

Assignment -4

Inventory Management System for Retailers – Kubernetes / Docker

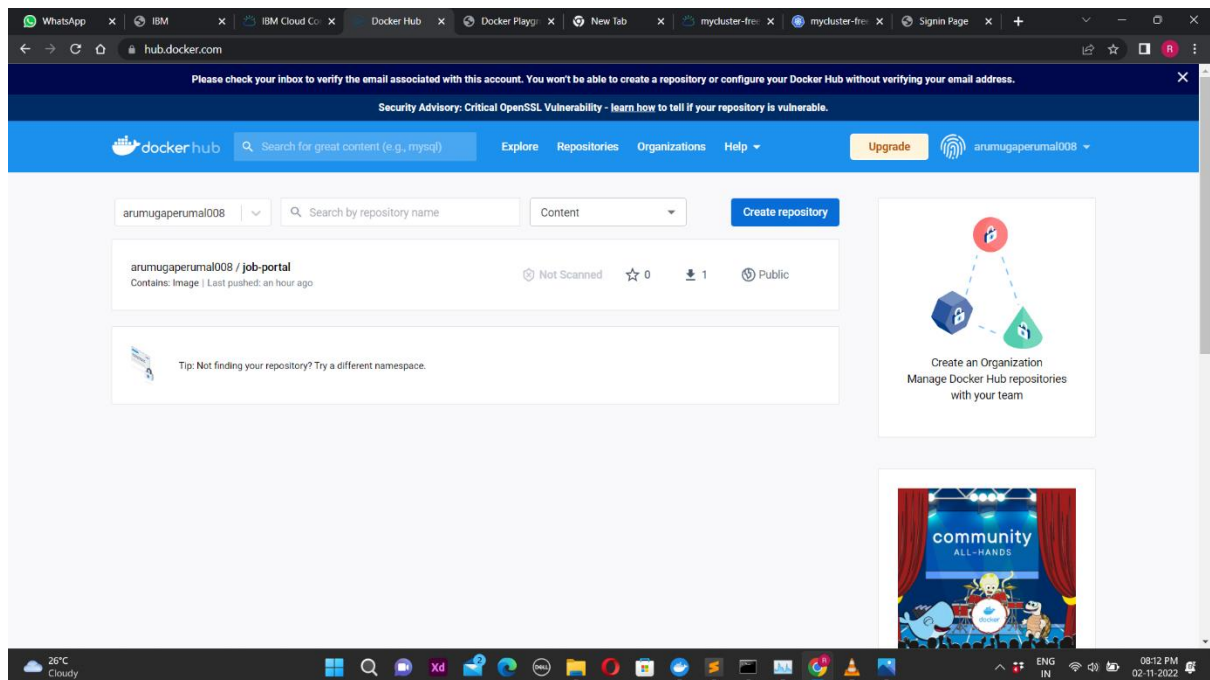
Assignment Date	20 October 2022
Student Name	ARUMUGAPERUMAL A
Student Roll Number	953719104008
Maximum Marks	2 Marks

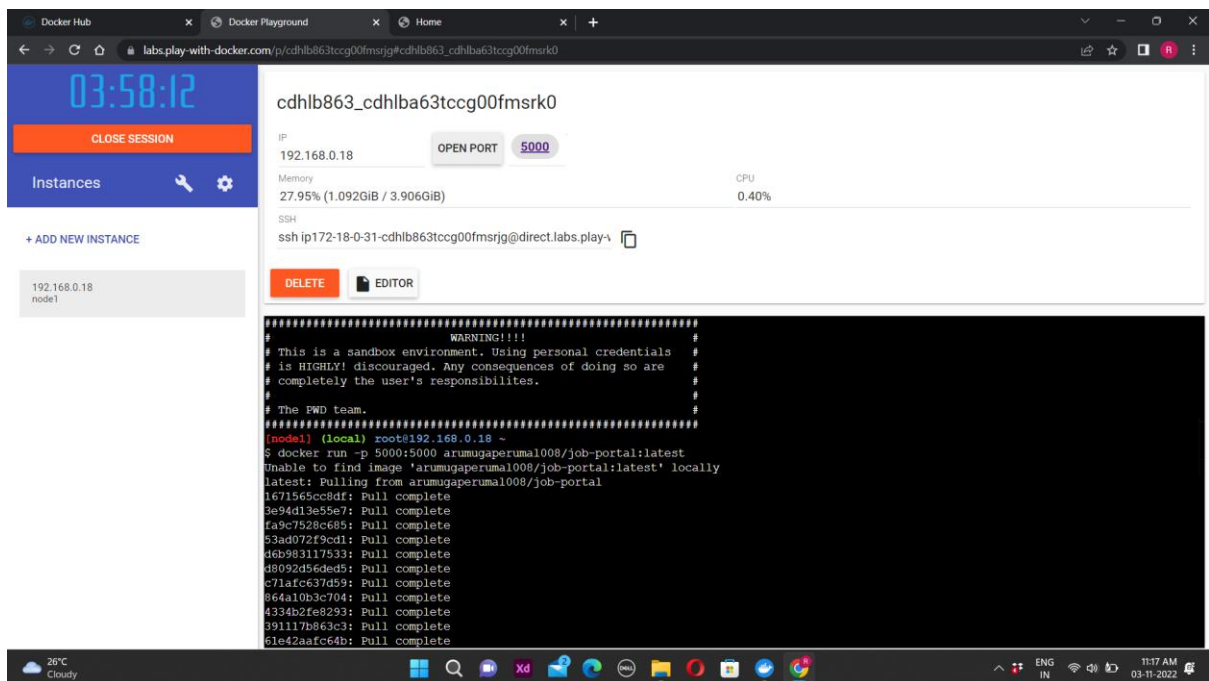
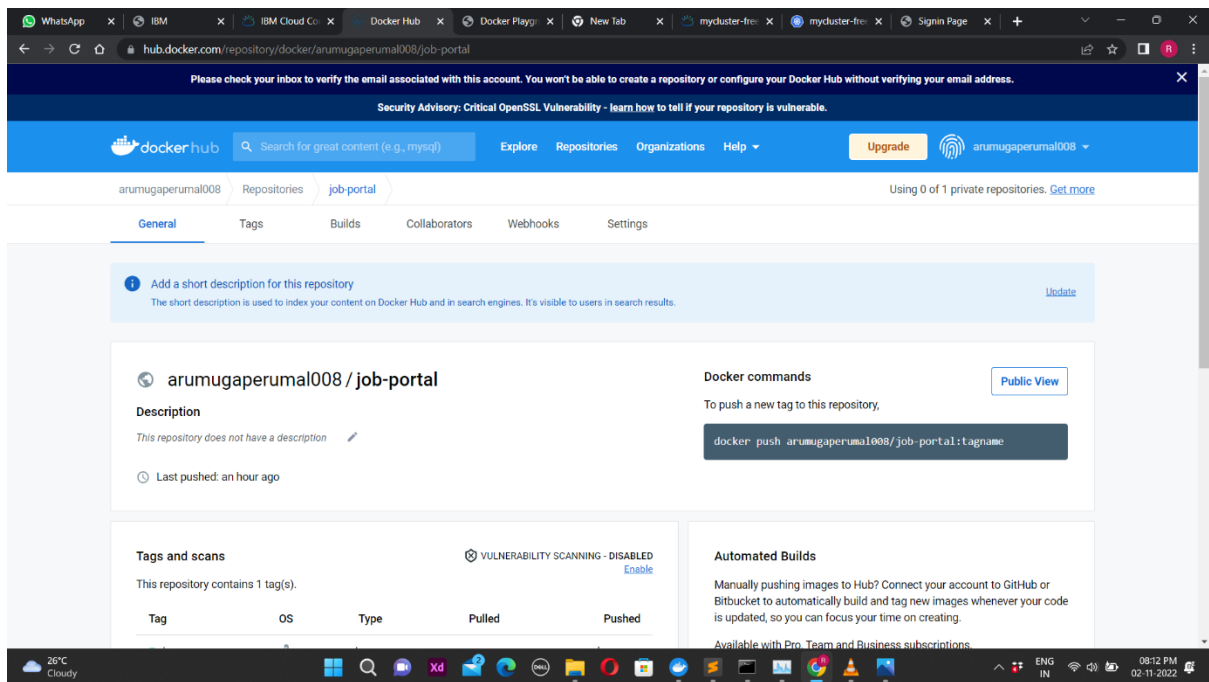
Question-1:

1. Pull an Image from docker hub and run it in docker playground.
2. Create a dockerfile for the job portal / flask application and deploy it in Docker desktop application.
3. Create a IBM container registry and push docker image of flask application or job portal app.
4. Create a Kubernetes cluster in IBM cloud and deploy flask application image or job portal image and also expose the same app to run in Nodeport.

Solution: **All the required files are uploaded in the ASSIGNMENTS/ARUMUGAPERUMAL A (TEAM MEMBER)/ASSIGNMENT 4 folder in the Git repo. Please verify it sir/mam.

Step 1: Pull an Image from docker hub and run it in docker playground.





Docker Hub Docker Playground Home

labs.play-with-docker.com/p/cdhlb863tccg00fmsrjg#cdhlb863_cdhlb63tccg00fmsrk0

03:58:06

CLOSE SESSION

Instances

+ ADD NEW INSTANCE

192.168.0.18 node1

cdhlb863_cdhlb63tccg00fmsrk0

IP 192.168.0.18 OPEN PORT 5000

Memory 27.95% (1.092GiB / 3.906GiB) CPU 0.27%

SSH ssh ip172-18-0-31-cdhlb863tccg00fmsrjg@direct.labs.play-with-docker.com

DELETE EDITOR

```
* Serving Flask app 'app'
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on all addresses (0.0.0.0)
* Running on http://127.0.0.1:5000
* Running on http://172.17.0.2:5000
Press CTRL-C to quit
172.18.0.1 - - [03/Nov/2022 05:47:43] "GET / HTTP/1.1" 200 -
172.18.0.1 - - [03/Nov/2022 05:47:44] "GET /static/css/bootstrap.min.css HTTP/1.1" 200 -
172.18.0.1 - - [03/Nov/2022 05:47:44] "GET /static/css/mystyle.css HTTP/1.1" 200 -
172.18.0.1 - - [03/Nov/2022 05:47:44] "GET /static/css/owl.carousel.min.css HTTP/1.1" 200 -
172.18.0.1 - - [03/Nov/2022 05:47:44] "GET /static/css/slicknav.css HTTP/1.1" 200 -
172.18.0.1 - - [03/Nov/2022 05:47:44] "GET /static/css/animate.min.css HTTP/1.1" 200 -
172.18.0.1 - - [03/Nov/2022 05:47:44] "GET /static/css/price_rangs.css HTTP/1.1" 200 -
172.18.0.1 - - [03/Nov/2022 05:47:44] "GET /static/css/magnific-popup.css HTTP/1.1" 200 -
172.18.0.1 - - [03/Nov/2022 05:47:45] "GET /static/css/fontawesome-all.min.css HTTP/1.1" 200 -
172.18.0.1 - - [03/Nov/2022 05:47:45] "GET /static/css/themify-icons.css HTTP/1.1" 200 -
172.18.0.1 - - [03/Nov/2022 05:47:45] "GET /static/css/slick.css HTTP/1.1" 200 -
172.18.0.1 - - [03/Nov/2022 05:47:45] "GET /static/css/nice-select.css HTTP/1.1" 200 -
172.18.0.1 - - [03/Nov/2022 05:47:45] "GET /static/css/style.css HTTP/1.1" 200 -
172.18.0.1 - - [03/Nov/2022 05:47:45] "GET /static/css/responsive.css HTTP/1.1" 200 -
172.18.0.1 - - [03/Nov/2022 05:47:46] "GET /static/js/vendor/modernizr-3.5.0.min.js HTTP/1.1" 200 -
172.18.0.1 - - [03/Nov/2022 05:47:46] "GET /static/js/vendor/jquery-1.12.4.min.js HTTP/1.1" 200 -
```

26°C Cloudy

11:18 AM 03-11-2022

Docker Hub Docker Playground Find a Job

labs.play-with-docker.com/p/cdhlb863tccg00fmsrjg#cdhlb863_cdhlb63tccg00fmsrk0

03:57:38

CLOSE SESSION

Instances

+ ADD NEW INSTANCE

192.168.0.18 node1

cdhlb863_cdhlb63tccg00fmsrk0

IP 192.168.0.18 OPEN PORT 5000

Memory 27.96% (1.092GiB / 3.906GiB) CPU 0.70%

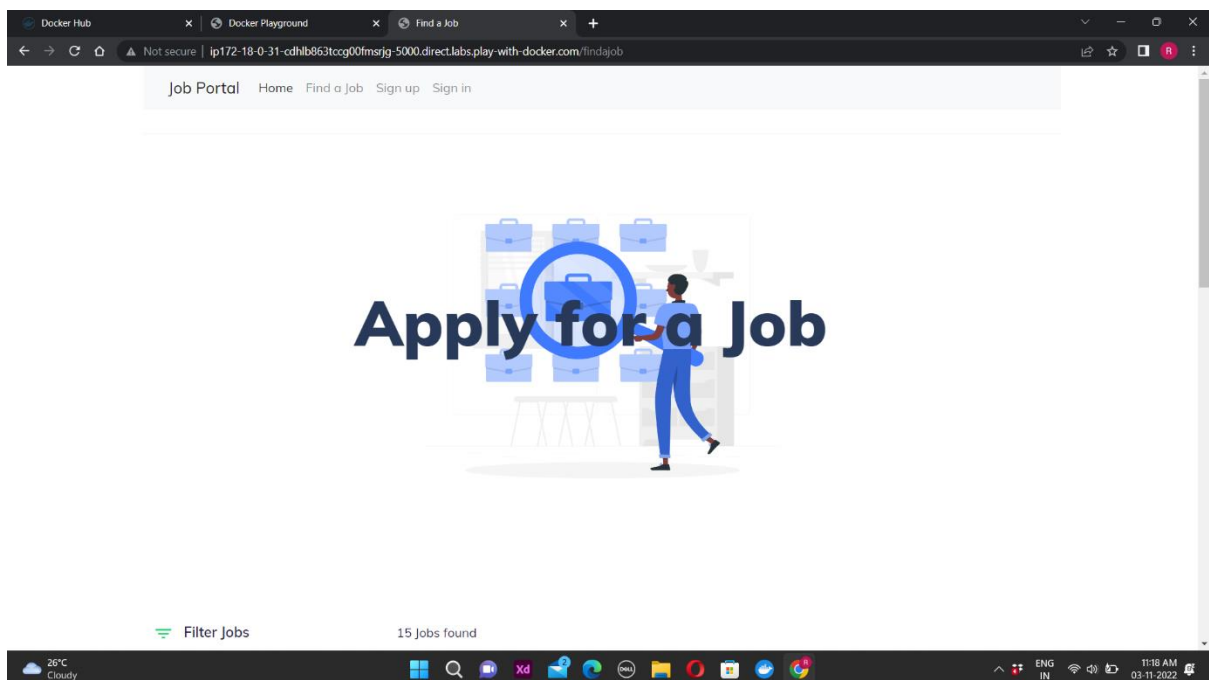
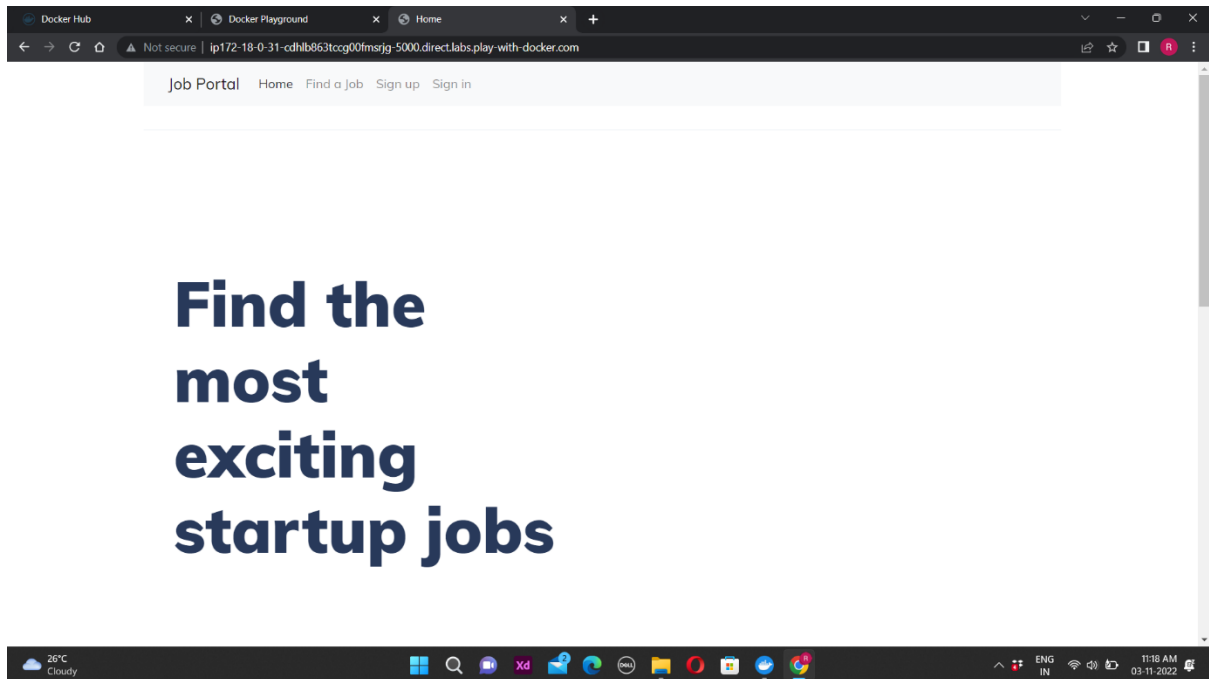
SSH ssh ip172-18-0-31-cdhlb863tccg00fmsrjg@direct.labs.play-with-docker.com

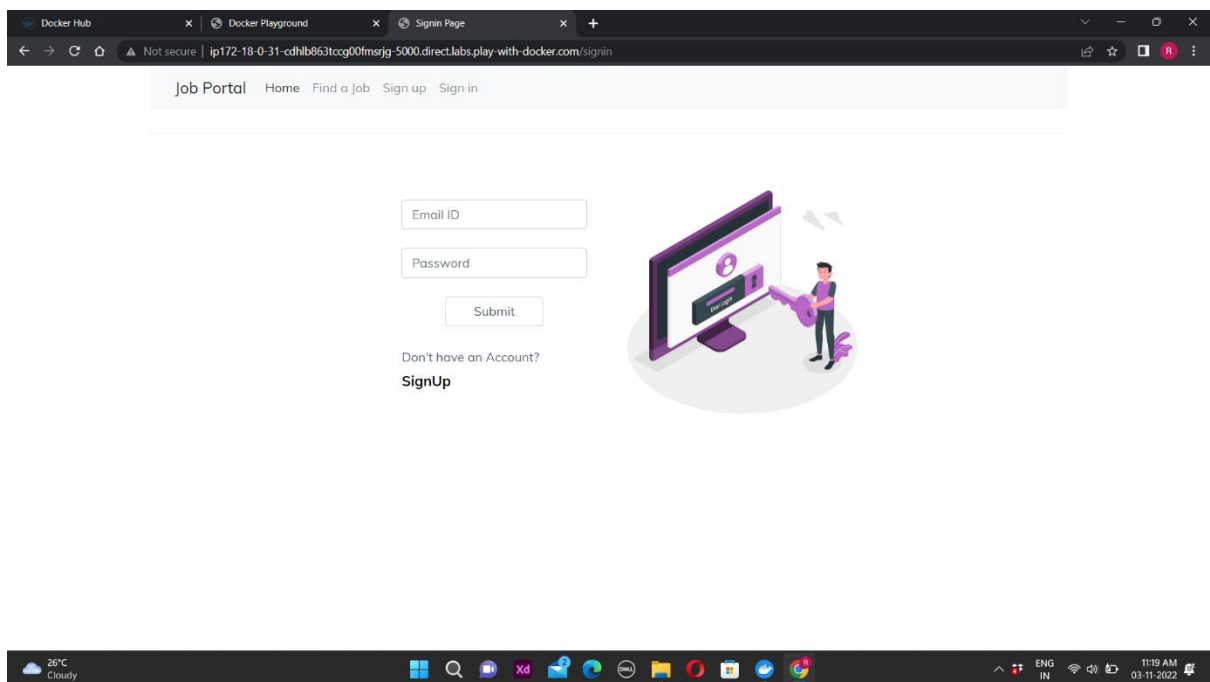
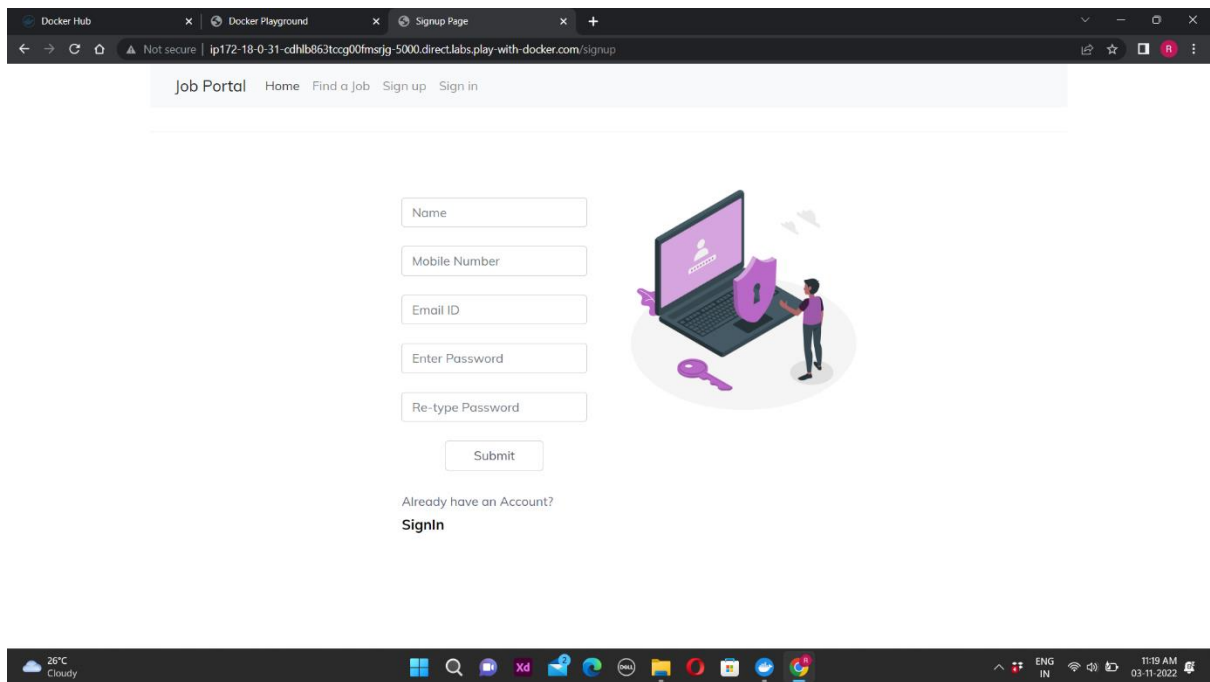
DELETE EDITOR

```
172.18.0.1 - - [03/Nov/2022 05:48:23] "GET /static/js/owl.carousel.min.js HTTP/1.1" 304 -
172.18.0.1 - - [03/Nov/2022 05:48:23] "GET /static/js/slick.min.js HTTP/1.1" 304 -
172.18.0.1 - - [03/Nov/2022 05:48:23] "GET /static/js/price_rangs.js HTTP/1.1" 304 -
172.18.0.1 - - [03/Nov/2022 05:48:23] "GET /static/js/animated.headline.js HTTP/1.1" 304 -
172.18.0.1 - - [03/Nov/2022 05:48:23] "GET /static/js/wow.min.js HTTP/1.1" 304 -
172.18.0.1 - - [03/Nov/2022 05:48:23] "GET /static/js/jquery.nice-select.min.js HTTP/1.1" 304 -
172.18.0.1 - - [03/Nov/2022 05:48:23] "GET /static/js/jquery.scrollUp.min.js HTTP/1.1" 304 -
172.18.0.1 - - [03/Nov/2022 05:48:23] "GET /static/js/jquery.sticky.js HTTP/1.1" 304 -
172.18.0.1 - - [03/Nov/2022 05:48:24] "GET /static/js/jquery.form.js HTTP/1.1" 304 -
172.18.0.1 - - [03/Nov/2022 05:48:24] "GET /static/js/jquery.magnific-popup.js HTTP/1.1" 304 -
172.18.0.1 - - [03/Nov/2022 05:48:24] "GET /static/js/contact.js HTTP/1.1" 304 -
172.18.0.1 - - [03/Nov/2022 05:48:24] "GET /static/js/jquery.validate.min.js HTTP/1.1" 304 -
172.18.0.1 - - [03/Nov/2022 05:48:24] "GET /static/js/mail-script.js HTTP/1.1" 304 -
172.18.0.1 - - [03/Nov/2022 05:48:24] "GET /static/js/jquery.ajaxchimp.min.js HTTP/1.1" 304 -
172.18.0.1 - - [03/Nov/2022 05:48:24] "GET /static/js/plugins.js HTTP/1.1" 304 -
172.18.0.1 - - [03/Nov/2022 05:48:24] "GET /static/js/main.js HTTP/1.1" 304 -
172.18.0.1 - - [03/Nov/2022 05:48:25] "GET /static/fonts/fa-solid-900.woff2 HTTP/1.1" 200 -
172.18.0.1 - - [03/Nov/2022 05:48:25] "GET /assets/img/icon/job-list4.png HTTP/1.1" 404 -
172.18.0.1 - - [03/Nov/2022 05:48:25] "GET /assets/img/icon/job-list2.png HTTP/1.1" 404 -
172.18.0.1 - - [03/Nov/2022 05:48:25] "GET /assets/img/icon/job-list1.png HTTP/1.1" 404 -
172.18.0.1 - - [03/Nov/2022 05:48:25] "GET /assets/img/icon/job-list3.png HTTP/1.1" 404 -
172.18.0.1 - - [03/Nov/2022 05:48:25] "GET /static/img/2.png HTTP/1.1" 200 -
```

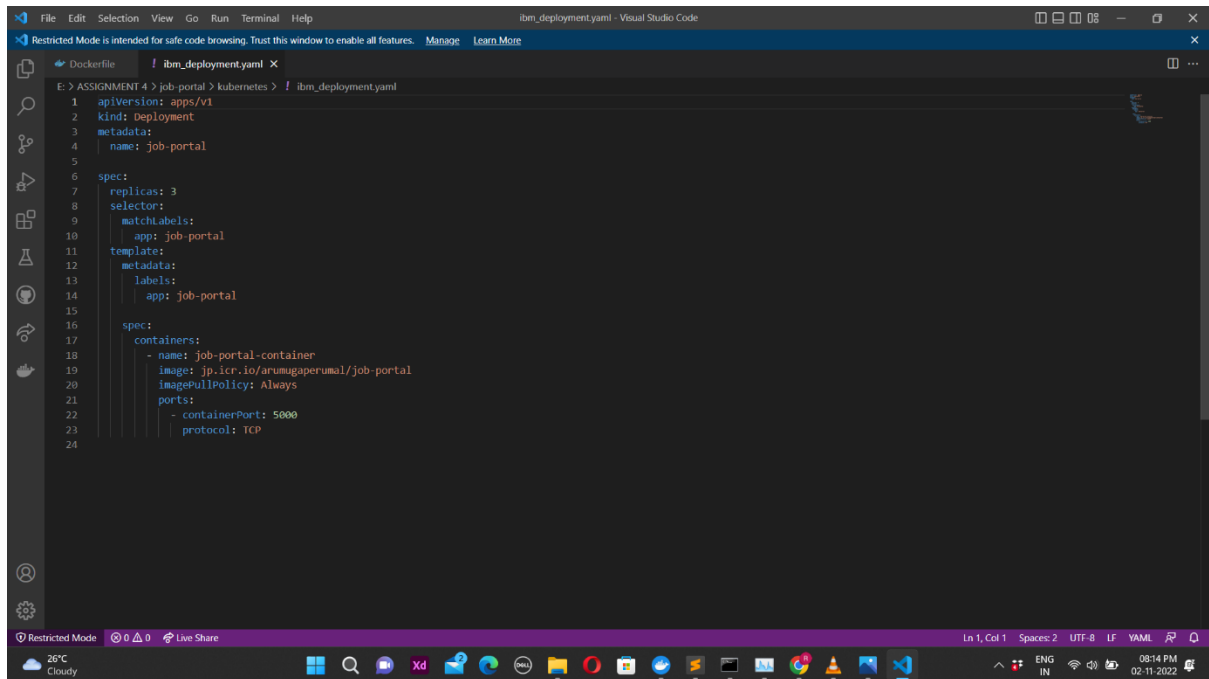
26°C Cloudy

11:18 AM 03-11-2022



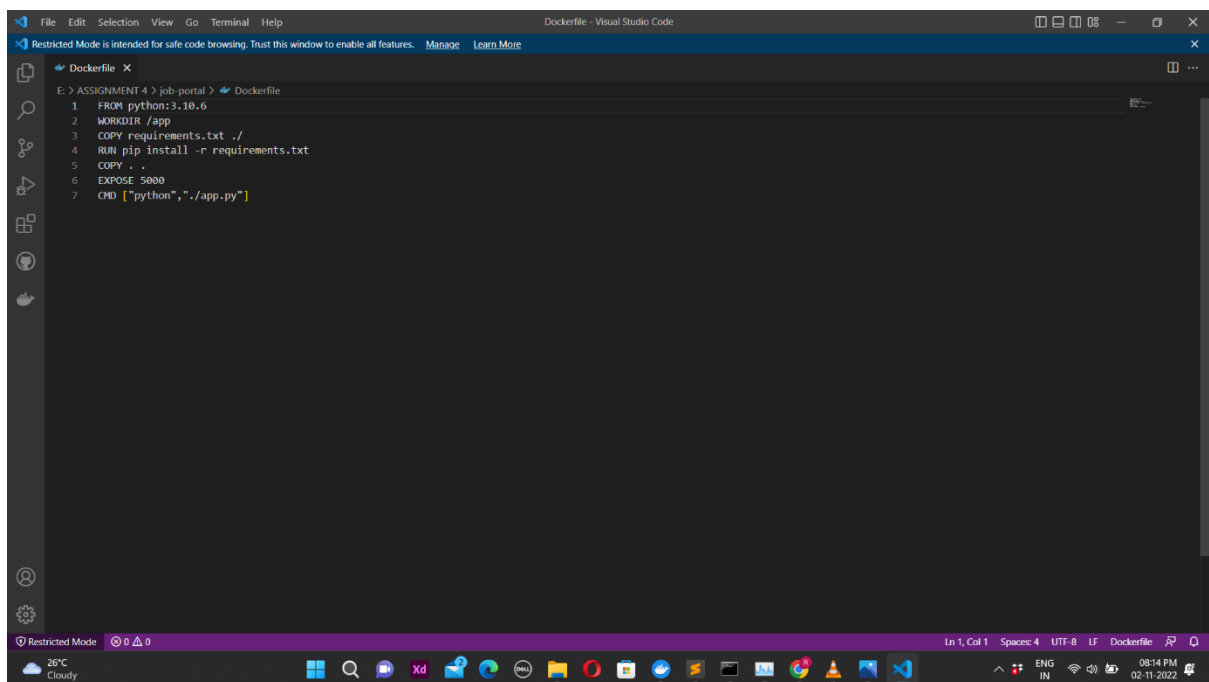


Step 2: Create a dockerfile for the job portal / flask application and deploy it in Docker desktop application.



The screenshot shows a Visual Studio Code window with a file named `ibm_deployment.yaml` open. The file contains a Kubernetes Deployment manifest for an application named `job-portal`. The manifest specifies 3 replicas, a selector matching the `app: job-portal` label, and a container named `job-portal-container` using the image `jp-icr.io/arumugaperumal/job-portal` with port 5000 exposed.

```
1 apiVersion: apps/v1
2 kind: Deployment
3 metadata:
4   name: job-portal
5
6 spec:
7   replicas: 3
8   selector:
9     matchLabels:
10      app: job-portal
11   template:
12     metadata:
13       labels:
14         app: job-portal
15     spec:
16       containers:
17         - name: job-portal-container
18           image: jp-icr.io/arumugaperumal/job-portal
19           imagePullPolicy: Always
20           ports:
21             - containerPort: 5000
22               protocol: TCP
```



The screenshot shows a Visual Studio Code window with a file named `Dockerfile` open. The file contains instructions to build a Docker image for the job portal application. It starts with a Python base image, sets the working directory to `/app`, copies the requirements file, installs dependencies, and sets the command to run `python ./app.py`.

```
1 FROM python:3.10.6
2 WORKDIR /app
3 COPY requirements.txt ./
4 RUN pip install -r requirements.txt
5 COPY . .
6 EXPOSE 5000
7 CMD ["python", "./app.py"]
```

The screenshot shows the Visual Studio Code editor with the file `flask_service.yaml` open. The editor is in "Restricted Mode" and displays a warning message: "Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More". The file content is as follows:

```
1 apiVersion: v1
2 kind: Service
3 metadata:
4   name: flask-app-service
5 spec:
6   type: NodePort
7   ports:
8     - port: 5000
9     selector:
10       app: job-portal
11
```

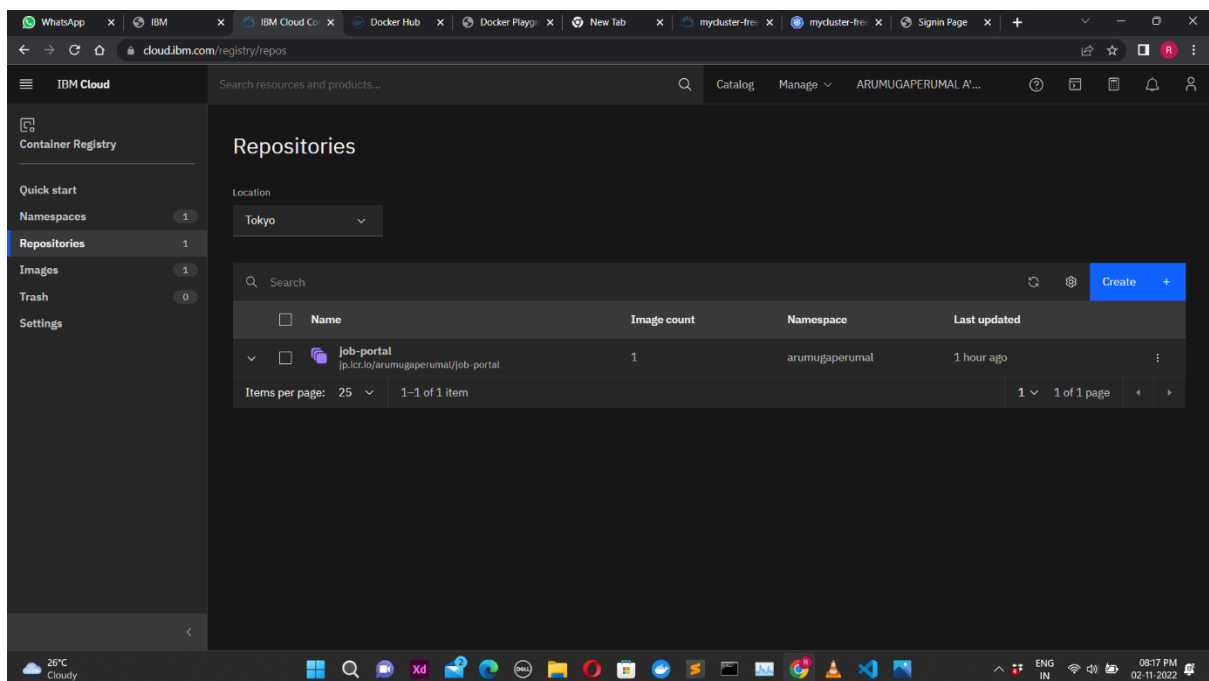
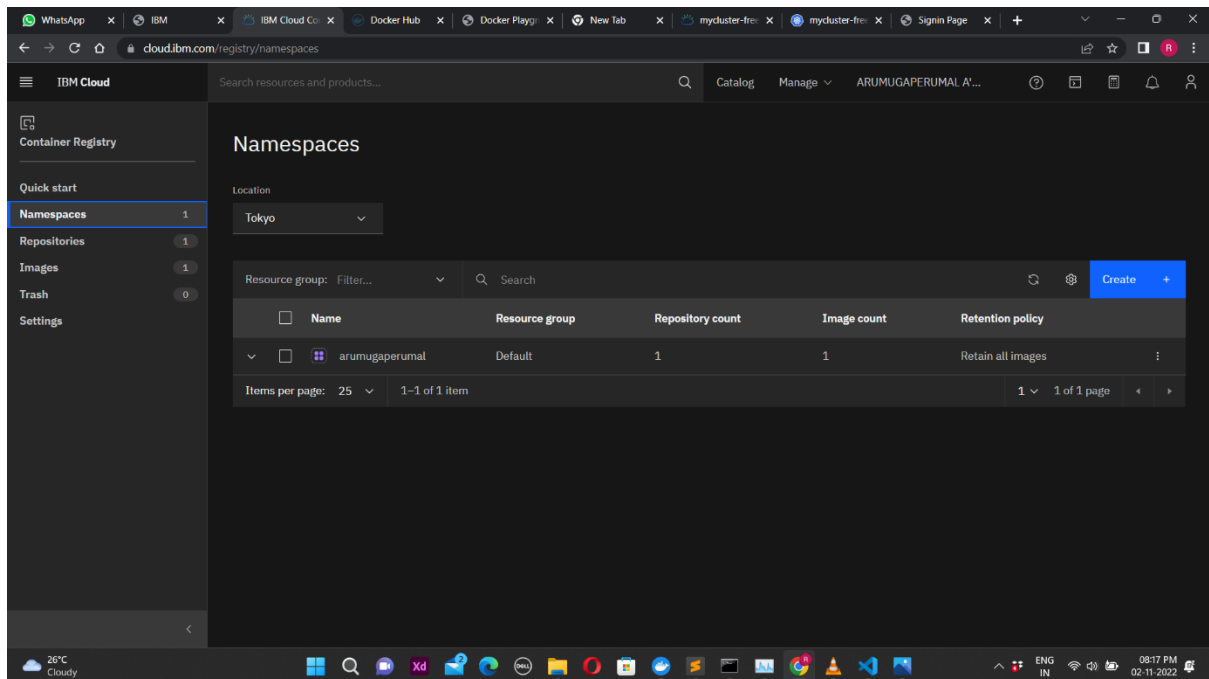
The status bar at the bottom indicates the file is in "Restricted Mode" and shows the current line and column as "Ln 1, Col 1". The system tray at the bottom shows the date and time as "08:14 PM 02-11-2022".

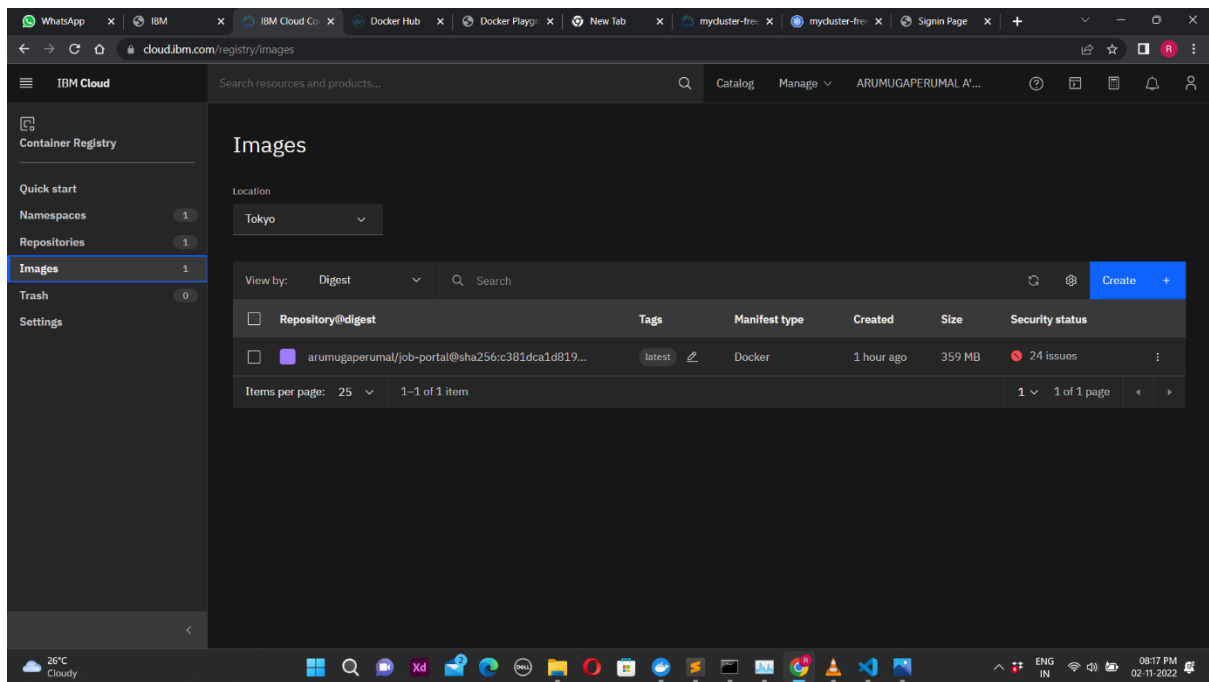
The screenshot shows the Visual Studio Code editor with the file `flask_ingress.yaml` open. The editor is in "Restricted Mode" and displays a warning message: "Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More". The file content is as follows:

```
1 apiVersion: networking.k8s.io/v1
2 kind: Ingress
3 metadata:
4   name: flask-app-ingress
5 annotations:
6   kubernetes.io/ingress.class: nginx
7   nginx.ingress.kubernetes.io/ssl-redirect: "false"
8
9 spec:
10   # ingressClassName: nginx
11   rules:
12     - http:
13       paths:
14         - backend:
15             service:
16               name: flask-app-service
17               port:
18                 number: 5000
19             path: /
20             pathType: Prefix
```

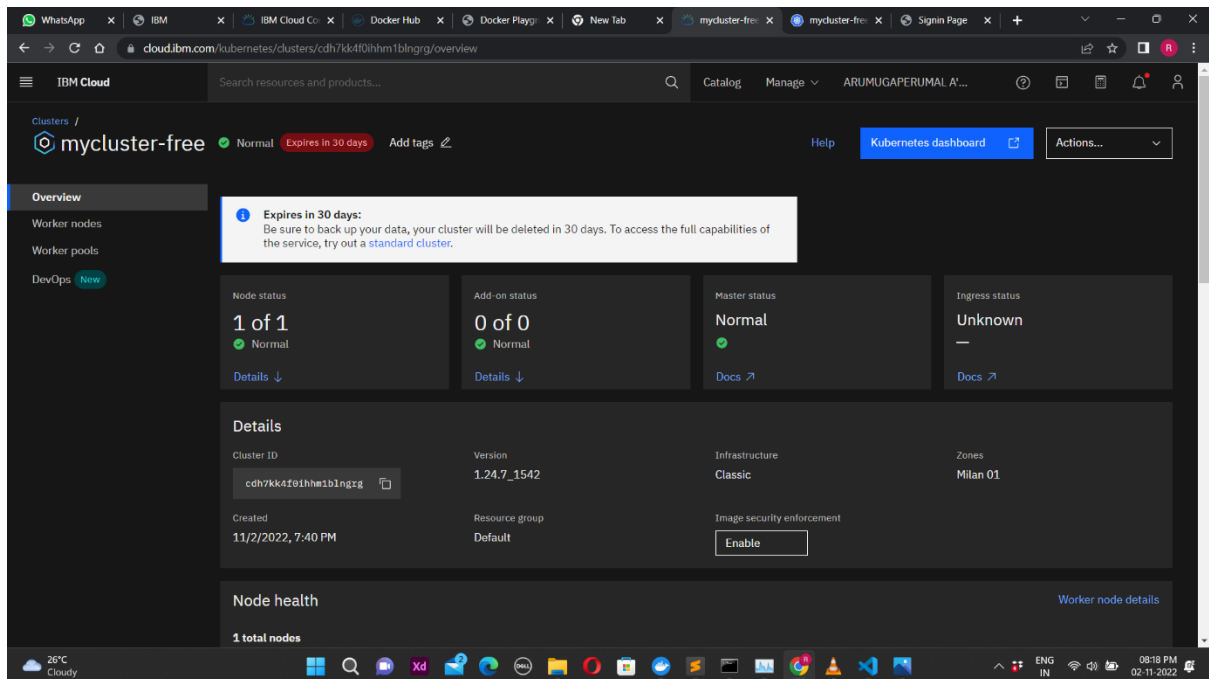
The status bar at the bottom indicates the file is in "Restricted Mode" and shows the current line and column as "Ln 1, Col 1". The system tray at the bottom shows the date and time as "08:14 PM 02-11-2022".

Step 3: Create a IBM container registry and push docker image of flask application or job portal app.





Step 4: Create a Kubernetes cluster in IBM cloud and deploy flask application image or job portal image and also expose the same app to run in Nodeport.



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cloud.ibm.com/kubernetes/clusters/cdh7kk40ihhm1blnggr/overview

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Clusters / mycluster-free Norm C:\Windows\System32\cmd.exe

Do you want to update? [y/N] > y

Installing version '2.12.1'...

Downloading... 14.95 MiB / 14.95 MiB [=====] 100.00% 4s (no value) bytes downloaded Saved in C:\Users\DELL\bluewin\temp\bx_2884953461\IBM_Cloud_CLI_2.12.1_amd64.exe

E:\ASSIGNMENT 4\job-portal>ibmcloud plugin install container-service

Node Looking up 'container-service' from repository 'IBM Cloud'...

Plug-in 'container-service[kubernetes-service/ks] 1.0.459' found in repository 'IBM Cloud'

1 C Plug-in 'container-service[kubernetes-service/ks] 1.0.459' was already installed. Do you want to re-install it or not? [y/N] > N

N Plug-in installation was canceled.

E:\ASSIGNMENT 4\job-portal>ibmcloud plugin list

Listing installed plug-ins...

Plug-in Name	Version	Status	Private endpoints supported
container-registry	1.0.2		true
container-service[kubernetes-service/ks]	1.0.459		false
observe-service[ob]	1.0.82		false

Cluster

cd E:\ASSIGNMENT 4\job-portal>ibmcloud cr login

Logging 'docker' in to 'jp.icr.io'...

logged in to 'jp.icr.io'.

Created 11/2/2022, 7:40 PM Default Enable

Ingress status Unknown Docs

Zones Milan 01

Node health 1 total nodes Worker node details

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cloud.ibm.com/kubernetes/clusters/cdh7kk40ihhm1blnggr/overview

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Clusters / mycluster-free Norm C:\Windows\System32\cmd.exe

Microsoft Windows [Version 10.0.22621.608] (c) Microsoft Corporation. All rights reserved.

E:\ASSIGNMENT 4\job-portal>docker tag job-portal arumugaperumal008/job-portal:latest

E:\ASSIGNMENT 4\job-portal>ibmcloud login

API endpoint: https://cloud.ibm.com

Region: jp-tok

Email: 953719104008@smartinternz.com

Node Password Authenticating...

1 C OK

N Targeted account ARUMUGAPERUMAL A's Account (e6dc5e89f95746bfcc6b64339f14dbb)

Detail

API endpoint: https://cloud.ibm.com

Region: jp-tok

User: 953719104008@smartinternz.com

Account: ARUMUGAPERUMAL A's Account (e6dc5e89f95746bfcc6b64339f14dbb)

Resource group: No resource group targeted, use 'ibmcloud target -g RESOURCE_GROUP'

Cluster Org: Space: cdl

cd

New version 2.12.1 is available. Change logs: https://github.com/IBM-Cloud/ibm-cloud-cli-release/releases/tag/v2.12.1

Created 11/2/2022, 7:40 PM Default Enable

Ingress status Unknown Docs

Zones Milan 01

Node health 1 total nodes Worker node details

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cloud.ibm.com/kubernetes/clusters/cdh7kk4f0ihhm1blnrg/overview

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Clusters / mycluster-free Norm C:\Windows\System32\cmd.exe

Overview Worker nodes Worker pools DevOps New

E:\ASSIGNMENT 4\job-portal>ibmcloud cr login
Logging 'docker' in to 'jp.icr.io'...
Logged in to 'jp.icr.io'.
OK

E:\ASSIGNMENT 4\job-portal>docker tag job-portal jp.icr.io/arumugaperumal/job-portal

E:\ASSIGNMENT 4\job-portal>docker push jp.icr.io/arumugaperumal/job-portal:latest
The push refers to repository [jp.icr.io/arumugaperumal/job-portal]
c3b724efad9e: Pushed
1f123186824c: Pushed
3d0eb1152931: Pushed
100796cdf3b1: Pushed
54acb5a6fa0b: Pushing [=====] 251.9WS4acb5a6fa0b: Pushing
54acb5a6fa0b: Pushed
8d51c618126f: Pushed
9ff6e4d46744: Pushed
a89d1d47b5a1: Pushed
655ed1b7a428: Pushed
cdlatest: digest: sha256:c381dca1d819473c01d19408fd85fde2abc5da047ffb8430bbf88a5f1104a31f size: 3054

Node health
1 total nodes

Ingress status
Unknown
Docs

Zones
Milan 01

11/2/2022, 7:40 PM Default Enable

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cloud.ibm.com/kubernetes/clusters/cdh7kk4f0ihhm1blnrg/overview

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Overview Worker nodes Worker pools DevOps New

E:\ASSIGNMENT 4\job-portal>ibmcloud ks cluster config --cluster cdh7kk4f0ihhm1blnrg
OK
The configuration for cdh7kk4f0ihhm1blnrg was downloaded successfully.

Added context for cdh7kk4f0ihhm1blnrg to the current kubeconfig file.
You can now execute 'kubectl' commands against your cluster. For example, run 'kubectl get nodes'.
If you are accessing the cluster for the first time, 'kubectl' commands might fail for a few seconds while RBAC synchronizes.

E:\ASSIGNMENT 4\job-portal>kubectl config current-context
mycluster-free/cdh7kk4f0ihhm1blnrg

E:\ASSIGNMENT 4\job-portal>kubectl apply -f kubernetes/ibm_deployment.yaml
deployment.apps/job-portal created

E:\ASSIGNMENT 4\job-portal>kubectl apply -f kubernetes/flask_service.yaml
service/flask-app-service created

E:\ASSIGNMENT 4\job-portal>kubectl apply -f kubernetes/flask_ingress.yaml
ingress.networking.k8s.io/flask-app-ingress created

E:\ASSIGNMENT 4\job-portal>kubectl describe svc flask-app-service
Name: flask-app-service
Namespace: default
Labels: <none>
Annotations: <none>
Selector: app=job-portal
Type: NodePort

Node health
1 total nodes

Ingress status
Unknown
Docs

Zones
Milan 01

11/2/2022, 7:40 PM Default Enable

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cloud.ibm.com/kubernetes/clusters/cdh7kk4i0ihm1blnrg/overview

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Clusters / mycluster-free Norm C:\Windows\System32\cmd.exe

```
E:\ASSIGNMENT 4\job-portal>kubectl apply -f kubernetes/flask_service.yaml
service/flask-app-service created
E:\ASSIGNMENT 4\job-portal>kubectl apply -f kubernetes/flask_ingress.yaml
ingress.networking.k8s.io/flask-app-ingress created
E:\ASSIGNMENT 4\job-portal>kubectl describe svc flask-app-service
Name: flask-app-service
Namespace: default
Labels: <none>
Annotations: <none>
Selector: app=job-portal
NodePort: 30468/TCP
IPFamilies: IPv4
IPFamilies: IPv4
IPs: 172.21.48.182
Port: 5000/TCP
TargetPort: 5000/TCP
NodePort: 30468/TCP
Endpoints: 172.30.230.203:5000,172.30.230.204:5000,172.30.230.205:5000
Session Affinity: None
External Traffic Policy: Cluster
ClusterEvents: <none>
```

1 CType: SingleStack
IP Families: IPv4
IPs: 172.21.48.182
Port: 5000/TCP
TargetPort: 5000/TCP
NodePort: 30468/TCP
Endpoints: 172.30.230.203:5000,172.30.230.204:5000,172.30.230.205:5000
Session Affinity: None
External Traffic Policy: Cluster
ClusterEvents: <none>

cd E:\ASSIGNMENT 4\job-portal>

Create: 11/2/2022, 7:40 PM
Resource group: Default
Image security: Enable

Node health
1 total nodes

Ingress status
Unknown
Docs

Zones
Milan 01

Worker node details

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eu-de.containers.cloud.ibm.com/kubeproxy/clusters/cdh7kk4i0ihm1blnrg/service/#/workloads?namespace=default

kubernetes default Search

Workloads

Workloads
Cron Jobs
Daemon Sets
Deployments
Jobs
Pods
Replica Sets
Replication Controllers
Stateful Sets
Service
Ingresses
Ingress Classes
Services
Config and Storage
Config Maps
Persistent Volume Claims
Secrets

Workload Status

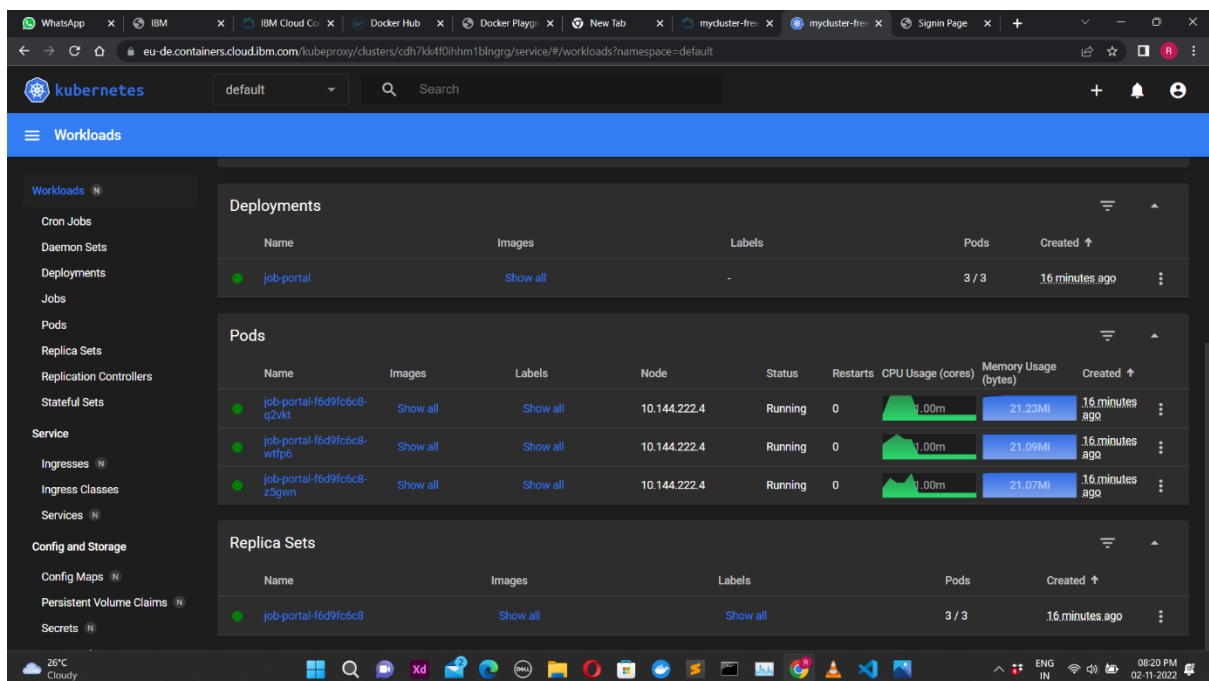
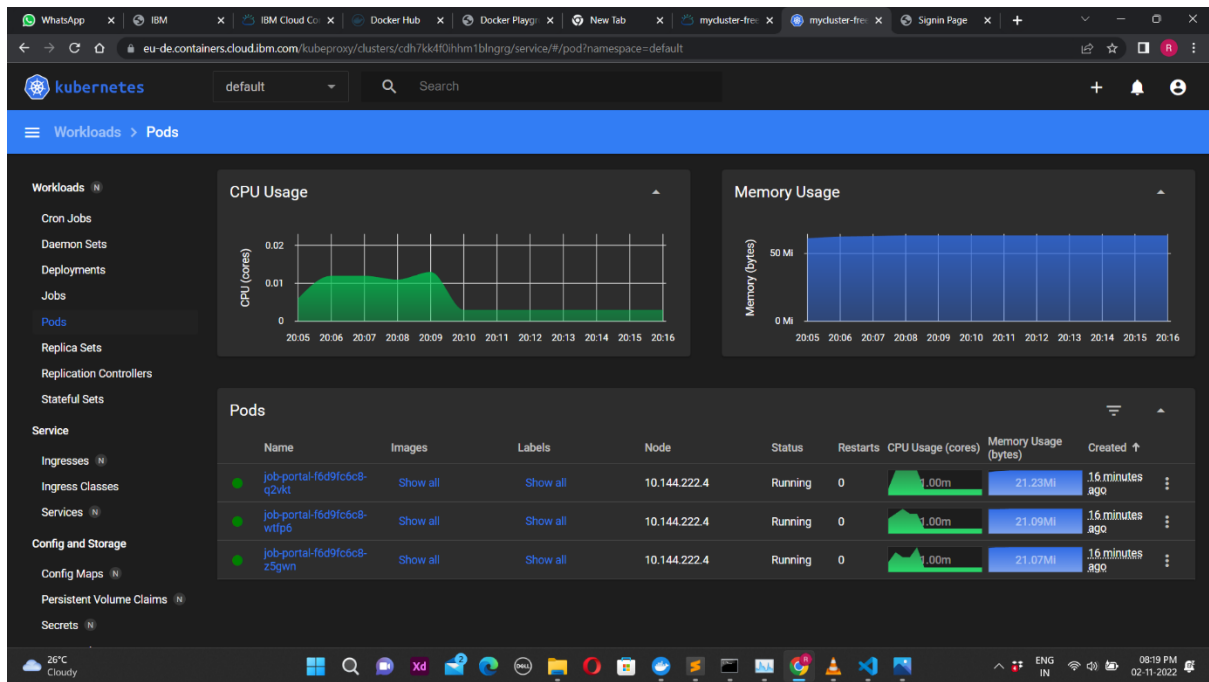
Running 1 Deployments
Running 3 Pods
Running 1 Replica Sets

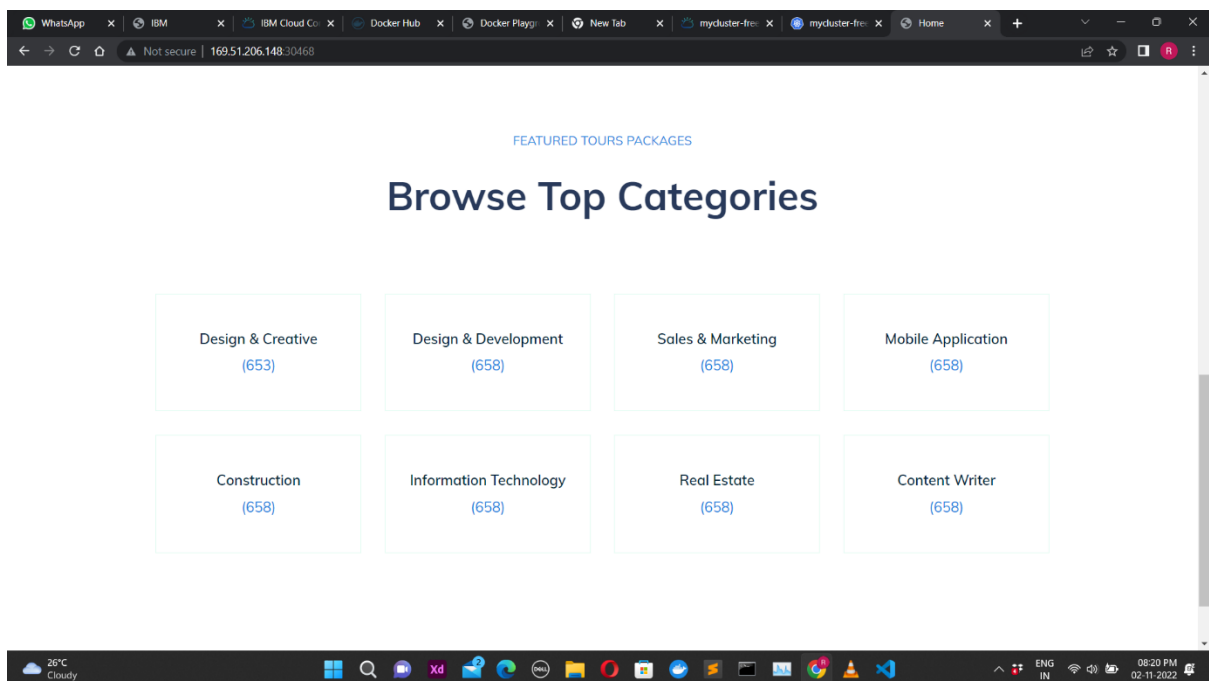
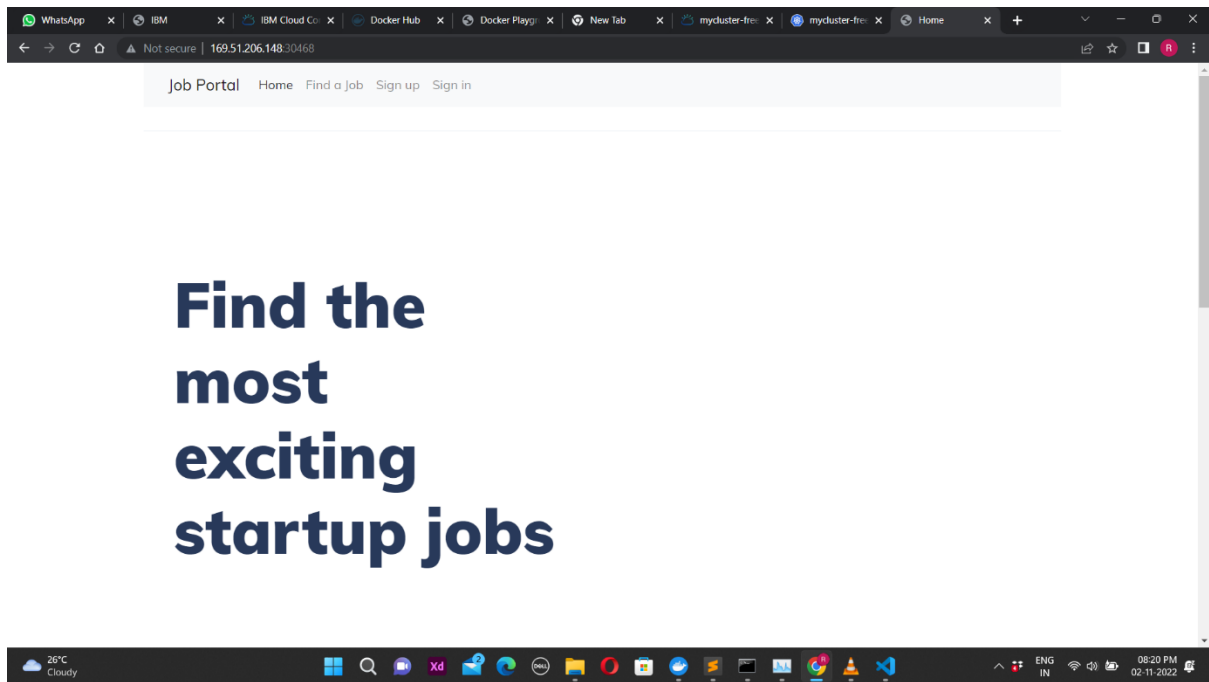
Deployments

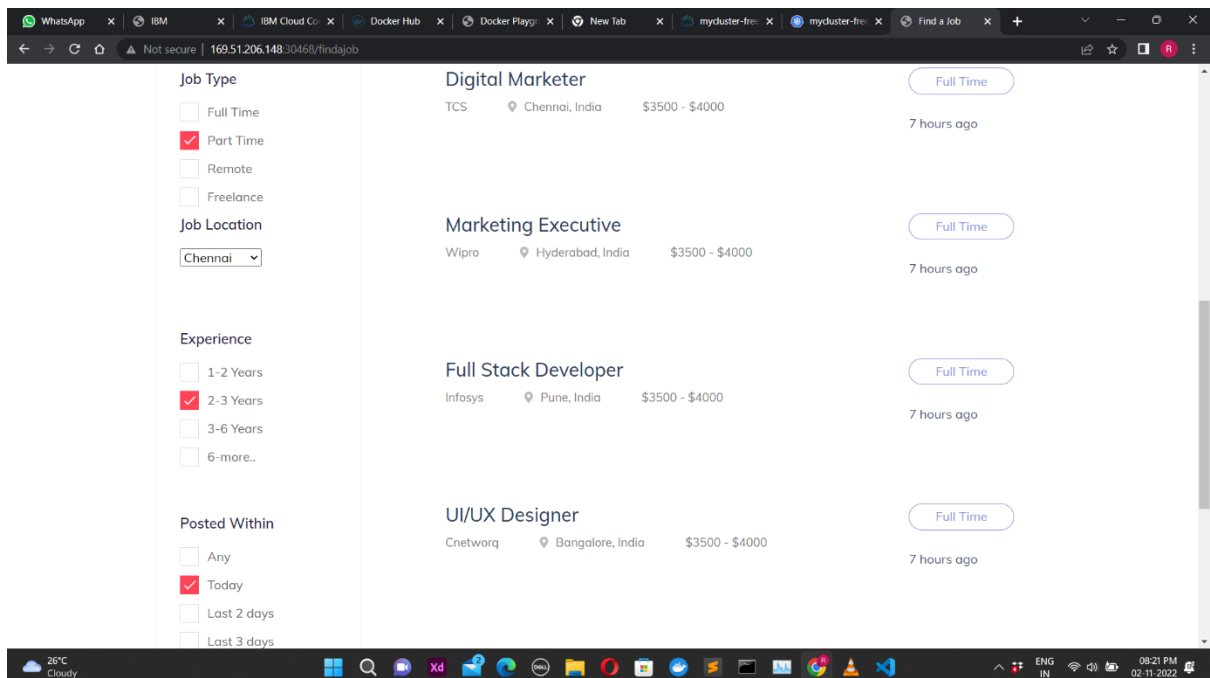
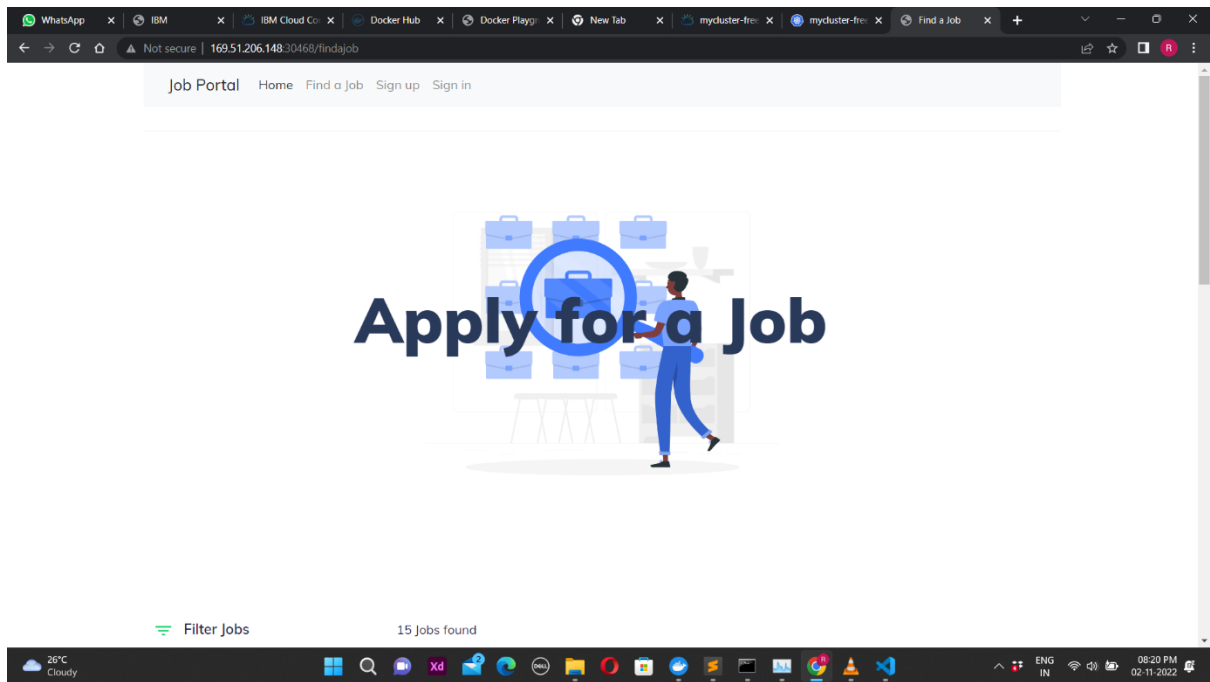
Name	Images	Labels	Pods	Created
job-portal	Show all	-	3 / 3	16 minutes ago

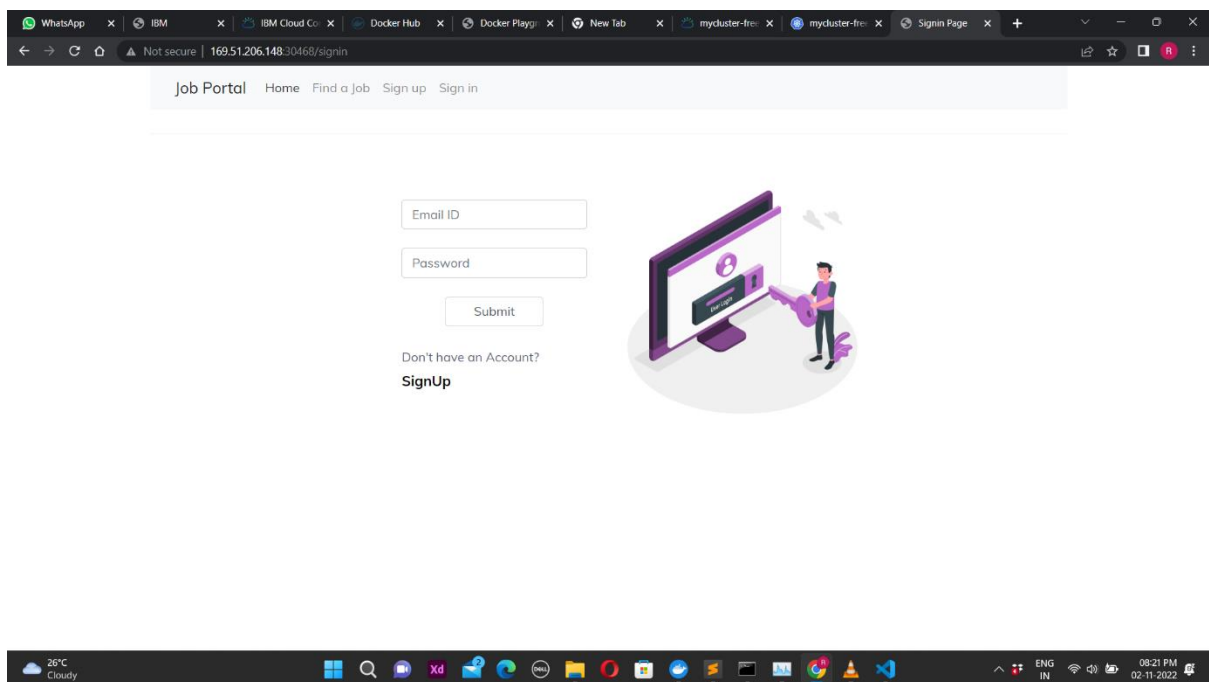
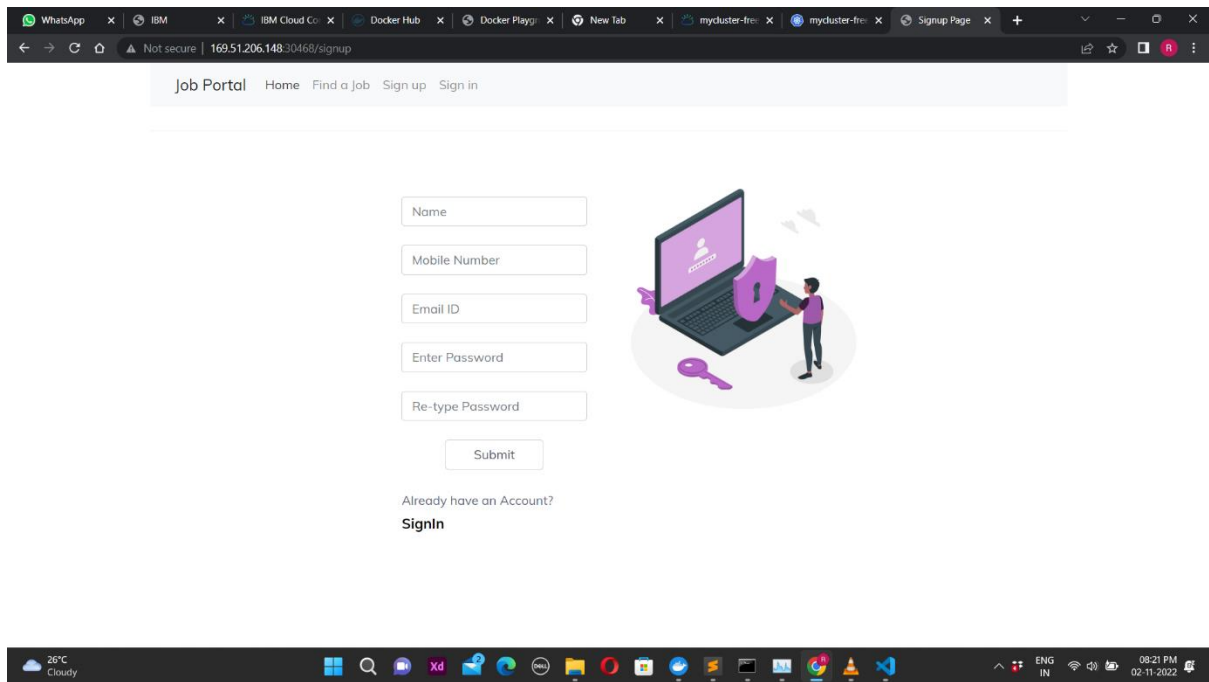
Pods

26°C Cloudy









View the deployed Job-portal flask application by clicking the below link:

<http://169.51.206.148:30468/>