

Assignment – 4

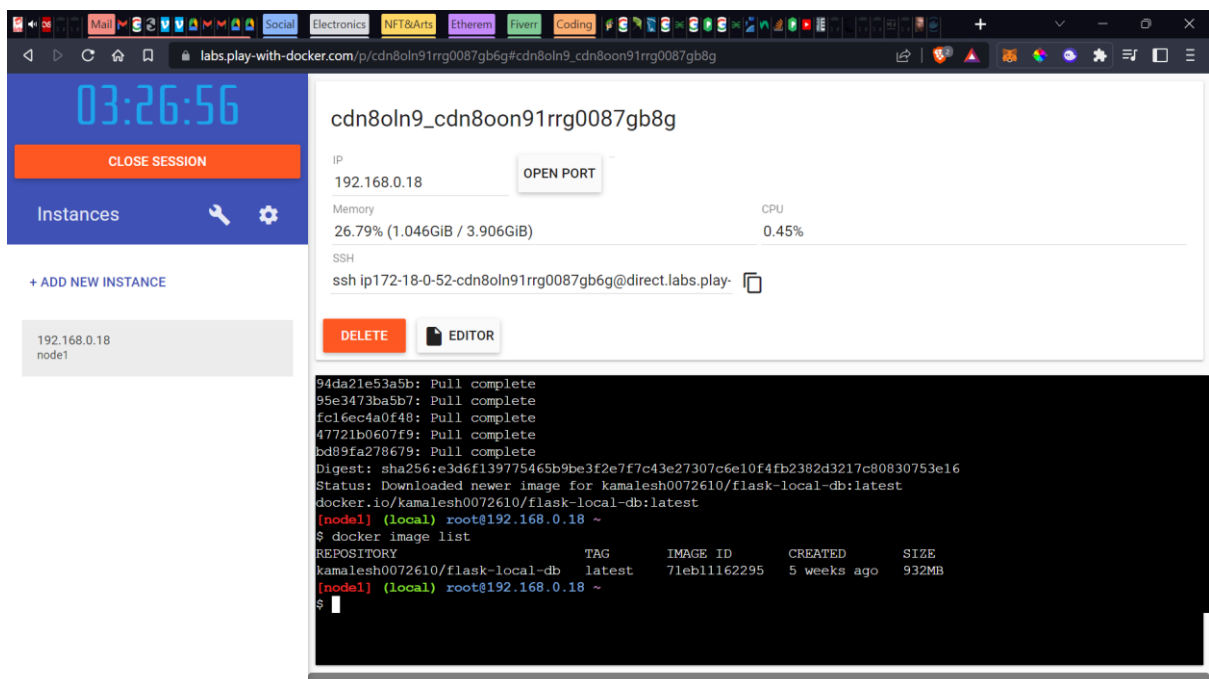
Cloud Application Development

Assignment Date	19 September 2022
Student Name	LOKESH N
Student Roll Number	211719106043
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 interface. On the left, there's a sidebar with a timer showing 03:26:56, a 'CLOSE SESSION' button, and a list of instances including '192.168.0.18 node1'. The main area shows details for a container named '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 Labs play-with-docker 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. Below this, a list of instances shows '192.168.0.18 node1'. The main area displays details for the container 'cdn8oln9_cdn8oon91rrg0087gb8g', including its IP (192.168.0.18), memory usage (27.64% / 1.08GiB / 3.906GiB), CPU usage (0.25%), and an SSH command: `ssh ip172-18-0-52-cdn8oln91rrg0087gb6g@direct.labs.play-`. There are 'DELETE' and 'EDITOR' buttons. Below this, a terminal window shows the command `docker run -itp 80:5000 ^C` and the output of `docker image list` and `docker run -itp 80:5000 kamalesh0072610/flask-local-db`. The output shows the Flask app 'app' is serving, debug mode is off, and it's running on all addresses (0.0.0.0) and on http://127.0.0.1:5000 and http://172.17.0.2:5000. A warning message states: 'WARNING: This is a development server. Do not use it in a production deployment. 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 sidebar on the left containing a file explorer. The file explorer shows a project named 'ASSIGNMENT2' with files: `__pycache__`, `static`, `templates`, `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 lines:

```
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"]
```

The status bar at the bottom indicates 'Ln 6, Col 27', 'Spaces: 4', 'UTF-8', 'CRLF', and 'Dockerfile'.

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 sha256:5fed83284be3857af98b40fda3e74ef8765581f9cf21edf6257d8d8c78d1325d 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 sha256:5fed83284be3857af98b40fda3e74ef8765581f9cf21edf6257d8d8c78d1325d 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   932MB
kamalesh0072610/flask-local-db 71eb11162295 5 weeks ago   932MB
flask-local-db       71eb11162295 5 weeks ago   latest
registry.k8s.io/ingress-nginx/controller d681a4ce3c50 6 weeks ago   264MB
```

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, displaying a list of running containers. The container 'lucid_hodgkin' is highlighted with a red box. The web browser shows the 'Flask App' running on 'localhost:5000', displaying a 'Registered User List' with the name 'Kamalesh Pathy'.

NAME	IMAGE	STATUS	PORT(S)	STAR
k8s_POD_dashl	k8s.gcr.io/q	Running	-	20 fr
k8s_POD_kube	k8s.gcr.io/q	Running	-	20 fr
k8s_dashboard	kubernetes	Running	-	20 fr
k8s_POD_ingre	k8s.gcr.io/q	Running	-	20 fr
k8s_controller	registry.k8s	Running	-	20 fr
k8s_kubernet	kubernetes	Running	-	19 fr
lucid_hodgkin	flask-app-a	Running	5000	2 mi

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"
```

```
ibmcloudcr namespace-add training
```

```
ibmcloudcr login
```

```
docker tag flask-app-assig4jp.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 image 'training/flask-app-assi4@sha256:7deb95a2bd91...' is listed with a 'latest' tag. The interface includes a sidebar with navigation options like 'Namespaces', 'Repositories', 'Images', 'Trash', and 'Settings'. The main area shows the 'Images' list with columns for Repository, Tags, Manifest type, Created, Size, and Security status.

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

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.

The screenshot shows the IBM Cloud console interface for a Kubernetes cluster named 'mycluster-free'. The cluster is in a 'Normal' state and expires in 30 days. The overview page displays the following details:

- Node status:** 1 of 1 Normal
- Add-on status:** 0 of 0 Normal
- Master status:** Normal
- Ingress status:** Unknown
- Cluster ID:** cdni3ogf0jtopd0h9tcg
- Version:** 1.24.7_1542
- Infrastructure:** Classic
- Zones:** Milan 01
- Created:** 11/12/2022, 10:02 AM
- Resource group:** Default
- Image security enforcement:** Enable

ibmcloud plugin install container-service

ibmcloud ks cluster config --cluster cdni3ogf0jtopd0h9tcg

kubect1 config current-context

The screenshot displays a Flask application running on a Kubernetes cluster. The application is titled 'Flask App' and shows a 'Registered User List' with the following users:

- Kamalesh Pathy
- Mahesh P
- A B
- LOKI Mr
- LATHA D

The terminal window shows the following commands and output:

```
E:\WMALESH\IBM_trying\testing_kube>ls
Dockerfile __pycache__ app.py kubernetes requirements.txt

E:\WMALESH\IBM_trying\testing_kube>ls kubernetes
dashboard-adminuser.yaml flask_ingress.yaml ibm_deployment.yaml
flask_deployment.yaml flask_service.yaml

E:\WMALESH\IBM_trying\testing_kube>kubect1 config get-contexts
CURRENT NAME CLUSTER
AUTHINFO
NAMESPACE
docker-desktop docker-desktop
docker-desktop

* mycluster-free/cdni3ogf0jtopd0h9tcg mycluster-free/cdni3ogf0jtopd0h9tc
g 211719186035@smartinternz.com/e0123962ba44f379d6695035e6657ca/iam.cloud.ibm.c
om-identity default

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

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

OK

E:\WMALESH\IBM_trying\testing_kube>
```

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 'Registered User List' containing five entries: Kamalesh Pathy, Mahesh P, A B, LOKI Mr, and LATHA D. The footer of the browser window shows '© Kamalespathy VA +91 8056117670' and a 'Flask App' logo with 'Home' and 'About' links. To the right of the browser window is a 'Command Prompt' window showing the following commands and output:

```

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

```

The screenshot shows the 'Registered User List' section of the Flask App interface. It contains five entries, each in a blue button: Kamalesh Pathy, Mahesh P, A B, LOKI Mr, and LATHA D.