

Assignment – 4

Cloud Application Development

| | |
|---------------------|-------------------|
| Assignment Date | 19 September 2022 |
| Student Name | Kamaleshpathy V A |
| Student Roll Number | 211719106035 |
| Maximum Mark | 2 Marks |

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

Pushed my own Image to Docker Hub and used that for this assignment.

```
docker pull kamalesh0072610/flask-local-db:latest  
docker image list
```

The screenshot displays the Docker Playground web interface. On the left, a sidebar shows a digital clock at 03:26:56, a 'CLOSE SESSION' button, and an 'Instances' section with a '+ ADD NEW INSTANCE' button and a list of instances including '192.168.0.18 node1'. The main panel shows details for instance 'cdn8oln9_cdn8oon91rrg0087gb8g', including its IP (192.168.0.18), memory usage (26.79%), CPU usage (0.45%), and an SSH command. Below this, a terminal window shows the execution of 'docker pull kamalesh0072610/flask-local-db:latest' and 'docker image list', which lists the pulled image.

```
94da21e53a5b: Pull complete  
95e3473ba5b7: Pull complete  
fc16ec4a0f48: Pull complete  
47721b0607f9: Pull complete  
bd89fa278679: Pull complete  
Digest: sha256:e3d6f139775465b9be3f2e7f7c43e27307c6e10f4fb2382d3217c80830753e16  
Status: Downloaded newer image for kamalesh0072610/flask-local-db:latest  
docker.io/kamalesh0072610/flask-local-db:latest  
[node1] (local) root@192.168.0.18 ~  
$ docker image list  
REPOSITORY          TAG             IMAGE ID        CREATED        SIZE  
kamalesh0072610/flask-local-db  latest         71eb11162295   5 weeks ago   932MB  
[node1] (local) root@192.168.0.18 ~  
$
```

`docker run -itp 80:5000 kamalesh0072610/flask-local-db` – run in interactive mode.

The screenshot shows the Play-with-Docker web interface. On the left, there's a sidebar with a clock showing 03:24:59, a 'CLOSE SESSION' button, and an 'Instances' section with a '+ ADD NEW INSTANCE' button and a list of instances including '192.168.0.18 node1'. The main area displays details for a container named 'cdn8oln9_cdn8oon91rrg0087gb8g', including its IP (192.168.0.18), memory usage (27.64%), CPU usage (0.25%), and an SSH command. Below this is a terminal window showing the execution of Docker commands and the output of running the 'kamalesh0072610/flask-local-db' image. The terminal output shows the container running on all addresses, including http://127.0.0.1:5000 and http://172.17.0.2:5000, with a warning to use a production WSGI server instead.

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

I've used the flask application used for assignment 2 for this assignment.

The screenshot shows a code editor with a file explorer on the left. The file explorer shows a project named 'ASSIGNMENT2' with files like 'app.py', 'database_setup.py', 'Dockerfile', 'requirements.txt', and 'user_base.db'. The main editor area shows the content of the 'Dockerfile' file, which contains the following instructions:

```
1 FROM python:3
2 WORKDIR /usr/src/app
3 COPY requirements.txt ./
4 RUN pip install --no-cache-dir -r requirements.txt
5 COPY . .
6 CMD ["python", "./app.py"]
```

docker build -t flask-app-assi4 . - build the image

```
C:\WINDOWS\system32\cmd. X + v

E:\KAMALESH\IBM_trying\Assignment2>docker build -t flask-app-assi4 .
[+] Building 4.4s (11/11) FINISHED
=> [internal] load build definition from Dockerfile 0.0s
=> => transferring dockerfile: 198B 0.0s
=> [internal] load .dockerignore 0.0s
=> => transferring context: 2B 0.0s
=> [internal] load metadata for docker.io/library/python:3 4.2s
=> [auth] library/python:pull token for registry-1.docker.io 0.0s
=> [1/5] FROM docker.io/library/python:3@sha256:b941b836b18734f4992a168b579b7c16ff4c3b544782953eeab3a5 0.0s
=> => resolve docker.io/library/python:3@sha256:b941b836b18734f4992a168b579b7c16ff4c3b544782953eeab3a5 0.0s
=> [internal] load build context 0.0s
=> => transferring context: 135.83kB 0.0s
=> CACHED [2/5] WORKDIR /usr/src/app 0.0s
=> CACHED [3/5] COPY requirements.txt / 0.0s
=> CACHED [4/5] RUN pip install --no-cache-dir -r requirements.txt 0.0s
=> [5/5] COPY . 0.0s
=> => exporting to image 0.0s
=> => exporting layers 0.0s
=> => writing image sha256:5fed83284be3857af98b40fda3e74ef8765581f9cf2ledf6257a8d8c78d1325d 0.0s
=> => naming to docker.io/library/flask-app-assi4 0.0s

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

E:\KAMALESH\IBM_trying\Assignment2>
```

```
C:\WINDOWS\system32\cmd. X + v

E:\KAMALESH\IBM_trying\Assignment2>docker build -t flask-app-assi4 .
[+] Building 4.4s (11/11) FINISHED
=> [internal] load build definition from Dockerfile 0.0s
=> => transferring dockerfile: 198B 0.0s
=> [internal] load .dockerignore 0.0s
=> => transferring context: 2B 0.0s
=> [internal] load metadata for docker.io/library/python:3 4.2s
=> [auth] library/python:pull token for registry-1.docker.io 0.0s
=> [1/5] FROM docker.io/library/python:3@sha256:b941b836b18734f4992a168b579b7c16ff4c3b544782953eeab3a5 0.0s
=> => resolve docker.io/library/python:3@sha256:b941b836b18734f4992a168b579b7c16ff4c3b544782953eeab3a5 0.0s
=> [internal] load build context 0.0s
=> => transferring context: 135.83kB 0.0s
=> CACHED [2/5] WORKDIR /usr/src/app 0.0s
=> CACHED [3/5] COPY requirements.txt / 0.0s
=> CACHED [4/5] RUN pip install --no-cache-dir -r requirements.txt 0.0s
=> [5/5] COPY . 0.0s
=> => exporting to image 0.0s
=> => exporting layers 0.0s
=> => writing image sha256:5fed83284be3857af98b40fda3e74ef8765581f9cf2ledf6257a8d8c78d1325d 0.0s
=> => naming to docker.io/library/flask-app-assi4 0.0s

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

E:\KAMALESH\IBM_trying\Assignment2>docker image list
REPOSITORY          IMAGE ID      CREATED      TAG
flask-app-assi4      5fed83284be3 49 seconds ago  latest
flask-app-testing    2d8f454de374 11 hours ago  latest
flask-testing-app    78a4955b95b2 10 days ago   latest
jp.icr.io/training/flask-local-db 71eb11162295 5 weeks ago   latest
kamalesh0072610/flask-local-db 71eb11162295 5 weeks ago   latest
flask-local-db       71eb11162295 5 weeks ago   latest
registry.k8s.io/ingress-nginx/controller d681a4ce3c50 6 weeks ago   <none>
```

Running the docker application locally.

The screenshot shows Docker Desktop on the left and a web browser on the right. In Docker Desktop, the 'Containers' tab is active, showing a list of running containers. The container 'lucid_hodgkin' (ID: 37b2f24fb601) is highlighted with a red box; it is using the 'flask-app-a' image and is running on port 5000. The web browser shows the 'Flask App' running at 'localhost:5000'. The page displays a 'Registered User List' with the following entries:

| Name | Path |
|----------|-------|
| Kamalesh | Pathy |
| Kamalesh | Pathy |

The footer of the web application shows '© Kamaleshpathy VA +91 8056117670'.

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

Pushed the image to ibm container registry.

ibmcloud login

ibmcloud plugin install container-registry -r "IBM Cloud"

ibmcloud cr namespace-add training

ibmcloud cr login

docker tag flask-app-assig4 jp.icr.io/training/flask-app-assi4:latest

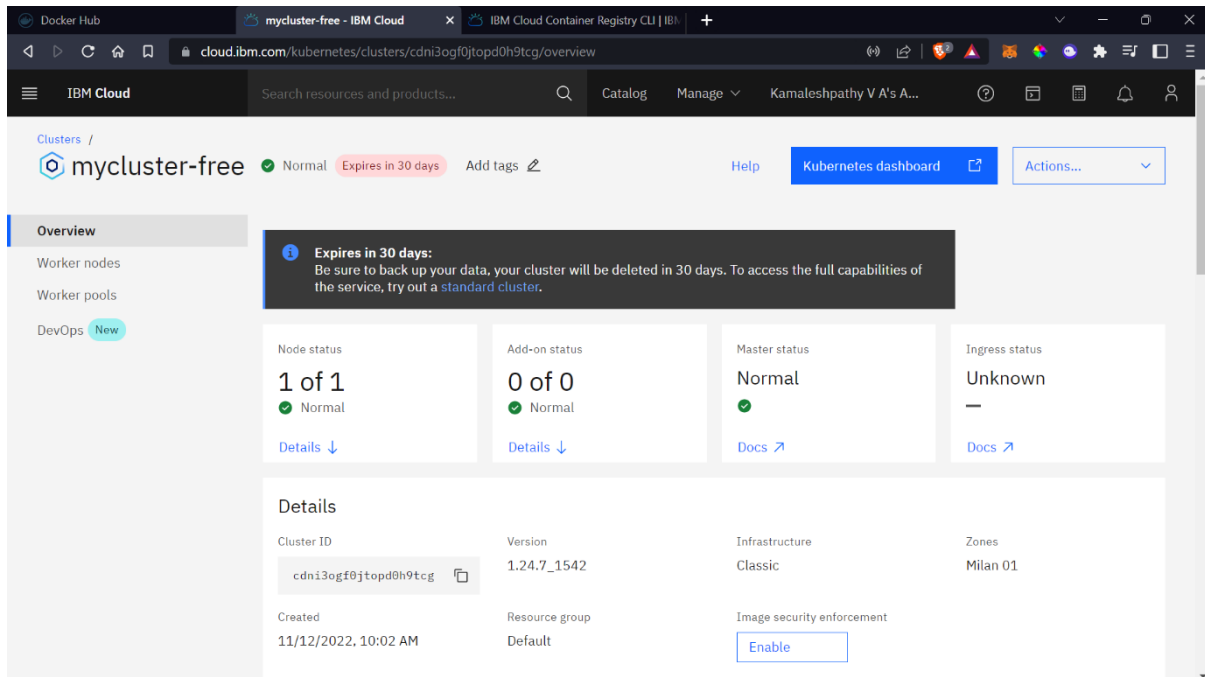
docker push jp.icr.io/training/flask-app-assi4:latest

The screenshot shows the IBM Cloud Container Registry interface. The 'Images' section is active, displaying a list of images. The location is set to 'Tokyo'. The table shows the following image:

| Repository@digest | Tags | Manifest type | Created | Size | Security status |
|---|--------|---------------|-------------|--------|-----------------|
| training/flask-app-assi4@sha256:7deb95a2bd91... | latest | Docker | 7 hours ago | 362 MB | 6 issues |

The interface also includes a search bar, a 'Create' button, and pagination controls showing '1 of 1 page'.

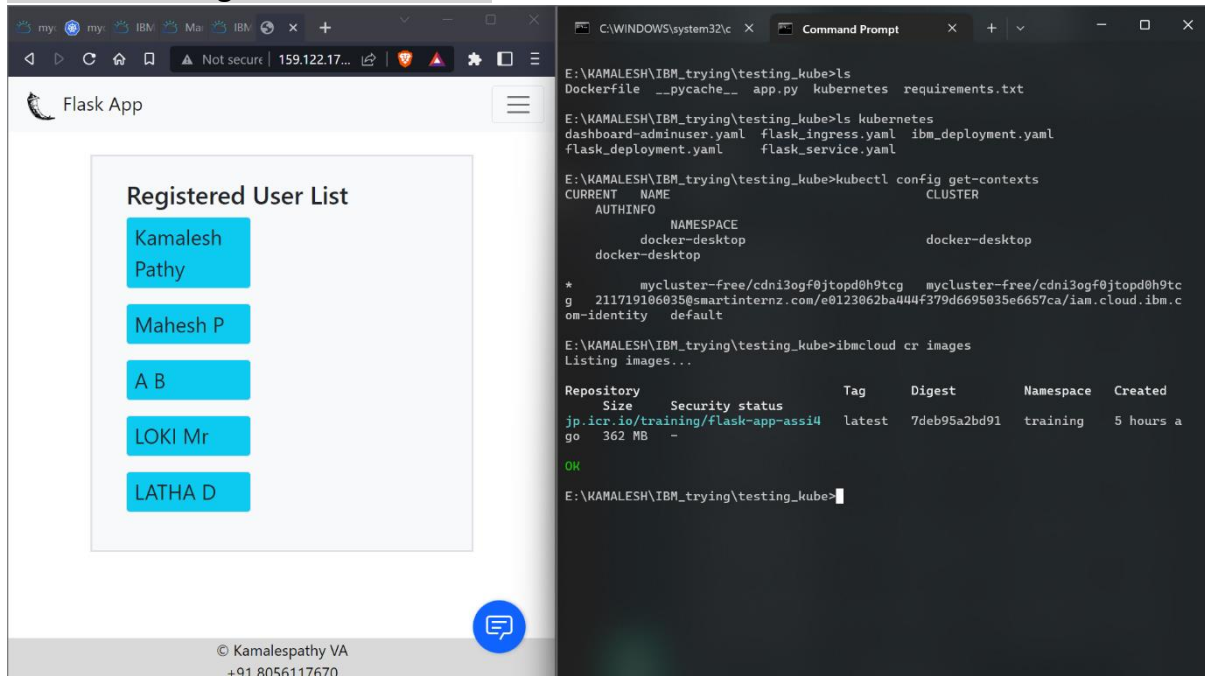
4. Create a Kubernetes cluster in IBM cloud and deploy flask application image or job portal image and also expose the same app to run in nodeport.



ibmcloud plugin install container-service

ibmcloud ks cluster config --cluster cdni3ogf0jtopd0h9tcg

kubectl config current-context



ibm_deployment.yaml

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: flask-app
```

```
spec:
  replicas: 5
  selector:
    matchLabels:
      app: flask-app
  template:
    metadata:
      labels:
        app: flask-app
```

```
    spec:
      containers:
        - name: flask-app-container
          image: jp.icr.io/training/flask-app-assi4
          imagePullPolicy: Always
          ports:
            - containerPort: 5000
              protocol: TCP
```

flask_service.yaml

```
apiVersion: v1
kind: Service
metadata:
  name: flask-app-service
spec:
  type: ClusterIP
  ports:
    - port: 5000
  selector:
    app: flask-app
```

flask_ingress.yaml

```
apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
  name: flask-app-ingress
  annotations:
    kubernetes.io/ingress.class: nginx
    nginx.ingress.kubernetes.io/ssl-redirect: "false"
spec:
  # ingressClassName: nginx
  rules:
    - http:
```

```

paths:
  - backend:
    service:
      name: flask-app-service
    port:
      number: 5000
    path: /
    pathType: Prefix

```

```

kubectl apply -f kubernetes/ibm_deployment.yaml
kubectl apply -f kubernetes/flask_service.yaml
kubectl apply -f kubernetes/flask_ingress.yaml
kubectl expose deployment flask-app --type=NodePort --name=flask-app

```

The screenshot shows a web browser window displaying the 'Flask App' interface. The interface has a header 'Flask App' and a sidebar with a menu icon. The main content area is titled 'Registered User List' and contains five blue buttons: 'Kamalesh Pathy', 'Mahesh P', 'A B', 'LOKI Mr', and 'LATHA D'. At the bottom of the browser window, there is a footer with the text '© Kamalpathy VA +91 8056117670' and a blue chat icon.

Overlaid on the right side of the browser window is a Windows Command Prompt window. It shows the following commands and output:

```

C:\WINDOWS\system32\cmd.exe
Command Prompt

CURRENT NAME CLUSTER
AUTHINFO
NAMESPACE docker-desktop
docker-desktop

* mycluster-free/cdni3ogf0jtopd0h9tcg mycluster-free/cdni3ogf0jtopd0h9tcg
g 211719186035@smartinternz.com/e0123862ba44f379d6695035e6657ca/iam.cloud.ibm.c
on-identity default

E:\KAMALESH\IBM_trying\testing_kube>ibmcloud cr images
Listing images...

Repository Tag Digest Namespace Created
Size Security status
jp.icr.io/training/flask-app-assi4 latest 7deb95a2bd91 training 5 hours a
go 362 MB -

OK

E:\KAMALESH\IBM_trying\testing_kube>kubectl get all
NAME READY STATUS RESTARTS AGE
pod/flask-app-69dfc957b4-hfdmg 1/1 Running 0 103m

NAME AGE TYPE CLUSTER-IP EXTERNAL-IP PORT(S)
service/flask-app 87m NodePort 172.21.6.6 <none> 5000:31356/TCP
service/flask-app-service 97m ClusterIP 172.21.241.192 <none> 5000/TCP
service/kubernetes 5h20m ClusterIP 172.21.0.1 <none> 443/TCP

NAME READY UP-TO-DATE AVAILABLE AGE
deployment.apps/flask-app 1/1 1 1 114m

NAME DESIRED CURRENT READY AGE
replicaset.apps/flask-app-67ff589dd4 0 0 0 114m
replicaset.apps/flask-app-69dfc957b4 1 1 1 104m

E:\KAMALESH\IBM_trying\testing_kube>

```

Registered User List

Kamalesh Pathy

Mahesh P

A B

LOKI Mr

LATHA D