

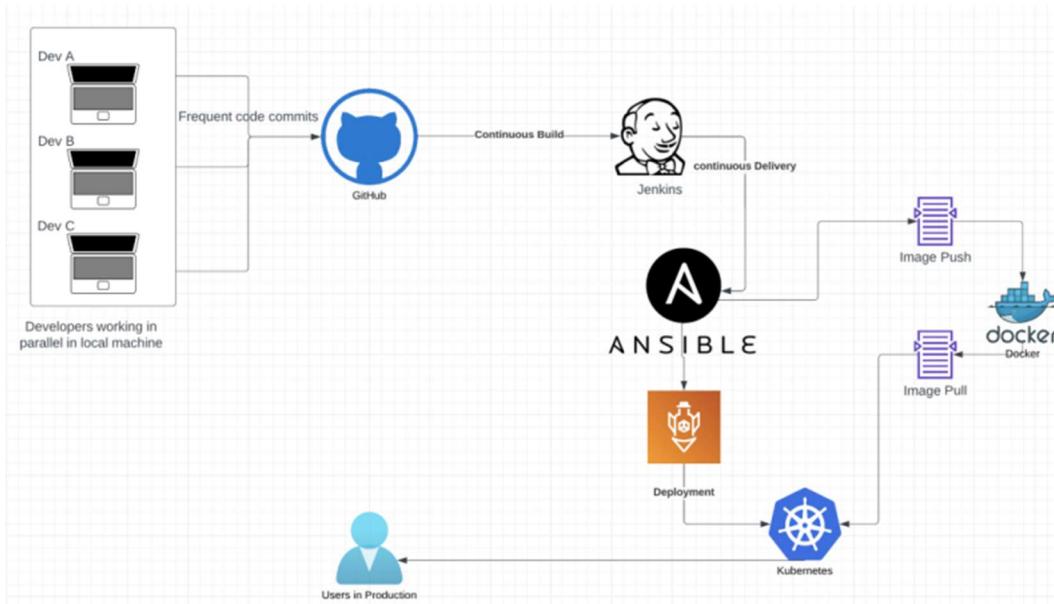
Industry Grade Project – II is selected as part of this exercise.

Goal of the project

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

- Develop a continuous integration pipeline in Jenkins to compile, test and package the code
- CICD pipeline to resolve business challenges by XYZ technologies.
- Real-time understanding and hands-on with Git, Jenkins, Ansible, Docker, Kubernetes, and AWS Devops services

Data Architecture Flow/Process Flow



Approach followed to create this project.

- 1) Downloaded the code (IGP Project2) from Edureka course.
- 2) Installed gitbash in local machine
- 3) Created a repository in GitHub with the name `purdue-igp-project2`
- 4) Published the code into remote (github.com/tgreddy1/purdue-igp-project2)
- 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

```
Ganganjanya@DESKTOP-MINGW64 ~/Downloads/industry_grade project ii/Industry Grade Project II - Java Project/XYZ Technologies
$ git init
Initialized empty Git repository in C:/Users/ganganjanya/Downloads/industry_grade project ii/Industry Grade Project II - Java Project/XYZ Technologies/.git/
Ganganjanya@DESKTOP-MINGW64 ~/Downloads/industry_grade project ii/Industry Grade Project II - Java Project/XYZ Technologies (main)
```

Downloads > industry_grade project ii > Industry Grade Project II - Java Project > XYZ Technologies			
Name	Date modified	Type	Size
.git	09-06-2024 18:49	File folder	
.settings	09-06-2024 18:45	File folder	
src	09-06-2024 18:45	File folder	
.classpath	09-06-2024 18:45	CLASSPATH File	2 KB
.project	09-06-2024 18:45	PROJECT File	1 KB
pom.xml	09-06-2024 18:45	XML Document	3 KB
pom.xml.bak	09-06-2024 18:45	BAK File	1 KB
README.md	09-06-2024 18:45	Markdown Source ...	1 KB

```
Ganganjanya@DESKTOP-MINGW64 ~/Downloads/industry_grade project ii/Industry Grade Project II - Java Project/XYZ Technologies
$ 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
    pom.xml
    pom.xml.bak
    src/
nothing added to commit but untracked files present (use "git add" to track)
```

```
Ganganjanya@DESKTOP-MINGW64 ~/Downloads/industry_grade project ii/Industry Grade Project II - Java Project/XYZ Technologies (main)
$ git add .
Ganganjanya@DESKTOP-MINGW64 ~/Downloads/industry_grade project ii/Industry Grade Project II - Java Project/XYZ Technologies (main)
$ git commit -m "IGP-project2-Commit"
[main (root-commit) 2493278] IGP-project2-Commit
13 files changed, 283 insertions(+)
create mode 100644 .classpath
create mode 100644 .project
create mode 100644 .settings
create mode 100644 README.md
create mode 100644 pom.xml
create mode 100644 pom.xml.bak
create mode 100644 src/main/java/com/xyz/AdminModule.java
create mode 100644 src/main/java/com/xyz/dataAccessObject/AdminDataAccessObject.java
create mode 100644 src/main/java/com/xyz/dataAccessObject/AdminDataAccessObject/AdminDataImp.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/xyz/dataAccessObject/AdminDataImpTest.java
Ganganjanya@DESKTOP-MINGW64 ~/Downloads/industry_grade project ii/Industry Grade Project II - Java Project/XYZ Technologies (main)
$ git status
On branch main
nothing to commit, working tree clean
Ganganjanya@DESKTOP-MINGW64 ~/Downloads/industry_grade project ii/Industry Grade Project II - Java Project/XYZ Technologies (main)
$
```

Owner * / Repository name *
 purdue-igp-project2 is available.

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

Description (optional)

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](#).

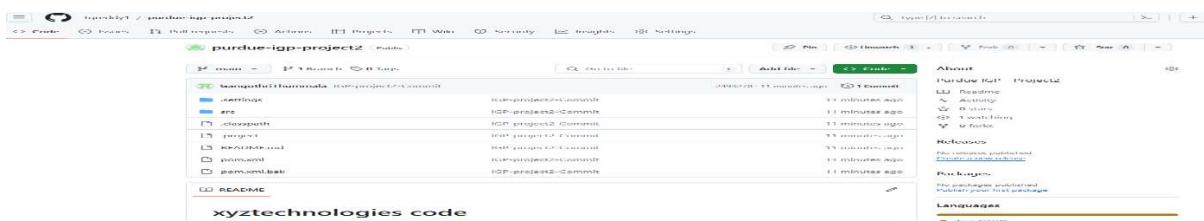
Add .gitignore
 Choose which files not to track from a list of templates. [Learn more about ignoring files](#).

Choose a license
 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

```
git remote add origin https://github.com/tgreddy1/purdue-igp-project2.git
git branch -M main
git push -u origin main
tanganjaneyal@DESKTOP-MINGW64 ~/Downloads/industry_grade project ii/Industry Grade Project II - Java Project/XYZ Technologies (main)
$ git remote add origin https://github.com/tgreddy1/purdue-igp-project2.git
tanganjaneyal@DESKTOP-MINGW64 ~/Downloads/industry_grade project ii/Industry Grade Project II - Java Project/XYZ Technologies (main)
$ git branch -M main
tanganjaneyal@DESKTOP-MINGW64 ~/Downloads/industry_grade project ii/Industry Grade Project II - Java Project/XYZ Technologies (main)
$ git push u origin main
Counting objects: 100% (29/29), done.
Delta compression using up to 4 threads
Compressing objects: 100% (20/20), done.
Writing objects: 100% (29/29), 4.44 KiB | 129.00 KiB/s, done.
Total 29 (delta 0), reused 0 (delta 0), pack-reused 0
To https://github.com/tgreddy1/purdue-igp-project2.git
 * [new branch]  main -> main
branch 'main' set up to track 'origin/main'.
```



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]
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
```

```
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]
```

```
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 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
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: 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 v
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 Serv
lines 1-18/18 (END)

```

Open the firewall.

```

edureka@kmaster:~$ sudo ufw status
status: inactive
edureka@kmaster:~$ sudo ufw allow 8090
Rules updated (v6)
edureka@kmaster:~$ sudo ufw status
status: inactive
edureka@kmaster:~$ sudo ufw allow 8080
skipping adding existing rule
skipping adding existing rule (v6)
edureka@kmaster:~$ sudo ufw enable
firewall is active and enabled on system startup
edureka@kmaster:~$ sudo ufw status
status: active
          Action      From
----- -----
8090      ALLOW      Anywhere
8080      ALLOW      Anywhere
8080 (v6)  ALLOW      Anywhere (v6)
8090 (v6)  ALLOW      Anywhere (v6)

```

2f9e7f2065cd4d74bfabe64d8d283527 – admin password to unlock Jenkins

The screenshot shows the Jenkins 'Getting Started' page. At the top, it says 'UNLOCK JENKINS'. Below that, it states: 'To ensure Jenkins is securely set up by the administrator, a password has been written to the log (not sure where to find it?) and this file on the server: /var/lib/jenkins/secrets/initialAdminPassword'. It also says 'Please copy the password from either location and paste it below.' A red box highlights the path '/var/lib/jenkins/secrets/initialAdminPassword'. A blue 'Continue' button is at the bottom right.

The screenshot shows the same 'Getting Started' page after the password has been entered. The 'Administrator password' field now contains a masked password. The blue 'Continue' button is visible at the bottom right.

Install the suggested Plugins

The screenshot shows the 'Getting Started' page with a grid of available Jenkins plugins. Plugins listed include Folders, Timestamper, Pipeline, OWASP Markup Validator, GitHub Branch Source, Build Timeout, Ant, Pipeline: GitHub Groovy Libraries, Credentials Binding, Gradle, Pipeline Graph View, Variant, SSH Credentials, Jenkins API, and commons-lang3 v2.x Jenkins. A red box highlights the 'Pipeline' plugin. The Jenkins version '2.452.1' is shown at the bottom left.

Create the jenkins user

The screenshot shows the 'Getting Started' page with a user creation form. It includes fields for 'Username' (purdue_igp_user), 'Password' (a masked password), and 'Confirm password'. A red box highlights the 'purdue_igp_user' field.

The screenshot shows the 'Instance Configuration' page. It has a 'Jenkins URL:' field containing 'http://localhost:8080/'. Below it, a note says 'The Jenkins URL is used to provide the root URL for absolute links to various Jenkins resources. That means this value is required for...'. At the bottom, there are 'Not now' and 'Save and Finish' buttons. A red box highlights the Jenkins URL field.

<http://localhost:8080/>

The screenshot shows the Jenkins dashboard. On the left, there's a sidebar with 'Dashboard >', 'New Item', 'Build History', 'Manage Jenkins', and 'My Views'. In the center, it says 'Welcome to Jenkins!'. Below that, it says 'This page is where your Jenkins jobs will be displayed. To get started, you can set up distributed builds or start building a software project.' At the bottom, there's a 'Start building your software project' button and a 'Create a job' input field. A red box highlights the 'Welcome to Jenkins!' message.

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/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
```

The screenshot shows the Jenkins Manage Jenkins dashboard. On the left, there's a sidebar with links: New Item, Build History, Manage Jenkins (which is selected and highlighted in blue), and My Views. Below the sidebar is a dropdown menu for the Build Queue. The main content area has a title 'Manage Jenkins'. A yellow banner at the top right says 'Building on the built-in node can be a security issue. You should set up distributed builds. See [the documentation](#)'. It includes three buttons: 'Set up agent', 'Set up cloud', and 'Dismiss'. Below the banner is a yellow box with the text 'Java 11 end of life in Jenkins' and two buttons: 'More Info' and 'Ignore'. At the bottom, there are two sections: 'System' (with a gear icon) and 'Tools' (with a wrench icon). Both sections have descriptive text below them.

Maven installations

Add Maven

Save **Apply**

Add Maven

Maven

Name: purdue-igp-maven

Install automatically

Install from Apache

Install from Apache

Version: 3.9.7

Add Installer ▾

Create project in Jenkins

Dashboard > All > Enter an item name

purdue-igp-project2 » 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 Creates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as Jenkins Pipeline) and/or organizing complex activities that do not easily fit in free-style job type.

Configure github URL

GitHub project

Project url ?

<https://github.com/tgreddy1/purdue-igp-project2.git/>

Script ?

```

1 pipeline
2 {
3     agent any
4     stages
5     {
6         stage("igp-project2 code checkout")
7         {
8             steps
9             {
10                // Get code from a GitHub repositorymain
11                git branch: 'main',
12                url: 'https://github.com/tgreddy1/purdue-igp-project2.git'
13            }
14        stage("igp-project2 code compile")
15        {
16            steps
17            {
18                sh 'mvn compile'
19
20            }
21        }
22    }
23    stage("igp-project2 code test")
24    {
25        steps
26        {
27            sh 'mvn test'
28        }
29    }
30    stage("igp-project2 code build")
31    {
32        steps
33        {
34            sh 'mvn package'
35        }
36    }
}

```

The screenshot shows the Jenkins interface for a build named "Build #1 (Jun 10, 2024, 12:32:47 AM)". The build status is "SUCCESS". The build duration was 2 min 50 sec. The build was started by user "TGreddy" and took 1 min 11 sec. The log output shows the following:

```

/jacoco.exec
[[1;34mINFO[m] Analyzed bundle 'adminModule' with 2
[[1;34mINFO[m] [1m-----
[[1;34mINFO[m] [1;32mBUILD SUCCESS[m
[[1;34mINFO[m] [1m-----
[[1;34mINFO[m] Total time: 12.787 s
[[1;34mINFO[m] Finished at: 2024-06-10T00:33:58Z
[[1;34mINFO[m] [1m-----
[Pipeline]
[Pipeline] // stage
[Pipeline]
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS

```

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

```

edureka@kmaster:/var/lib/jenkins/workspace/purdue-igp-project2/target$ ls
XYZtechnologies-1.0      generated-test-sources  site
XYZtechnologies-1.0.war   jacoco.exec            surefire-reports
classes                   maven-archiver        test-classes
generated-sources         maven-status
edureka@kmaster:/var/lib/jenkins/workspace/purdue-igp-project2/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/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
  DEP-11 Metadata [2464 B]
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 certificate 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
```

```
-- 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) ...
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) ...

sdureka@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.
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/

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)

Add the dockerhub credentials to Jenkins to execute the pipeline.

Dashboard > Manage Jenkins > Credentials

Credentials

T	P	Store	Domain	ID	Name
█	██	System	(global)	dockerhub_id	DockerHub Account

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

```

stage('igp-project2 Build Docker Image')
{
    steps
    {
        sh 'cp /var/lib/jenkins/workspace/$JOB_NAME/target/XYZtechnologies-1.0.war xyz_tech.war'
        sh 'docker build -t xyz_tech:$BUILD_NUMBER'
        sh 'docker tag xyz_tech:$BUILD_NUMBER tgreddy1/xyz_tech:$BUILD_NUMBER'
    }
}
stage('igp-project2 Push Docker Image')
{
    steps
    {
        withDockerRegistry([ credentialsId: "dockerhub_id", url: "" ])
        {
            sh 'docker push tgreddy1/xyz_tech:$BUILD_NUMBER'
        }
    }
}

stage('igp-project2 Deploy as container')
{
    steps
    {
        sh 'docker run -itd -P tgreddy1/xyz_tech:$BUILD_NUMBER'
    }
}
stage('Deploy to k8s cluster for Project 2 ')
{
    steps
    {
        sh "sed -i 's/xyz_tech:latest/xyz_tech:$BUILD_NUMBER/g' deploy_xyz.yaml"
        sh 'kubectl create -f deploy_xyz.yaml'
        sh 'kubectl create -f svc_xyz.yaml'
    }
}
```

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

```

</> Changes
  1. XYZ Technologies Project2 files Commit (commit: ed7be88) (details / githubweb)

Started by user TGReddy
This run spent:
  • 61 ms waiting;
  • 1 min 13 sec build duration;
  • 1 min 13 sec total from scheduled to completion.

git Revision: ed7be88857ba7f0c7fd2aff9b05f689813e4cd9f
Repository: https://github.com/tgreddy1/purdue-lgp-project2.git

[Pipeline] sh
+ docker run -itd -P tgreddy1/xyz_tech:2
be8117dd39d3b83b51bae47fe850afc864bdb7654b81d6b04a1674598fe5fe25
[Pipeline]
[Pipeline] // stage
[Pipeline]
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS

```

Installation on Ansible plugin in Jenkins

Name	Status
Ansible	Installed

Docker ps -a

CONTAINER ID	IMAGE	COMMAND	CREATED
STATUS			NA
be8117dd39d3	tgreddy1/xyz_tech:2	"catalina.sh run"	2 minutes ago
go_	Up 2 minutes	0.0.0.0:32768->8080/tcp, :::32768->8080/tcp	am
azing_tu			
0aa7779087a1	d70a5947d57e	"/opt/cni/bin/install"	4 minutes ago
go_	Exited (2) 4 minutes ago		k8
s_install-cni_calico-node-f8wqc_kube-system_e4223026-a52e-4dc9-accc-3bda47b9c14d			
_25			
dac3cc714e2b	67da37a9a360	"/coredns -conf /etc..."	2 hours ago
Up 2 hours			k8
s_coredns_coredns-66bff467f8-p4dz9_kube-system_d3d84b5d-b20a-4ffc-9fcc-7ffa5a8ad			
89f_20			

```

ca7caa63db19    k8s.gcr.io/pause:3.2          "/pause"           2 hours ago   k8
  Up 2 hours
s_POD_coredns-66bff467f8-p4dz9_kube-system_d3d84b5d-b20a-4ffc-9fcc-7ffa5a8ad89f_122
eac0a0119e9d    c49ccdef0ab0                  "/opt/bin/flanneld -..."  2 hours ago   k8
  Up 2 hours
s_kube-flannel_kube-flannel-ds-2hbpj_kube-flannel_6198b48a-9f00-4c83-a40e-c190f04dde96_23
1b06da31a71a    c49ccdef0ab0                  "cp -f /etc/kube-fla..."  2 hours ago   k8
  Exited (0) 2 hours ago
s_install-cni_kube-flannel-ds-2hbpj_kube-flannel_6198b48a-9f00-4c83-a40e-c190f04d96_0
225528525c37    flannel/flannel-cni-plugin    "cp -f /flannel /opt..."  2 hours ago   k8
  Exited (0) 2 hours ago
s_install-cni-plugin_kube-flannel-ds-2hbpj_kube-flannel_6198b48a-9f00-4c83-a40e-c190f04c190f04dde96_21
53628f7ac33c    d70a5947d57e                  "/opt/cni/bin/calico..."  2 hours ago   k8
  Exited (0) 2 hours ago
s_upgrade-ipam_calico-node-f8wqc_kube-system_e4223026-a52e-4dc9-accc-3bda47b9c14d_1
b2f56496106b    27f8b8d51985                 "/usr/local/bin/kube..."  2 hours ago   k8
  Up 2 hours

i4cb047efd23    a05ala79adaa                "kube-scheduler --au..."  2 hours ago   k8
  Up 2 hours
i_kube-scheduler_kube-scheduler-kmaster_kube-system_e541886a4cda0424b9879a78869a_1c51_21
i40f7f600d76    k8s.gcr.io/pause:3.2          "/pause"           2 hours ago   k8
  Up 2 hours
i_POD_kube-apiserver-kmaster_kube-system_96e971bc0b77f9ff41e087f4691674b6_21
i1bb3bf33cf5    k8s.gcr.io/pause:3.2          "/pause"           2 hours ago   k8
  Up 2 hours
i_POD_kube-controller-manager-kmaster_kube-system_a1c55946454cf66a5e00762a7acd3d_16_1
i98b9e32d305    k8s.gcr.io/pause:3.2          "/pause"           2 hours ago   k8
  Up 2 hours
i_POD_etcd-kmaster_kube-system_d9bf566719c981fbcbc95256827c80cc_21
i001e180c8a4    k8s.gcr.io/pause:3.2          "/pause"           2 hours ago   k8
  Up 2 hours
i_POD_kube-scheduler-kmaster_kube-system_e541886a4cda0424b9879a78869adc51_21
i904690bd9f     tgreddy1/abc_tech:21        "catalina.sh run"   3 days ago   bu
  Exited (143) 3 days ago
iy_ptolemy      Exited (2) 3 days ago          "kube-controller-man..."  3 days ago   k8

Exited (0) 3 days ago
i_POD_kube-flannel-ds-2hbpj_kube-flannel_6198b48a-9f00-4c83-a40e-c190f04dde96_20
i1b27df1e66     k8s.gcr.io/pause:3.2          "/pause"           3 days ago   k8
  Exited (0) 3 days ago
i_POD_kube-proxy-8ktfc_kube-system_d8031871-8df0-463d-aa54-19128f29df19_20
i768f202b8b     k8s.gcr.io/pause:3.2          "/kube-apiserver -ad..."  3 days ago   k8
  Exited (0) 3 days ago
i_kube-apiserver_kube-apiserver-kmaster_kube-system_96e971bc0b77f9ff41e087f469164b6_20
i2992a2bea61    a05ala79adaa                "kube-scheduler --au..."  3 days ago   k8
  Exited (2) 3 days ago
i_kube-scheduler_kube-scheduler-kmaster_kube-system_e541886a4cda0424b9879a78869a_1c51_20
i461429e516d    303ce5db0e90                 "etcd --advertise-cl..."  3 days ago   k8
  Exited (0) 3 days ago
i_POD_kube-apiserver-kmaster_kube-system_d9bf566719c981fbcbc95256827c80cc_20
i1dd3d9b8b     k8s.gcr.io/pause:3.2          "/pause"           3 days ago   k8
  Exited (0) 3 days ago
i_POD_kube-scheduler-kmaster_kube-system_e541886a4cda0424b9879a78869adc51_20
i71ee8824       k8s.gcr.io/pause:3.2          "/pause"           3 days ago   k8
  Exited (0) 3 days ago
i_POD_kube-apiserver-kmaster_kube-system_96e971bc0b77f9ff41e087f4691674b6_20
id3dd9cda17c    k8s.gcr.io/pause:3.2          "/pause"           3 days ago   k8
  Exited (0) 3 days ago

```

REPOSITORY	TAG	IMAGE ID	CREATED
SIZE			
tgreddy1/xyz_tech	3	fdb92f0a4030	2 hours ag
547MB			
tgreddy1/xyz_tech	2	bdf6e31dc690	2 hours ag
547MB			
tgreddy1/abc_tech	21	9cf21970628	3 days ago
547MB			
tgreddy1/abc_tech	20	6cbe95b4c01e	4 days ago
547MR			

After successful build this the web page that came for the IGP project 2 (XYZ Technologies).

Welcome to XYZ technologies

This is admin Module

Add User View User Delete User

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
OK
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/apt 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_PUBK
EY 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_PUBK
EY 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_PU
RKFY F88Q7QFRQR3AACF?
```

```
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.
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.
```

```
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).
kubectl 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).
kubectl 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:"2e7996e3e2712684bc73f0dec0200d64eec7fe40", 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@kslave1:~$
```

```
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

```

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/kubernetes/pki/front-proxy-ca.crt
I0606 04:35:51.220045 1 dynamic_cafe_content.go:167] Starting client-ca-bundle:::/etc/kubernetes/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 [::]:10257
I0606 04:35:51.2221673 1 leaderelection.go:242] attempting to acquire leader lease kube-system/kube-controller-manager...
I0606 04:36:07.446966 1 leaderelection.go:252] successfully acquired lease kube-system/kube-controller-manager
I0606 04:36:07.47449 1 event.go:278] Event{v1.ObjectReference{Kind:"Endpoints", Namespace:"kube-system", Name:"kube-controller-manager", UID:"51d47cdb-b850-4456-93a0-2c54f52f14b9", APIVersion:"v1", ResourceVersion:"131178", FieldPath:""}}, type: 'Normal' reason: 'LeaderElection' kmaster_48b5e0ff-a439-45fe-891a-9fc03adfbcb7 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. Skipping 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 mark cidr[10.244.0.0/24] at idx [0] as occupied for node: kmaster: cidr 10.244.0.0/24 is out the range 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-cidr=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 back to: stable-1.18
W0606 05:28:02.613197 20010 configset.go:202] WARNING: kubeadm cannot validate component configs 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/manifests/kube-apiserver.yaml already exists
  [WARNING FileAvailable--etc-kubernetes-manifests-kube-controller-manager.yaml]: /etc/kubernetes/manifests/kube-controller-manager.yaml already exists
  [WARNING FileAvailable--etc-kubernetes-manifests-kube-scheduler.yaml]: /etc/kubernetes/manifests/kube-scheduler.yaml already exists
  [WARNING FileAvailable--etc-kubernetes-manifests-etcd.yaml]: /etc/kubernetes/manifests/etcd.yaml already exists
```

Executed the next steps for kubeadm.

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 interface. At the top, there's a 'Build History' section with three entries: #3 (Jun 10, 2024, 1:13 AM), #2 (Jun 10, 2024, 12:57 AM), and #1 (Jun 10, 2024, 12:32 AM). Below this is a detailed view for Build #3 (Jun 10, 2024, 1:13:22 AM). The build was started by user TGReddy and took 58 seconds. The pipeline consists of several stages, all marked as successful (green checkmarks). The pipeline ID is #3. The log output for the build shows the Jenkins pipeline stages and the execution of Git commands to fetch code from a GitHub repository. The log also includes Maven compilation commands at the end.

```
Started by user TGReddy
[Pipeline] Start of Pipeline
[Pipeline] node
Running on Jenkins in /var/lib/jenkins/workspace/purdue-igp-project2
[Pipeline] {
[Pipeline] stage
[Pipeline] { (igp-project2 code checkout)
[Pipeline] git
The recommended git tool is: NONE
No credentials specified
> git rev-parse --resolve-git-dir /var/lib/jenkins/workspace/purdue-igp-project2/.git # timeout=10
Fetching changes from the remote Git repository
> git config remote.origin.url https://github.com/tgreddy1/purdue-igp-project2.git # timeout=10
Fetching upstream changes from https://github.com/tgreddy1/purdue-igp-project2.git

> git rev-parse --resolve-git-dir /var/lib/jenkins/workspace/purdue-igp-project2/.git # timeout=10
Fetching changes from the remote Git repository
> git config remote.origin.url https://github.com/tgreddy1/purdue-igp-project2.git # timeout=10
Fetching upstream changes from https://github.com/tgreddy1/purdue-igp-project2.git

> git --version # timeout=10
> git -v # 'git version 2.17.1'
> git fetch --tags --progress -- https://github.com/tgreddy1/purdue-igp-project2.git +refs/heads/*:refs/remotes/origin/* # timeout=10
> git rev-parse refs/remotes/origin/main^{commit} # timeout=10
Checking out Revision ed7be88857ba7f0c7fd2aff9b05f689813e4cd9f (refs/remotes/origin/main)
> git config core.sparsecheckout # timeout=10
> git checkout -f ed7be88857ba7f0c7fd2aff9b05f689813e4cd9f # timeout=10
> git branch -a -v --no-abbrev # timeout=10
> git branch -D main # timeout=10

Checking out Revision ed7be88857ba7f0c7fd2aff9b05f689813e4cd9f (refs/remotes/origin/main)
> git config core.sparsecheckout # timeout=10
> git checkout -b main ed7be88857ba7f0c7fd2aff9b05f689813e4cd9f # timeout=10
Commit message: "XYZ Technologies Project2 files Commit"
> git rev-list --no-walk ed7be88857ba7f0c7fd2aff9b05f689813e4cd9f # timeout=10
[Pipeline]
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (igp-project2 code compile)
[Pipeline] sh
+ mvn 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
[[1;34mINFO[m] Scanning for projects...
[[1;34mINFO[m]
[[1;34mINFO[m] [1m-----< [0;36mcom.xyz:XYZtechnologies[0;1m >-----[m
[[1;34mINFO[m] [1mBuilding adminModule 1.0[m
[[1;34mINFO[m] [1m-----[ war ]-----[ m

[36mXYZtechnologies[0;1m ---[m
[[1;34mINFO[m] Using 'UTF-8' encoding to copy filtered resources.
[[1;34mINFO[m] skip non existing resourceDirectory /var/lib/jenkins/workspace/purdue-igp-project2
/src/main/resources
[[1;34mINFO[m]
[[1;34mINFO[m] [1m--- [0;32mmaven-compiler-plugin:3.1:compile[m [1m(default-compile)[m @
[36mXYZtechnologies[0;1m ---[m
[[1;34mINFO[m] Nothing to compile - all classes are up to date
[[1;34mINFO[m] [1m-----[ m
[[1;34mINFO[m] [1;32mBUILD SUCCESS[m
[[1;34mINFO[m] [1m-----[ m
[[1;34mINFO[m] Total time: 2.866 s
[[1;34mINFO[m] Finished at: 2024-06-10T01:13:31Z
[[1;34mINFO[m] [1m-----[ m
[Pipeline] }

[Pipeline] { (igp-project2 code test)
[Pipeline] sh
+ 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
[[1;34mINFO[m] Scanning for projects...
[[1;34mINFO[m]
[[1;34mINFO[m] [1m-----< [0;36mcom.xyz:XYZtechnologies[0;1m >-----[m
[[1;34mINFO[m] [1mBuilding adminModule 1.0[m
[[1;34mINFO[m] [1m-----[ war ]-----[ m

[[1;34mINFO[m] [1m--- [0;32mmaven-resources-plugin:2.6:resources[m [1m(default-resources)[m @
[36mXYZtechnologies[0;1m ---[m
[[1;34mINFO[m] Using 'UTF-8' encoding to copy filtered resources.
[[1;34mINFO[m] skip non existing resourceDirectory /var/lib/jenkins/workspace/purdue-igp-project2
/src/main/resources
[[1;34mINFO[m]
[[1;34mINFO[m] [1m--- [0;32mmaven-compiler-plugin:3.1:compile[m [1m(default-compile)[m @
[36mXYZtechnologies[0;1m ---[m
[[1;34mINFO[m] Nothing to compile - all classes are up to date
[[1;34mINFO[m]
[[1;34mINFO[m] [1m--- [0;32mmaven-resources-plugin:2.6:testResources[m [1m(default-testResources)[m @
[36mXYZtechnologies[0;1m ---[m
[[1;34mINFO[m] Using 'UTF-8' encoding to copy filtered resources.
[[1;34mINFO[m] skip non existing resourceDirectory /var/lib/jenkins/workspace/purdue-igp-project2
/src/test/resources
[[1;34mINFO[m]

[[1;34mINFO[m] Surefire report directory: /var/lib/jenkins/workspace/purdue-igp-project2/target
/surefire-reports
-----
T E S T S
-----
Running com.xyz.dataAccessObject.AdminDataImpTest
Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.155 sec

Results :

Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[[1;34mINFO[m] [1m-----[ m
[[1;34mINFO[m] [1;32mBUILD SUCCESS[m
[[1;34mINFO[m] [1m-----[ m

```

```

[[1;34mINFO[m] [1m-----[m
[[1;34mINFO[m] [1;32mBUILD SUCCESS[m
[[1;34mINFO[m] [1m-----[m
[[1;34mINFO[m] Total time: 3.820 s
[[1;34mINFO[m] Finished at: 2024-06-10T01:13:38Z
[[1;34mINFO[m] [1m-----[m
[Pipeline]
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (igp-project2 code build)
[Pipeline] sh
+ mvn package
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by com.doodle.inject.internal.colib.core.$ReflectUtils$1 (file:/usr
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (igp-project2 Build Docker Image)
[Pipeline] sh
+ cp /var/lib/jenkins/workspace/purdue-igp-project2/target/XYZtechnologies-1.0.war xyz_tech.war
[Pipeline] sh
+ docker build -t xyz_tech:3 .
#1 [internal] load .dockerignore
#1 transferring context: 2B done
#1 DONE 0.1s

#2 [internal] load build definition from Dockerfile
#2 transferring dockerfile: 141B 0.0s done
#2 DONE 0.1s

#3 [internal] load metadata for docker.io/iamdevopstrainer/tomcat:base

#3 DONE 1.7s

#4 [1/2] FROM docker.io/iamdevopstrainer
/tomcat:base@sha256:bb49574b0fa6e5c0f8514987f95dd337b8117e5387f9327f080fa68caaefb316
#4 DONE 0.0s

#5 [internal] load build context
#5 transferring context: 7.13MB 0.1s done
#5 DONE 0.1s

#4 [1/2] FROM docker.io/iamdevopstrainer
/tomcat:base@sha256:bb49574b0fa6e5c0f8514987f95dd337b8117e5387f9327f080fa68caaefb316
#4 CACHED

#6 [2/2] COPY xyz_tech.war /usr/local/tomcat/webapps/

[Pipeline]
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (igp-project2 Push Docker Image)
[Pipeline] withDockerRegistry
$ docker login -u tgreddyl -p ***** https://index.docker.io/v1/
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-project2@tmp
/6d588445-6242-463f-b607-a6ea4be51de4/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded
[Pipeline]
[Pipeline] sh
+ docker push tgreddyl/xyz_tech:3

9f99f85da76a: Layer already exists
766f6e8770f3: Layer already exists
b18043518924: Layer already exists
5f3a5adb8e97: Layer already exists
2ee490fb316: Layer already exists
91ecdd7165d3: Layer already exists
9a11244a7e74: Layer already exists
e4b20fcc48f4: Layer already exists
73bfa217d66f: Layer already exists
6edcacf02042: Pushed
3: digest: sha256:6fc5e92390f697104df94785648117d5cf76863e958bac23a7c7ae23765b01e7 size: 3265
[Pipeline]
[Pipeline] // withDockerRegistry
[Pipeline]
[Pipeline] // stage
[Pipeline] stage

```

```

[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (igp-project2 Deploy as container)
[Pipeline] sh
+ docker run -itd -P tgreddy1/xyz_tech:3
597f7a2755c15a22cf112e0db38c2d7134d87de87073f401e675bfff59af8d30
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Deploy to k8s cluster for Project 2 )
[Pipeline] sh
+ sed -i s/xyz_tech:latest/xyz_tech:3/g deploy_xyz.yaml
[Pipeline] sh
+ kubectl create -f deploy_xyz.yaml

+ sed -i s/xyz_tech:latest/xyz_tech:3/g deploy_xyz.yaml
[Pipeline] sh
+ kubectl create -f deploy_xyz.yaml
deployment.apps/xyz-tech-deploy created
[Pipeline] sh
+ kubectl create -f svc_xyz.yaml
service/xyz-nodeport-svc created
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS

edureka@kmaster:~$ kubectl get nodes
NAME      STATUS   ROLES   AGE     VERSION
kmaster   Ready    master   13d    v1.18.3
kslave1  Ready    <none>  13d    v1.18.3
edureka@kmaster:~$ kubectl get pods -o wide
NAME                               READY   STATUS    RESTARTS   AGE     IP
abc-tech-deploy-78974cd967-6tqws  1/1    Running   1          3d19h  10.244.1
.10   kslave1  <none>   <none>    <none>   3d19h  10.244.1
abc-tech-deploy-78974cd967-dn8md  1/1    Running   1          3d19h  10.244.1
.13   kslave1  <none>   <none>    <none>   3d19h  10.244.1
abc-tech-deploy-78974cd967-k9j2w  1/1    Running   1          3d19h  10.244.1
.12   kslave1  <none>   <none>    <none>   3d19h  10.244.1
xyz-tech-deploy-68f8fddb5b-9dmtn  1/1    Running   0          8m51s  10.244.1
.14   kslave1  <none>   <none>    <none>   8m51s  10.244.1
xyz-tech-deploy-68f8fddb5b-lpv8p  1/1    Running   0          8m51s  10.244.1
.16   kslave1  <none>   <none>    <none>   8m51s  10.244.1
xyz-tech-deploy-68f8fddb5b-q6xl7  1/1    Running   0          8m51s  10.244.1
.15   kslave1  <none>   <none>    <none>   8m51s  10.244.1

edureka@kmaster:~$ kubectl get deployment -o wide
NAME           READY   UP-TO-DATE   AVAILABLE   AGE     CONTAINERS   IMAGES
              SELECTOR
abc-tech-deploy 3/3     3           3           3d19h  abc-app      tgreddy1
/abc_tech:21   app=abc_deploy
xyz-tech-deploy 3/3     3           3           10m    xyz-app      tgreddy1
/xyz_tech:3   app=xyz_deploy

```

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%2Fs%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%3B%20filename%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
```

```
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.
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  4 05:19:19 kmaster node_exporter[28248]: ts=2024-06-04T05:19:19.842Z 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']

```

```

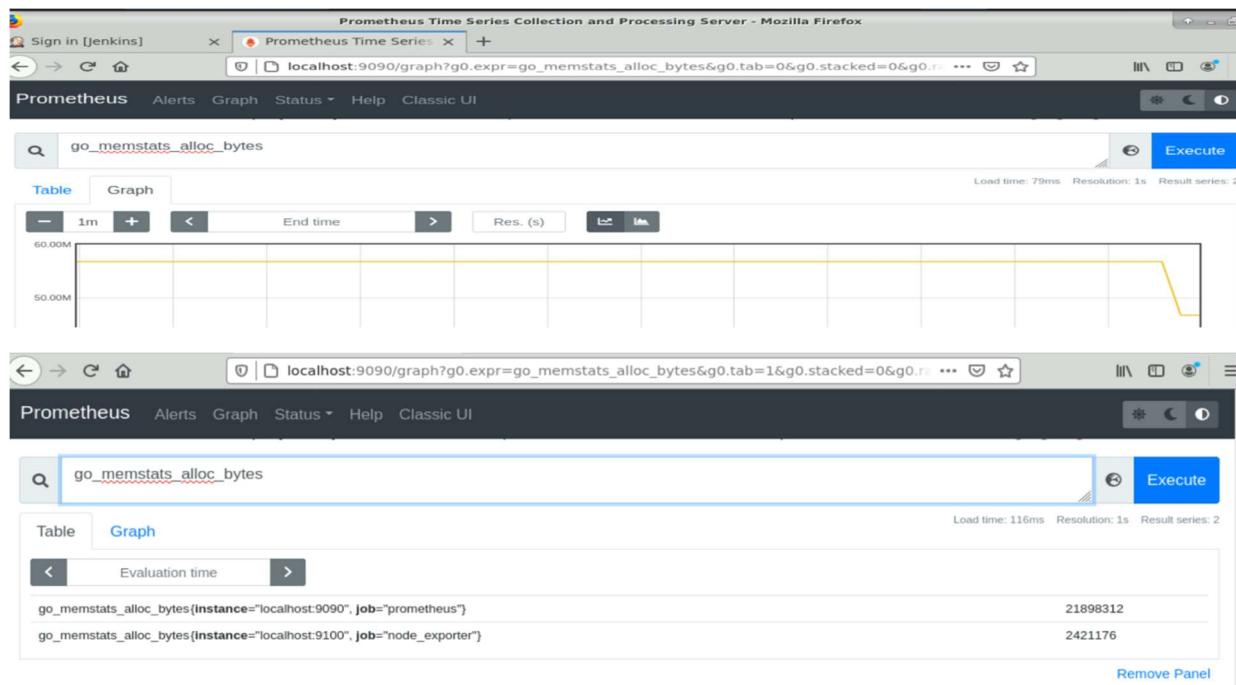
edureka@kmaster:/opt/prometheus-2.27$ vi prometheus.yml
edureka@kmaster:/opt/prometheus-2.27$ sudo /opt/prometheus-2.27/prometheus
--config.file=/opt/prometheus-2.27/prometheus.yml
level=info ts=2024-06-05T05:39:12.635Z caller=main.go:388 msg="No time or
size retention was set so using the default time 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)"

```

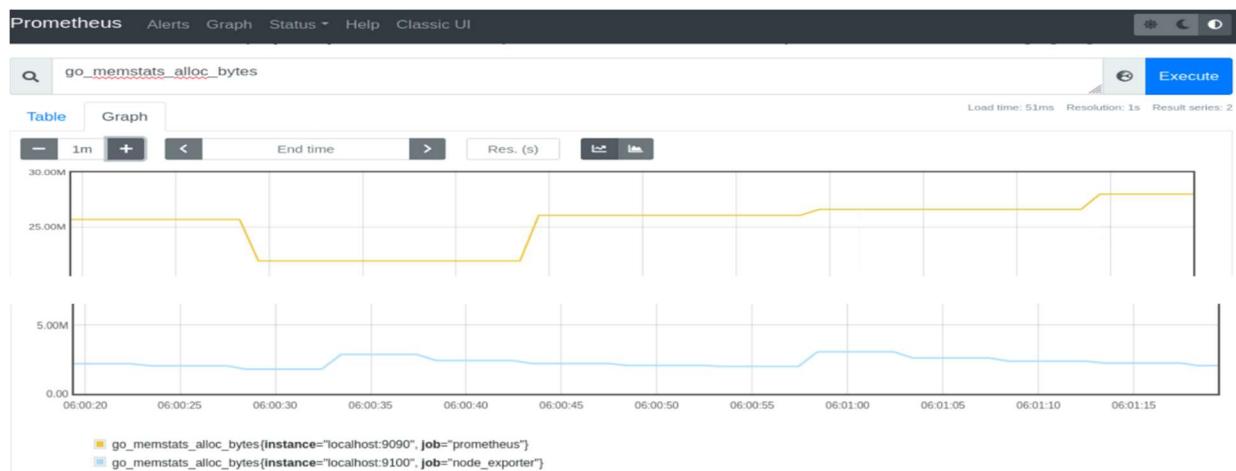
After starting prometheus, this is the page that got displayed.

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

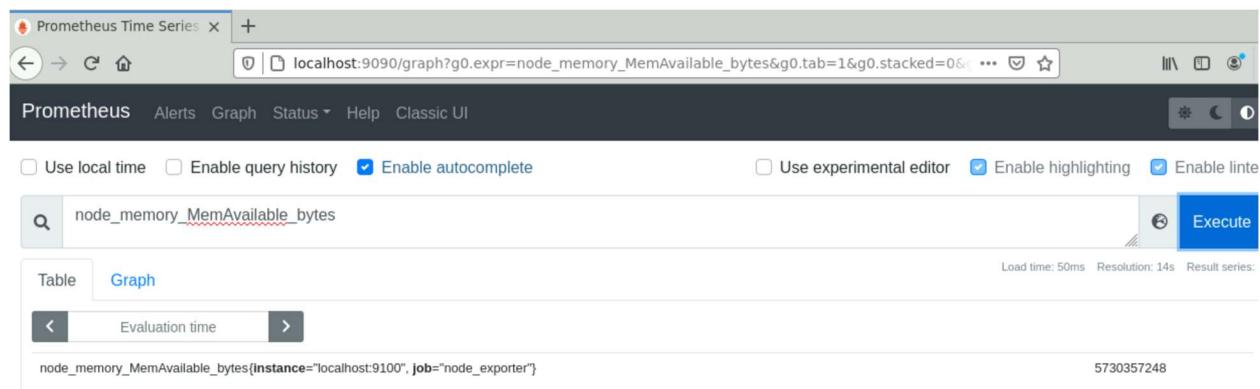
Memory Stats

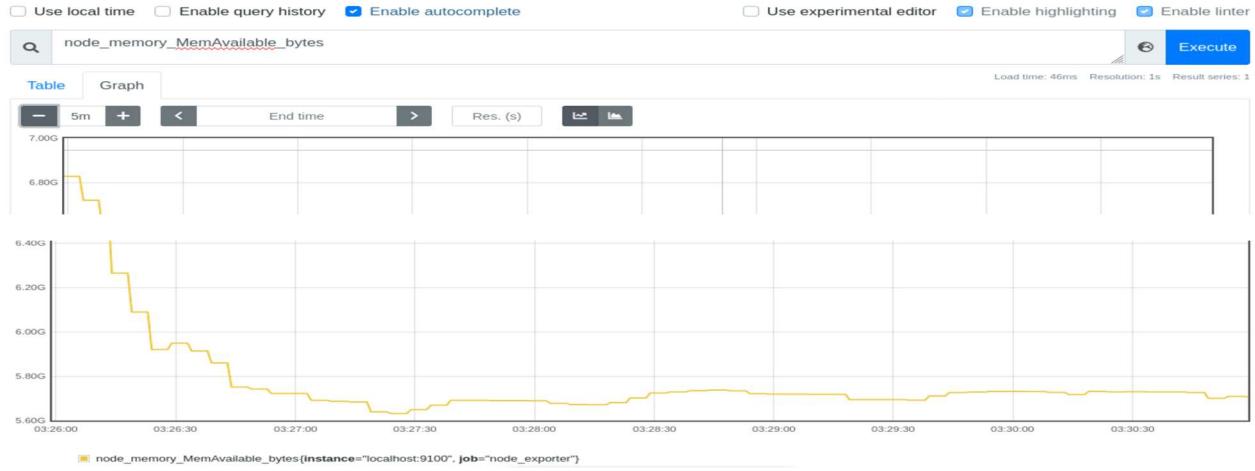


Memory Stats by Graph

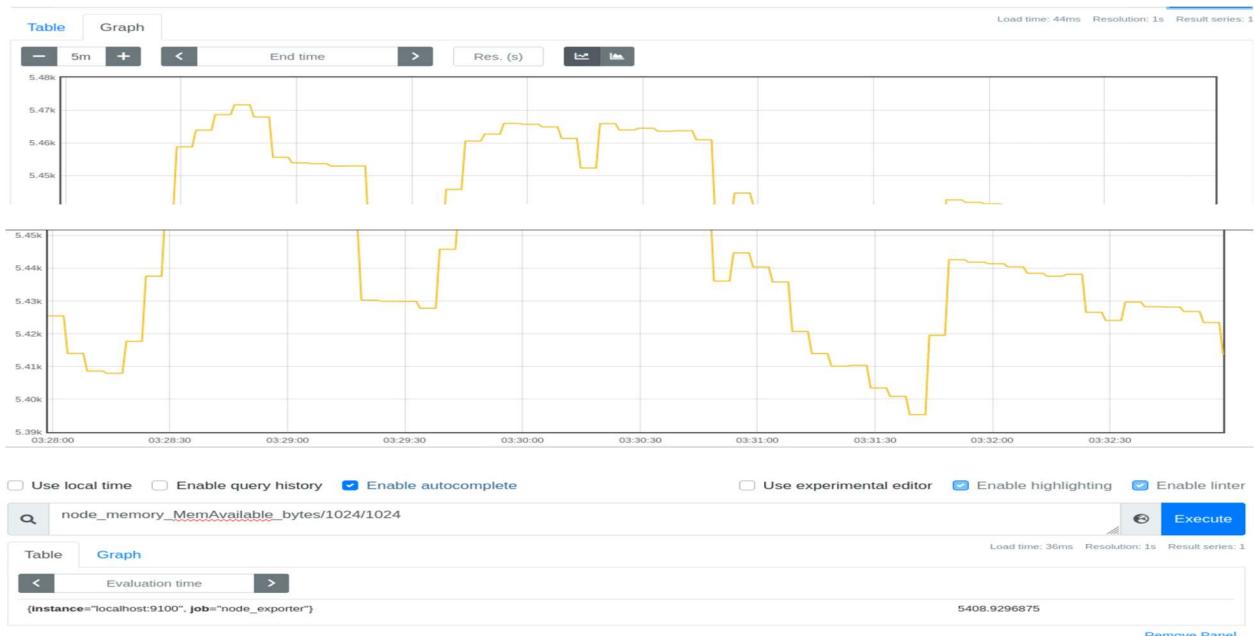


Available Memory Graph

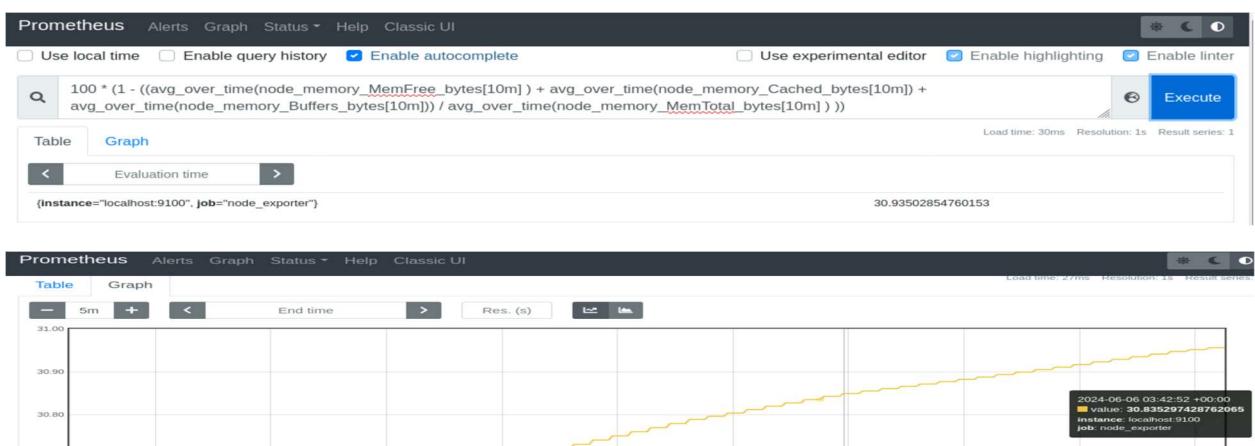




Memory in MB



Load Memory %

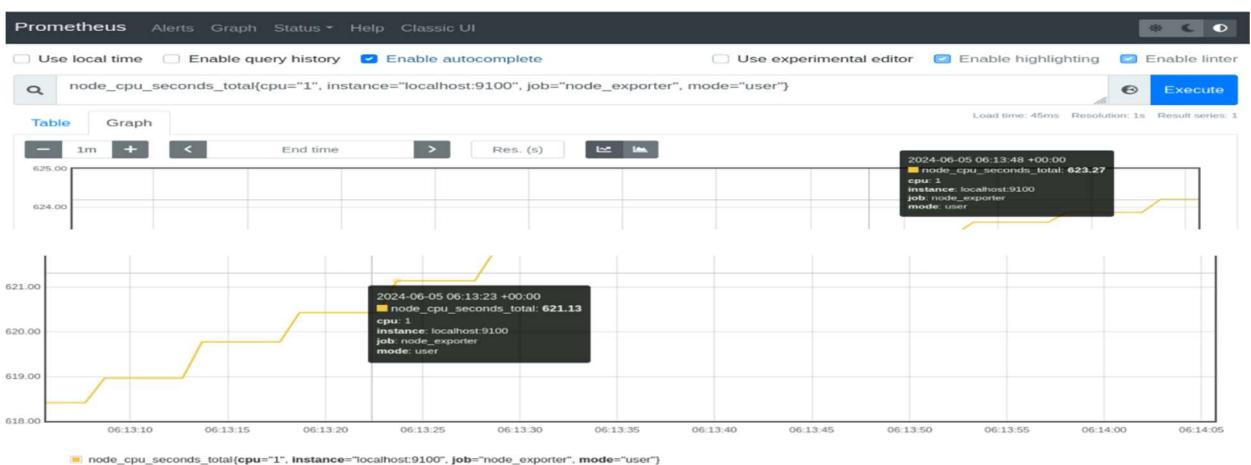




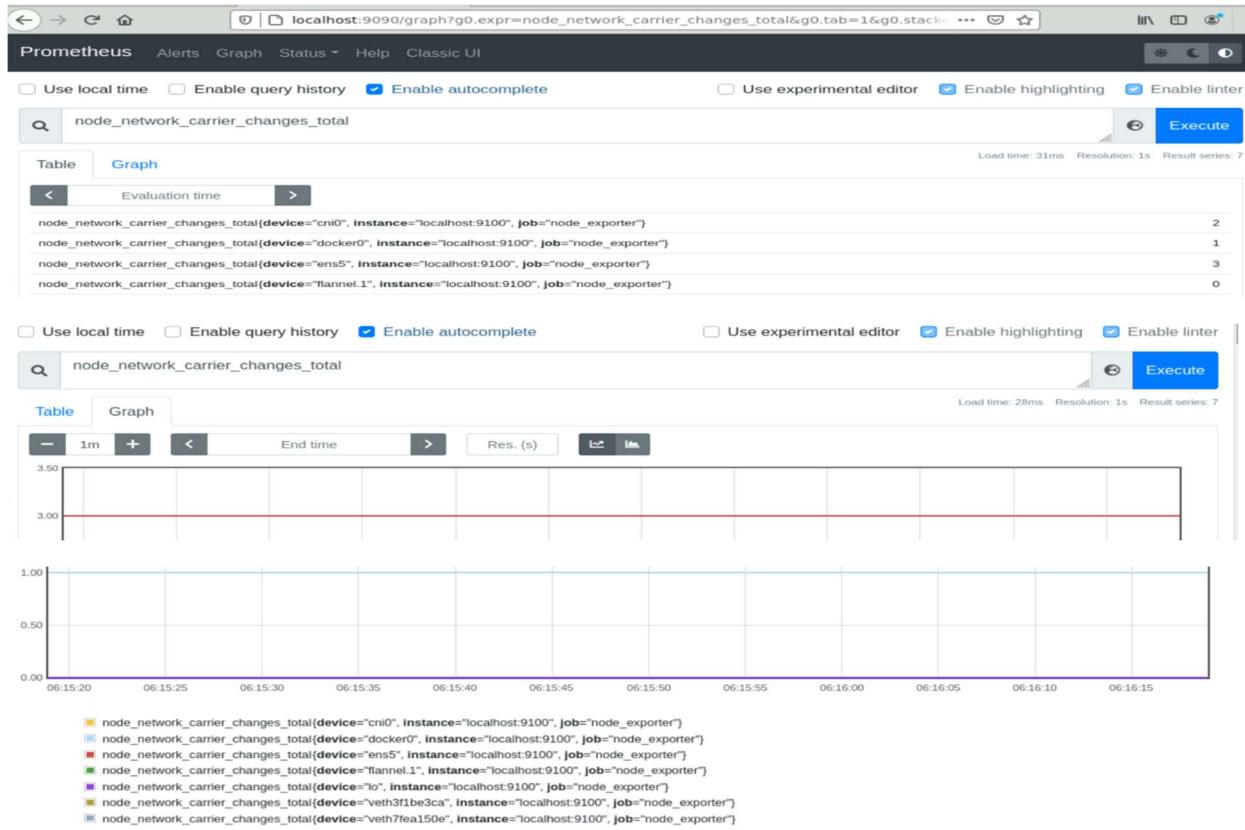
CPU Utilization values & graph.

This screenshot shows a Prometheus Graph interface with the query `node_cpu_seconds_total`. It includes filter options for local time, query history, autocomplete, experimental editor, highlighting, and linter. The results table shows data for all four cores (cpu=0, 1, 2, 3) across various modes (idle, iowait, irq, nice, softirq, steal, system, user). The total CPU seconds for each mode are listed, with the user mode being the most significant for all cores.

Mode	CPU 0	CPU 1	CPU 2	CPU 3
idle	8588.34	214.98	0	0.09
iowait				
irq				
nice				
softirq				
steal				
system				
user	613.56	354.9	15.27	0.01



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			
node_exporter (1/1 up) show less					
Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
http://localhost:9100/metrics	UP	instance="localhost:9100" job="node_exporter"	2.108s ago	33.794ms	
prometheus (1/1 up) show less					
Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
http://localhost:9090/metrics	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

Prometheus Alerts Graph Status Help New UI

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.

```

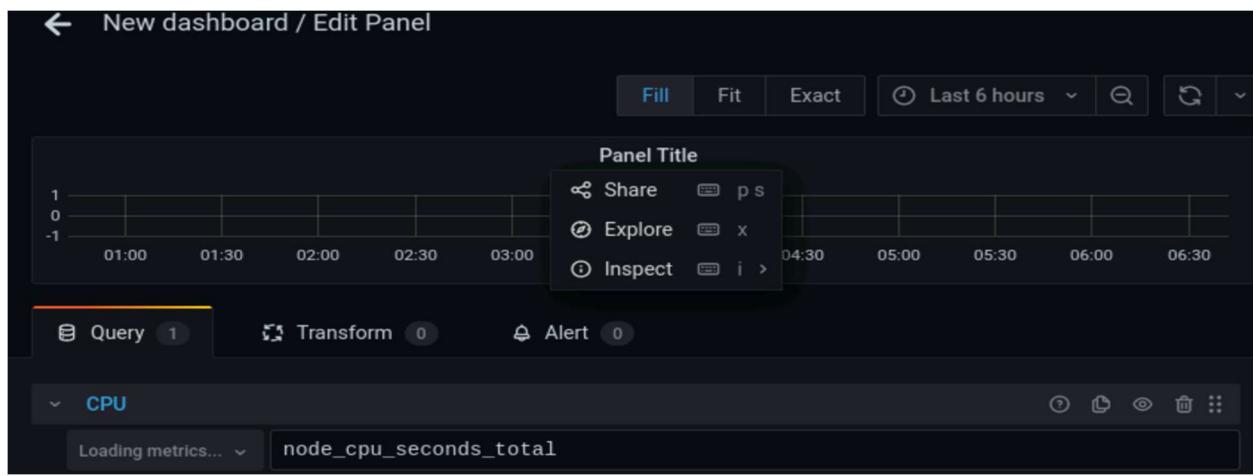
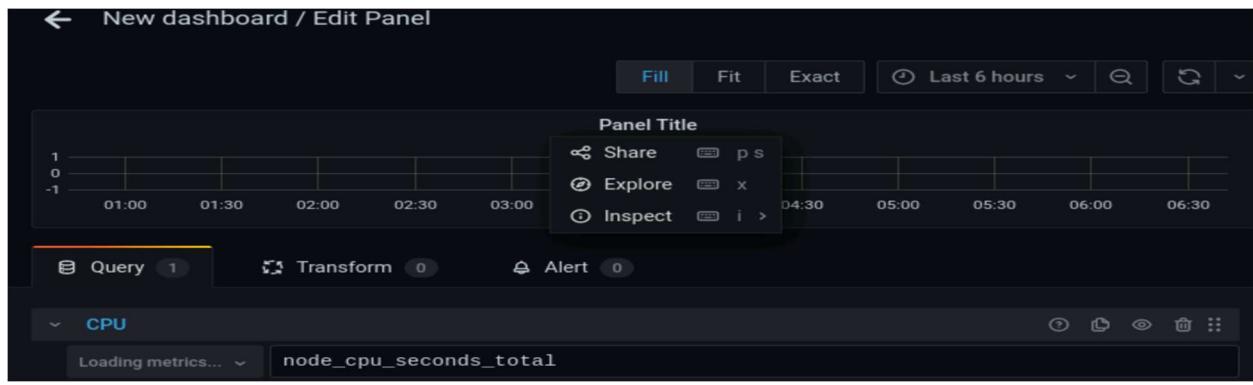
Started the grafana service in Edureka master node.

```
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 2 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