

Assignment - 4

Kubernetes / Docker

Assignment Date	11 November 2022
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Maximum Marks	2 Marks

Question-1:

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

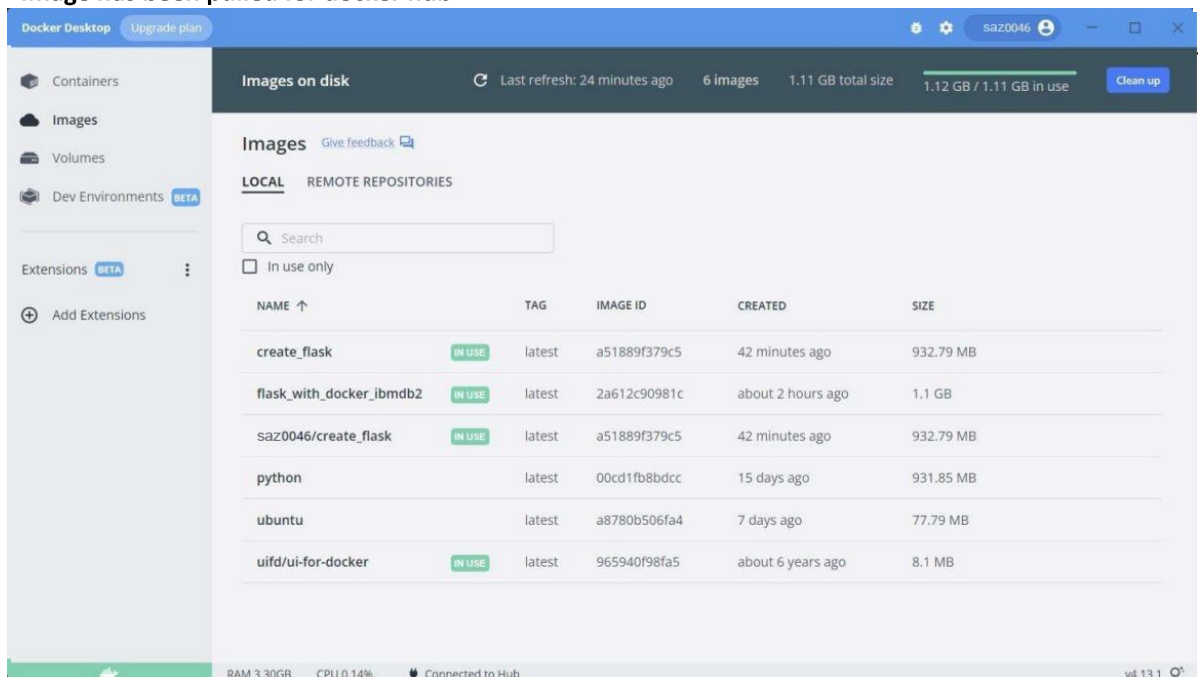
Solution:

docker pull uifd/ui-for-docker - command is used to pull an image from docker hub using command prompt.

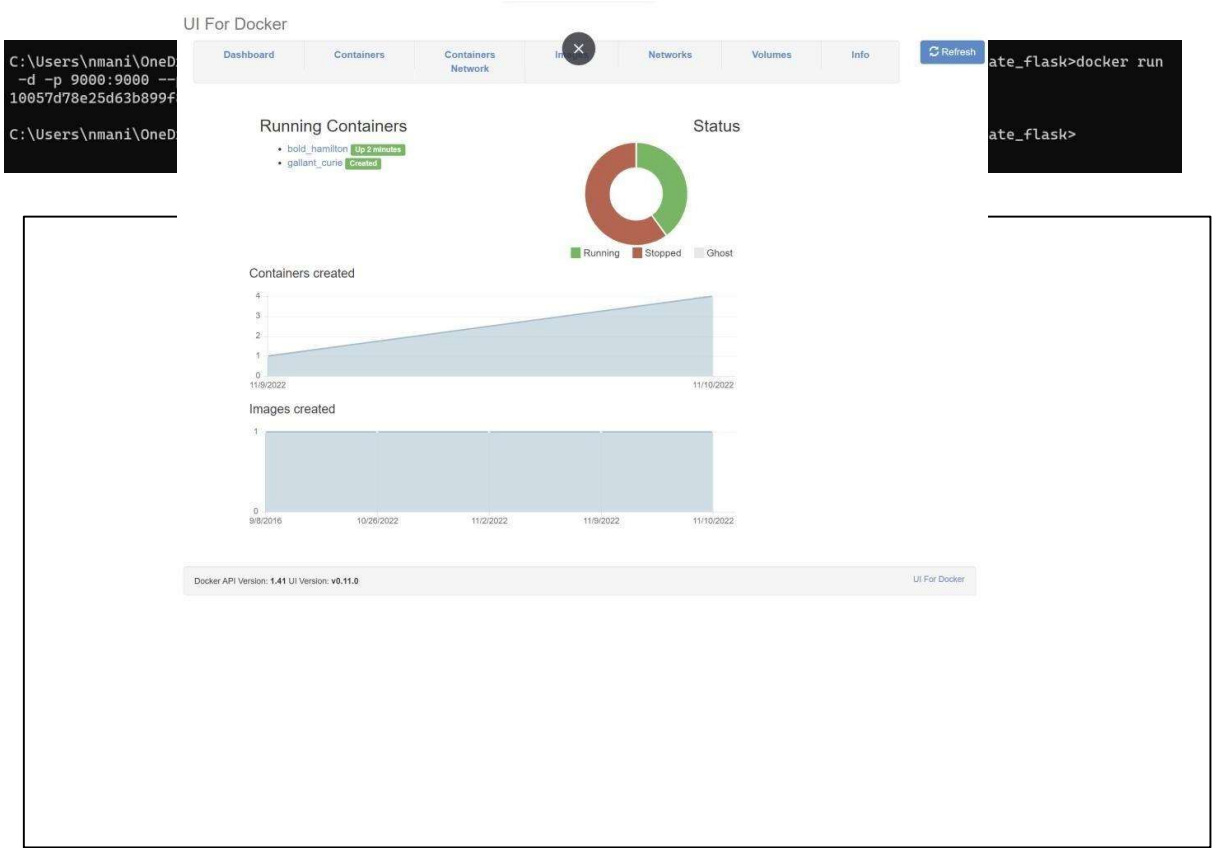
```
C:\Users\nmani\OneDrive\Desktop\IBM_Project\Assignments\Sazwan Faraas\Assignment-4\
create_flask>docker pull uifd/ui-for-docker
Using default tag: latest
latest: Pulling from uifd/ui-for-docker
841194d080c8: Pull complete
Digest: sha256:fe371ff5a69549269b24073a5ab1244dd4c0b834cbadf244870572150b1cb749
Status: Downloaded newer image for uifd/ui-for-docker:latest
docker.io/uifd/ui-for-docker:latest

C:\Users\nmani\OneDrive\Desktop\IBM_Project\Assignments\Sazwan Faraas\Assignment-4\
create_flask>
```

Image has been pulled for docker hub



`docker run -d -p 9000:9000 --privileged -v /var/run/docker.sock:/var/run/docker.sock uifd/ui-for-docker` - command is used to run an image from docker hub using command prompt.



Docker playground:

03:56:41

CLOSE SESSION

Instances

+ ADD NEW INSTANCE

192.168.0.8 node1

cdmhhsn9_cdmhhun91rrg009jd3v0

IP: 192.168.0.8 OPEN PORT

Memory: 26.79% (1.046GiB / 3.906GiB) CPU: 0.17%

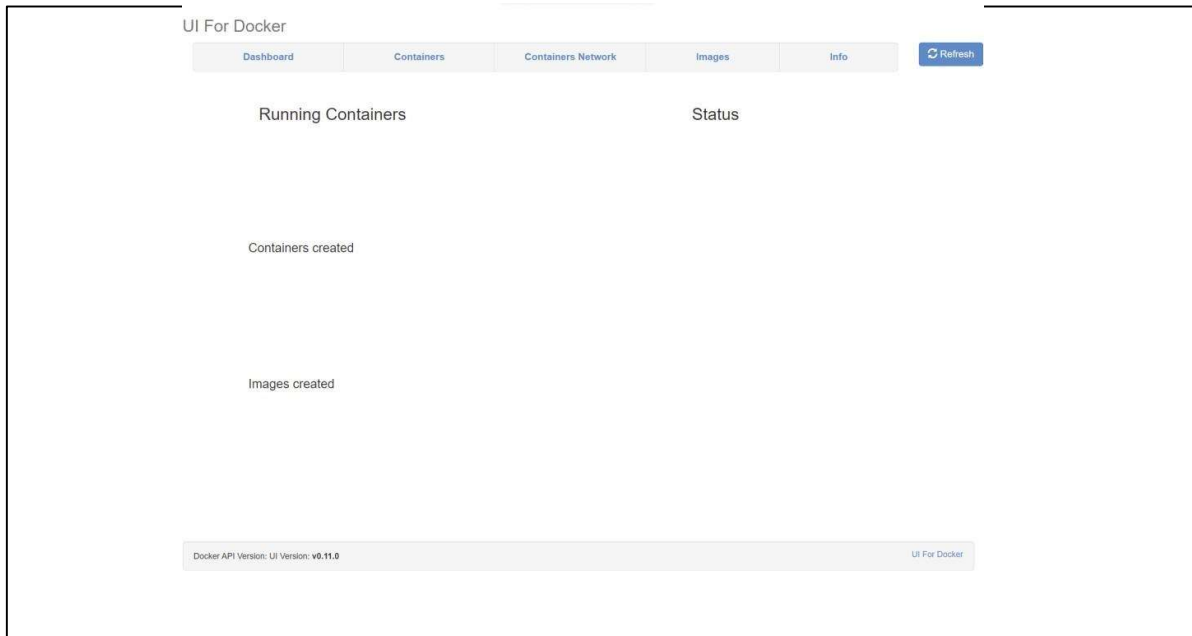
SSH

ssh ip172:18-0-46-cdmhhsn91rrg009jd3ug@direct.labs.play

DELETE EDITOR

```
Login with your Docker ID to push and pull images from Docker Hub. If you don't have a Docker ID, head over to https://hub.docker.com to create one.
Username: nmani3008@gmail.com
Password:
Error response from daemon: Get "https://registry-1.docker.io/v2/": unauthorized: incorrect username or password
[tmux] (local) root@192.168.0.8 ~
$ docker login
Login with your Docker ID to push and pull images from Docker Hub. If you don't have a Docker ID, head over to https://hub.docker.com to create one.
Username: prem0046
Password:
WARNING! Your password will be stored unencrypted in /root/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded
[tmux] (local) root@192.168.0.8 ~
$ docker pull prem0046/create_flask:latest
latest: Pulling from prem0046/create_flask
f606d8928ed3: Pull complete
47db815c6a45: Pull complete
bf4849400000: Pull complete
a572f7a256d3: Pull complete
4f7d83258995: Pull complete
7110f04115ae: Pull complete
c4b413c6a489: Pull complete
22311b72a3cb: Pull complete
8dcbfe38b6fa: Pull complete
8b05933b0f2c: Pull complete
2f1a0c141488: Pull complete
07a24093d86e: Pull complete
7563e205955b: Pull complete
Digest: sha256:df311c99b8affc6242b84fc949f329cedf9905cd691b4b95a5e5d022877ad
Status: Downloaded newer image for prem0046/create_flask:latest
docker.io/prem0046/create_flask:latest
[tmux] (local) root@192.168.0.8 ~
$ []
```



Question-2:

Create a docker file for the job portal application or helloworld app and deploy it in Docker desktop application.

Building docker image: hello_world

```
Microsoft Windows [Version 10.0.22623.885]
(c) Microsoft Corporation. All rights reserved.

C:\Users\mmani\OneDrive\Desktop\IBM_Project\Assignments\Sazwan Faraas\Assignment-4\hello_world>docker build -t hello_world .
[*] Building 2.8s (11/11) FINISHED
=> [internal] load build definition from Dockerfile                                0.0s
=> => transferring dockerfile: 18kB                                              0.0s
=> [internal] load .dockerignore                                                  0.0s
=> => transferring context: 2B                                                    0.0s
=> [internal] load metadata for docker.io/library/python:3.10.7                 2.7s
=> [auth] library/python:pull token for registry-1.docker.io                   0.0s
=> [internal] load build context                                                 0.0s
=> => transferring context: 545B                                                 0.0s
=> [1/5] FROM docker.io/library/python:3.10.7@sha256:53e57720ad362233ee92aeb5119449271f5eb26f99c61464afe9167ddbc 0.0s
=> CACHED [2/5] WORKDIR /app                                                    0.0s
=> CACHED [3/5] COPY requirements.txt ./                                         0.0s
=> CACHED [4/5] RUN pip install -r requirements.txt                             0.0s
=> [5/5] COPY                                                                    0.0s
=> exporting to image                                                            0.0s
=> exporting layers                                                              0.0s
=> writing image sha256:82b4aa395a180417d8bd9b218b540aa95f5dc9fc72aa4aaa2348c783c8cf1b 0.0s
=> naming to docker.io/library/hello_world                                     0.0s

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

C:\Users\mmani\OneDrive\Desktop\IBM_Project\Assignments\Sazwan Faraas\Assignment-4\hello_world>
```

Pushing the image into repository in docker hub:

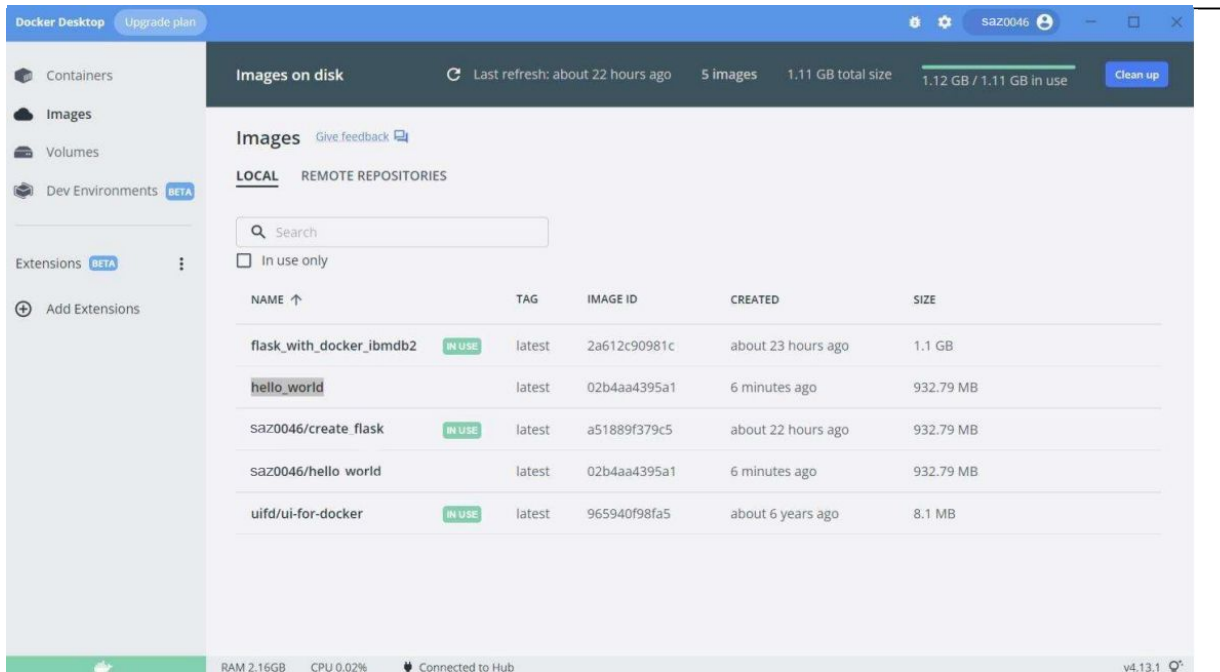
```
C:\Users\mmani\OneDrive\Desktop\IBM_Project\Assignments\Sazwan Faraas\Assignment-4\hello_world>docker
Authenticating with existing credentials...
Login Succeeded

Logging in with your password grants your terminal complete access to your account.
For better security, log in with a limited-privilege personal access token. Learn more at https://docs.docker.com/go/access-tokens/

C:\Users\mmani\OneDrive\Desktop\IBM_Project\Assignments\Sazwan Faraas\Assignment-4\hello_world>docker tag hello_world sa20046/hello_world

C:\Users\mmani\OneDrive\Desktop\IBM_Project\Assignments\Sazwan Faraas\Assignment-4\hello_world>docker push sa20046/hello_world
Using default tag: latest
The push refers to repository [docker.io/sa20046/hello_world]
096703ae4186: Pushed
30b75c628008: Mounted from sa20046/create_flask
265d09ef557c: Mounted from sa20046/create_flask
94b76bc8510f: Mounted from sa20046/create_flask
cf399be408ea: Mounted from sa20046/create_flask
793b971ccb99: Mounted from sa20046/create_flask
d172a9e6f9e6: Mounted from sa20046/create_flask
0c7da9a72c8: Mounted from sa20046/create_flask
75ba82937496: Mounted from sa20046/create_flask
288cf3a46e32: Mounted from sa20046/create_flask
186da837555d: Mounted from sa20046/create_flask
955c9335e041: Mounted from sa20046/create_flask
8e079fee2186: Mounted from sa20046/create_flask
latest: digest: sha256:a66e001d30bf36740ec97fe3f5bca2cbc87f7750dfd359b260e6c89d2fd8f1b size: 3050

C:\Users\mmani\OneDrive\Desktop\IBM_Project\Assignments\Sazwan Faraas\Assignment-4\hello_world>
```



Testing it using docker playground:

03:56:04

CLOSE SESSION

Instances

+ ADD NEW INSTANCE

192.168.0.8
node1

cdmimr63_cdmimte3tccg009qdjgg

IP: 192.168.0.8

OPEN PORT 5002

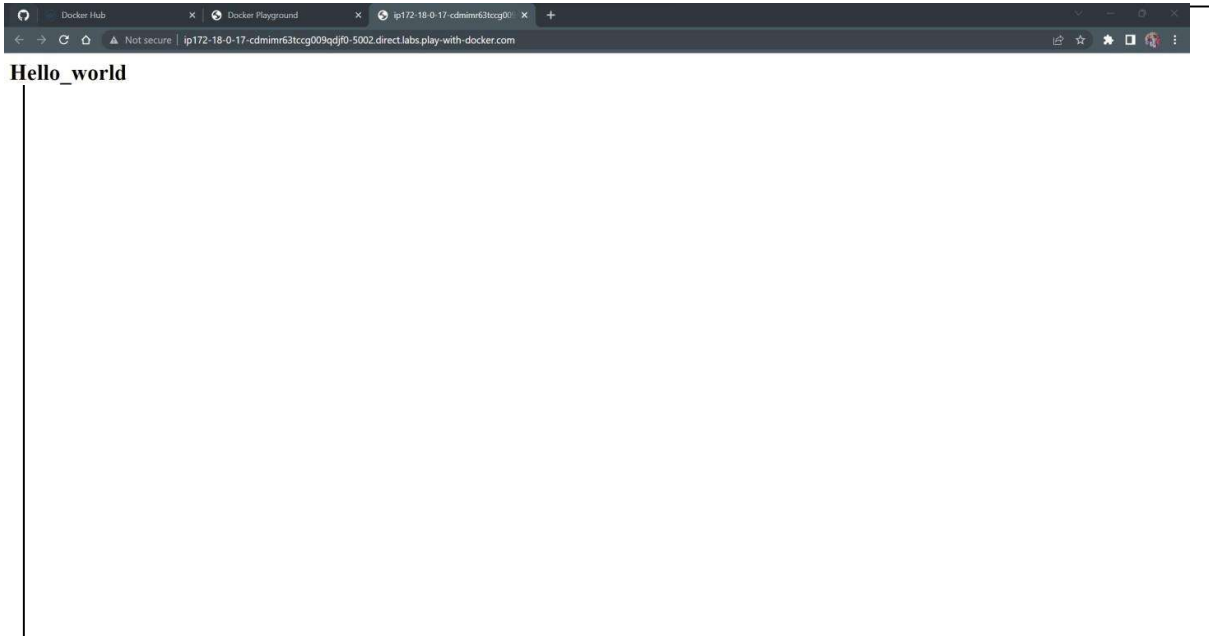
Memory: 28.12% (1.098GiB / 3.906GiB)

CPU: 0.32%

SSH: ssh ip172-18-0-17-cdmimr63tccg009qdjgg@direct.labs.play-

DELETE EDITOR

```
lcb21a2b0930: Download complete
failed to register layer: Error processing tar file(exit status 1): write /usr/share/bash-completion/completions/delpart: no space left on device
(node1) (local) root@192.168.0.8 ~
$ docker pull prem0046/hello_world
Using default tag: latest
latest: Pulling from prem0046/hello_world
f606d8928ed3: Pull complete
4fdb815c6445: Pull complete
bf4849400000: Pull complete
a572f7a256d3: Pull complete
8f7d05258955: Pull complete
7110f04115ae: Pull complete
e-b8413c6489: Pull complete
22311b72a3cb: Pull complete
8dcbfe38b6fa: Pull complete
9b05935b0f2c: Pull complete
2f1abc141488: Pull complete
67a2409a886e: Pull complete
lcb21a2b0930: Pull complete
Digest: sha256:a66e00d30bff36740ec97fe3fbc2cbca2cb87f7750dfd389b260e6c89d2fd8f1b
Status: Downloaded newer image for prem0046/hello_world:latest
(node1) (local) root@192.168.0.8 ~
$ docker run -p 5002:5002 prem0046/hello_world
* Serving Flask app 'app'
* Debug mode: on
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://127.0.0.1:5002
* Running on http://172.17.0.2:5002
press CTRL+C to quit
* Restarting with stat
* Debugger is active!
```



Question- 3:

Create a IBM container registry and deploy hello world app or job portal app.

Hello_world Image link: icr.io/create_flask/hello_world

```
C:\Users\nmani>ibmcloud login
API endpoint: https://cloud.ibm.com
Region: jp-tok

Email> sec19cs035@sairamtap.edu.in

Password>
Authenticating...
OK

Targeted account          Sazwan Faraas's Account (c50714902c8f4427b45032b104b525a1)

API endpoint:            https://cloud.ibm.com
Region:                  jp-tok
User:                    sec19cs035@sairamtap.edu.in
Account:                  Sazwan Faraas's Account (c50714902c8f4427b45032b104b525a1)
Resource group:          No resource group targeted, use 'ibmcloud target -g RESOURCE_GROUP'
CF API endpoint:
Org:
Space:

C:\Users\nmani>ibmcloud plugin install container-service
Looking up 'container-service' from repository 'IBM Cloud'...
Plug-in 'container-service[kubernetes-service/ks] 1.0.459' found in repository 'IBM Cloud'
Attempting to download the binary file...
26.86 MiB / 26.86 MiB [=====] 100.00% 1s
28168192 bytes downloaded
Installing binary...
OK
Plug-in 'container-service 1.0.459' was successfully installed into C:\Users\nmani\bluemix\plugins\container-service. Use 'ibmcloud plugin show container-service' to show its details.

C:\Users\nmani>ibmcloud plugin install container-registry
Looking up 'container-registry' from repository 'IBM Cloud'...
Plug-in 'container-registry[cr] 1.0.2' found in repository 'IBM Cloud'
Attempting to download the binary file...
11.90 MiB / 11.90 MiB [=====] 100.00% 0s
12476416 bytes downloaded
Installing binary...
OK
Plug-in 'container-registry 1.0.2' was successfully installed into C:\Users\nmani\bluemix\plugins\container-registry. Use 'ibmcloud plugin show container-registry' to show its details.
```

```
C:\Users\nmani>ibmcloud plugin install observe-service
Looking up 'observe-service' from repository 'IBM Cloud'...
Plug-in 'observe-service 1.0.82' found in repository 'IBM Cloud'
Attempting to download the binary file...
13.38 MiB / 13.38 MiB [=====] 100.00% 0s
14024784 bytes downloaded
Installing binary...
OK
Plug-in 'observe-service 1.0.82' was successfully installed into C:\Users\nmani\bluemix\plugins\observe-service. Use 'ibmcloud plugin show observe-service' to show its details.

C:\Users\nmani>ibmcloud plugin list
Listing installed plug-ins...

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

```
C:\Users\nmani>docker tag hello_world icr.io/create_flask/hello_world:latest
C:\Users\nmani>docker push icr.io/create_flask/hello_world:latest
The push refers to repository [icr.io/create_flask/hello_world]
096703ae4106: Pushed
30b75c628008: Pushed
265d09ef557c: Pushed
94b76bc8510f: Pushed
cf399be408ea: Pushed
793b971ccb99: Pushed
d172a9e6f9e6: Pushed
0c7daf9a72c8: Pushed
75ba02937496: Pushed
288cf3a46e32: Pushed
186da837555d: Pushed
955c9335e041: Pushed
8e079fee2186: Pushed
latest: digest: sha256:a66e001d30bff36740ec97fe3f5bca2cbc87f7750dfd359b260e6c89d2fd8f1b size: 3050

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

Repository          Size      Tag      Digest          Namespace
Created
icr.io/create_flask/hello_world latest a66e001d30bf create_flask 19 hours ago 356 MB -
```

Hello world

Container Registry

Quick start

Namespaces 1

Repositories 1

Images 1

Trash 0

Settings

Repositories

Location: Global

Search

Create

Name	Image count	Namespace	Last updated
<div>hello_world</div> <div>icr.io/create_flask/hello_world</div>	1	create_flask	1 day ago

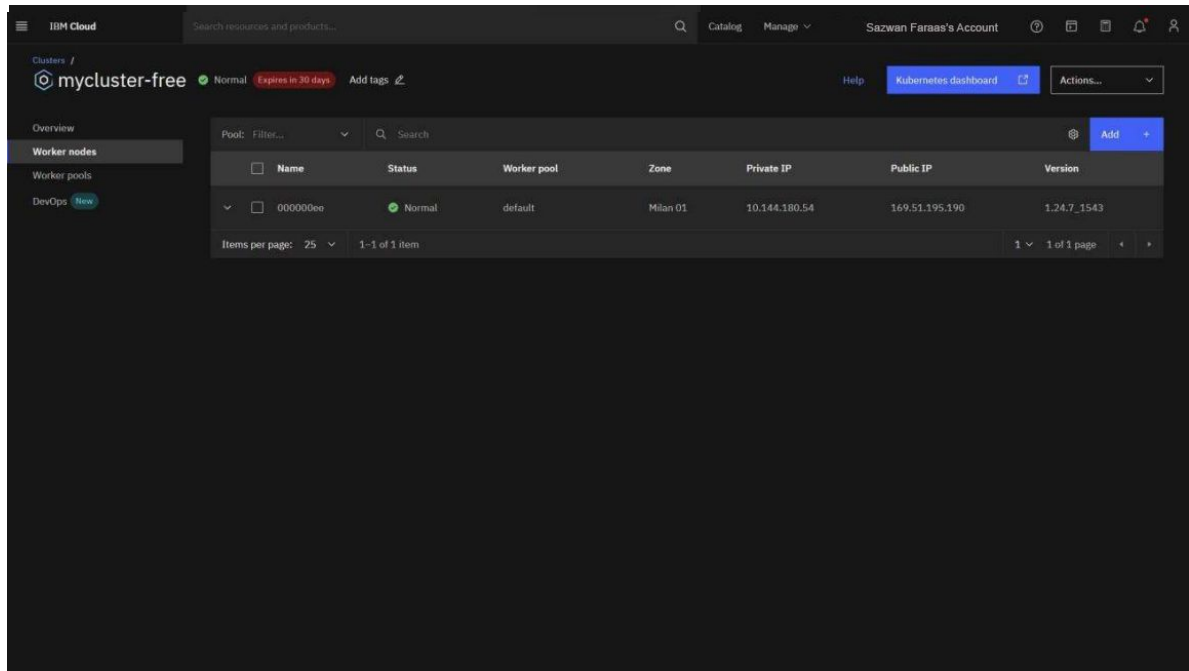
Items per page: 25 1-1 of 1 item 1 1 of 1 page

```
PS C:\Users\nmani> docker run -p 5002:5002 icr.io/create_flask/hello_world
* Serving Flask app 'app'
* Debug mode: on
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://127.0.0.1:5002
* Running on http://172.17.0.2:5002
Press CTRL+C to quit
* Restarting with stat
* Debugger is active!
* Debugger PIN: 166-878-257
172.17.0.1 - - [11/Nov/2022 12:09:17] "GET / HTTP/1.1" 200 -
```

Question -4:

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

Creating a Kubernetes cluster in IBM cloud



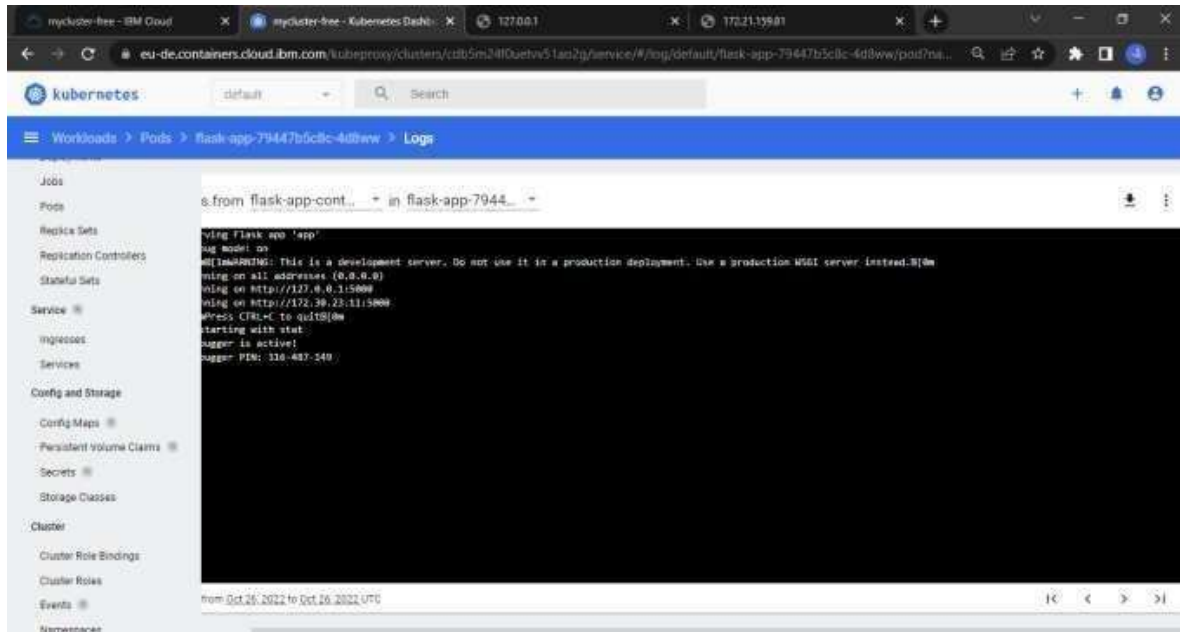
```
C:\Users\gani\Desktop>cd deploy
The system cannot find the path specified.

C:\Users\gani\Desktop>kubectl apply -f kubernetes/depoly.yaml
error: the path "kubernetes/depoly.yaml" does not exist

C:\Users\gani\Desktop>kubectl apply -f depoly.yaml
error: the path "depoly.yaml" does not exist

C:\Users\gani\Desktop>kubectl apply -f C:\Users\gani\Desktop\deploy.yaml
deployment.apps/flask-app created

C:\Users\gani\Desktop>
```

```
C:\Windows\System32\cmd.exe
C:\Windows\system32>kubectl expose deployment flask-app --type=NodePort --name=flask-service
The Service "flask-service" is invalid: metadata.name: Invalid value: "flask-service": a DNS-1035 label must consist of lower case alphanumeric characters or '-', start with an alphabetic character, and end with an alphanumeric character (e.g. "my-name", or "abc-123", regex used for validation is "[a-z]([a-z0-9]*[a-z0-9])?")

C:\Windows\system32>kubectl expose deployment flask-app --type=NodePort --name=flask-service
The Service "flask-service" is invalid: metadata.name: Invalid value: "flask-service": a DNS-1035 label must consist of lower case alphanumeric characters or '-', start with an alphabetic character, and end with an alphanumeric character (e.g. "my-name", or "abc-123", regex used for validation is "[a-z]([a-z0-9]*[a-z0-9])?")

C:\Windows\system32>kubectl expose deployment flask-app --type=NodePort --name=flask-service
The Service "flask-service" is invalid: metadata.name: Invalid value: "flask-service": a DNS-1035 label must consist of lower case alphanumeric characters or '-', start with an alphabetic character, and end with an alphanumeric character (e.g. "my-name", or "abc-123", regex used for validation is "[a-z]([a-z0-9]*[a-z0-9])?")

C:\Windows\system32>kubectl expose deployment flask-app --type=NodePort --name=flask-service
Error from server (AlreadyExists): services "flask-service" already exists

C:\Windows\system32>
C:\Windows\system32>kubectl -n kubernetes-dashboard get deploy
No resources found in kubernetes-dashboard namespace.

C:\Windows\system32>kubectl -n kubernetes-dashboard get deploy
No resources found in kubernetes-dashboard namespace.

C:\Windows\system32>kubectl proxy
Starting to serve on 127.0.0.1:8001

C:\Windows\system32>kubectl -n kubernetes-dashboard get deploy
No resources found in kubernetes-dashboard namespace.

C:\Windows\system32>kubectl -n kubernetes-dashboard get deploy
No resources found in kubernetes-dashboard namespace.

C:\Windows\system32>kubectl -n kubernetes-dashboard get pods
No resources found in kubernetes-dashboard namespace.

C:\Windows\system32>kubectl expose deployment flask-app --type=NodePort --name=flask-service
Error from server (AlreadyExists): services "flask-service" already exists

C:\Windows\system32>kubectl get ing
NAME          CLASS  HOSTS      ADDRESS      PORTS      AGE
flask-app-ingress  cncd    *          *            80         27s

C:\Windows\system32>kubectl get svc
NAME          TYPE          CLUSTER-IP      EXTERNAL-IP  PORT(S)      AGE
flask-app-ingress  NodePort      10.0.0.1         *            80           27s
```