

Assignment-4

Assignment Date	29 October 2022
Student Name	Praveen Kumar S
Student Roll Number	610519104079
Maximum Marks	2 Marks

Question:

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

```
Windows PowerShell
PS C:\Users\RISHI> docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
docker_with_flask_inventory	latest	5d844c12d2ef	18 hours ago	933MB
rishinagulr/flask-docker	latest	5d844c12d2ef	18 hours ago	933MB
jp.icr.io/do-fs/docker_with_flask_inventory	latest	5d844c12d2ef	18 hours ago	933MB
jp.icr.io/do-fs/docker_with_flask_inventory	latest	5d844c12d2ef	18 hours ago	933MB
hubproxy.docker.internal:5000/docker/desktop-kubernetes	kubernetes-v1.25.2-cni-v1.1.1-critools-v1.24.2-cri-dockerd-v0.2.5-1-debian	09d7e10bc2e4	6 weeks ago	363MB
k8s.gcr.io/kube-apiserver	v1.25.2	97801f839490	7 weeks ago	128MB
k8s.gcr.io/kube-scheduler	v1.25.2	ca0ea1ee3cfd	7 weeks ago	50.6MB
k8s.gcr.io/kube-controller-manager	v1.25.2	dbfceb93c69b	7 weeks ago	117MB
k8s.gcr.io/kube-proxy	v1.25.2	1c7d8c51823b	7 weeks ago	61.7MB
kubernetesui/dashboard	v2.6.1	783e2b6d87ed	2 months ago	246MB
k8s.gcr.io/pause	3.8	4873874c08ef	4 months ago	711kB
k8s.gcr.io/etcd	3.5.4-0	a8a176a5d5d6	5 months ago	300MB
kubernetesui/metrics-scraper	v1.0.8	115053965e86	5 months ago	43.8MB
k8s.gcr.io/coredns	v1.9.3	5185b96f0bec	5 months ago	48.8MB
docker/getting-started	latest	cb90f98f4791	7 months ago	28.8MB
docker/desktop-vpnkit-controller	v2.0	8c2c38aa676e	18 months ago	21MB
docker/desktop-storage-provisioner	v2.0	99f89471f470	18 months ago	41.9MB

```
PS C:\Users\RISHI>
```

Docker Desktop

Upgrade plan

Containers

Images

Volumes

Dev Environments

Extensions

Add Extensions

Images on disk

Last refresh: about 6 hours ago

17 Images

961.57 MB total size

318.32 MB / 961.57 MB in use

Clean up

Images

Give feedback

LOCAL

REMOTE REPOSITORIES

NAME	TAG	ID	UPDATED	SIZE
hubproxy.docker.internal:500...	kubernetes-v1.25.2-cni-v...	09d7e1dbc2c4	about 2 months ago	363.32 MB
jp.icr.io/do-fs/docker_with_flas...	latest	5d844c12d2ef	about 14 hours ago	932.79 MB
jp.icr.io/do-fs/docker_with_flas...	latest	5d844c12d2ef	about 14 hours ago	932.79 MB
k8s.gcr.io/coredns	v1.9.3	5185b96f0bec	6 months ago	48.8 MB
k8s.gcr.io/etcd	3.5.4-0	a8a176a5d5d6	5 months ago	299.52 MB
k8s.gcr.io/kube-apiserver	v1.25.2	97801f839490	about 2 months ago	127.73 MB
k8s.gcr.io/kube-controller-ma...	v1.25.2	dbfceb93c69b	about 2 months ago	117.1 MB
k8s.gcr.io/kube-proxy	v1.25.2	1c7d8c51823b	about 2 months ago	61.69 MB
k8s.gcr.io/kube-scheduler	v1.25.2	ca0ea1ee3cfd	about 2 months ago	50.58 MB
k8s.gcr.io/pause	3.8	4873874c08ef	5 months ago	711.18 KB
kubernetesui/dashboard	v2.6.1	783e2b6d87ed	3 months ago	245.72 MB
kubernetesui/metrics-scraper	v1.0.8	115053965e86	5 months ago	43.82 MB
rishiragur/flask-docker	latest	5d844c12d2ef	about 14 hours ago	932.79 MB

RAM 3.53GB

CPU 3.60%

Connected to Hub

v4.13.1

Docker Desktop

Upgrade plan

Images

Volumes

Dev Environments

Extensions

Add Extensions

Images

Last refresh: about 6 hours ago

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Images

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LOCAL

REMOTE REPOSITORIES

NAME	TAG	ID	UPDATED	SIZE
hubproxy.docker.internal:500...	kubernetes-v1.25.2-cni-v...	09d7e1dbc2c4	about 2 months ago	363.32 MB
jp.icr.io/do-fs/docker_with_flas...	latest	5d844c12d2ef	about 14 hours ago	932.79 MB
jp.icr.io/do-fs/docker_with_flas...	latest	5d844c12d2ef	about 14 hours ago	932.79 MB
k8s.gcr.io/coredns	v1.9.3	5185b96f0bec	6 months ago	48.8 MB
k8s.gcr.io/etcd	3.5.4-0	a8a176a5d5d6	5 months ago	299.52 MB
k8s.gcr.io/kube-apiserver	v1.25.2	97801f839490	about 2 months ago	127.73 MB
k8s.gcr.io/kube-controller-ma...	v1.25.2	dbfceb93c69b	about 2 months ago	117.1 MB
k8s.gcr.io/kube-proxy	v1.25.2	1c7d8c51823b	about 2 months ago	61.69 MB
k8s.gcr.io/kube-scheduler	v1.25.2	ca0ea1ee3cfd	about 2 months ago	50.58 MB
k8s.gcr.io/pause	3.8	4873874c08ef	5 months ago	711.18 KB
kubernetesui/dashboard	v2.6.1	783e2b6d87ed	3 months ago	245.72 MB
kubernetesui/metrics-scraper	v1.0.8	115053965e86	5 months ago	43.82 MB
rishiragur/flask-docker	latest	5d844c12d2ef	about 14 hours ago	932.79 MB

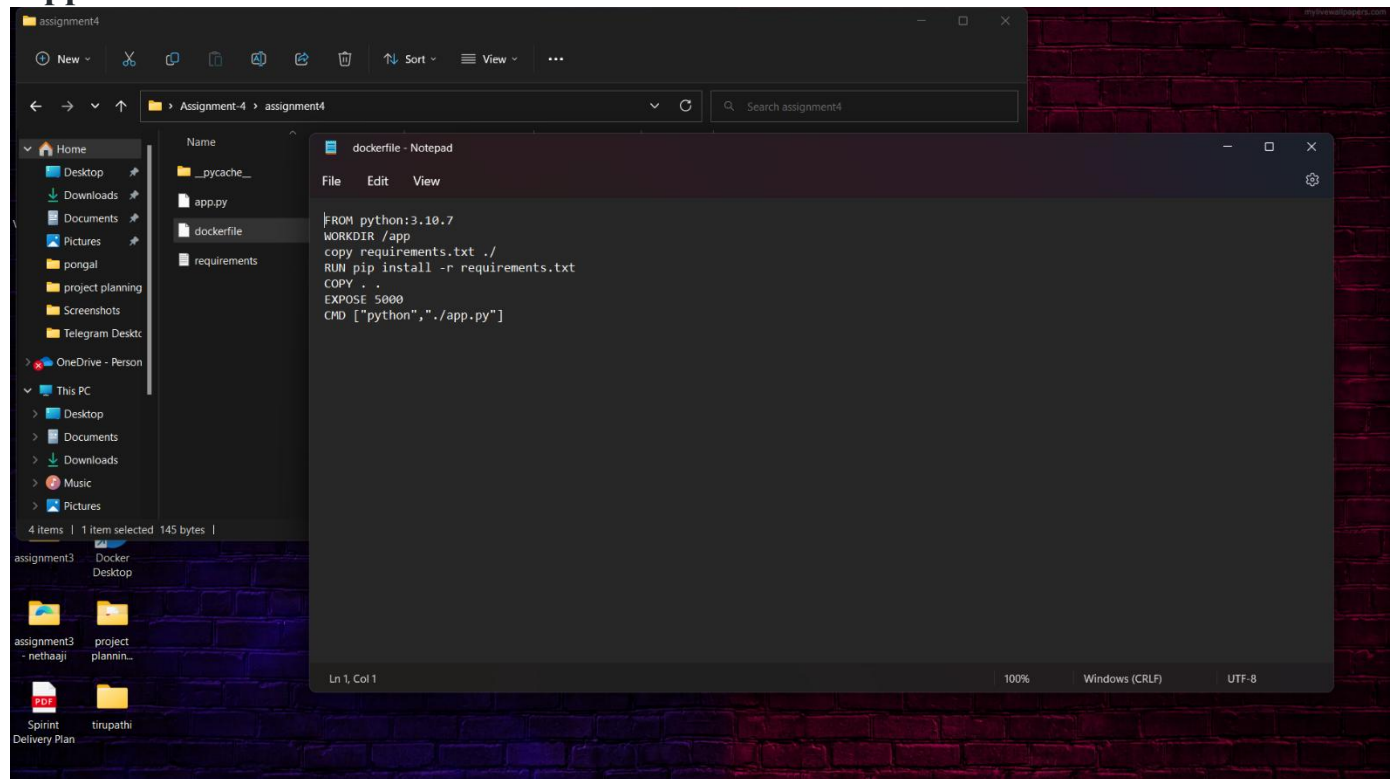
RAM 3.52GB

CPU 2.68%

Connected to Hub

v4.13.1

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



Deploy in docker application

```
C:\Users\RISHI\Desktop\Assignment-4\assignment4>docker build -t docker_with_flask_inventory .
[+] Building 115.0s (10/10) FINISHED
-> [internal] load build definition from Dockerfile
-> => transferring dockerfile: 32B
-> [internal] load .dockerignore
-> => transferring context: 2B
-> [internal] load metadata for docker.io/library/python:3.10.7
-> [1/5] FROM docker.io/library/python:3.10.7@sha256:53e577204d362233ee92aeb5119449271f5eb24f99c61464efe9167ddbc8640f
-> => resolve docker.io/library/python:3.10.7@sha256:53e577204d362233ee92aeb5119449271f5eb24f99c61464efe9167ddbc8640f
-> => sha256:da84e66c3a7ca695cd8ac439270ff19b019a5e22ba7cae5ba410a8584a13b107 8.53kB / 8.53kB
-> => sha256:f606d8928ed378229f2460b94b504cca239fb906efc57acbd9f340bd298d5ddf 55.05MB / 55.05MB
-> => sha256:47db815c6a4547dc224b75222193cb1851cf529d2cbdf26f854b9bbf97099b08 5.16MB / 5.16MB
-> => sha256:53e577204d362233ee92aeb5119449271f5eb24f99c61464efe9167ddbc8640f 2.36kB / 2.36kB
-> => sha256:d400cf9859668146180d9c8b522917b13aiced49fc190f2a047220307fede1a5c 2.22kB / 2.22kB
-> => sha256:bf48494000001a037b72870d2a6a2536f9da8bc5d1ceddd72d79f451fe7a60e 10.88MB / 10.88MB
-> => sha256:a572f7a256d36a93ab0777949771b120c5d7dce75ea2a2d09444f930b2b2ef1 54.58MB / 54.58MB
-> => sha256:8f709525895528fdb73153451e112bb08e1854549bd1e0e6f4ac0ba2ee98172 196.85MB / 196.85MB
-> => sha256:7110f04115ae2d7232ed9e59b070b7cf7337c91f95edc25428baa3e522064187 6.29MB / 6.29MB
-> => sha256:c4b413c6a4894499e2ee7df958d411ccfcc899dcccffe61de71cbb433e4e76143 20.05MB / 20.05MB
-> => sha256:22311b72a3cb993d70dc2f9440feb89ca571ae931b080d975c81f4270ca90908 231B / 231B
-> => sha256:8dcbf38b6fa1182030e006f135471f3726cef064f6fc90edbd9f00f450fad79 3.04MB / 3.04MB
-> => extracting sha256:f606d8928ed378229f2460b94b504cca239fb906efc57acbd9f340bd298d5ddf
-> => extracting sha256:47db815c6a4547dc224b75222193cb1851cf529d2cbdf26f854b9bbf97099b08
-> => extracting sha256:bf48494000001a037b72870d2a6a2536f9da8bc5d1ceddd72d79f451fe7a60e
-> => extracting sha256:a572f7a256d36a93ab0777949771b120c5d7dce75ea2a2d09444f930b2b2ef1
-> => extracting sha256:8f709525895528fdb73153451e112bb08e1854549bd1e0e6f4ac0ba2ee98172
-> => extracting sha256:7110f04115ae2d7232ed9e59b070b7cf7337c91f95edc25428baa3e522064187
-> => extracting sha256:c4b413c6a4894499e2ee7df958d411ccfcc899dcccffe61de71cbb433e4e76143
-> => extracting sha256:22311b72a3cb993d70dc2f9440feb89ca571ae931b080d975c81f4270ca90908
-> => extracting sha256:8dcbf38b6fa1182030e006f135471f3726cef064f6fc90edbd9f00f450fad79
-> [internal] load build context
-> => transferring context: 190B
-> [2/5] WORKDIR /app
-> [3/5] COPY requirements.txt ./
-> [4/5] RUN pip install -r requirements.txt
-> [5/5] COPY . .
-> => exporting to image
-> => exporting layers
-> => writing image sha256:5d844c12d2eff9ba170fc15034f0c9c00efbed528ea42cb6a351f21377d4c6bd
-> => naming to docker.io/library/docker_with_flask_inventory

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

C:\Users\RISHI\Desktop\Assignment-4\assignment4>
```

Running in docker desktop

The image shows a Visual Studio Code editor window titled "app.py - assignment4 - Visual Studio Code". The Explorer sidebar on the left shows a project structure with "ASSIGNMENT4" containing files like "_pycache_", "app.py", "dockerfile", and "requirements.txt". The main editor displays the content of "app.py", which is a Flask application. The code includes imports for Flask and MarkupSafe, a Flask app instance, and two routes: a root route returning a welcome message and a "/<name>" route returning a personalized hello message. The app is run on host "0.0.0.0" and port "5000".

```
1 from flask import Flask
2 from markupsafe import escape
3
4 app = Flask(__name__)
5
6 @app.route("/")
7 def index():
8     return "<p> Inventory Management System <br> Hello Guys <p>"
9
10 @app.route("/<name>")
11 def hello(name):
12     return f"hello, {escape(name)}!"
13
14 if __name__ == "__main__":
15     app.run(host="0.0.0.0", port=5000)
```

The bottom of the window features a TERMINAL panel. It shows the command to run the application and the resulting output. The output indicates that the Flask app is serving on port 5000, with warnings about development server usage and the specific addresses and ports it is running on.

```
Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\RISHI\Desktop\Assignment-4\assignment4> & C:\Users\RISHI\AppData\Local\Programs\Python\Python310\python.exe c:/Users/RISHI/Desktop/Assignment-4/assignment4/app.py
* 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://192.168.101.5:5000
Press CTRL+C to quit
```

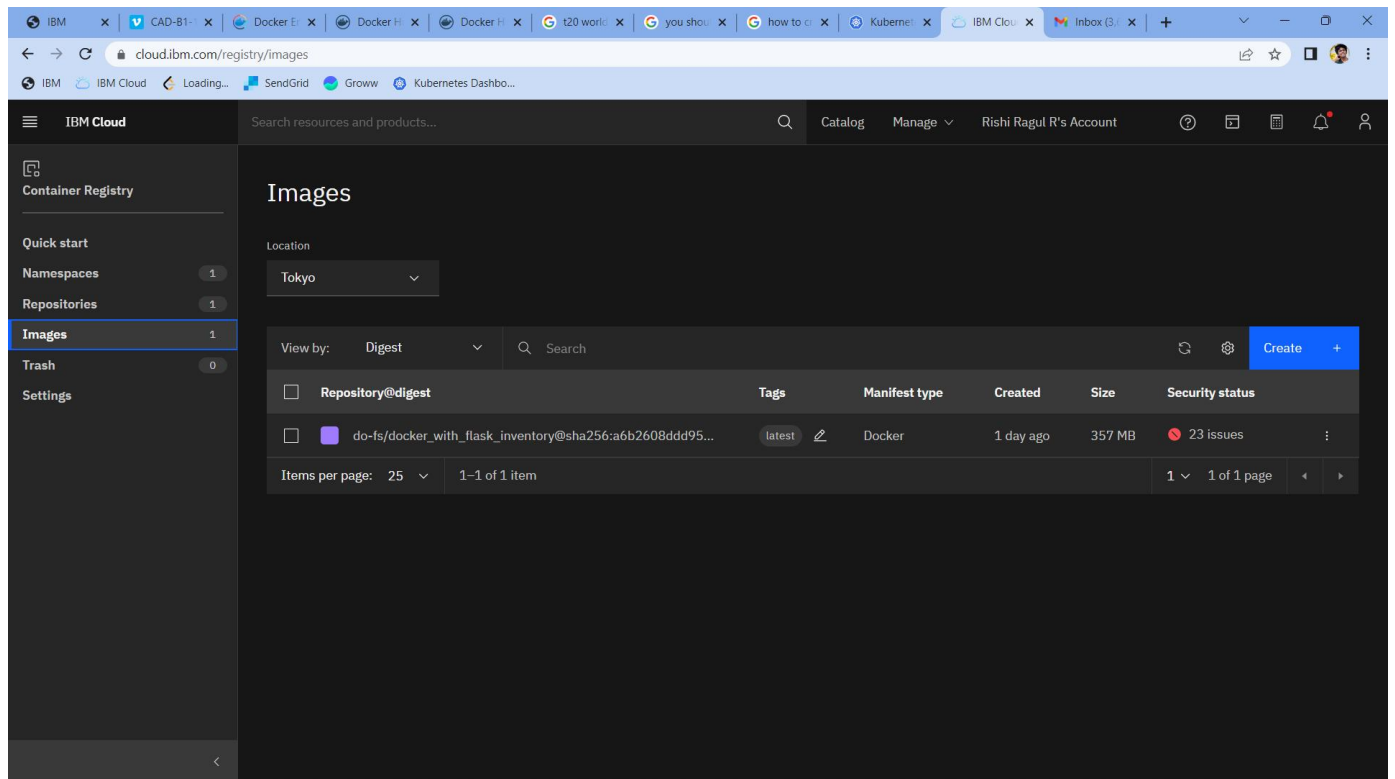
3. Create a IBM container registry and deploy hello world app or job portal app.

```
Windows PowerShell
Email> 610519104082@smartinternz.com

Password>
Authenticating...
OK

Targeted account Rishi Ragul R's Account (68a0040c508e44ffa939bddb1044d350)

API endpoint:      https://cloud.ibm.com
Region:            jp-tok
User:              610519104082@smartinternz.com
Account:           Rishi Ragul R's Account (68a0040c508e44ffa939bddb1044d350)
Resource group:    No resource group targeted, use 'C:\Program Files\IBM\Cloud\bin\ibmcloud.exe target -g RESOURCE_GROUP'
CF API endpoint:
Org:
Space:
PS C:\Users\RISHI> docker images
REPOSITORY                                TAG                                IMAGE ID                                CREATED                                SIZE
docker_with_flask_inventory               latest                           5d844c12d2ef                           13 hours ago                          933MB
rishiragulr/flask-docker                 latest                           5d844c12d2ef                           13 hours ago                          933MB
jp.icr.io/do-fs/docker_with_flask_inventory latest                           5d844c12d2ef                           13 hours ago                          933MB
hubproxy.docker.internal:5000/docker/desktop-kubernetes kubernet... latest                           09d7e1dbc2c4                           6 weeks ago                           363MB
k8s.gcr.io/kube-apiserver                 v1.25.2                         97801f839490                           7 weeks ago                           128MB
k8s.gcr.io/kube-controller-manager        v1.25.2                         dbfceb993c69b                           7 weeks ago                           117MB
k8s.gcr.io/kube-scheduler                 v1.25.2                         ca0ea1ee3cfd                           7 weeks ago                           50.6MB
k8s.gcr.io/kube-proxy                     v1.25.2                         1c7d8c51823b                           7 weeks ago                           61.7MB
kubernetesui/dashboard                   v2.6.1                         783c2b6d87ed                           2 months ago                          240MB
k8s.gcr.io/pause                          3.8                             4873874c88ef                           4 months ago                          711kB
k8s.gcr.io/etcd                           3.5.4-0                         a8a176a5d5d6                           5 months ago                          300MB
kubernetesui/metrics-scraper              v1.0.8                         115053965e86                           5 months ago                          43.8MB
k8s.gcr.io/coredns                       v1.9.3                         5185b96f0bec                           5 months ago                          48.8MB
docker/getting-started                    latest                           cb90f98fd791                           7 months ago                          28.8MB
docker/desktop-vpnkit-controller          v2.0                             8c2c38aa676e                           18 months ago                         21MB
docker/desktop-storage-provisioner        v2.0                             99f89471f470                           18 months ago                         41.9MB
PS C:\Users\RISHI> docker tag docker_with_flask_inventory jp.icr.io/do-fs/docker_with_flask_inventory
PS C:\Users\RISHI> docker push jp.icr.io/do-fs/docker_with_flask_inventory
Using default tag: latest
The push refers to repository [jp.icr.io/do-fs/docker_with_flask_inventory]
d39020a385be: Preparing
7143fba1c510: Preparing
f36426436017: Preparing
b9c0c0fe7120: Preparing
cf399be408ea: Preparing
793b971ccb99: Waiting
d172a9e6f9e6: Waiting
0c7daf9a72e8: Waiting
75ba02937496: Waiting
288cf3a46e32: Waiting
186da83755d5: Waiting
955c9335e041: Waiting
8e079fee2186: Waiting
```



Deploy hello world or job portal

```
Windows PowerShell
PS C:\Users\RISHI> ibmcloud cr login
Logging 'docker' in to 'jp.icr.io'...
logged in to 'jp.icr.io'.

OK
PS C:\Users\RISHI> docker tag docker_with_flask_inventory jp.icr.io/do-fs/docker_with_flask_inventory
PS C:\Users\RISHI> docker push jp.icr.io/do-fs/docker_with_flask_inventory:latest
The push refers to repository [jp.icr.io/do-fs/docker_with_flask_inventory]
d39020a385be: Pushed
7143fba1c510: Pushed
f36426436017: Pushed
b9c0c0fe7120: Pushed
cf399be008ea: Pushed
793b971ccb99: Pushed
d172a9e6f9e6: Pushed
0c7da9a72c8: Pushed
75ba02937496: Pushed
288cf3a46e32: Pushed
186da837555d: Pushed
950c9335e041: Pushed
8a079fec2186: Pushed
latest: digest: sha256:a6b2608ddd954c79c05fabd2ada6970008c4a8970eca1833ad685099139fc8f6 size: 3051
PS C:\Users\RISHI> docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
docker_with_flask_inventory	latest	5d844c12d2ef	18 hours ago	933MB
rishiragulr/flask-docker	latest	5d844c12d2ef	18 hours ago	933MB
jp.icr.io/do-fs/docker_with_flask_inventory	latest	5d844c12d2ef	18 hours ago	933MB
jp.icr.io/do-fs/docker_with_flask_inventory	latest	5d844c12d2ef	18 hours ago	933MB
hubproxy.docker.internal:5000/docker/desktop-kubernetes	kubernetes-v1.25.2-cni-v1.1.1-critools-v1.24.2-cri-dockerd-v0.2.5-1-debian	09d7e1dbc2c4	6 weeks ago	363MB
k8s.gcr.io/kube-apiserver	v1.25.2	97801f839490	7 weeks ago	128MB
k8s.gcr.io/kube-scheduler	v1.25.2	ca8ea1ee3cfd	7 weeks ago	50.6MB
k8s.gcr.io/kube-controller-manager	v1.25.2	dbfceb93c69b	7 weeks ago	117MB
k8s.gcr.io/kube-proxy	v1.25.2	1c7d8c51823b	7 weeks ago	61.7MB
kubernetesui/dashboard	v2.6.1	783e2b6d87ed	2 months ago	246MB
k8s.gcr.io/pause	3.8	4873874c08ef	4 months ago	711kB
k8s.gcr.io/etcd	3.5.4-0	a8a176a5d5d6	5 months ago	300MB
kubernetesui/metrics-scraper	v1.0.8	115053965e86	5 months ago	43.8MB
k8s.gcr.io/coredns	v1.9.3	5185b96f0bec	5 months ago	48.8MB
docker/getting-started	latest	cb90f98fd791	7 months ago	28.8MB
docker/desktop-vpnkit-controller	v2.0	8c2c38aa676e	18 months ago	21MB
docker/desktop-storage-provisioner	v2.0	99f89471f470	18 months ago	41.9MB

```
PS C:\Users\RISHI>
```

4. Create a Kubernetes cluster in IBM cloud and deploy hello world image or job portal image and also expose the same app to run in node port.

Creating a Kubernetes cluster in IBM cloud

The screenshot shows the IBM Cloud Kubernetes dashboard. The top navigation bar includes the IBM Cloud logo, a search bar, and user account information. The main header displays the cluster name 'mycluster-free' with a status of 'Normal' and an expiration notice 'Expires In 29 days'. A sidebar on the left contains links for Overview, Worker nodes (selected), Worker pools, and DevOps. The central area features a table of worker nodes. The table has columns for Name, Status, Worker pool, Zone, Private IP, Public IP, and Version. One node is listed with ID '0000007d', status 'Normal', and IP addresses '10.144.214.101' and '169.51.205.202'. The bottom of the table shows pagination information: 'Items per page: 25' and '1-1 of 1 item'.

Name	Status	Worker pool	Zone	Private IP	Public IP	Version
0000007d	Normal	default	Milan 01	10.144.214.101	169.51.205.202	1.24.7_1543

Expose the same app to run in noteport


```
Command Prompt
C:\Users\RISHI>cd C:\Users\RISHI\Desktop\Assignment-4\assignment4
C:\Users\RISHI\Desktop\Assignment-4\assignment4>kubectl apply -f kubernetes/deployment.yaml
error: the path "kubernetes/deployment.yaml" does not exist
C:\Users\RISHI\Desktop\Assignment-4\assignment4>ibmcloud ks cluster config --cluster cd1tlpof0uv2a9hfiubg
The configuration for cd1tlpof0uv2a9hfiubg was downloaded successfully.
Added context for cd1tlpof0uv2a9hfiubg 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.
C:\Users\RISHI\Desktop\Assignment-4\assignment4>kubectl apply -f kubernetes/flask_deployment.yaml
error: the path "kubernetes/flask_deployment.yaml" does not exist
C:\Users\RISHI\Desktop\Assignment-4\assignment4>kubectl apply -f kubernetes/flask_deployment.yaml
deployment.apps/flask-app created
C:\Users\RISHI\Desktop\Assignment-4\assignment4>kubectl_
```

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eu-de.containers.cloud.ibm.com/kubeproxy/clusters/cdltpof0uv2a9hfiubg/service/#/workloads?namespace=default

IBMIBM CloudLoading...SendGridGrowwKubernetes Dashbo...Docker Hub

kubernetes

default

Search

+🔔👤

Workloads

Workloads N

Cron Jobs

Daemon Sets

Deployments

Jobs

Pods

Replica Sets

Replication Controllers

Stateful Sets

Service

Ingresses N

Ingress Classes

Services N

Config and Storage

Config Maps N

Persistent Volume Claims N

Secrets N

Storage Classes

Workload Status

Failed: 1

Deployments

Failed: 5

Pods

Failed: 1

Replica Sets

Deployments

Name	Images	Labels	Pods	Created ↑
<div>flask-app</div>	<div>Show all</div>	-	0 / 5	4 minutes ago

Pods

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Inbox (3)

ibm clou

mycluste

mycluste

eu-de.containers.cloud.ibm.com/kubeproxy/clusters/cdltpof0uv2a9hfiubg/service/#/pod?namespace=default

IBMIBM CloudLoading...SendGridGrowwKubernetes Dashbo...Docker Hub

kubernetes

default

Search

+🔔👤

Workloads > Pods

Workloads N

Cron Jobs

Daemon Sets

Deployments

Jobs

Pods

Replica Sets

Replication Controllers

Stateful Sets

Service

Ingresses N

Ingress Classes

Services N

Config and Storage

Config Maps N

Persistent Volume Claims N

Secrets N

Storage Classes

Pods

Name	Images	Labels	Node	Status	Restarts	CPU Usage (cores)	Memory Usage (bytes)	Created ↑
<div>flask-app-5c85fdb465-fqx8b</div>	<div>Show all</div>	<div>Show all</div>	10.144.214.101	ErrImageNev 0	-	-	-	5 minutes ago
<div>flask-app-5c85fdb465-gvv9x</div>	<div>Show all</div>	<div>Show all</div>	10.144.214.101	ErrImageNev 0	-	-	-	5 minutes ago
<div>flask-app-5c85fdb465-wmrb6</div>	<div>Show all</div>	<div>Show all</div>	10.144.214.101	ErrImageNev 0	-	-	-	5 minutes ago
<div>flask-app-5c85fdb465-xqf5h</div>	<div>Show all</div>	<div>Show all</div>	10.144.214.101	ErrImageNev 0	-	-	-	5 minutes ago
<div>flask-app-5c85fdb465-zqpb9</div>	<div>Show all</div>	<div>Show all</div>	10.144.214.101	ErrImageNev 0	-	-	-	5 minutes ago