

# IGP Project Submission – Name Vivek Gupta

I'm using 4 servers.

1 server's hostname as jump using for  
Docker, Jenkins, Git Maven

```
• MobaXterm Personal Edition v22.1 •
(SSH client, X server and network tools)

> SSH session to vivek@192.168.242.111
• Direct SSH : ✓
• SSH compression : ✓
• SSH-browser : ✓
• X11-forwarding : ✗ (disabled or not supported by server)

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

Activate the web console with: systemctl enable --now cockpit.socket

Last login: Thu Oct 3 10:58:17 2024 from 192.168.242.1
[vivek@jump ~]$ hostname
jump
[vivek@jump ~]$
```

3 servers hostname master, worker-1 and worker-2 using for  
Kubernetes cluster.

```
[vivek@master ~]$ kubectl get nodes -o wide
```

NAME	STATUS	ROLES	AGE	VERSION	INTERNAL-IP	EXTERNAL-IP	OS-IMAGE	KERNEL-VERSION	CONTAINER-RUNTIME
master	Ready	control-plane	56d	v1.29.7	192.168.242.112	<none>	Rocky Linux 8.10 (Green Obsidian)	4.18.0-553.el8_10.x86_64	containerd://
worker1	Ready	<none>	56d	v1.29.7	192.168.242.113	<none>	Rocky Linux 8.10 (Green Obsidian)	4.18.0-553.el8_10.x86_64	containerd://
worker2	Ready	<none>	56d	v1.29.7	192.168.242.114	<none>	Rocky Linux 8.10 (Green Obsidian)	4.18.0-553.el8_10.x86_64	containerd://

## Task 1

Install git

```
[vivek@jump ~]$ git --version
git version 2.43.5
[vivek@jump ~]$
```

Download source code.

```
[vivek@jump source_code]$ ls -l
total 0
drwxrwxr-x 4 vivek vivek 119 Oct 2 12:31 ABC_Technologies
[vivek@jump source_code]$ pwd
/source_code
[vivek@jump source_code]$
```

## Initialization git

```
[vivek@jamp ABC_Technologies]$ git init
hint: Using 'master' as the name for the initial branch. This default branch name
hint: is subject to change. To configure the initial branch name to use in all
hint: of your new repositories, which will suppress this warning, call:
hint:
hint:   git config --global init.defaultBranch <name>
hint:
hint: Names commonly chosen instead of 'master' are 'main', 'trunk' and
hint: 'development'. The just-created branch can be renamed via this command:
hint:
hint:   git branch -m <name>
Initialized empty Git repository in /source_code/ABC_Technologies/.git/
[vivek@jamp ABC_Technologies]$ git add
```

Code moves to staging area.

```
[vivek@jamp ABC_Technologies]$ git add .
[vivek@jamp ABC_Technologies]$
```

## Git status

```
[vivek@jamp ABC_Technologies]$ git status
On branch master

No commits yet

Changes to be committed:
  (use "git rm --cached <file> ..." to unstage)
    new file:   .classpath
    new file:   .project
    new file:   .settings/org.eclipse.jdt.core.prefs
    new file:   .settings/org.eclipse.m2e.core.prefs
    new file:   README.md
    new file:   pom.xml
    new file:   pom.xml.bak
    new file:   src/main/java/com/abc/RetailModule.java
    new file:   src/main/java/com/abc/dataAccessObject/RetailAccessObject.java
    new file:   src/main/java/com/abc/dataAccessObject/RetailDataImp.java
    new file:   src/main/webapp/WEB-INF/web.xml
    new file:   src/main/webapp/index.jsp
    new file:   src/test/java/com/abc/dataAccessObject/ProductImpTest.java

[vivek@jamp ABC_Technologies]$ git commit -m "first code commit"
```

Commit the code.

```
[vivek@jamp ABC_Technologies]$ git commit -m "first code commit"
[master (root-commit) d12f241] first code commit
13 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 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
[vivek@jamp ABC_Technologies]$
```

Code push to the github in master branch.

```
[vivek@jamp ABC_Technologies]$ git push -u origin master
Username for 'https://github.com': vgvivekgupt
Password for 'https://vgvivekgupt@github.com':
Enumerating objects: 29, done.
Counting objects: 100% (29/29), done.
Compressing objects: 100% (20/20), done.
Writing objects: 100% (29/29), 4.48 KiB | 1.49 MiB/s, done.
Total 29 (delta 0), reused 0 (delta 0), pack-reused 0
To https://github.com/vgvivekgupt/ABC_Technologies.git
 * [new branch]      master -> master
branch 'master' set up to track 'origin/master'.
[vivek@jamp ABC_Technologies]$
```

Here is the repository.

ABC\_Technologies Public

Pin Unwatch 1

master 1 Branch 0 Tags

Go to file t Add file <> Code

vgvivekgupt first code commit d12f241 · 7 minutes ago 1 Commit

.settings	first code commit	7 minutes ago
src	first code commit	7 minutes ago
.classpath	first code commit	7 minutes ago
.project	first code commit	7 minutes ago
README.md	first code commit	7 minutes ago
pom.xml	first code commit	7 minutes ago
pom.xml.bak	first code commit	7 minutes ago

Install Jenkins.

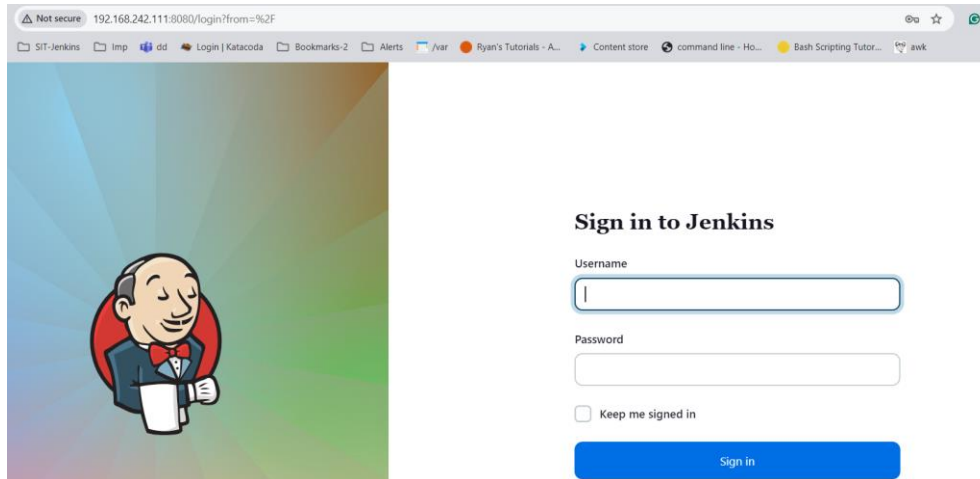
```
[vivek@jamp ABC_Technologies]$ sudo systemctl start jenkins
[vivek@jamp ABC_Technologies]$
[vivek@jamp ABC_Technologies]$ sudo systemctl status jenkins
● jenkins.service - Jenkins Continuous Integration Server
   Loaded: loaded (/usr/lib/systemd/system/jenkins.service; disabled; vendor preset: disabled)
   Active: active (running) since Wed 2024-10-02 12:48:56 EDT; 5min ago
     Main PID: 2073 (java)
       Tasks: 40 (limit: 17394)
      Memory: 619.0M
    CGroup: /system.slice/jenkins.service
            └─2073 /usr/bin/java -Djava.awt.headless=true -jar /usr/share/java/jenkins.war --v
```

```
[vivek@jamp ABC_Technologies]$ jenkins --version
2.462.1
```

## Install maven.

```
[vivek@jamp ABC_Technologies]$ mvn --version
Apache Maven 3.9.9 (8e8579a9e76f7d015ee5ec7bfcdc97d260186937)
Maven home: /opt/maven
Java version: 11.0.24, vendor: Red Hat, Inc., runtime: /usr/lib/jvm/java-11-openjdk-11.0.24.0.8-3.el8.x86_64
Default locale: en_US, platform encoding: UTF-8
OS name: "linux", version: "4.18.0-553.16.1.el8_10.x86_64", arch: "amd64", family: "unix"
[vivek@jamp ABC_Technologies]$
```

## Login to the Jenkins.



Not secure 192.168.242.111:8080/login?from=%2F

SIT-Jenkins Imp dd Login | Katacoda Bookmarks-2 Alerts /var Ryan's Tutorials - A... Content store command line - Ho... Bash Scripting Tutor... awk

### Sign in to Jenkins

Username

Password






☐ Keep me signed in

Sign in

## Creating pipeline folder for code.

Enter an item name

Select an item type

-  **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.
-  **Maven project**  
Build a maven project. Jenkins takes advantage of your POM files and drastically reduces the configuration.
-  **Pipeline**  
Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.
-  **Multi-configuration project**  
Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc.
-  **Folder**

OK

I have attached the pipeline script in the github repo you can refer.  
Run the pipeline to check the pipe on server using tomcat web-server.

		Declarative: Tool Install	Code- Compile	Code- Review	Code-Test	Code- Coverage	Code-Build	Code- Deploy	Declarative: Post Actions
Average stage times: (Average full run time: ~1min 10s)		381ms	10s	20s	11s	11s	10s	1s	186ms
#2	Oct 02 22:27 No Changes	345ms	7s	15s	7s	9s	9s	1s	286ms
#1	Oct 02 22:27 No Changes	417ms	13s	25s	15s	13s	10s	760ms	87ms

Pipeline working fine we can see the below snap.



Install Docker/

```
[vivek@jamp ~]$ sudo systemctl status docker
● docker.service - Docker Application Container Engine
  Loaded: loaded (/usr/lib/systemd/system/docker.service; disabled; vendor preset: disabled)
  Active: active (running) since Wed 2024-10-02 13:40:16 EDT; 20s ago
  Docs: https://docs.docker.com
  Main PID: 33547 (dockerd)
  Tasks: 7
  Memory: 33.4M
  CGroup: /system.slice/docker.service
          └─33547 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock

Oct 02 13:40:15 jamp systemd[1]: Starting Docker Application Container Engine...
Oct 02 13:40:15 jamp dockerd[33547]: time="2024-10-02T13:40:15.338889410-04:00" level=info msg="Starting up"
Oct 02 13:40:15 jamp dockerd[33547]: time="2024-10-02T13:40:15.402625192-04:00" level=info msg="Loading containers: start."
Oct 02 13:40:16 jamp dockerd[33547]: time="2024-10-02T13:40:16.187713313-04:00" level=info msg="Loading containers: done."
```

```
[vivek@jamp ~]$ docker --version
Docker version 26.1.3, build b72abbb
```

Login to the docker with user and password.

```
[vivek@jamp docker]$ docker login
Log in with your Docker ID or email address to push and pull images from Docker Hub. If you don't have a Docker ID, head over to https://hub.docker.com/choose-your-account to create one.
You can log in with your password or a Personal Access Token (PAT). Using a limited-scope PAT grants better security and is required for organizations. Learn more at https://docs.docker.com/go/access-tokens/

Username: vgveikgupt
Password:
WARNING! Your password will be stored unencrypted in /home/vivek/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded
```

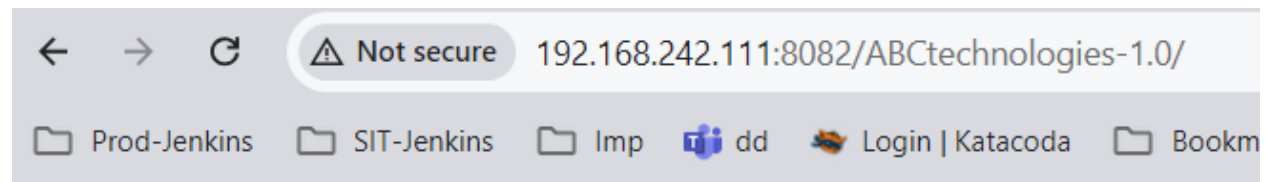
Building the image

```
[vivek@jamp docker]$ sudo docker build -t abctechnologies .
[+] Building 2.5s (8/8) FINISHED                                docker:default
=> [internal] load build definition from Dockerfile              0.0s
=> => transferring dockerfile: 393B                             0.0s
=> [internal] load metadata for docker.io/library/tomcat:9       2.4s
=> [internal] load .dockerignore                                0.0s
=> => transferring context: 2B                                    0.0s
=> [internal] load build context                                0.0s
=> => transferring context: 47B                                    0.0s
=> [1/3] FROM docker.io/library/tomcat:9@sha256:67f6b5f0d4061aea0cbd1e005d5987b13ccab5505aecc75383203cf0650dfe3  0.0s
=> CACHED [2/3] COPY ABCtechnologies-1.0.war /usr/local/tomcat/webapps/ 0.0s
=> CACHED [3/3] WORKDIR /usr/local/tomcat/bin                    0.0s
=> exporting to image                                           0.0s
=> => exporting layers                                           0.0s
=> => writing image sha256:2f0b7c70e483c6644bb72dd3701591385c31c8d6c8f6b882839deb38a502a43c 0.0s
=> => naming to docker.io/library/abctechnologies              0.0s
[vivek@jamp docker]$
```

Deploying the image with code to the container for testing.

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
7c79f84d9478	app	"catalina.sh run"	5 minutes ago	Up 5 minutes	0.0.0.0:8082->8080/tcp, :::8082->8080/tcp	my-tomcat-container

Container working with we can check with IP with bind port,



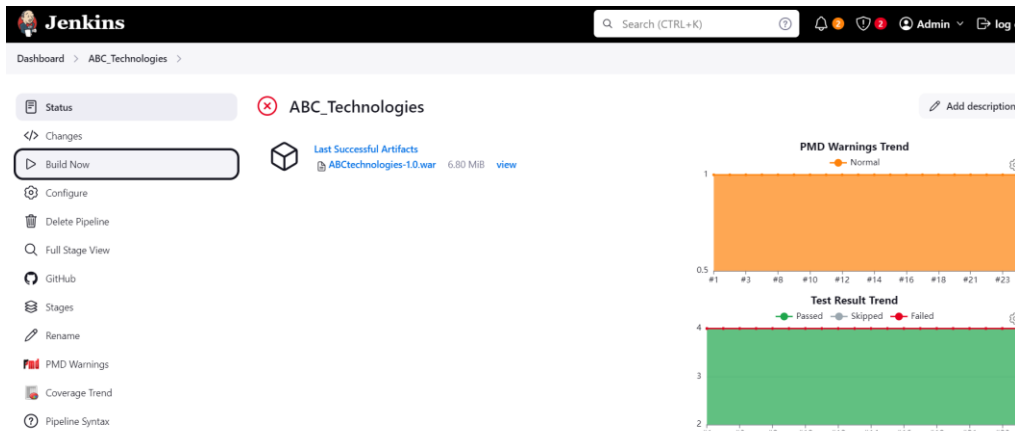
# Welcome to ABC technologies

## This is retail portal

Add Product

View Product

Adding docker image build, running the container and push image to dockerhub.



### Stage View

		Declarative: Tool Install	Code-Compile	Code-Review	Code-Test	Code-Coverage	Code-Build	Build Docker Image	Run Docker Container	Push to Docker Hub	Declarative: Post Actions
Average stage times: (Average full run time: ~2min 47s)		577ms	19s	38s	25s	31s	31s	4s	1s	6s	203ms
#26	Oct 03 20:40	598ms	16s	37s	24s	30s	32s	4s	3s	13s	276ms

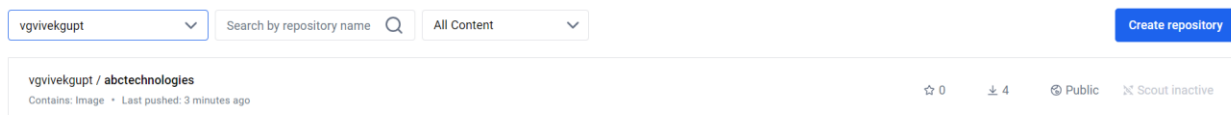
Image has build after running pipeline.

```
[vivek@jamp ~]$ docker image ls -a
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
abctechnologies     25                 3903aa9472c0       12 hours ago       471MB
abctechnologies     26                 3903aa9472c0       12 hours ago       471MB
abctechnologies     BUILD_NUMBER       3903aa9472c0       12 hours ago       471MB
vgvivekgupt/abctechnologies latest             3903aa9472c0       12 hours ago       471MB
```

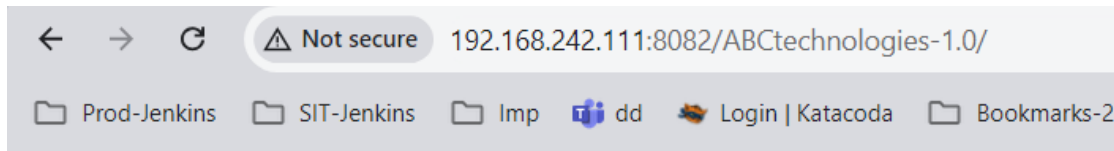
Container created after running pipeline.

```
[vivek@jamp ~]$ docker container ls -a
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS               NAMES
50ff3a31d3a4       vgvivekgupt/abctechnologies:latest   "catalina.sh run"   About a minute ago   Up About a minute   0.0.0.0:8082->8080/tcp, :::8082->8080/tcp   a
```

Build image has push to the dockerhub.



Pipeline working file we can see the bind port with IP of container.



## Welcome to ABC technologies

This is retail portal

Add Product

View Product

Now deploying source code to the Kubernetes using 1 master 2 worker. We can see in below snap.

```
[vivek@master ~]$ kubectl get node -o wide
NAME          STATUS    ROLES    AGE   VERSION   INTERNAL-IP   EXTERNAL-IP   OS-IMAGE                                     KERNEL-VERSION   CONTAINER-RUNTIME
master        Ready     control-plane  56d   v1.29.7   192.168.242.112 <none>        Rocky Linux 8.10 (Green Obsidian)         4.18.0-553.el8_10.x86_64 containerd://
worker1/1.6.32 Ready     <none>     56d   v1.29.7   192.168.242.113 <none>        Rocky Linux 8.10 (Green Obsidian)         4.18.0-553.el8_10.x86_64 containerd://
worker2/1.6.32 Ready     <none>     56d   v1.29.7   192.168.242.114 <none>        Rocky Linux 8.10 (Green Obsidian)         4.18.0-553.el8_10.x86_64 containerd://
```

Writing the deployment and service file and creating pod.

```
[vivek@master ~]$ kubectl apply -f deployment.yml
deployment.apps/abctechologies created
[vivek@master ~]$
[vivek@master ~]$
[vivek@master ~]$ kubectl apply -f service.yml
service/service-abctechologies created
```

Here we can see the pods.

```
[vivek@master ~]$ kubectl get pods -o wide
NAME                                READY   STATUS    RESTARTS   AGE   IP            NODE       NOMINATED NODE   READINESS GATES
abctechologies-5f747f7bfb-gqrtw    1/1     Running   0           9m5s  10.10.189.77  worker2    <none>            <none>
abctechologies-5f747f7bfb-qw85p    1/1     Running   0           9m6s  10.10.235.141 worker1    <none>            <none>
abctechologies-5f747f7bfb-v9sk5    1/1     Running   0           9m5s  10.10.189.78  worker2    <none>            <none>
```

Created the secret file for dockerhub.

```
[vivek@master ~]$ kubectl get secrets -o wide
NAME          TYPE                      DATA   AGE
dockerhub-secret  kubernetes.io/dockerconfigjson  1       14m
[vivek@master ~]$
```



Here we can see pod is working with help of nodePort.



Doing setup for Kubernetes monitoring.

These are the repo have to install

1. helm repo add stable <https://charts.helm.sh/stable>
2. helm repo add prometheus-community <https://prometheus-community.github.io/helm-charts>
3. helm search repo prometheus-community
4. kubectl create namespace Prometheus

Here we can see the pods of monitoring

```
[vivek@master ~]$ kubectl get pods -n prometheus
```

NAME	READY	STATUS	RESTARTS	AGE
alertmanager-stable-kube-prometheus-sta-alertmanager-0	2/2	Running	0	6m40s
prometheus-stable-kube-prometheus-sta-prometheus-0	2/2	Running	0	6m37s
stable-grafana-5fff8dc495-b9kp6	3/3	Running	0	6m48s
stable-kube-prometheus-sta-operator-6cf7d5cf64-kkwm	1/1	Running	0	6m48s
stable-kube-state-metrics-784c9bff7d-b9ps7	1/1	Running	0	6m48s
stable-prometheus-node-exporter-7jnh5	1/1	Running	0	6m48s
stable-prometheus-node-exporter-n9xfr	1/1	Running	0	6m48s
stable-prometheus-node-exporter-qpxgs	1/1	Running	0	6m48s

```
[vivek@master ~]$
```

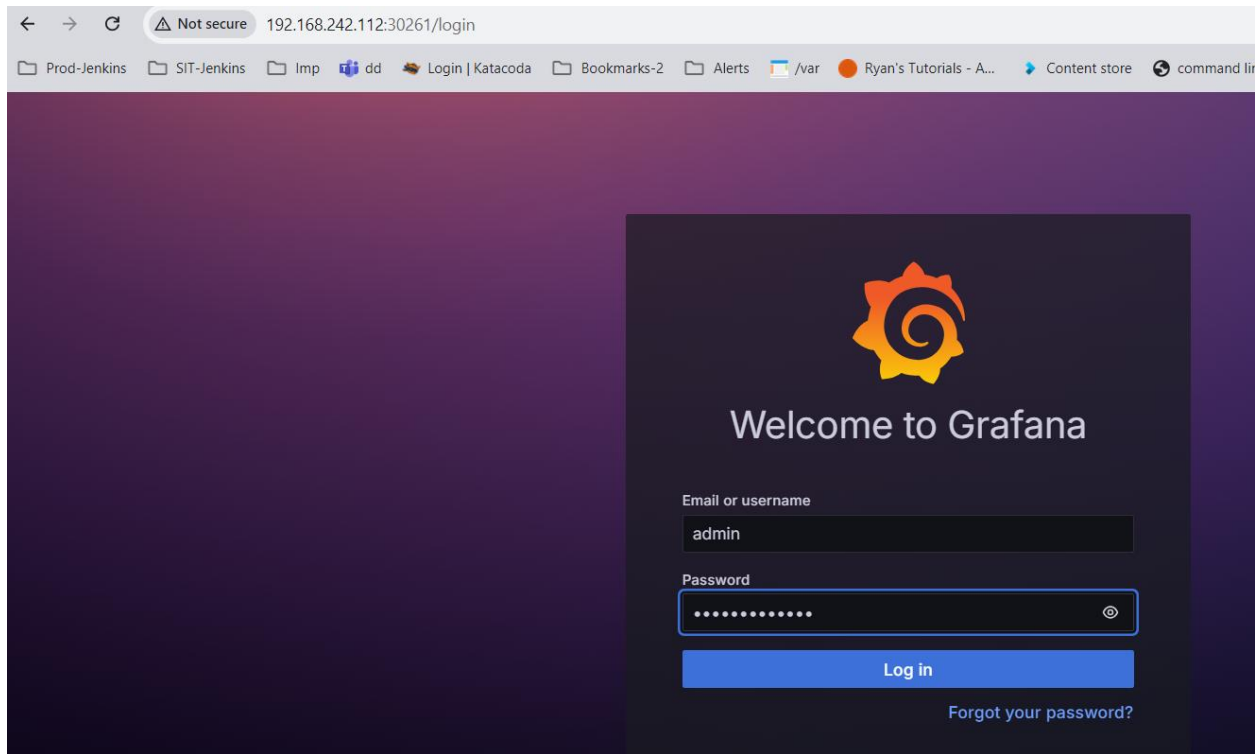
Here we can see the list of services

```
[vivek@master ~]$ kubectl get svc -n prometheus
```

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
alertmanager-operated	ClusterIP	None	<none>	9093/TCP,9094/TCP,9094/UDP	6m59s
prometheus-operated	ClusterIP	None	<none>	9090/TCP	6m56s
stable-grafana	NodePort	10.109.90.183	<none>	80:30261/TCP	7m8s
stable-kube-prometheus-sta-alertmanager	ClusterIP	10.105.236.205	<none>	9093/TCP,8080/TCP	7m8s
stable-kube-prometheus-sta-operator	ClusterIP	10.99.137.131	<none>	443/TCP	7m8s
stable-kube-prometheus-sta-prometheus	NodePort	10.96.40.152	<none>	9090:32074/TCP,8080:30217/TCP	7m8s
stable-kube-state-metrics	ClusterIP	10.108.2.167	<none>	8080/TCP	7m8s
stable-prometheus-node-exporter	ClusterIP	10.109.36.141	<none>	9100/TCP	7m8s


```
[vivek@master ~]$
```

## Login Grafana dashboard with help of NodePort and use and password



← → ↻ ⚠ Not secure 192.168.242.112:30261/login

Prod-Jenkins SIT-Jenkins Imp dd Login | Katacoda Bookmarks-2 Alerts /var Ryan's Tutorials - A... Content store command lin



Welcome to Grafana

Email or username

admin

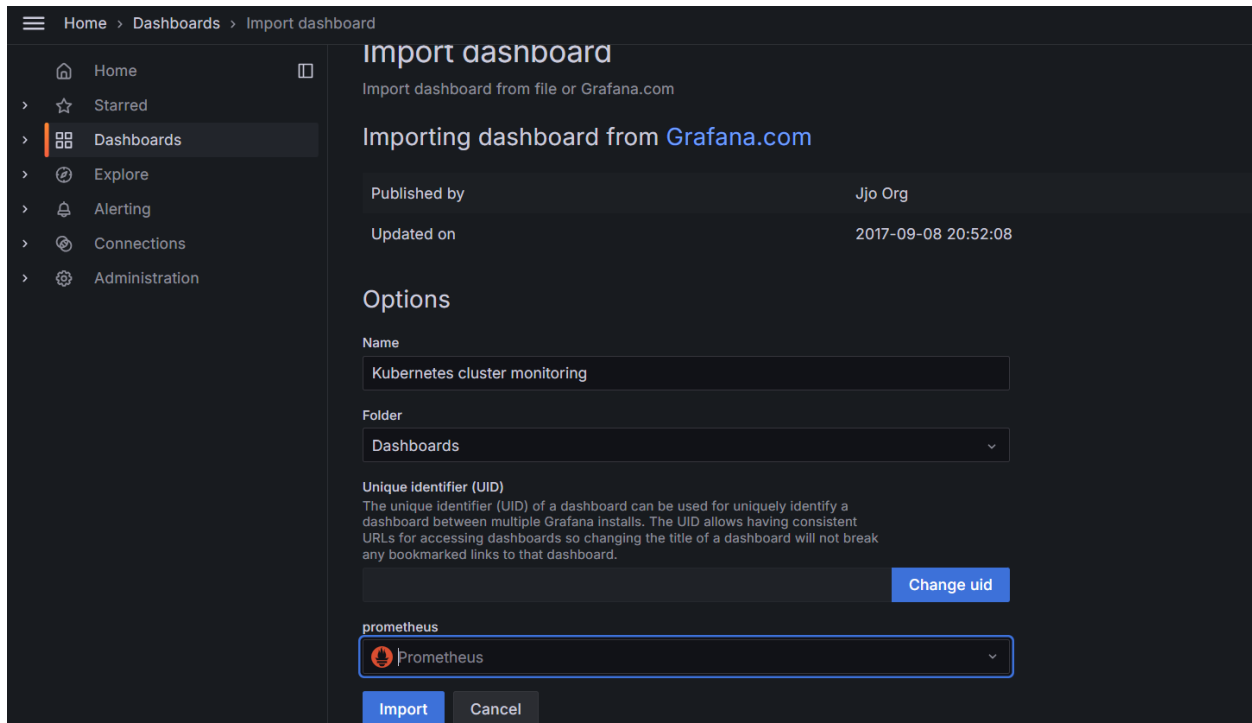
Password

.....

Log in

[Forgot your password?](#)

## Importing the dashboard for monitoring.



Home > Dashboards > Import dashboard

**Import dashboard**

Import dashboard from file or Grafana.com

Importing dashboard from [Grafana.com](#)

Published by Jfo Org

Updated on 2017-09-08 20:52:08

**Options**

Name

Kubernetes cluster monitoring

Folder

Dashboards

**Unique Identifier (UID)**

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

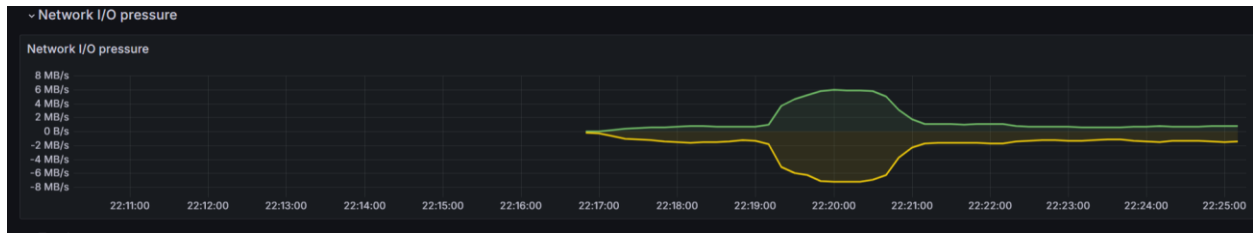
Change uid

prometheus

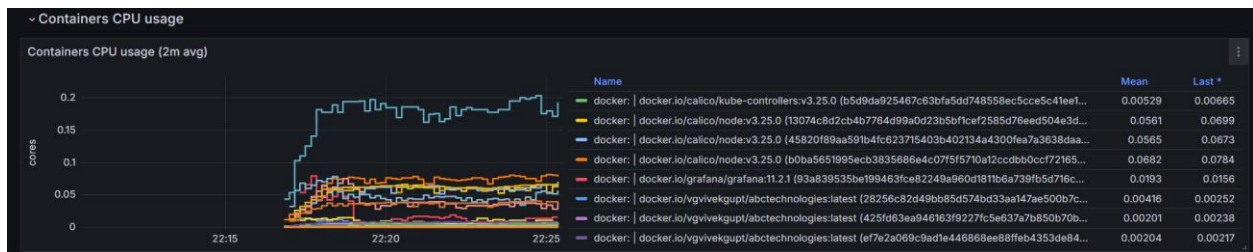
Prometheus

Import Cancel

Here we can see the network input and output monitoring data.



Here we can see the container CPU utilization monitoring data.



Here we can see the container memory utilization monitoring data.



Here is the Prometheus dashboard to get query to monitoring data fetch.

