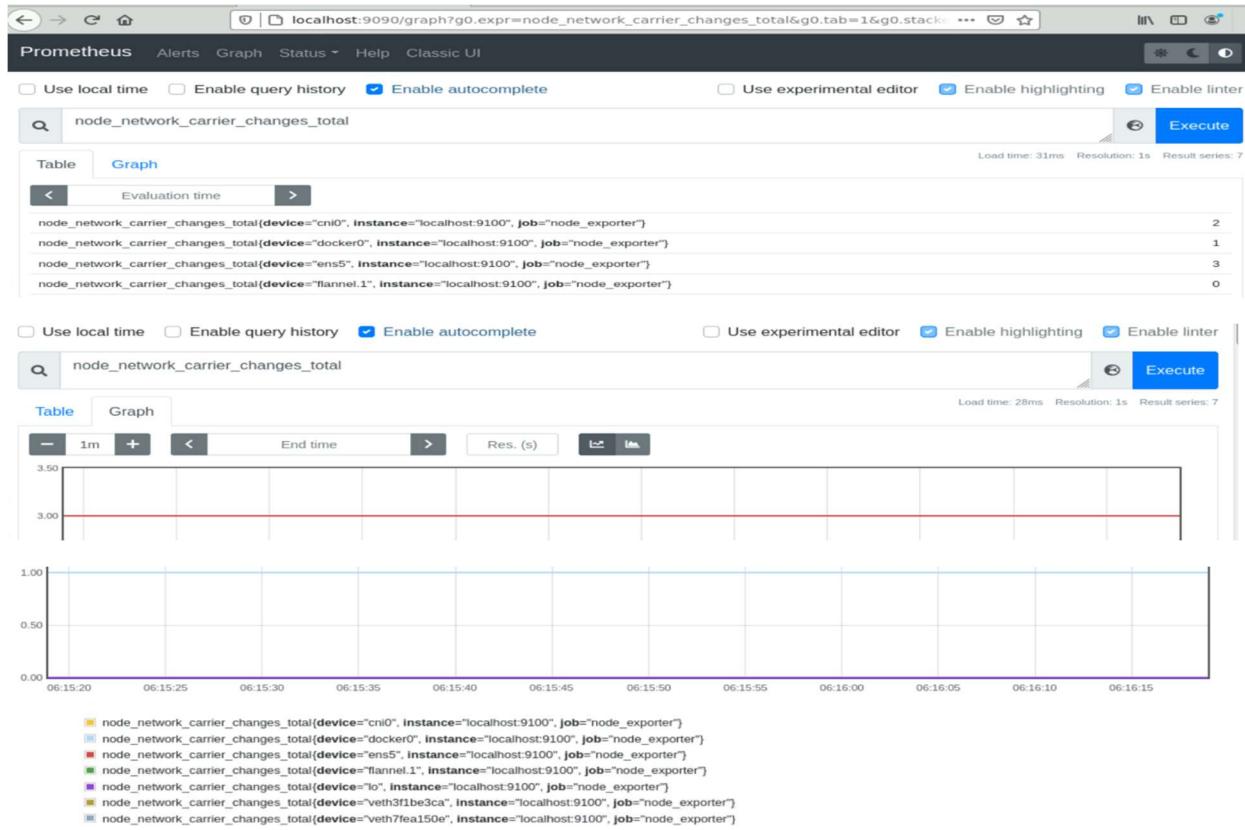
CPU Utilization values & graph.

This screenshot shows a more detailed view of CPU utilization metrics. The top part is identical to the previous one, showing the overall trend. Below it, a search bar contains the query `node_cpu_seconds_total`. The results table shows data for both CPU 0 and CPU 1 across various modes:

Mode	CPU 0	CPU 1
idle	8588.34	0
iowait	214.98	0
irq	0	15.27
nice	0.09	354.9
softirq	0	288.8
steal	0	613.56
system	0	621.79
user	0	623.27

The bottom part of the screenshot shows a zoomed-in view of the CPU 1 utilization for the user mode. The graph displays a step function with a value of 621.13 at 06:13:23 and 623.27 at 06:13:48. A tooltip provides the exact timestamp and value: "2024-06-05 06:13:23 +00:00 node\_cpu\_seconds\_total: 621.13 cpu: 1 instance: localhost:9100 job: node\_exporter mode: user".

Network related metrics.



## Setting up the targets in prometheus

The screenshot shows the Prometheus Targets page with the URL `localhost:9090/targets`.

**Targets Table:**

All	Unhealthy	Collapse All			
<b>node_exporter (1/1 up)</b> <a href="#">show less</a>					
Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
<a href="#">http://localhost:9100/metrics</a>	UP	instance="localhost:9100" job="node_exporter"	2.108s ago	33.794ms	
<b>prometheus (1/1 up)</b> <a href="#">show less</a>					
Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
<a href="#">http://localhost:9090/metrics</a>	UP	instance="localhost:9090" job="prometheus"	6.903s ago	14.546ms	

**Alerts Page:**

The screenshot shows the Prometheus Alerts page with the URL `localhost:9090/alerts`. It displays three alert status indicators: Inactive (0), Pending (0), and Firing (0).

## Verify configurations in prometheus GUI

```

global:
  scrape_interval: 15s
  scrape_timeout: 10s
  evaluation_interval: 15s
alerting:
  alertmanagers:
    - follow_redirects: true
      scheme: http
      timeout: 10s
      api_version: v2
      static_configs:
        - targets: []

scrape_configs:
  - job_name: prometheus
    honor_timestamps: true
    scrape_interval: 15s
    scrape_timeout: 10s
    metrics_path: /metrics
    scheme: http
    follow_redirects: true
    static_configs:
      - targets:
          - localhost:9090
    - job_name: node_exporter
      honor_timestamps: true
      scrape_interval: 5s
      scrape_timeout: 5s
      metrics_path: /metrics

```

follow\_redirects: true  
static\_configs:  
- targets:  
  - localhost:9090  
- job\_name: node\_exporter  
  honor\_timestamps: true  
  scrape\_interval: 5s  
  scrape\_timeout: 5s  
  metrics\_path: /metrics  
  scheme: http  
  follow\_redirects: true  
  static\_configs:  
    - targets:  
      - localhost:9100

## Service Discovery

- [node\\_exporter](#) (1/1 active targets)
- [prometheus](#) (1/1 active targets)

[node\\_exporter](#) [show more](#)

[prometheus](#) [show more](#)

## Metrics that can be displayed

```

HELP go_gc_duration_seconds A summary of the pause duration of garbage collection cycles.
TYPE go_gc_duration_seconds summary
_gc_duration_seconds{quantile="0"} 4.7911e-05
_gc_duration_seconds{quantile="0.25"} 6.691e-05
_gc_duration_seconds{quantile="0.5"} 8.521e-05
_gc_duration_seconds{quantile="0.75"} 0.000234531
_gc_duration_seconds{quantile="1"} 0.006363339
_gc_duration_seconds sum 0.012033066
_gc_duration_seconds count 12
HELP go_goroutines Number of goroutines that currently exist.
TYPE go_goroutines gauge
_goroutines 34
HELP go_info Information about the Go environment.
TYPE go_info gauge
_info{version="go1.16.4"} 1
HELP go_memstats_alloc_bytes Number of bytes allocated and still in use.
TYPE go_memstats_alloc_bytes gauge
_memstats_alloc_bytes 2.7815552e+07
HELP go_memstats_alloc_bytes_total Total number of bytes allocated, even if freed.
TYPE go_memstats_alloc_bytes_total counter
_memstats_alloc_bytes_total 1.16090576e+08
HELP go_memstats_buck_hash_sys_bytes Number of bytes used by the profiling bucket hash table.
TYPE go_memstats_buck_hash_sys_bytes gauge
_memstats_buck_hash_sys_bytes 1.470888e+06
HELP go_memstats_frees_total Total number of frees.

```

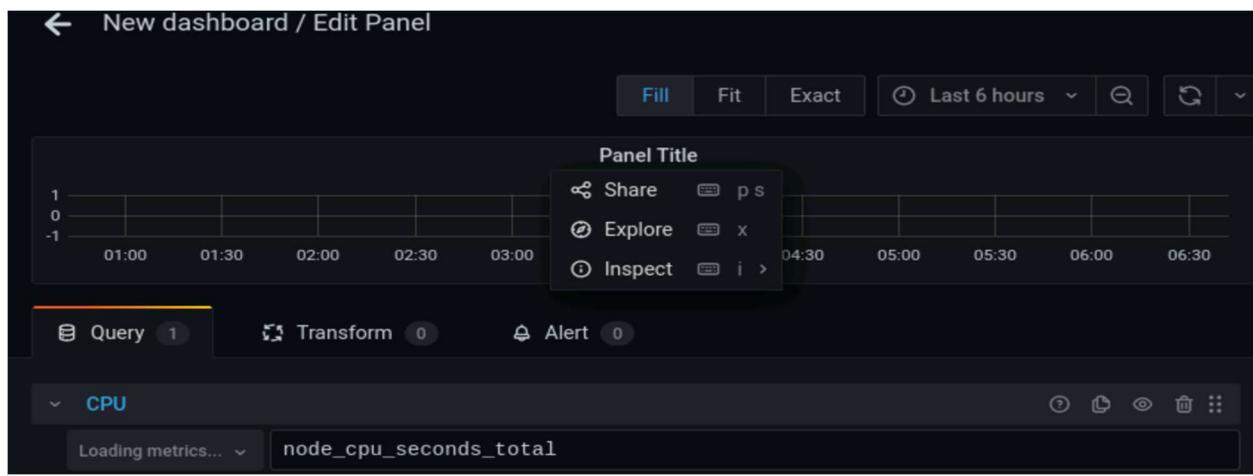
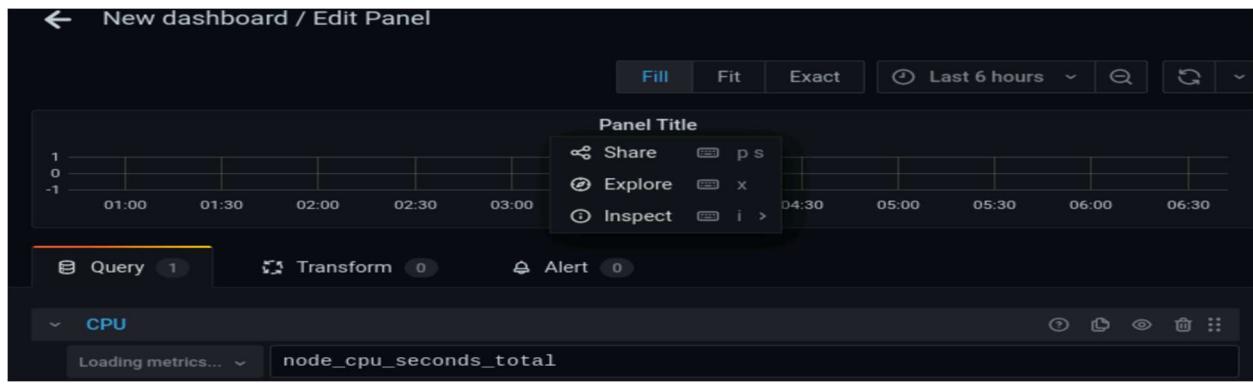
Started the grafana service in Edureka master node.

```
sudo systemctl start grafana-server
```

Logged in using the user "admin"

The image consists of three vertically stacked screenshots of the Grafana web application.

- Screenshot 1: Grafana Home Screen**  
The top screenshot shows the Grafana home page. It features a "Welcome to Grafana" banner, navigation links for "General / Home", "TUTORIAL", "DATA SOURCES", and "DASHBOARDS". A sidebar on the left contains icons for search, add, dashboard, user, alert, and settings.
- Screenshot 2: Prometheus Data Source Settings**  
The middle screenshot shows the "Settings" tab of the Prometheus data source configuration. It includes fields for "Name" (set to "Prometheus"), "Default" status (unchecked), and an "HTTP" section with "URL" (set to "http://localhost:9090") and "Access" (set to "Server (default)").
- Screenshot 3: Detailed Prometheus Configuration**  
The bottom screenshot provides a closer look at the "HTTP" section of the Prometheus configuration. It shows the "URL" field with "http://localhost:9090" and the "Access" dropdown set to "Server (default)".



With the above steps, completed the project 1 using DevOps utilities. I have completed this project with the help of Support teams (multiple people helped me whenever there is an issue) and lot of materials from Internet (in the respective websites, I have not noted/copied down the list of websites that I had referred for this). I am very much thankful to Edureka instructors who explained and guided me to complete this project.

## Thank You