Assignment-4

Cloud App Development

Assignment Date	7 September 2022
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Student Roll Number	812619104027
Maximum Marks	2 Marks

Questions:

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

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

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

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

Dockerfile

```
FROM python:3.10-buster

WORKDIR /app

COPY . .

RUN pip install --no-cache-dir -r requirements.txt

CMD ["gunicorn", "--bind", "0.0.0.0:5000", "app:app"]
```

App.py

```
import uuid

from flask import Flask

instance_id = uuid.uuid4().hex

app = Flask(__name__)



@app.route("/")

def get_instance_id():

    return f"<b style='font-size:30px;color:red;'>Instance ID: {instance_id}</b>"



if __name__ == "__main__":

    app.run(port=5000,host="0.0.0.0")
```

desktop.yml

```
apiVersion: v1

clusters:

-cluster:

    certificate-authority-data:
LS0tLS1CRUdJTiBDRVJUSUZJQ0FURS0tLS0tCk1JSUMvakNDQWVhZ0F3SUJBZ0lCQURBTkJ
na3Foa2lHOXcwQkFRc0ZBREFWTVJNd0VRWURWUVFERXdwcmRXSmwKY201bGRHVnpNQj
RYRFRJeU1UQXdOVEUxTWpjME9Gb1hEVE15TVRBd01qRTFNamMwT0Zvd0ZURVRNQkVHQT
FVRQpBeE1LYTNWaVpYSnVaWFJsY3pDQ0FTSXdEUVlKS29aSWh2Y05BUUVCQlFBRGdnRVB
BRENDQVFvQ2dnRUJBS3J5CnM2cC9iZTRBaTlPNmY3VjBuRHFYL0Roai9oQmlYWEhlT2dISHJ
```

kNWs0V1NjRTVzeUtWdERydUx3MVFrUEJVWkwKenlNWWQ2OEFSRDdnaGxpYzRhUnFJV09v
OVNSVEVSaUo0RDJqZWJGWFR0d1BpZGFEUFlEVm85UlFBS0hBQXliMQpSZmMvT2FkaEEvb
2FHNGxLSFRrQUlKV1JlclFCbThhTWFExTlhkemtVVTV6NElJbE5CNm9YcUtmbGJpbDBxMG1UC
lkxSndWQ3pIVFVXcXo1OUFNVkFvQ01RQkhXcWZ5enQyODVkOVN2YVpyUTF3VVBqY2Zzc0Zx
TUNPeUx3MzI5dkMKVlhienFLMDA5bzVkbWsvZXZJQUxSNmRKL3NNMTg5T2k4bWFVQ1NL
MzVUU2xJNVI0M2lML3l1UVd4aVFUb0Rwawo3OU9wQjJZQ25DQTdRZWhxR3JFQ0F3RUFBY
U5aTUZjd0RnWURWUjBQQVFIL0JBUURBZ0trTUE4R0ExVWRFd0VCCi93UUZNQU1CQWY4d0h
RWURWUjBPQkJZRUZNZHhDVVdRSTVGRmQvU0pwZEd0cUNVL25kMVlNQlVHQTFVZEVRUU
8KTUF5Q0NtdDFZbVZ5Ym1WMFpYTXdEUVlKS29aSWh2Y05BUUVMQlFBRGdnRUJBRHllYnJ
Xa3ZITDU1ZjRQaFI5UwpycER2UnQwZ1lMZHZ4RXJSSTkJPNFFGSUJXTUhxRDFTMlVITWNzME
NnUGpQQ3ptWnUybzNCNkp4eUpkWUwrRWtjCjJQYkFuWXdpQ3AzaEwxN2NJcXZ1bXNDcng3
MVpGdElNNFhtTmd0bjFiTnpWR3QvMzdWaWNsNjdsTFVydnp0RUcKOFcwMVRoQ2hwVlJiQm
ptYStOZ295SGNuNFJZY0dJTHZFTVNQa1BZRXlOVTN5MmtXRkgwaElMMlZRYmJzUlYxTApJ
OElVM3VQZEV3ZktLN0dNeW85VGoxc3NsRWVBTnFUeWVUYzg1MHlZYThYekxVTzloM1kwV
Wc4a2c1NlFaZVJUCnE1a2lGQ3p6OGRjZi9xN2tHN0RBaENvcFhhc3VQYlV5TnNvQVRBOTVRd
W83MEQzdDNCQ1F2OTIvV2NJNnBKRW0KVUtrPQotLS0tLUVORCBDRVJUSUZJQ0FURS0tLS0
tCg==

    server: https://kubernetes.docker.internal:6443

  name: docker-desktop

contexts:

- context:

    cluster: docker-desktop

    user: docker-desktop

  name: docker-desktop

current-context: docker-desktop

kind: Config

preferences: {}

users:

- name: docker-desktop

  user:

    client-certificate-data:
LS0tLS1CRUdJTiBDRVJUSUZJQ0FURS0tLS0tCk1JSURRakNDQWlxZ0F3SUJBZ0lJU3lNR3o4K
1lDK013RFFZSktvWklodmNOQVFFTEJRQXdGVEVUTUJFR0ExVUUKQXhNS2EzVmlaWEp1Wlh
SbGN6QWVGdzB5TWpFd01EVXhOVEkzTkRoYUZ3MHlNekV3TURreE16TXdNVFJhTURZeApG
ekFWQmdOVkJBb1REbk41YzNSbGJUcHRZWE4wWlhKek1Sc3dHUVlEVlFRREV4SmtiMk5yWl
hJdFptOXlMV1JsCmMydDBiM0F3Z2dFaU1BMEdDU3FHU0liM0RRRUJBUVVBQTRJQkR3QXd

nZ0VLQW9JQkFRRHR2T1VUbElOZmw3MG8KK1hpR1o1d1VLbVZ6dnFPOW9ycXB4OE15aXVi
MUQ0dXkyMHlScUhPTEVwRHkxalpPV0szUHBGTUxGcXQ3QmZDLwpVUGJPN3pGbXBYQ2Vu
VkhmSThqRmRSRUlnQ0U3a2dJNGdqMzNzRlVWbkloclhUblFZQWpqS3lIRkYrTFphbyt3Ck5nU
Tl4d0xiQTkrQlY5ZXJYMkZObHoxRXBnNi9CYWNIMDVaQnJGNGVhR25VdUpQTUI3L0NFVHVS
ajVJRW5KUnlKUW1YSnBJdVo4TXkzbnJseXVGZzNlYzNaNW91YU10c3B4NEtBSXRyMXhwZU
xLU21VTGNISTBIUkhLZEVmM3UwRgp5akNaWEFoZjRlREo2MitJUXZ2UmJ3Y0x3eGFYRytMTl
VNMU5zdHhpamtOSE9PSUZ1R1JFclRSRlpTHByVk55CjhaMEhCelZGQWdNQkFBR2pkVEJ6T
UE0R0ExVWREd0VCL3dRRUF3SUZvREFUQmdOVkhTVUVEREFLQmdnckJnRUYKQlFjREFqQU1
CZ05WSFJNQkFmOEVBakFBTUI4R0ExVWRJd1FZTUJhQUZNZHhhDVVdRSTVGRmQvU0pwZEd
0cUNNVLwpuZDFZTUIwR0ExVWRFUVFXTUJTQ0VtUnZZMnRsY2kxbWIzSXRaR1Z6YTNSdmNE
QU5CZ2txaGtpRzl3MEJBUXNGCkFBT0NBUUVBSCtELzQ4NXkweWl4cVIxd3U4Q2k3K1phbklU
UVdIb1MvaWJObjQxNlpMdDZRRUxhZlVxTHo3S3EKcWhFamFGGMkhvQ1RrTDAyUVR1WXlPaF
hFQlF1eTI0UkFkTml2d2VObW1qc3IyZ2Ric25ua1hCQld6RU80UzVySwpCbVkzOENNxUWxFL1dj
dktXb0hmVTIvZU1obzYvQlIPc1gxQ1JKVVl3NGFNU2JzNTQybGs0UnQrb3IvRmxZVXU1CmJYT
WF3QUNhT0xoNUF5ZW9sS0xrOFV0aFg3VHlHTy9scVJWaWN5dlhvcXdPSFZXWENBNklzTFR
5SUVGUExxNGlKdlRjMFhmcFyeWVYNDd1QVZyUHY1ODdib1B3WTNtdTArTTg5RzFwM0Ztd2
FDRlV1bGJJaVZUNW9mWjRSS1VpOQpFTWhhK0x4czBibTFFeUtrLzdZY3pJbE8yVjdkb3c9PQ
otLS0tLUVORCBDRVJUSUZJQ0FURS0tLS0tCg==

client-key-data:
LS0tLS1CRUdJTiBSU0EgUFJJVkFURSBLRVktLS0tLQpNSUlFb2dJQkFBS0NBUUVBN2J6bEU1
U0RYNWU5S1BsNGhtZWNGQ3BsYzc2anZhSzZxY2ZETW9ybTlRK0xzdHRNCmthaHppeEtROH
RZMlRsaXR6NlJUQ3hhcmV3WHd2MUQyenU4eFpxVnducDFSM3lQSXhYVVJDSUFoTzVJQ09J
STkKOTdCVkZaeUlhMTA1MEdBSTR5c2h4UmZpMldxUHNEWUVQY2NDMndQZmdWZlhxMTlo
VFpjOVJLWU92d1duQjlPVwpRYXhlSG1ocDFMaVR6QWUvd2hFN2tZK1NCSnlVYTBKbHlhU0xt
ZkRNdDU2NWNyaFlOeDNOMmVhTG1qTGJLY2VDCmdDTGE5Y2FYaXlrcGxxDM0J5TklwUnluU
kg5N3RCY293bVZ3SVgrQnd5ZXR2aUVMNzBXOEhDOE1XbHh2aXpWRE4KVGJMY1lvNURSSe
mppQmJoa1JLMkVRMklpNmExVGN2R2RCd2MxUlFJREFRQUJBb0lCQUhVWnV4aEc2ZUwzS
WZTQgoxUzBXOGRrNC9ObmpTRklMU3JpQUxoVENPSHJ6R2xPU0U0Z1htam9oZmdZdkgzYT
kxWGRXc0pUZ3FMeWpNMjk1CkdPamJCdEZSb2tSdXB6b3JMU1Nkd2pNV3NjZmU1bnNoSkJ
iUjQwY080RjlKLzBVMVdJdFUzb0J2Z0I5cElYZWgKVTd0K1FGaIM4bytLVGpBYWZob3k2Ym5i
dFoyKzN0Nnhad3dqeIJYcldIRW9DNVZRRm1tbXNKWnFXYVVBeEZSUgpQQdTFCeWpGQnIvd1
MxVVRSSMnhIV2xtb1J1Y3RGeS9tZDJNcXZ1bngzb2JHSHVDaWxGUDNVdXhrbFErbE5LWDZvC
jY3SExxCOWRKUDNrNWt1WjFROUNwcIplNmhCSjZ2NHdSejdzc0luTkd3Q2Frai90NWtUVlR4bX
FIc0tEU0hXWWcKN2taHowMENnWUVBNzBldW93MGdSRlRvWG5SS0hYQzM1aUJ2V3VjL2N
yeXRFKzZJaEo1c1pQT05OWG01dGNJRQoybEZ2NUJ1MnRtUG5sOS9wcmNDL1lRUklrQldKbC
t1ZmpPdFRHaWVWUi81dTdlYWVsOU0xNDBvTUZpL2c4YzlqCjJJU3JCdW1oUlVXTXN2U2Nm
N2hXZDRrSnBDOE5rMnNpemJSa1pWVVV6NWNOOUGxYV1lIQ0pCMWNDZ1lFQS9sbWcKV3o
UFdqVW95cTlMaWdGYVBiYnd2ajhtaHVkN3RVTmFjWk9rQWgxS05qTW9oK0phSmpLZlY4Mm
VRNlJ6TUxSVgpRbEV6TSs2N1NqZEpreGxPdGdNR3VPcDd5dUJ5bHM4dVRsK211UVFHYjZF
WlA1NkdrY2MvQTZhei9kME1RYVJCkNRNnNOMDFuSUFQaXRTS2NCYTAvV0QvRkVwdGhhR
GJLUzlQaGtzTUNnWUJaWm1qalZyWWxrYXU0RHE3YVRSRUkKbERuR3R2dkh2S0xWL1p0WUI
YRFNUd1VGWTlOMUMyYVF3emlRKzZIS2g0MHgrMkR0b0VSZzFSN2Zab3InREZMeQpiY0lBM

WFVNjN0OUd6aEwzR3R6WmJRTVREeFIyaEV3RHk1MnkyWHQ5ekR5RGFFMUlrdkVMZkZIejIv
aXdpYWpaClBucjhPVXVyTy82Z3VhVjlKczZyeFFLQmdFNFVDVXU1ZFl5RmdRNG5lWk14c3hm
NnpwQTRKb1dIRGN5bzdseXlKSzgrU1dqT2xKSzRCNkJhTnQ2aG1jRXpuY0l6azdyODYyZkw1Ti
9raVc2MlNPVDFhVkhmeIV5a0dHV2IrRm9McwpqZXVCdHRBUnJnUi9qMk8wdkQxTXNUZ2U0
U0pOaVRKdWxLTXRXWmpVV0lXdUtDTDkrZElIVVdIUzNPWDIyOGJlCk5obXRBb0dBR3ZPeXR3
emRlUGR0TzNscFowS3pibnF6NkQ3SHpHblYyaGdCWUNvTDdQaVpHVWMrdHdtOFJwVW4KU
29PYmsvOVM1S3Y0NXNlTnRjTjd5VS8wVjhpUUFwUmZkVDVSYnNjT3ZrUlFSQmo1VkJxa0pM
VlppeS85QmJDbgpXNU1ZV0NqSi9lWHk0ZGVMdnZFckRJVHhDRFVYbkNWRU1ReUlXcDB4T2
Y4b1lla2h6U009Ci0tLS0tRU5EIFJTQSBQUklWQVRFIEtFWS0tLS0tCg==

razorops.yaml

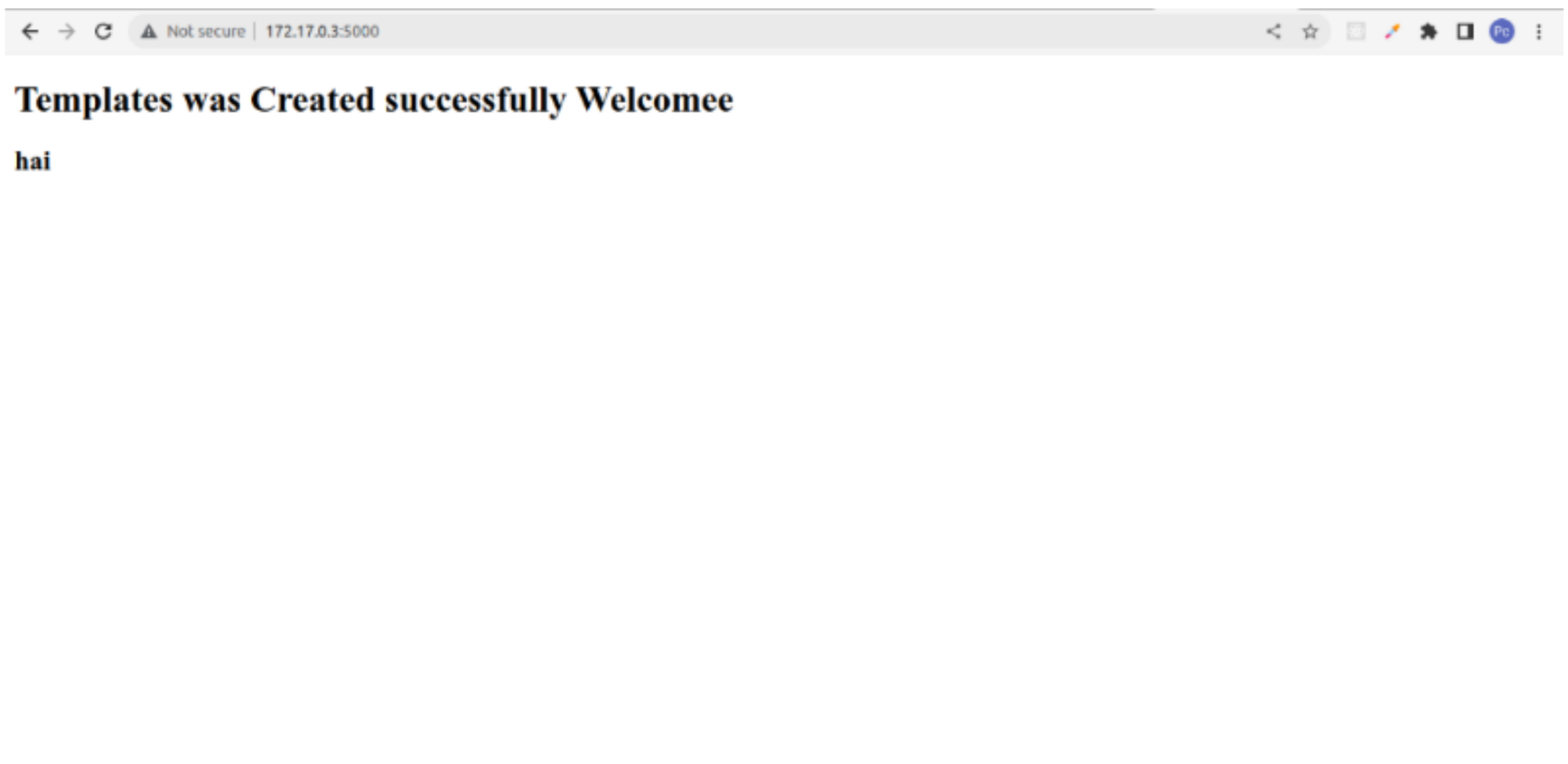
```
version: v2

tasks:
  build:
    runner: razorci/python:3.9
    steps:
    - checkout
    - cache/pull: pip-deps-{{ checksum "requirements.txt" }}
    - commands:
      - python -c 'import site; print(site.getsitepackages())'
      - pip install -r requirements.txt
    - commands:
      - python test.py
    - cache/push:
        key: pip-deps-{{ checksum "requirements.txt" }}
        paths:
        - /usr/local/lib/python3.9/site-packages
    - reports/junit: test-reports/*.xml
```

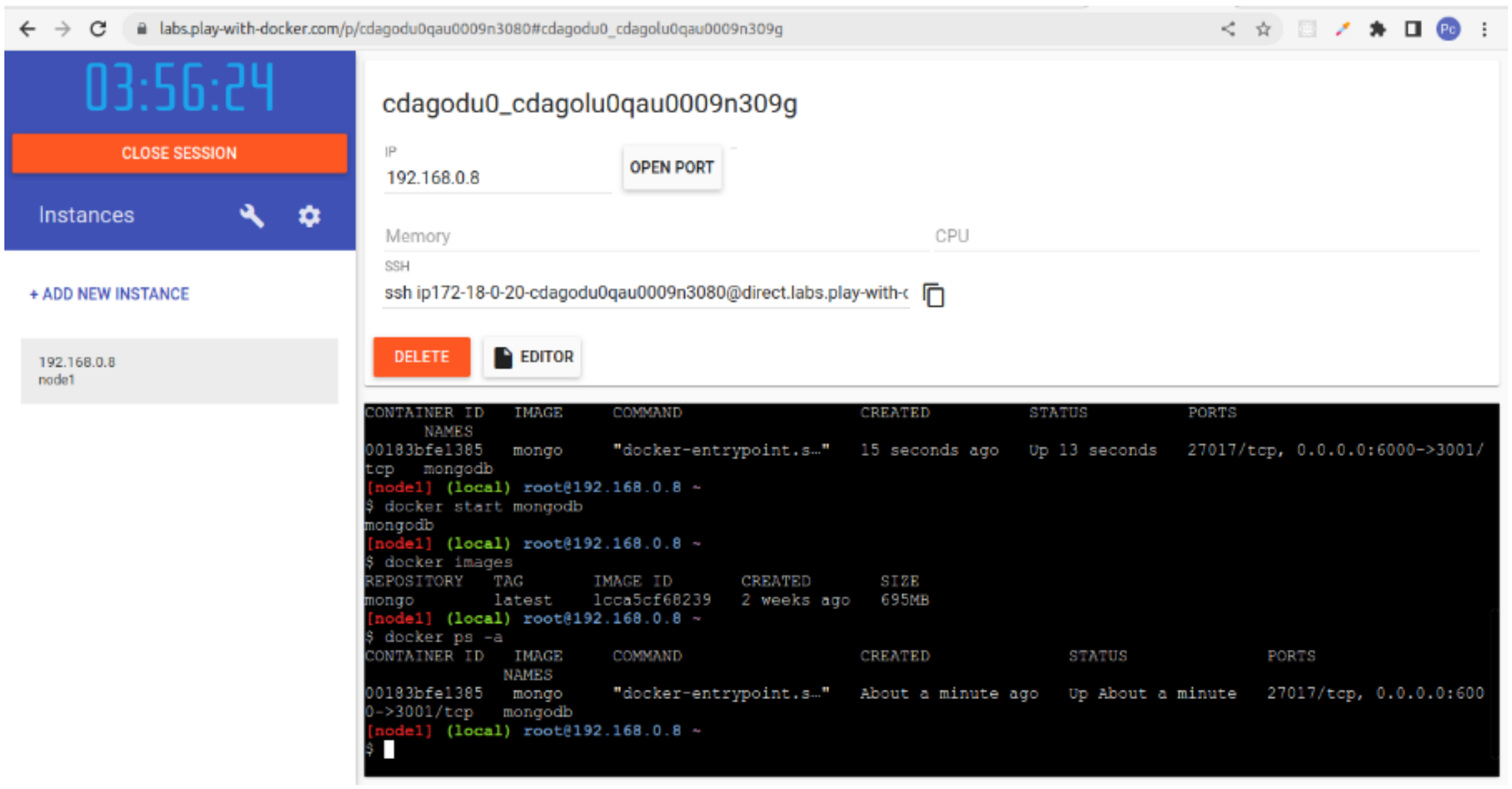
Requirements.txt

flask

gunicorn

Outputs:





labs.play-with-docker.com/p/cdagodu0qau0009n3080#cdagodu0_cdagolu0qau0009n309g

03:53:15

CLOSE SESSION

Instances

+ ADD NEW INSTANCE

192.168.0.8
node1

cdagodu0_cdagolu0qau0009n309g

IP
192.168.0.8

OPEN PORT

Memory

CPU

SSH
ssh ip172-18-0-20-cdagodu0qau0009n3080@direct.labs.play-with-c

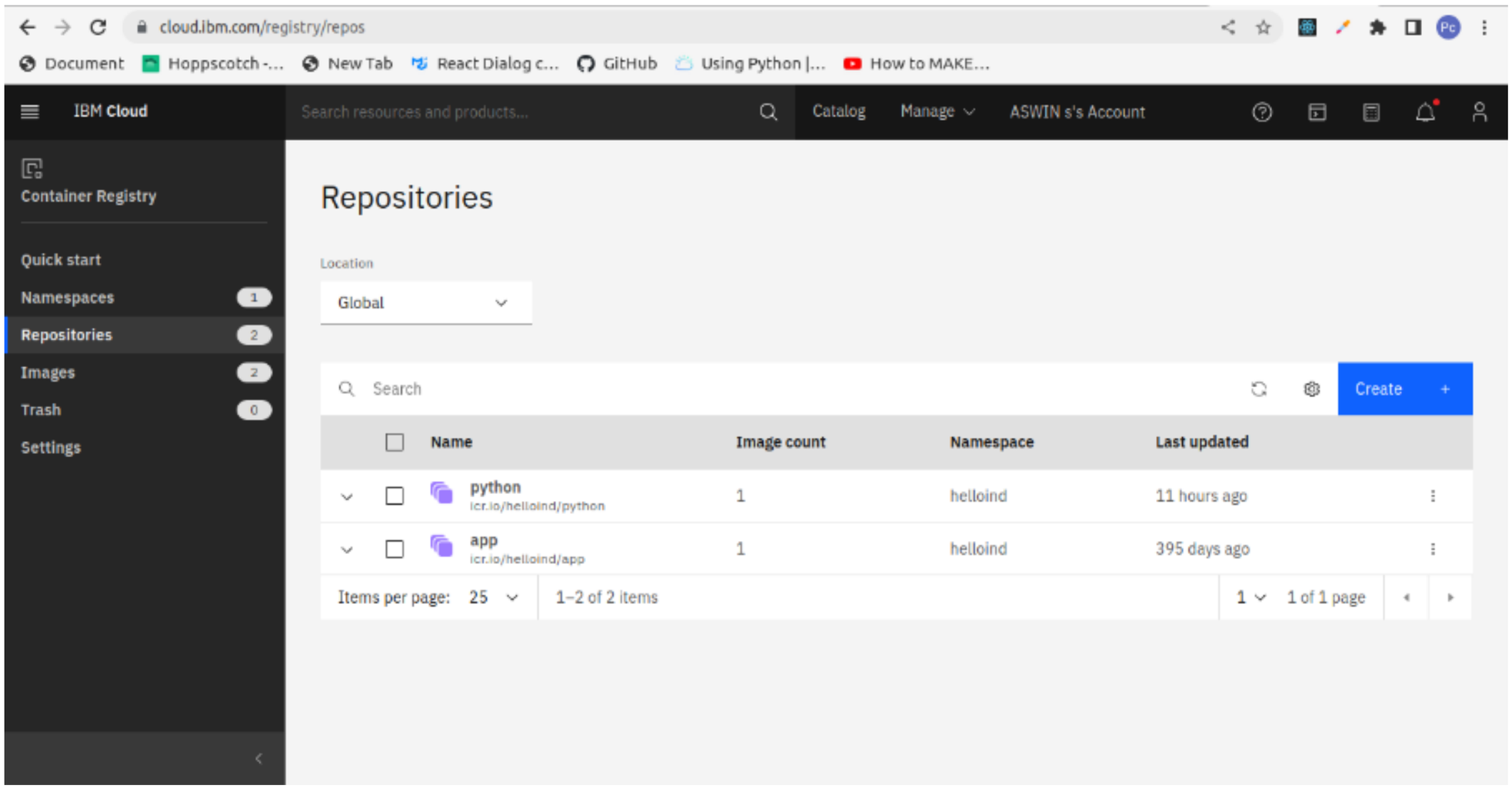
DELETE

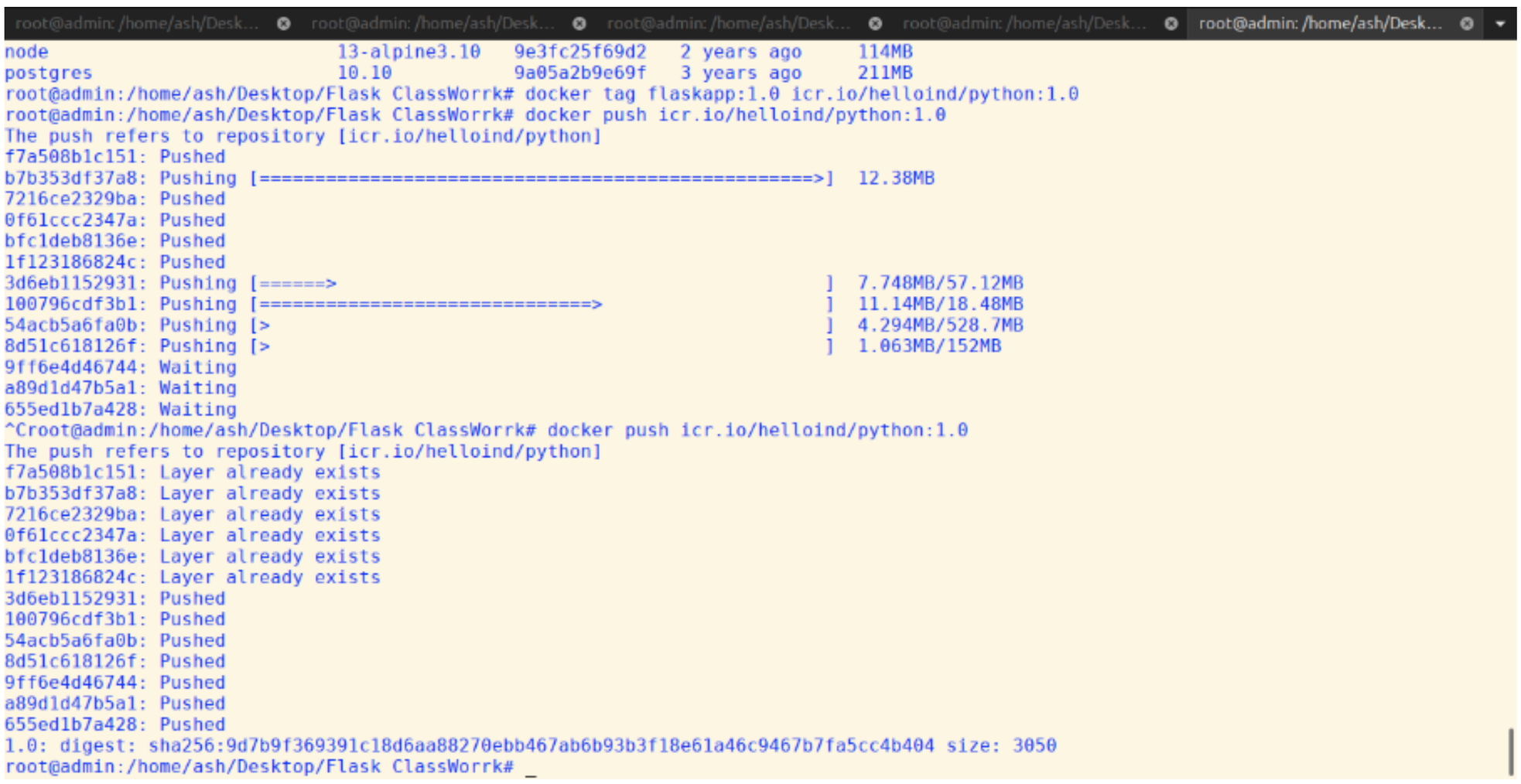
EDITOR

```
$ docker run -d -p6010:3000  hello-world
9b7c8f4adb31df3a7ceaf431f63e2eae868a579059402bc72b630b7e5e911875
^[[D[node1] (local) root@192.168.0.8 ~
$ docker run -d -p6020:3000  hello-world
6b0f1699a8ced253d9df780a42eeff298a0c2fb2c6389e709681da2e63879b0b
[node1] (local) root@192.168.0.8 ~
$ docker run  -p6120:3000  hello-world

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
 1. The Docker client contacted the Docker daemon.
 2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
    (amd64)
```

root@admin: /home/ash/Desktop/Flask ClassWorrk | root@admin: /home/ash/Desktop/Flask ClassWorrk

```
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/
root@admin:/home/ash/Desktop/Flask ClassWorrk# docker run -p5000:5000 flakapp:1.0
Unable to find image 'flakapp:1.0' locally
docker: Error response from daemon: pull access denied for flakapp, repository does not exist or may require 'docker login': denied: re
quested access to the resource is denied.
See 'docker run --help'.
root@admin:/home/ash/Desktop/Flask ClassWorrk# docker run -p5000:5000 -t  flakapp:1.0
Unable to find image 'flakapp:1.0' locally
docker: Error response from daemon: pull access denied for flakapp, repository does not exist or may require 'docker login': denied: re
quested access to the resource is denied.
See 'docker run --help'.
root@admin:/home/ash/Desktop/Flask ClassWorrk# docker run -p5000:5000 -t  flakapp
Unable to find image 'flakapp:latest' locally
docker: Error response from daemon: pull access denied for flakapp, repository does not exist or may require 'docker login': denied: re
quested access to the resource is denied.
See 'docker run --help'.
root@admin:/home/ash/Desktop/Flask ClassWorrk# docker run -p5000:5000 -t  flaskapp:1.0
docker: Error response from daemon: driver failed programming external connectivity on endpoint silly_bardeen (717385e0278ed4890d3355b9
d59728f1e3577afe801b18edb0257c07b377889d): Bind for 0.0.0.0:5000 failed: port is already allocated.
ERRO[0002] error waiting for container: context canceled
root@admin:/home/ash/Desktop/Flask ClassWorrk# docker run  -t  flaskapp:1.0
 * 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://172.17.0.3:5000
Press CTRL+C to quit
172.17.0.1 - - [23/Oct/2022 17:21:29] "GET / HTTP/1.1" 200 -
172.17.0.1 - - [23/Oct/2022 17:21:29] "GET /favicon.ico HTTP/1.1" 404 -
172.17.0.1 - - [23/Oct/2022 17:21:50] "GET / HTTP/1.1" 200 -
```





Kubernetes

Dashboard-adminuser.yaml

apiVersion: v1

kind: ServiceAccount

metadata:

```
  name: admin-user
  namespace: kubernetes-dashboard
---
apiVersion: v1
kind: Secret
metadata:
  name: admin-user-token
  namespace: kubernetes-dashboard
  annotations:
    kubernetes.io/service-account.name: admin-user
type: kubernetes.io/service-account-token
```

flask_deployment.yaml

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

spec:
  replicas: 3
  selector:
    matchLabels:
      app: flask-app
  template:
    metadata:
      labels:
        app: flask-app
```

```
spec:
  containers:
    - name: flask-app-container
      image: flask-app-testing
      imagePullPolicy: Never
      ports:
        - containerPort: 5000
          protocol: TCP
```

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
```

flask_service.yaml

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


---
apiVersion: rbac.authorization.k8s.io/v1
kind: ClusterRoleBinding
metadata:
  name: admin-user
roleRef:
  apiGroup: rbac.authorization.k8s.io
  kind: ClusterRole
  name: cluster-admin
subjects:
```

```
- kind: ServiceAccount
  name: admin-user
  namespace: kubernetes-dashboard
```