

## Assignment – 4

Assignment Date	02.11.2022
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Maximum Marks	2 Marks

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

The screenshot shows the Docker Playground interface. On the left, there's a sidebar with a timer at 03:49:27, a 'CLOSE SESSION' button, and a list of instances. The main area displays the container 'cdp6ide3\_cdp6mkf91rrg00a4ekcg' with its IP (192.168.0.8), memory usage (1.20%), and CPU usage (0.59%). Below this, the SSH command is shown: `ssh ip172-18-0-12-cdp6ide3tccg00c9c78g@direct.labs.play`. The terminal output shows a warning message, followed by the user running `docker images` and `docker pull hello-world`. The output of the pull command shows the image being pulled from the library and the container being created.

The screenshot shows the Docker Playground interface with the timer at 03:48:27. The container 'cdp6ide3\_cdp6mkf91rrg00a4ekcg' is shown with its IP (192.168.0.8), memory usage (1.23%), and CPU usage (0.29%). The SSH command is the same as in the previous screenshot. The terminal output now shows the 'Hello from Docker!' message, followed by a detailed explanation of the steps taken to generate the message: 1. The Docker client contacted the Docker daemon. 2. The Docker daemon pulled the "hello-world" image from the Docker Hub. 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. Below this, there's a suggestion to run an Ubuntu container with `docker run -it ubuntu bash` and a link to the Docker Hub for more examples.

## 2. Create a docker file for the jobportal application and deploy it in Docker desktop application.

```
Command Prompt
Microsoft Windows [Version 10.0.22000.1219]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Tamilarasana.S>D:

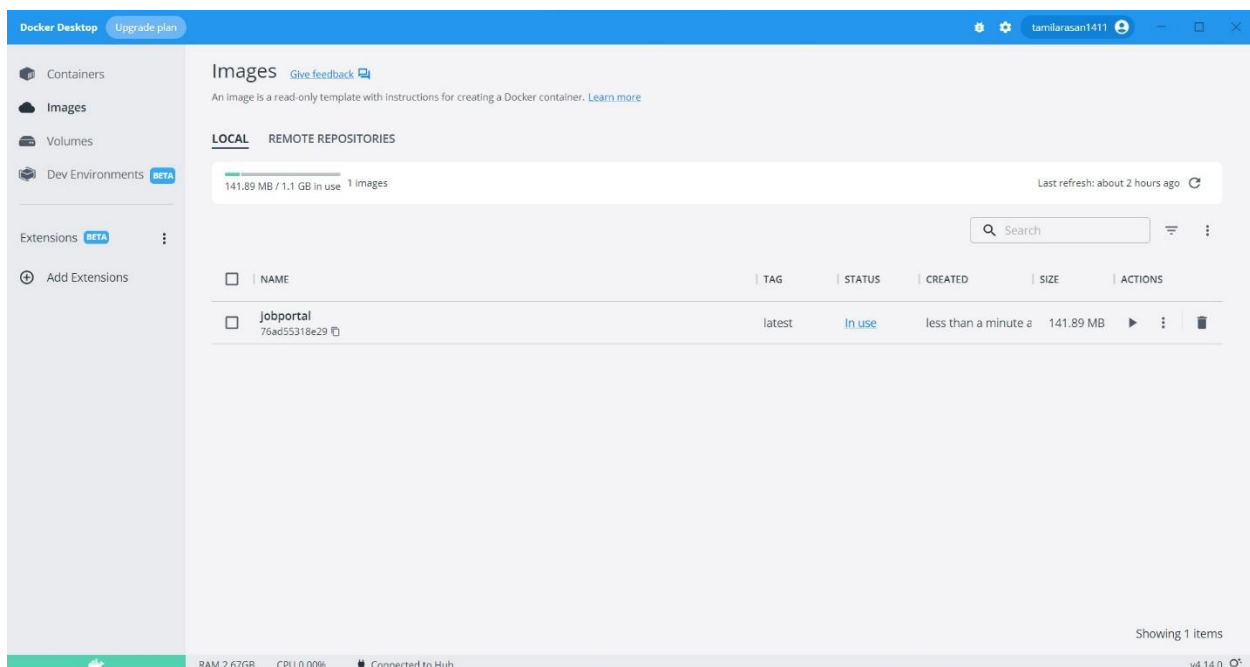
D:\>cd IBM/Assignment 4

D:\IBM\Assignment 4>docker images
REPOSITORY TAG IMAGE ID CREATED SIZE

D:\IBM\Assignment 4>docker build -t jobportal .
[+] Building 5.0s (16/16) FINISHED
=> [internal] load build definition from Dockerfile 0.0s
=> => transferring dockerfile: 32B 0.0s
=> [internal] load .dockerignore 0.0s
=> => transferring context: 2B 0.0s
=> resolve image config for docker.io/docker/dockerfile:1 2.2s
=> [auth] docker/dockerfile:pull token for registry-1.docker.io 0.0s
=> CACHED docker-image://docker.io/docker/dockerfile:1@sha256:9ba7531bd80fb0a858632727cf7a112fbfd19b17e94c4e84ce 0.0s
=> [internal] load build definition from Dockerfile 0.0s
=> [internal] load .dockerignore 0.0s
=> [internal] load metadata for docker.io/library/python:3.10-slim-buster 1.7s
=> [auth] library/python:pull token for registry-1.docker.io 0.0s
=> [1/5] FROM docker.io/library/python:3.10-slim-buster@sha256:c2b2fbfcb541f6012e98911afc371be734d2f9c1f875f6e5a 0.0s
=> [internal] load build context 0.1s
=> => transferring context: 13.8kB 0.0s
=> CACHED [2/5] WORKDIR /python-docker 0.0s
=> CACHED [3/5] COPY requirements.txt requirements.txt 0.0s
=> CACHED [4/5] RUN pip3 install -r requirements.txt 0.0s
=> [5/5] COPY . . 0.3s
=> exporting to image 0.2s
=> => exporting layers 0.1s
=> => writing image sha256:76ad55318e295ea02d2e2030ea672fb164b801a557c271940833d378a13c8021 0.0s
=> => naming to docker.io/library/jobportal 0.0s

Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them

D:\IBM\Assignment 4>docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
jobportal latest 76ad55318e29 9 seconds ago 142MB
```



```
Command Prompt
D:\IBM\Assignment 4>docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE

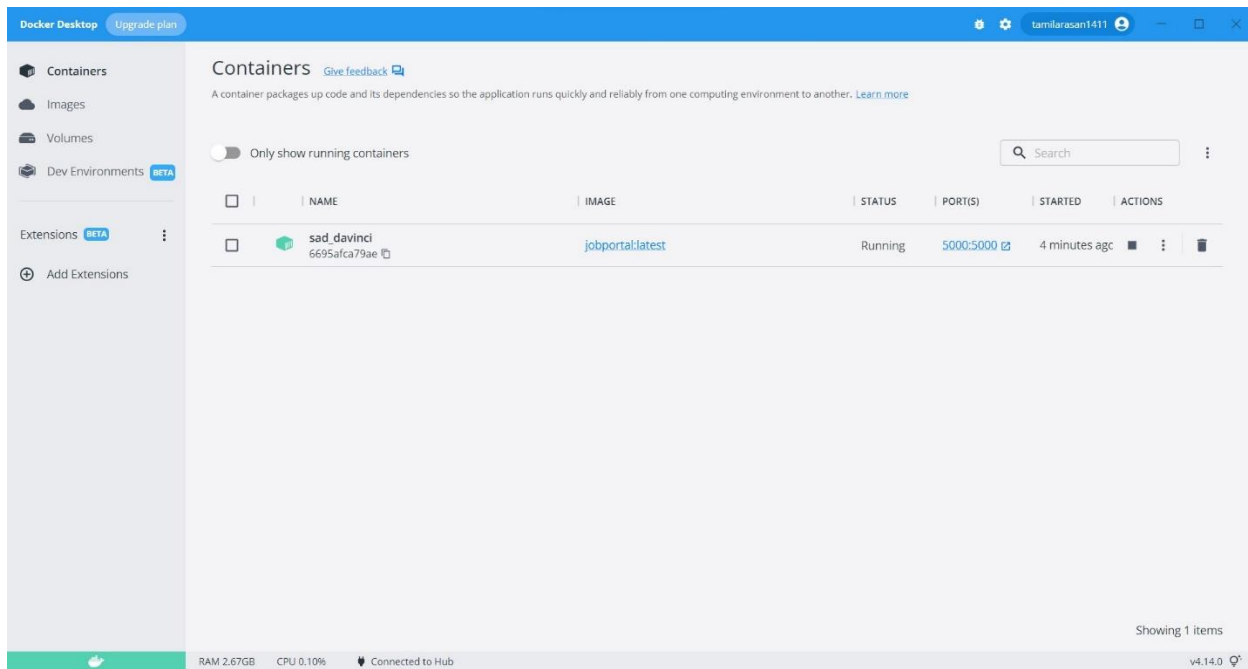
D:\IBM\Assignment 4>docker build -t jobportal .
[+] Building 5.0s (16/16) FINISHED
=> [internal] load build definition from Dockerfile                                0.0s
=> => transferring dockerfile: 32B                                                0.0s
=> [internal] load .dockerignore                                                  0.0s
=> => transferring context: 2B                                                    0.0s
=> resolve image config for docker.io/docker/dockerfile:1                      2.2s
=> [auth] docker/dockerfile:pull token for registry-1.docker.io                0.0s
=> CACHED docker-image://docker.io/docker/dockerfile:1@sha256:9ba7531bd80fb0a858632727cf7a112fbfd19b17e94c4e84ce 0.0s
=> [internal] load build definition from Dockerfile                                0.0s
=> [internal] load .dockerignore                                                  0.0s
=> [internal] load metadata for docker.io/library/python:3.10-slim-buster       1.7s
=> [auth] library/python:pull token for registry-1.docker.io                    0.0s
=> [1/5] FROM docker.io/library/python:3.10-slim-buster@sha256:c2b2fbfcb541f6012e98911afc371be734d2f9c1f875f6e5a 0.0s
=> [internal] load build context                                                  0.1s
=> => transferring context: 13.81kB                                              0.0s
=> CACHED [2/5] WORKDIR /python-docker                                           0.0s
=> CACHED [3/5] COPY requirements.txt requirements.txt                           0.0s
=> CACHED [4/5] RUN pip3 install -r requirements.txt                             0.0s
=> [5/5] COPY . .                                                                0.3s
=> exporting to image                                                            0.2s
=> => exporting layers                                                            0.1s
=> => writing image sha256:76ad55318e295ea02d2e2030ea672fb164b801a557c271940833d378a13c8021 0.0s
=> => naming to docker.io/library/jobportal                                     0.0s

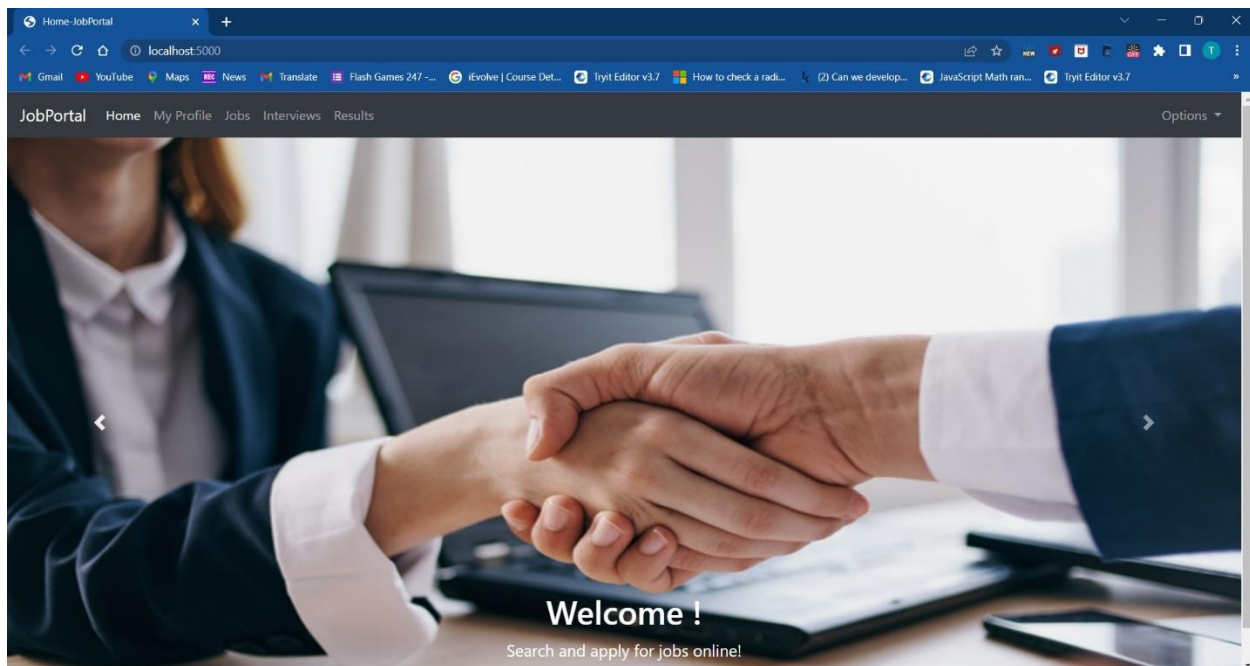
Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them

D:\IBM\Assignment 4>docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
jobportal     latest    76ad55318e29   9 seconds ago  142MB

D:\IBM\Assignment 4>docker run -d -p 5000:5000 jobportal
6695afca79ae1388644c52e3b3f9b20efd88177ba55e0846fccc4d7a241034cc

D:\IBM\Assignment 4>
```





3. Create a IBM container registry and deploy helloworld app or jobportalapp.

```
Command Prompt
Microsoft Windows [Version 10.0.22000.1219]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Tamilarasan.S>ibmcloud login
API endpoint: https://cloud.ibm.com
Region: eu-gb

Email> tamilthiru1428@gmail.com

Password>
Authenticating...
OK

Targeted account Tamilarasan S's Account (1abfc63c80374666a7deffe6381bac63)

API endpoint: https://cloud.ibm.com
Region: eu-gb
User: tamilthiru1428@gmail.com
Account: Tamilarasan S's Account (1abfc63c80374666a7deffe6381bac63)
Resource group: No resource group targeted, use 'ibmcloud target -g RESOURCE_GROUP'
CF API endpoint:
Org:
Space:

C:\Users\Tamilarasan.S>ibmcloud cr login
Logging 'docker' in to 'uk.icr.io'...
Logged in to 'uk.icr.io'.

OK
```



```
Command Prompt
C:\Users\Tamilarasana.S>docker pull hello-world
Using default tag: latest
latest: Pulling from library/hello-world
2db29710123e: Pull complete
Digest: sha256:faa03e786c97f07ef34423fccceec2398ec8a5759259f94d99078f264e9d7af
Status: Downloaded newer image for hello-world:latest
docker.io/library/hello-world:latest

C:\Users\Tamilarasana.S>docker tag hello-world uk.icr.io/ibm_assignments/ibm_assignments:hello-world

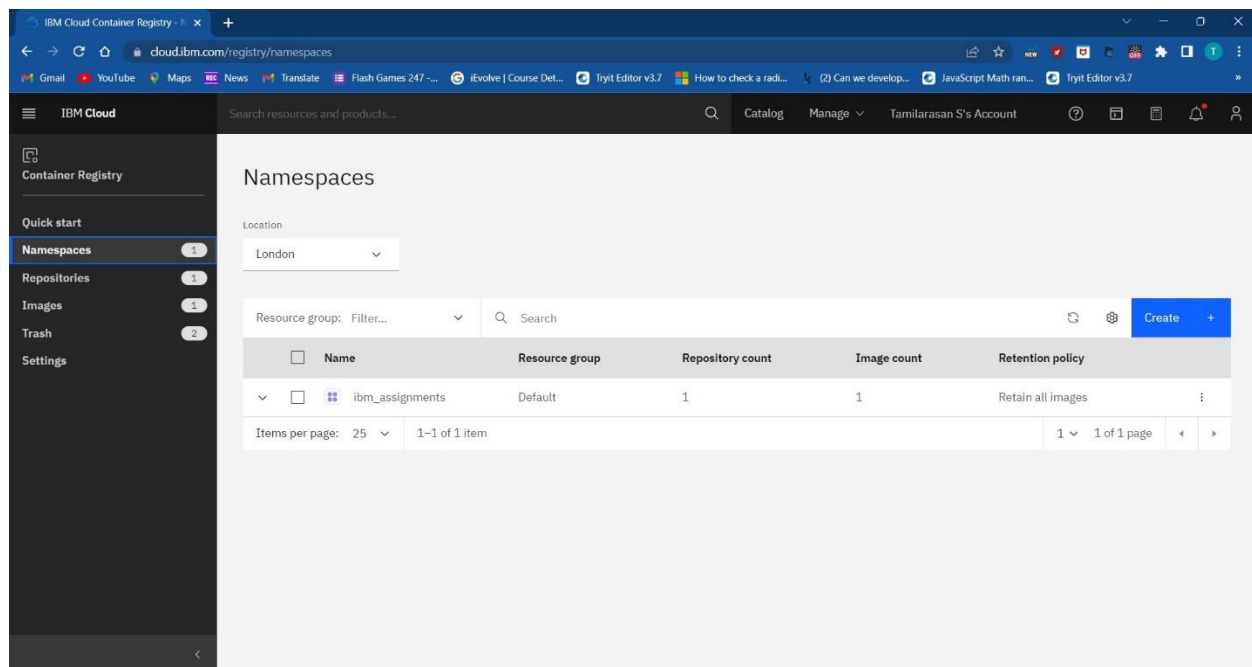
C:\Users\Tamilarasana.S>docker push uk.icr.io/ibm_assignments/ibm_assignments:hello-world
The push refers to repository [uk.icr.io/ibm_assignments/ibm_assignments]
e07ee1baac5f: Layer already exists
hello-world: digest: sha256:f54a58bc1aac5ea1a25d796ae155dc228b3f0e11d046ae276b39c4bf2f13d8c4 size: 525

C:\Users\Tamilarasana.S>ibmcloud cr image-list
Listing images...

Repository                                Tag          Digest          Namespace      Created      Size      Security status
uk.icr.io/ibm_assignments/ibm_assignments hello-world   f54a58bc1aac    ibm_assignments 1 year ago   2.5 kB    -

OK

C:\Users\Tamilarasana.S>
```



IBM Cloud Container Registry - 1 x

cloud.ibm.com/registry/repos

IBM Cloud

Search resources and products...

Container Registry

Quick start

Namespaces 1

Repositories 1

Images 1

Trash 2

Settings

## Repositories

Location

London

Search

Create +

<input type="checkbox"/>	Name	Image count	Namespace	Last updated	
<input checked="" type="checkbox"/>	ibm_assignments uk.icr.io/ibm_assignments/ibm_assignments	1	ibm_assignments	417 days ago	

Items per page: 25 1-1 of 1 item

1 1 of 1 page

IBM Cloud Container Registry - 1 x

cloud.ibm.com/registry/images

IBM Cloud

Search resources and products...

Container Registry

Quick start

Namespaces 1

Repositories 1

Images 1

Trash 2

Settings

## Images

Location

London

View by: Digest

Search

Create +

<input type="checkbox"/>	Repository@digest	Tags	Manifest type	Created	Size	Security status	
<input checked="" type="checkbox"/>	ibm_assignments/ibm_assignments@sha256:f54a58bc1aac...	hello-world	Docker	417 days ago	2 KB	Unsupported OS	

Items per page: 25 1-1 of 1 item

1 1 of 1 page

4. Create a Kubernetes cluster in IBM cloud and deploy helloworld image or jobportal image and also expose the same app to run in nodeport.

The screenshot shows the Kubernetes Dashboard interface. The left sidebar contains a navigation menu with categories: Workloads, Service, Config and Storage, and others. The main area displays 'Workload Status' with three green circles representing the status of Deployments, Pods, and Replica Sets. Below this, a 'Deployments' table lists the following:

Name	Images	Labels	Pods	Created
flask-app	jobportal	-	5 / 5	11 minutes ago
dashboard-metrics-scraper	kubernetes/dashboard-metrics-scraper:v1.0.8	k8s-app: dashboard-metrics-scraper	1 / 1	3 days ago
kubernetes-dashboard	kubernetes/dashboard:v2.6.1	k8s-app: kubernetes-dashboard	1 / 1	3 days ago

The screenshot shows the IBM Cloud console for a 'mycluster-free' Kubernetes cluster. The cluster is in a 'Normal' state and expires in 26 days. The overview section displays the following status:

- Node status: 1 of 1 Normal
- Add-on status: 0 of 0 Normal
- Master status: Normal
- Ingress status: Healthy

The details section provides the following information:

- Cluster ID: cdpbpbpfesn181f5ehg0
- Version: 1.24.7\_1542
- Infrastructure: Classic
- Zones: Milan 01
- Created: 11/15/2022, 3:39 AM
- Resource group: Default
- Image security enforcement: Enable

The bottom section shows 'Node health' with a link to 'Worker node details'.

mycluster-free - Kubernetes Dashboard

eu-de.containers.cloud.ibm.com/kubeproxy/clusters/cdpbpbpf0snl81f50hg0/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

#### Workload Status

Running: 1 Deployments

Running: 3 Pods

Running: 1 Replica Sets

#### Deployments

Name	Images	Labels	Pods	Created
jobportal	uk.icr.io/ibm_assignments/jobportal	-	3 / 3	2 minutes ago

```
Administrator: Command Prompt
D:\IBM\Assignment 4>ibmcloud ks cluster config --cluster cdpbpbpf0snl81f50hg0
OK
The configuration for cdpbpbpf0snl81f50hg0 was downloaded successfully.

Added context for cdpbpbpf0snl81f50hg0 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.

D:\IBM\Assignment 4>kubectl config get-contexts
CURRENT  NAME                                     CLUSTER                                AUTHINFO
*        docker-desktop                          docker-desktop                        docker-desktop
*        mycluster-free/cdpbpbpf0snl81f50hg0    mycluster-free/cdpbpbpf0snl81f50hg0    tamilthiru1428@gmail.com/1abfc63c80374666a7d
        effe6381bac63/iam.cloud.ibm.com-identity default

D:\IBM\Assignment 4>kubectl apply -f kubernetess/ibm_deployment.yaml
deployment.apps/jobportal created

D:\IBM\Assignment 4>kubectl apply -f kubernetess/flask_service.yaml
service/flask-app-service created

D:\IBM\Assignment 4>kubectl apply -f kubernetess/flask_ingress.yaml
ingress.networking.k8s.io/flask-app-ingress created

D:\IBM\Assignment 4>kubectl get ing
NAME          CLASS  HOSTS  ADDRESS  PORTS  AGE
flask-app-ingress <none> *      80      33s

D:\IBM\Assignment 4>kubectl get nodes -o wide
NAME          STATUS  ROLES  AGE  VERSION  INTERNAL-IP  EXTERNAL-IP  OS-IMAGE  KERNEL-VERSION
CONTAINER-RUNTIME
10.144.214.212 Ready  <none>  3d19h  v1.24.7+IKS  10.144.214.212  169.51.205.168  Ubuntu 18.04.6 LTS  4.15.0-194-generic
containerd://1.6.8
```



```
Administrator: Command Prompt
D:\IBM\Assignment 4>kubect1 get svc
NAME                TYPE        CLUSTER-IP    EXTERNAL-IP    PORT(S)        AGE
flask-app-service    ClusterIP    172.21.101.89    <none>         5000/TCP        6m1s
kubernetes            ClusterIP    172.21.0.1      <none>         443/TCP         3d19h

D:\IBM\Assignment 4>kubect1 expose deployment jobportal --type=NodePort --name=jobportal
service/jobportal exposed

D:\IBM\Assignment 4>kubect1 get svc
NAME                TYPE        CLUSTER-IP    EXTERNAL-IP    PORT(S)        AGE
flask-app-service    ClusterIP    172.21.101.89    <none>         5000/TCP        22m
jobportal            NodePort     172.21.103.31    <none>         5000:31248/TCP  8m10s
kubernetes            ClusterIP    172.21.0.1      <none>         443/TCP         3d19h

D:\IBM\Assignment 4>kubect1 describe svc jobportal
Name:                jobportal
Namespace:           default
Labels:              <none>
Annotations:         <none>
Selector:             app=jobportal
Type:                NodePort
IP Family Policy:     SingleStack
IP Families:          IPv4
IP:                  172.21.103.31
IPs:                  172.21.103.31
Port:                <unset> 5000/TCP
TargetPort:          5000/TCP
NodePort:            <unset> 31248/TCP
Endpoints:            172.30.140.139:5000,172.30.140.140:5000,172.30.140.141:5000
Session Affinity:     None
External Traffic Policy: Cluster
Events:              <none>

D:\IBM\Assignment 4>
```

