

## Assignment 4

Assignment date	11/11/2022
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### Question 1:

Pull an image from docker hub and run it on docker playground.

### Solution 1:

Docker playground:

The screenshot shows the Docker Playground interface in a web browser. The left sidebar has a clock showing 03:58:21, a 'CLOSE SESSION' button, and an 'Instances' section with a '+ ADD NEW INSTANCE' button. Below this, a single instance '192.168.0.28 node1' is listed. The main area displays the instance details for 'cdjq86f9\_cdjq87v91rrg00fv70og', including its IP, memory usage (1.23%), CPU usage (0.57%), and an SSH command. Below the details is a terminal window showing the following commands and output:

```
##### WARNING!!!! #####
# This is a sandbox environment. Using personal credentials #
# is HIGHLY! discouraged. Any consequences of doing so are #
# completely the user's responsibilities. #
# #
# The PWD team. #
#####
[node1] (local) root@192.168.0.28 ~
$ docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
[node1] (local) root@192.168.0.28 ~
$ docker pull hello-world
Using default tag: latest
latest: Pulling from library/hello-world
2db29710123e: Pull complete
Digest: sha256:e18f0a777aefabe047a671ab3ec3eed05414477c951ab1a6f352a06974245fe7
Status: Downloaded newer image for hello-world:latest
docker.io/library/hello-world:latest
[node1] (local) root@192.168.0.28 ~
$ docker run 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:
```

### Docker UI:

The screenshot shows the Docker Desktop interface. The left sidebar has a 'Containers' section with a 'Give feedback' link. The main area displays a list of running containers with the following columns: NAME, IMAGE, STATUS, PORT(S), STARTED, and ACTIONS. The containers listed are:

NAME	IMAGE	STATUS	PORT(S)	STARTED	ACTIONS
bold_shtern 3111c34b95db	docker/getting-started:latest	Running	80:80	35 minutes ago	[Stop] [Restart] [Delete]
stoic_wozniak dc36997d169e	<none>:<none>	Running	3000:3000	34 minutes ago	[Stop] [Restart] [Delete]
quizzical_vivesvaraya 275b013f9069	test-boot:latest	Running	5000:80	51 seconds ago	[Stop] [Restart] [Delete]

At the bottom, the status bar shows 'RAM 2.15GB', 'CPU 0.11%', 'Connected to Hub', and 'v4.13.0'.

## Question 2:

Create a docker file for the job portal app or hello world app and deploy it in docker desktop app.

## Solution 2:

### DockerFile

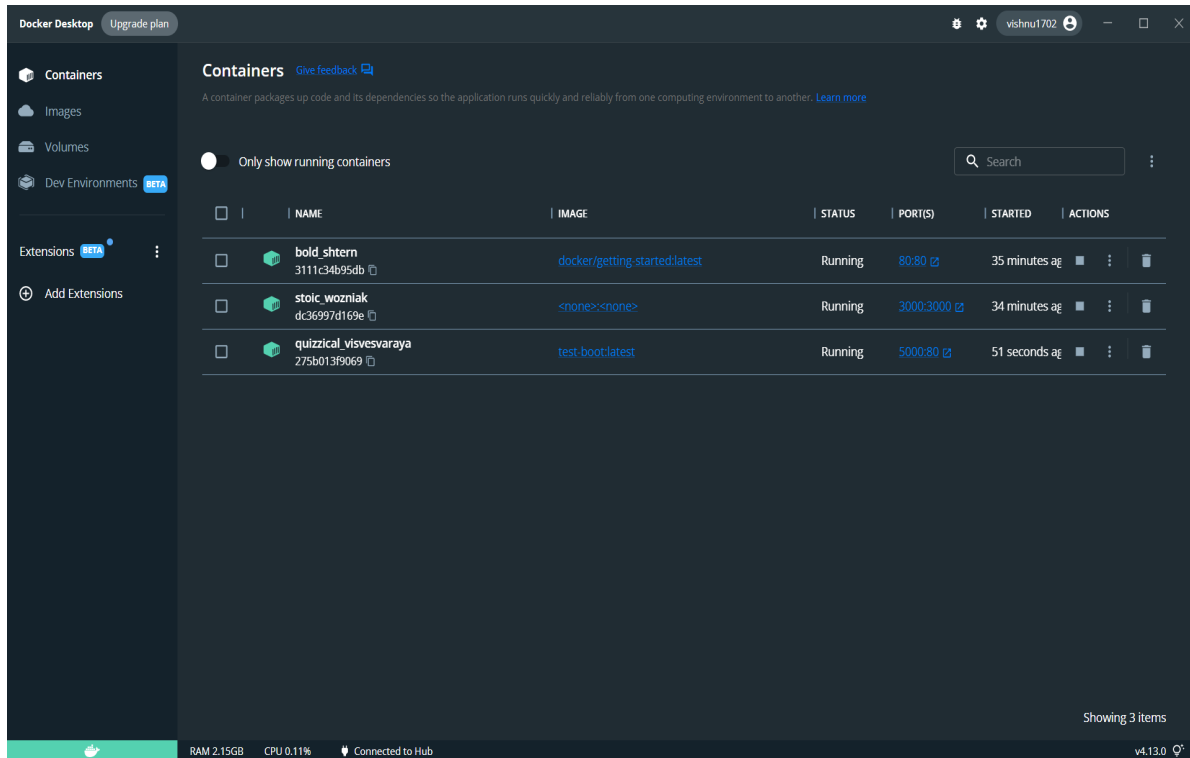
```
FROM node:12-alpine
# Adding build tools to make yarn install work on Apple silicon / arm64 machines
RUN apk add --no-cache python2 g++ make
WORKDIR /app
COPY . .
RUN yarn install --production
CMD ["node", "src/index.js"]
```

## Bulid Docker image

```
C:\Windows\System32\cmd.exe

E:\Study materials\Sem 7\IBM\Exercise\Assignment4>docker build -t hello-world .
[+] Building 160.4s (10/10) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 194B
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [internal] load metadata for docker.io/library/python:3.8
=> [1/5] FROM docker.io/library/python:3.8@sha256:089d758211770a2dd03ecc4b10a8d851f6f77af3f1e3f3620d8519190b8aa1d5
=> => resolve docker.io/library/python:3.8@sha256:089d758211770a2dd03ecc4b10a8d851f6f77af3f1e3f3620d8519190b8aa1d5 149.9s
=> => sha256:900972f1eecd8c17c25b21573681851f802e054f57cc07eb43937e1a47114480 8.56kB / 8.56kB
=> => sha256:17c9e6141fdb3387e5a1c07d4f9b0a05ac1498e96029fa3ea55470d4504f7770 55.05MB / 55.05MB
=> => sha256:4edcd8587e6c18412817019074f5e04a8ede4e2fc09d06af13df3f80d78a70d 10.80MB / 10.80MB
=> => sha256:089d758211770a2dd03ecc4b10a8d851f6f77af3f1e3f3620d8519190b8aa1d5 1.86kB / 1.86kB
=> => sha256:254101fcf737ef89a912ce9ad7488801a01e0a35bf1cc5e7d0bb06d0b6e1c3f 2.22kB / 2.22kB
=> => sha256:de4a4c6cae8801bb0b7377e10220a914da403bc93fa79663cbf2dcf1000b6f1 5.16MB / 5.16MB
=> => sha256:a7969cfff46e6a91291fd76b19ecbe93c03ea4ded0d14042aecb4c0c4211a43 54.59MB / 54.59MB
=> => sha256:74fbfde6af91271fb88f0a1716224dccc5c0ehead3609943792a9c0b0a4d0d3d 196.87MB / 196.87MB
=> => sha256:16fe51aed099f36017fe42b598b1a622b29e0e8c3622e92e13df14578025eb37 6.29MB / 6.29MB
=> => sha256:2b979a731384cf50dac8fd255d381b70028d67b69b45c1a2b6c3ae10b92636d4 17.39MB / 17.39MB
=> => sha256:aa3c4359fdb43308669ae8ba78b2ebb713221ef3a3eca97f93596588f1506de1 234B / 234B
=> => extracting sha256:17c9e6141fdb3387e5a1c07d4f9b0a05ac1498e96029fa3ea55470d4504f7770 10.8s
=> => sha256:58700fbcfa0c82e5d24a9f76ba7748a194c4fd7312a397060b4637f72ce91b6 2.89MB / 2.89MB
=> => extracting sha256:de4a4c6cae8801bb0b7377e10220a914da403bc93fa79663cbf2dcf1000b6f1 1.3s
=> => extracting sha256:4edcd8587e6c18412817019074f5e04a8ede4e2fc09d06af13df3f80d78a70d 1.0s
=> => extracting sha256:a7969cfff46e6a91291fd76b19ecbe93c03ea4ded0d14042aecb4c0c4211a43 13.1s
=> => extracting sha256:74fbfde6af91271fb88f0a1716224dccc5c0ehead3609943792a9c0b0a4d0d3d 13.6s
=> => extracting sha256:16fe51aed099f36017fe42b598b1a622b29e0e8c3622e92e13df14578025eb37 0.4s
=> => extracting sha256:2b979a731384cf50dac8fd255d381b70028d67b69b45c1a2b6c3ae10b92636d4 1.1s
=> => extracting sha256:aa3c4359fdb43308669ae8ba78b2ebb713221ef3a3eca97f93596588f1506de1 0.0s
=> => extracting sha256:58700fbcfa0c82e5d24a9f76ba7748a194c4fd7312a397060b4637f72ce91b6 0.4s
=> [internal] load build context
=> => transferring context: 1.15kB
=> [2/5] WORKDIR /app
=> [3/5] ADD . /app
=> [4/5] COPY requirements.txt /app
=> [5/5] RUN python3 -m pip install -r requirements.txt
=> exporting to image
=> => writing image sha256:f60fcdce5bb665f00e8f47bc4d137a4f7e0533348402c5bfddad71121d7d43f63
=> => naming to docker.io/library/hello-world
Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
```

## Deploy it on Docker hub



```
E:\Study materials\Sem 7\IBM\Exercise\Assignment4>docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
hello-world   latest    f68fcdce5bb6   5 minutes ago  919MB

E:\Study materials\Sem 7\IBM\Exercise\Assignment4>docker login
Authenticating with existing credentials...
Login Succeeded

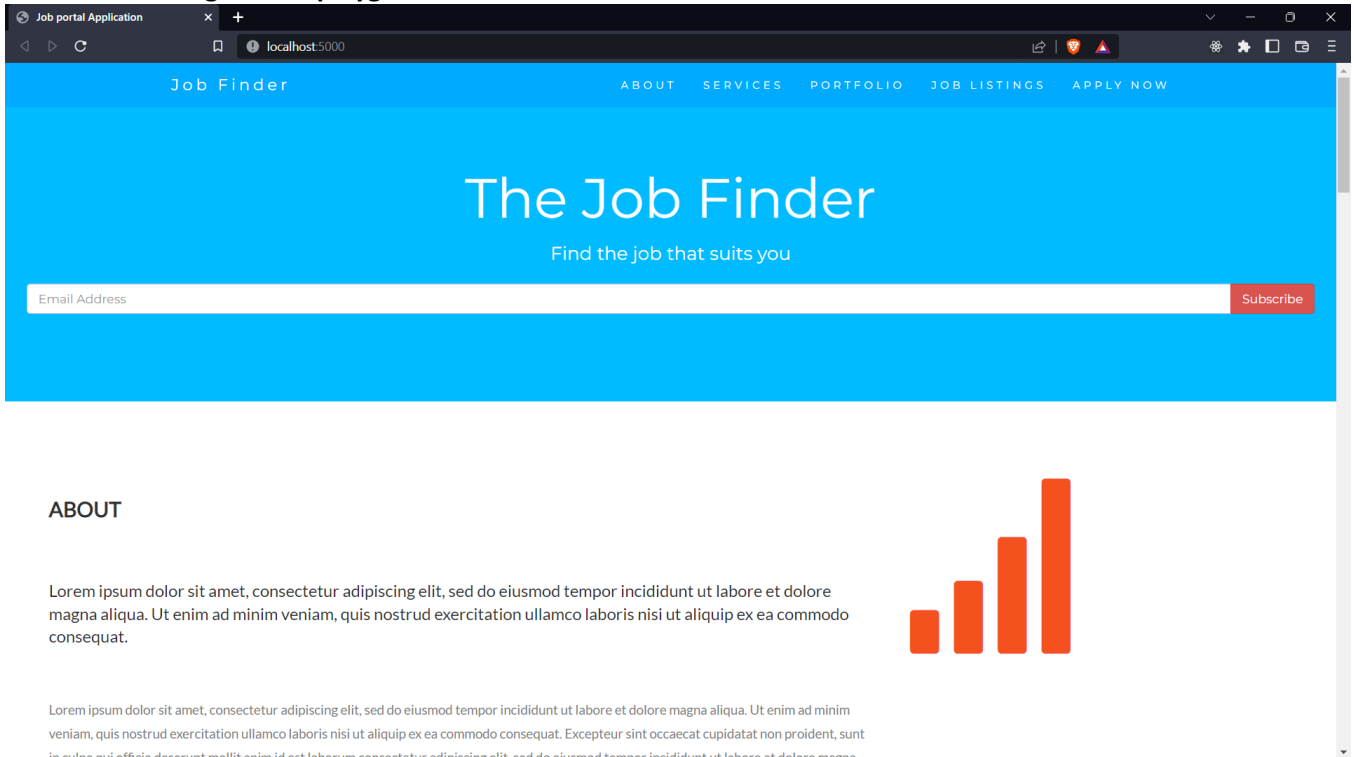
Logging in with your password grants your terminal complete access to your account.
For better security, log in with a limited-privilege personal access token. Learn more at https://docs.docker.com/go/access-tokens/

E:\Study materials\Sem 7\IBM\Exercise\Assignment4>docker tag hello-world itsmona14/hello-world

E:\Study materials\Sem 7\IBM\Exercise\Assignment4>docker push itsmona14/hello-world
Using default tag: latest
The push refers to repository [docker.io/itsmona14/hello-world]
373eb5cf4ceb: Pushed
1e505dc1de5e: Pushed
090c85cb75c5: Pushed
ded8299b8f1a: Pushed
1fe0699af9f7: Mounted from library/python
156568a71809: Mounted from library/python
5fca8a94d542: Mounted from library/python
6b183c62e3d7: Mounted from library/python
882fd36bf435: Mounted from library/python
d1dec9917839: Mounted from library/python
d38adf39e1dd: Mounted from library/python
4ed121b04368: Mounted from library/python
d9d07d703dd5: Mounted from library/python
latest: digest: sha256:46fff91edc98aaa5d7fff51ba708b6498af3c4f64612d9a990bf437497555fd82 size: 3049

E:\Study materials\Sem 7\IBM\Exercise\Assignment4>
```

## Tested it using Docker playground



### Question 3:

Create an IBM container registry and deploy helloworld app or job portal app.

### Solution 3:

My image link: [au.icr.io/hello-world-app/hello-world](https://au.icr.io/hello-world-app/hello-world)

```
Command Prompt
Space:

C:\Users\silen>ibmcloud cr region-set global
The region is set to 'global', the registry is 'icr.io'.

C:\Users\silen>ibmcloud cr namespace-add job-portal-app
No resource group is targeted. Therefore, the default resource group for the account ('Default') is targeted.
Adding namespace 'job-portal-app' in resource group 'Default' for account Vishnu Kumar V K's Account in registry icr.io...
FAILED
The requested namespace is already in use in registry 'icr.io'.
Choose a different namespace.

C:\Users\silen>ibmcloud cr namespace-add job-apply-app
No resource group is targeted. Therefore, the default resource group for the account ('Default') is targeted.
Adding namespace 'job-apply-app' in resource group 'Default' for account Vishnu Kumar V K's Account in registry icr.io...
Successfully added namespace 'job-apply-app'

C:\Users\silen>ibmcloud cr login
Logging 'docker' in to 'icr.io'...
FAILED
Failed to 'docker login' to 'icr.io' with error: error during connect: This error may indicate that the docker daemon is not running.: Post "http://%2F%2F%2Fpipe%2Fdocker_engine/v1.24/auth": open //./pipe/docke
r_engine: The system cannot find the file specified.

C:\Users\silen>ibmcloud cr login
Logging 'docker' in to 'icr.io'...
Logged in to 'icr.io'.

C:\Users\silen>ibmcloud cr namespace-add hello-world-app1
No resource group is targeted. Therefore, the default resource group for the account ('Default') is targeted.
Adding namespace 'hello-world-app1' in resource group 'Default' for account Vishnu Kumar V K's Account in registry icr.io...
Successfully added namespace 'hello-world-app1'

C:\Users\silen>cd d/
The system cannot find the path specified.
```

```

Command Prompt
(c) Microsoft Corporation. All rights reserved.

C:\Users\silen>ibmcloud login
API endpoint: https://cloud.ibm.com
Region: us-east

Email> vishnukumar.vk.2019.it@rajalakshmi.edu.in

Password>
Authenticating...
Credentials were rejected.
Code: BXNIM0602E, message: The credentials you entered for the user 'vishnukumar.vk.2019.it@rajalakshmi.edu.in' are incorrect.

Password>
Authenticating...
OK

Targeted account Vishnu Kumar V K's Account (f21b26afeec34e3aa0466ee382b43503)

API endpoint: https://cloud.ibm.com
Region: us-east
User: vishnukumar.vk.2019.it@rajalakshmi.edu.in
Account: Vishnu Kumar V K's Account (f21b26afeec34e3aa0466ee382b43503)
Resource group: No resource group targeted, use 'ibmcloud target -g RESOURCE_GROUP'
CF API endpoint:
Org:
Space:

C:\Users\silen>ibmcloud cr region-set global
The region is set to 'global', the registry is 'icr.io'.
OK

C:\Users\silen>ibmcloud cr namespace-add job-portal-app
No resource group is targeted. Therefore, the default resource group for the account ('Default') is targeted.
Adding namespace 'job-portal-app' in resource group 'Default' for account Vishnu Kumar V K's Account in registry icr.io...
FAILED
The requested namespace is already in use in registry 'icr.io'.
Choose a different namespace.

C:\Users\silen>ibmcloud cr namespace-add job-apply-app
No resource group is targeted. Therefore, the default resource group for the account ('Default') is targeted.
Adding namespace 'job-apply-app' in resource group 'Default' for account Vishnu Kumar V K's Account in registry icr.io...
Successfully added namespace 'job-apply-app'
OK

```

```

Command Prompt
Digest: sha256:faa03e786c97f07ef34423fccceec2398ec8a5759259f94d99078f264e9d7af
Status: Image is up to date for hello-world:latest
docker.io/library/hello-world:latest

F:\Walaia Thiran\DOCKER>dir
Volume in drive F is Disk 2
Volume Serial Number is B85A-C57E

Directory of F:\Walaia Thiran\DOCKER

11-11-2022  20:32    <DIR>        .
06-11-2022  08:07    <DIR>        ..
11-11-2022  20:36    <DIR>        app
06-11-2022  08:07             1,760,114 app.zip
               1 File(s)      1,760,114 bytes
               3 Dir(s)      58,446,766,080 bytes free

F:\Walaia Thiran\DOCKER>docker tag hello-world icr.io/hello-world-app/hello-world:hello-world

F:\Walaia Thiran\DOCKER>docker push icr.io/hello-world-app/hello-world:hello-world
The push refers to repository [icr.io/hello-world-app/hello-world]
e07ee1baac5f: Preparing
denied: insufficient scope

F:\Walaia Thiran\DOCKER>ibcloud cr image-list
'ibcloud' is not recognized as an internal or external command,
operable program or batch file.

F:\Walaia Thiran\DOCKER>ibmcloud cr image-list
Listing images...

You have no images in the namespaces for this account, or you are not authorized to view any namespaces for this account.
Push an image, or ensure that the IAM access policy for this account grants you Reader or Manager access to at least one namespace.
To see IBM-provided images, run 'ibmcloud cr image-list --include-ibm'.

F:\Walaia Thiran\DOCKER>docker tag hello-world icr.io/hello-world-app/hello-world:hello-world

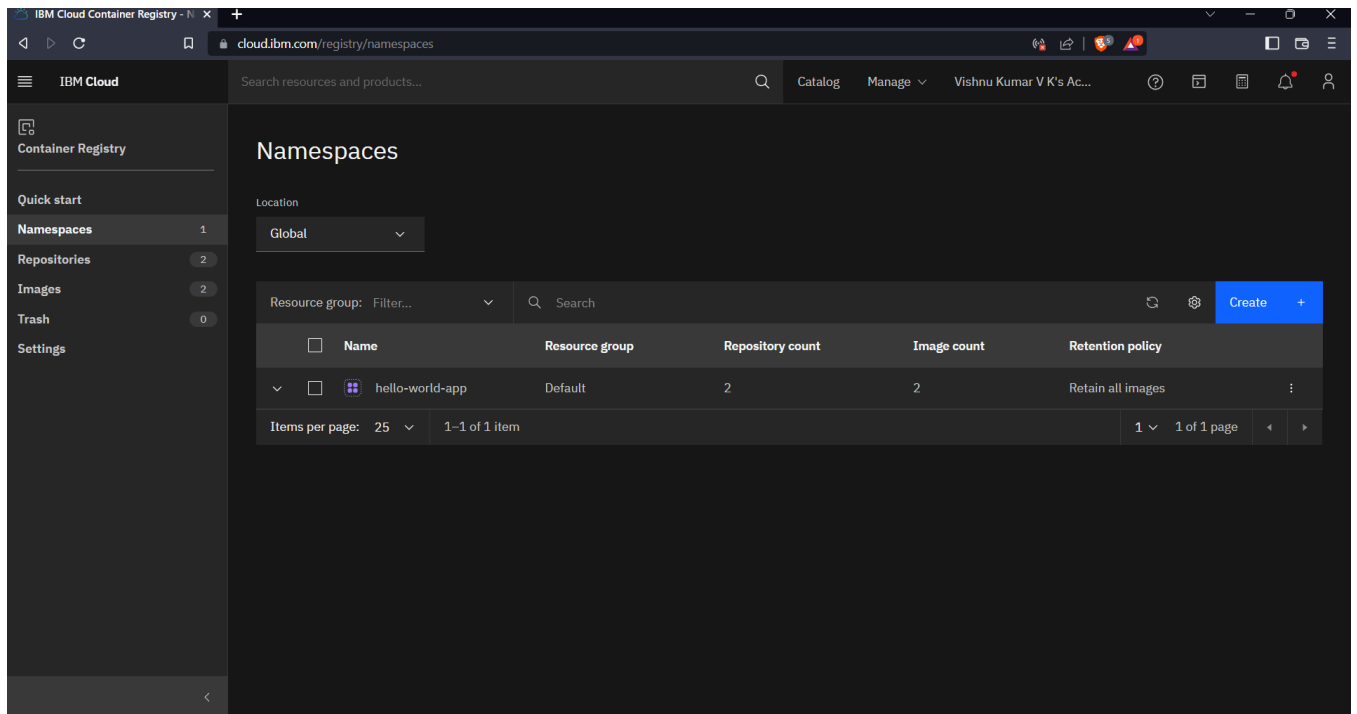
F:\Walaia Thiran\DOCKER>docker push icr.io/hello-world-app/hello-world:hello-world
The push refers to repository [icr.io/hello-world-app/hello-world]
e07ee1baac5f: Pushed
hello-world: digest: sha256:f54a58bc1aac5e1a25d796ae155dc228b3f0e11d046ae276b39c4bf2f13d8c4 size: 525

F:\Walaia Thiran\DOCKER>ibcloud cr image-list
'ibcloud' is not recognized as an internal or external command,
operable program or batch file.

F:\Walaia Thiran\DOCKER>ibmcloud cr image-list
Listing images...

Repository          Tag          Digest          Namespace      Created      Size      Security status
icr.io/hello-world-app/hello-world  hello-world  f54a58bc1aac    hello-world-app  1 year ago  2.5 kB    -

```



#### 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 nodeport.

#### Solution 4:

```
apiVersion: v1
kind: Service
metadata:
  name: hello-world-deployment
spec:
  ports:
    - port: 5000
      targetPort: 5000
  selector:
    app: hello-world
---
apiVersion: apps/v1
kind: Deployment
metadata:
  name: hello-world-deployment
spec:
  replicas: 1
  selector:
    matchLabels:
      app: hello-world
  template:
    metadata:
      labels:
        app: hello-world
    spec:
      containers:
        - name: hello-world
          image: au.icr.io/hello-world-app/hello-world
          imagePullPolicy: Always
          ports:
            - containerPort: 5000
```

clusters / mycluster-free Normal Expires in 29 days [Add tags](#) [Help](#) [Kubernetes dashboard](#) [Actions...](#)

**Overview**

Worker nodes  
Worker pools  
DevOps new

**Expires in 29 days:**  
Be sure to back up your data, your cluster will be deleted in 29 days. To access the full capabilities of the service, try out a [standard cluster](#).

**Node status**  
1 of 1  
Normal  
[Details](#)

**Add-on status**  
0 of 0  
Normal  
[Details](#)

**Master status**  
Normal  
[Docs](#)

**Ingress status**  
Unknown  
[Docs](#)

**Details**

Cluster ID	Version	Infrastructure	Zones
cd1f3cf0a6mchav0k1g	1.24.7-1542	Classic	Milan 01
Created	Resource group	Image security enforcement	
04/11/2022, 01:12	Default	<a href="#">Enable</a>	

kubernetes default  [+](#) [🔔](#) [👤](#)

**Workloads > Deployments**

**Workloads** 11

Cron Jobs  
Daemon Sets  
**Deployments**  
Jobs  
Pods  
Replica Sets  
Replication Controllers  
Stateful Sets

**Service**

Ingresses 11  
Ingress Classes  
Services 11

**Config and Storage**

Config Maps 11

**CPU Usage**

**Memory Usage**

**Deployments**

Name	Images	Labels	Pods	Created
<span>🟢</span> hello-world-deployment	<a href="#">Show all</a>	-	1 / 1	24 minutes ago

kubernetes default  [+](#) [🔔](#) [👤](#)

**Workloads > Pods > hello-world-deployment-6c75b9c898-p4ntv > Logs**

**Workloads** 11

Cron Jobs  
Daemon Sets  
Deployments  
Jobs  
Pods  
Replica Sets  
Replication Controllers  
**Stateful Sets**

**Service**

Ingresses 11  
Ingress Classes  
Services 11

**Config and Storage**

Config Maps 11

Logs from hello-world in hello-world-dep...

```
* 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://127.0.0.1:5000
* Running on http://172.38.82.142:5000
Press CTRL+C to quit
```

Logs from Nov 4, 2022 to Nov 4, 2022 UTC [K](#) [<](#) [>](#)

cd: containers.cloud.ibm.com/kubeprox/clusters/cd1f3cf0a6mchav0k1g/...

